A MULTIPLE-CASE STUDY OF HIGH SCHOOL ENGLISH AND MATH PROFESSIONAL LEARNING COMMUNITIES

A Capstone Project

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The Faculty of the Curry School of Education

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Doctor of Education

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by

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APPROVAL OF THE CAPSTONE PROJECT

This capstone project, “A Multiple-Case Study of High School English and Math Professional Learning Communities,” has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Education.

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Executive Summary

Introduction

The implementation of a Professional Learning Community (PLC) network in schools seeks to eradicate the "lone wolf" as described by Huberman (1995). PLCs impact student achievement (DuFour & Eaker, 1998; Hord, 1997). Teacher collaboration through PLCs can beneficially impact teacher practice, which ultimately can positively affect student achievement (Moolenaar, Sleegers, & Daly, 2011). The collective responsibility for a shared population, which Goddard (2002) refers to as collective efficacy, engenders increased feelings of effectiveness by teachers to implement best practices and high standards for their students, and ultimately leads to increased levels of student achievement. Huberman's (1995) argument notes an exception to the "lone wolf" scenario – when ambitious programs of innovation offer collaborative work, new materials or technologies, or the opportunity for inquiry, all of which are distinctly possible in the context of PLCs. PLCs therefore can foster a shared responsibility for student well-being, the practice of teacher interdependence, and ultimately a school ethos for both teacher learning and student achievement (Little, 1999).

Purpose

In order to address the lack of purposeful collaboration as well as to increase student achievement on high-stakes standardized tests, the Buchanan School District (BSD) chose to study the DuFour and Eaker (1998) model of PLCs across all schools, beginning during the 2003-2004 academic year, with implementation occurring during the 2005-2006 academic year. The BSD

superintendent addressed PLCs in his back-to-school message in August 2003. He argued that although BSD was at or near a 90% pass rate on state standardized tests after the 2002-2003 academic year, the school division wanted to develop a quality-learning model that would reduce variance in achievement for all learners across all schools. At that time and continuing to the present day, researchers and educators recognize DuFour and Eaker (1998) as a dominant architect of PLC models (Rahman, 2011). The DuFour and Eaker (1998) model of PLC was chosen by the BSD in large part because of its emphasis on "data-driven" decisions and results. Now more than a decade after the implementation of PLCs, BSD has continued to tout PLC as an integral factor in the success of its school system.

The purpose of this capstone study then is to understand how teachers in English 11 and Algebra 1 at Wheatland High School (WHS) make sense of the purpose and focus of PLCs. Therefore, the problems of practice that I seek to answer in this capstone study are as follows:

- Has the focus of PLCs in BSD and WHS stayed consistent since implementation?
- Do the teachers at WHS adhere to the principles of the DuFour and Eaker (1998) model of PLC?

Methodology

The structure of this capstone study was a multiple-case study of English 11 and Algebra 1 PLC teams at WHS. The data collection for this study occurred over a 13-week period from October 2016 through January 2017. The procedures

for data collection included interviews of teachers and administrators, observations of PLC team meetings, and the review of documents associated with the PLC teams. The data analysis procedures of data condensation, data display, and verification followed the process as outlined by Miles, Huberman, and Saldana (2014). The design of this study sought trustworthiness by addressing credibility, transferability, dependability, and confirmability. The study addressed the confidentiality of participants and the research site by using pseudonyms.

Findings

The findings of the study reflect the English 11 and Algebra 1 PLC teams only, limiting generalizations to other PLC teams. The two findings of this multiple-case study are as follows:

1. PLC team meetings at WHS did not reflect many of the core elements of the DuFour and Eaker (1998) model. Based on teacher actions during PLC team meetings and interview responses there was no evidence to suggest that teachers were familiar with the DuFour and Eaker (1998) model of PLC. As a result, teachers used the PLC time to discuss and act in four broad ways: school logistics, extra-curricular discussion, instructional, and assessment.
2. The focus of the PLC teams differed. The Algebra 1 PLC team largely focused on the state-mandated end-of-course standardized tests, while the English PLC team focused on developing team collegiality and a singular common assessment.

Implications and Recommendations

Based on the implications of the findings, the recommendations to BSD and WHS include ways for those organizations to reconnect purposefully with the DuFour and Eaker (1998) model of PLC as well as ways to address teacher awareness of PLC. The recommendations are as follows:

- **Recommendation One:** Both BSD and WHS should clarify the purpose and focus of PLC teams as well as identify the optimal use of PLC time within the context of the goals of the school division.
- **Recommendation Two:** WHS should provide sustained and differentiated professional development to teachers in the DuFour and Eaker (1998) model of PLC.

DEDICATION

I dedicate this work to my children, Eliza and Charlie. You both are my persistent joy and I cannot wait to see where life takes you.

ACKNOWLEDGEMENTS

This capstone study would not have been possible without the willingness and cooperation of the English 11 and Algebra 1 PLC teams at Wheatland High School. Thank you all for allowing me to observe and interview you while I investigated the problems of practice in my capstone study. In addition, I appreciate my colleagues over the years who encouraged and in many varied ways helped me to accomplish this task. I am particularly grateful for my friendship with Dr. Jim Huneycutt who encouraged me to pursue my doctoral studies and welcomed me back into the fold as a social studies teacher a few years later.

Thank you to my family for their constant cheerleading of me during this process. To Hannah, your untiring support and encouragement motivated me to complete this effort – I could not have done it without you. I appreciate the unwavering support of my mother, Carole Baran, grandmother, Maureen Groseclose, mother-in-law, Susan Taylor, father-in-law, David Kalan, and grandmother-in-law, Doris “Mambo” Kalan. Two of my most ardent champions are with me in spirit as I complete this doctoral program: my father-in-law, Rob Taylor and my grandfather, Tyler Groseclose. Lastly, my father, John C. Baran, Sr., with whom my time together ended far too soon: I attempt to model daily his character, sense of humor, and work ethic.

Finally, the members of my capstone committee deserve the highest praise. They have been integral in my professional development since my undergraduate student days.

Dr. Ruth Ferree's ebullient passion for learning is infectious. She has served on all of my assessment committees throughout this doctoral program. Her time and feedback have been invaluable to my growth and understanding. *Je vous remercie de tout mon coeur*.

Dr. Susan Mintz is the consummate teacher. I credit her with helping me understand how to give my students feedback and I have always appreciated her insightful commentary on my work. Additionally, I am particularly grateful for our discussions of challenging questions, whether in class or over tea, that have challenged me to interrogate my perspective.

Dr. Stephanie van Hover originally turned my love of history into a love of teaching history. Years later, when I returned as her doctoral student, she afforded me many valuable opportunities at the Curry School. At a time when I thought that I would not finish, a chance encounter between us motivated me. I am indebted to her for the compassion, generosity, and patience she has shown me as a teacher, mentor, counselor, and friend.

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Introduction

The implementation of a Professional Learning Community (PLC) network in schools seeks to eradicate the "lone wolf" as described by Huberman (1995). The "lone wolf" operates in a closed-door classroom making solitary pedagogical decisions about instruction and assessment for his students and professional development for himself (Huberman, 1995). He does not seek out opportunities for collaboration, the discomfort of constructive criticism, or any other method of disrupting his *status quo*.

In addition to making the "lone wolf" extinct, PLCs impact student achievement (DuFour & Eaker, 1998; Hord, 1997). Teacher collaboration through PLCs can beneficially impact teacher practice, which ultimately can positively affect student achievement (Moolenaar, Sleegers, & Daly, 2011). The collective responsibility for a shared population, which Goddard (2002) refers to as collective efficacy, engenders increased feelings of effectiveness by teachers to implement best practices and high standards for their students, and ultimately leads to increased levels of student achievement.

Huberman's (1995) argument notes an exception to the "lone wolf" scenario – when ambitious programs of innovation offer collaborative work, new materials or technologies, or the opportunity for inquiry all of which are distinctly possible in the context of PLCs. PLCs then can remedy this affliction known as

"lone wolf" sickness amongst teachers while also increasing student achievement. PLCs are "ongoing groups that meet regularly for the purpose of increasing their own learning and that of their students" (Lieberman & Miller, 2011, p. 16). DuFour and Eaker (1998) further characterize PLCs as groups where, "educators create an environment that fosters mutual cooperation, emotional support, and personal growth as they work together to achieve what they cannot accomplish alone" (p. xii). PLCs therefore can foster a shared responsibility for student well-being, the practice of teacher interdependence, and ultimately a school ethos for both teacher learning and student achievement (Little, 1999).

When I began my teaching career, Buchanan School District (BSD) implemented the DuFour and Eaker (1998) model of PLC. The practice of "doing" PLC became part of my daily professional expectations and I was lucky to have outstanding colleagues with whom I worked and learned. Additionally, both Rick and Becky DuFour presented a workshop for teachers at Wheatland High School (WHS), and I was a member selected from the Social Studies Department to participate. I felt that the practices that I learned when introduced to the DuFour and Eaker (1998) model of PLC made me a better-informed teacher and helped my students. As a member of the 11th grade U.S. History PLC, my colleagues and I dissected the teaching of writing. Through the work of our PLC team, we designed writing opportunities, defined common terms, developed writing rubrics, give substantive feedback, and co-graded student responses. Because of this work, I served my students in in their growth as writers. I was highly interested in pursuing this capstone study in order to understand how

current WHS teachers are aware of PLC and what actions they take during PLC team meetings so that I might provide recommendations to improve practice. In the next section, I briefly describe the school and district in which this capstone study took place, as well as the historical background of the BSD and WHS implementation of the DuFour and Eaker (1998) model of PLC.

Contextual Background

WHS sits geographically in the southern end of a large county and is one of three comprehensive high schools in the BSD. BSD serves almost 14,000 students from a large, centrally located county, in a southeastern state. The 26 schools that comprise the school district spread out over 800 square miles in a diverse mix of rural, suburban, and urban settings.

WHS is the most recently built high school in BSD. The physical layout of WHS offers the opportunity for collaboration and instructional dialogue. The larger school building divides into four "houses." Each "house" has 2 floors, is color-coded, and generally serves one grade level. There is a purposeful layout of disciplines. A science lab anchors both levels of each hall. The other classrooms contain social studies, math, and world language courses. Many feature retractable dividing walls that further encourage interdisciplinary collaboration. Despite this physical structure designed for collaboration, "lone wolf" teachers did not generally utilize resources for cooperation.

Since its opening, WHS has been consistently populated by an ethnically, racially, and socioeconomically diverse student body, much more so than other schools in BSD. WHS has had a stable percentage of low socioeconomic class "at-

risk" students, currently at a reported rate of around 33%; one of the highest proportions in WSD. Student achievement on the state standardized tests that are required for graduation has and continues to be an area of concern for BSD officials as well as administrators and teachers at WHS.

In order to address the lack of purposeful collaboration as well as to increase student achievement on state standardized tests, BSD chose to study the DuFour and Eaker (1998) model of PLCs across all schools, beginning during the 2003-2004 academic year, with implementation occurring during the 2005-2006 academic year. The BSD superintendent addressed PLCs in his back-to-school message in August 2003. Although BSD was at or near a 90% pass rate on state standardized tests after the 2002-2003 academic year, the school division wanted to develop a quality-learning model that would reduce variance in achievement for all learners across all schools. At that time, and continuing to the present day, researchers and educators recognize DuFour and Eaker (1998) as a dominant architect of PLC models (Rahman, 2011). The DuFour and Eaker (1998) model of PLC was chosen in large part because of its emphasis on "data-driven" decisions and results. Now more than a decade after the implementation of PLCs, BSD has continued to tout PLC as an integral factor in the success of its school system.

DuFour and Eaker's (1998) Model of PLC

DuFour and Eaker (1998) identify six attributes of PLCs: shared mission, vision, and values; collective inquiry; collaborative teams; action orientation and experimentation; continuous improvement; and results orientation. The shared

mission and vision is the core of PLCs and is a "collective commitment to guiding principles that articulate what the people in the school believe and what they seek to create" (DuFour & Eaker, 1998, p. 25). The driving force behind collective inquiry is curiosity. Questioning the *status quo* is encouraged, as are new methods, with the process of searching for an answer being more significant than achieving the answer. It is on this point that DuFour and Eaker directly refer to the organizational learning work of Senge (1990), with particular emphasis on changing organizational culture for positive gain. Collaborative teams share a common purpose and although individual growth is a likely outcome, growth for the school as a whole requires professional cooperation. Action orientation and experimentation work concomitantly so that teachers have the comfort to try and do, with the risk of failure, but with the expectation that the same cycle will continue. Continuous improvement builds upon the ideas of action orientation and experimentation, but implies the understanding that mission and vision are lofty goals to work toward and are not necessarily ever fully accomplished. The last attribute, results orientation, is a harbinger of the data-driven standards movement of the 1990s: "Unless initiatives are subject to ongoing assessment on the basis of tangible results, they represent random groping in the dark rather than purposeful movement" (DuFour & Eaker, 1998, p. 29). The goal of this model then is to initiate and sustain professional work by educators to increase the effectiveness of an entire school.

With the shift to the DuFour and Eaker (1998) model of PLCs, BSD touted itself as a data-driven organization that intended to use PLCs to increase student

achievement on state standardized tests. In order to provide structure and protocols for teachers to align more closely state standards, instruction and assessment, and discipline content, BSD developed the Framework for Quality Learning (FQL) that structured units and lessons to the state course curriculum standards. Additionally, teachers of the same courses were required to develop common assessments, delivered across tracked academic levels, and collect that assessment data. Teachers then used that collected data to inform review and remediation with students in preparation for the state standardized tests. The work of PLCs in BSD centered around developing the FQL units and common assessments as well as discussing individual students in relation to their potential success on the state tests. Therefore, the development, implementation, and work of PLCs focused on student success on the state tests.

More than a decade after the implementation of PLCs, BSD has continued to highlight PLC as an integral factor of its school system. BSD maintains an online professional development portal that includes an extensive collection of curated PLC resources. In the time since the start of PLCs, however, the focus has shifted. BSD has pushed many of its initiatives into PLCs causing the emphasis on being data-driven and state test focused to take a backseat. One example of an initiative that BSD implemented to shift the PLCs attention away from standardized testing was greater technology usage in the form of interactive white boards, 1:1 laptops, and other devices and instruments to engage students. WSD also invested in developing and implementing performance assessments as a way to collect data on students solving real world

problems. Members of the school board and the central office of BSD publicly stated that they intended to petition the state for permission to use these performance assessments to replace the required state standardized tests in order to meet graduation requirements. A final example of more recent initiative is incorporating maker education into all disciplines, and maker spaces in schools to carry out this work, in particular to engage students who are disinterested in school. Over time, the prominence of these individual initiatives has ebbed and flowed, but it is clear that while BSD continues to promote its usage of PLCs, the focus of those PLCs has gravitated away from being data-driven and state test-focused to the whims of the current initiative

Theoretical Frame

Fullan's (1982; 2007) work on educational change serves as the theoretical framework for this capstone study. The visual presented in Figure 1 on page 9 represents the theoretical frame for this study. While much of Fullan's work focuses on the perspectives of change agents who are stakeholders in educational communities, it is his continuum of the phases of the change process that is utilized in this capstone study. Fullan (1982; 2007) identifies three broad phases of the change process for education: initiation, implementation, and institutionalization. Although there are distinct phases of the change process, change leaders according to Fullan (1982; 2007) must plan for all three phases simultaneously.

In the initiation phase, leaders, when promoting an innovation, must articulate both a rationale and urgency for the proposed change. Those tasked

with implementing the innovation need to be well versed in how it will lead to improvement and why colleagues should buy-into the innovation. For all stakeholders impacted by the innovation, its goals and the plan of action for achieving those goals must be evident and transparent. Change leaders must delineate the indicators for success and benchmarks for assessing the progress of the innovation.

Implementation is the second phase of the change process, which focuses on getting the innovation off the ground and up and running. From the very start of the change process, leaders must be cognizant of what full implementation of the innovation might look like. Having a clear understanding of full implementation allows leaders to monitor and adjust to the right conditions and support to make full implementation a reality. This second phase puts the innovation into practice by planning for and supporting implementation. Throughout this second phase, it is important for leaders to provide feedback and professional development for those responsible for implementing the innovation. Only with regular monitoring and measuring of the innovation can achievement of the implementation ultimately, succeed.

Lastly, institutionalization occurs when all members of an organization have routinized the innovation, any major issues related to implementation have been resolved, and the organization and its stakeholders are achieving the results that they desire based on the innovation. The characteristic of this last phase is widespread usage by implementers that forces organizations to debate whether to emphasize a deeper implementation, or a commitment to the sustainability of the

innovation is the best use of time and other resources. Additionally, organizations face the problem of sustaining the freshness of the change or reigniting the whole change process again for another innovation.

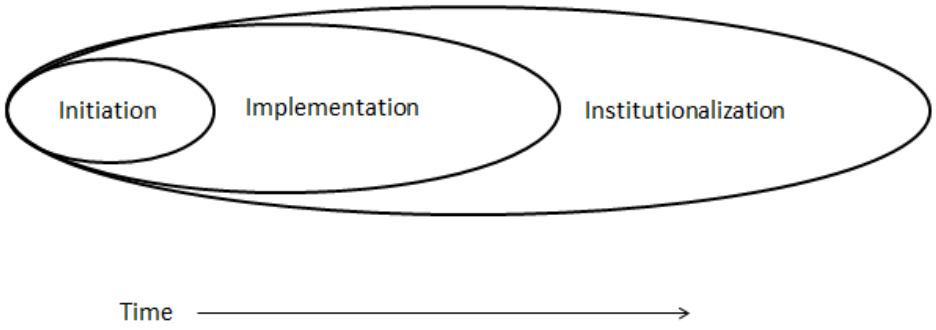


Figure 1. Fullan's (1982; 2007) overlapping phases of the change process.

Conceptual Framework

Eaker, DuFour, and Burnette (2002) envision a trifold principle framework for PLC team establishment and maintenance: ensure that students learn, create a culture of collaboration, and focus on results. While these three core principles provide an overarching purpose for PLC teams, DuFour and Eaker (1998) advocate six core characteristics that each PLC team should strive for: (1) shared mission, vision, and values, (2) collective inquiry, (3) collaborative teams, (4) action orientation and experimentation, (5) continuous improvement, and (6) results orientation.

The conceptual framework for this capstone study is a visual presented as Figure 2 on page 10, that draws from the work of DuFour and Eaker (1998) on the topic of PLCs and reflects the school district, the school, and individual

department contexts who are impacted. WHS is one of three comprehensive high schools in the BSD. The establishment of PLCs at WHS is unique in the BSD because the administration at the time changed the daily schedule to afford time for teachers to meet in PLC teams. Teachers have PLC team meeting time in two 35-minute segments each week. DuFour and Eaker (1998) argue that this commitment to establishing time during the school for PLC teams to collaborate is essential for implementation of the model and thus school transformation. Since the implementation of the DuFour and Eaker (1998) model of PLC, three different principals and a host of assistant principals have steered the expectations and results of PLC teams. Additionally, several teachers and department chairs employed by the school at the onset of the DuFour model of PLC remain, while those hired since have received various introductions to the model from both BSD central office and WHS administration.

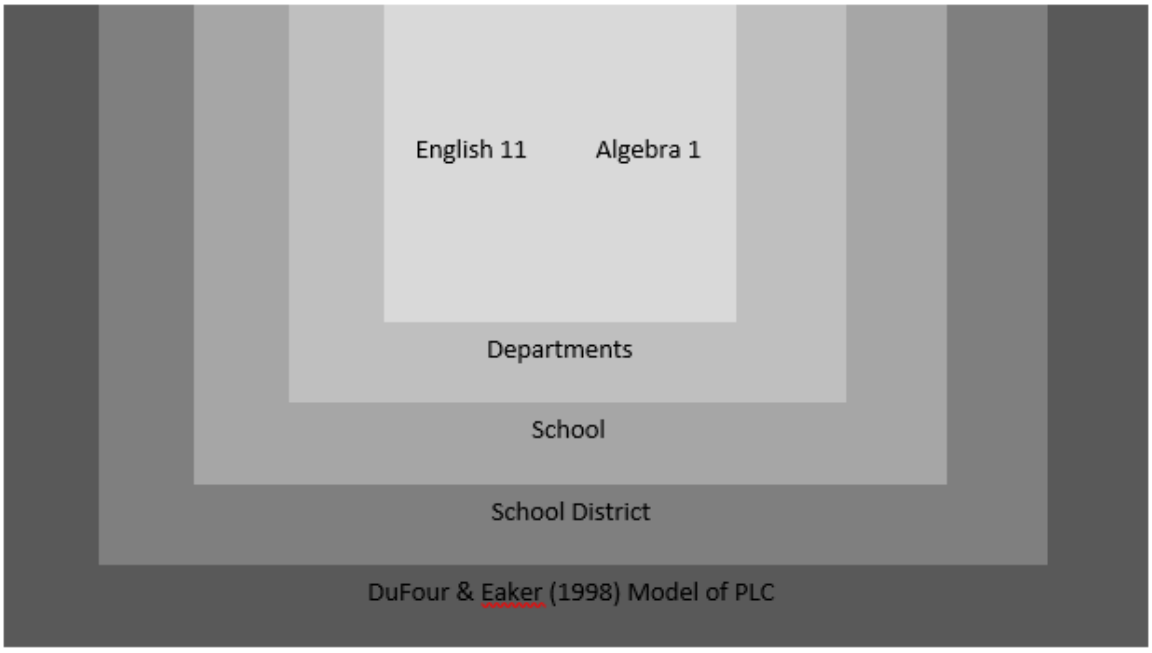


Figure 2. Conceptual framework for the capstone study.

The commitment to the DuFour and Eaker (1998) model of PLC is longstanding in both BSD and WHS, which is unique in a profession that has a quickness to jettison innovations. Teachers employed by the school district and especially at WHS are aware that PLC is not a fad; there is not the mindset that "this too shall pass" in large part to the ubiquity of PLC and the daily time commitment. Therefore, if DuFour and Eaker (1998) is the PLC model institutionally utilized, it is necessary to ensure that its implementation is reflective of the authors' intentions and subsequent revisions in order to benefit most fully the school and its students.

Currently there is wide latitude afforded to PLC teams at WHS. There are two universal expectations of PLC teams: (1) that they meet regularly during weekly scheduled PLC time slots, and (2) that they contribute to the mid-year review department report. The mid-year review process has gone through several iterations in the time that the DuFour and Eaker (1998) model of PLC has been implemented. In some years, the focus was on student readiness for high-stakes state assessments. In other years, the focus was on individual students and risk factors that were preventing them from being successful in school. The mid-year review during the 2015-2016 academic year centered on WHS's newly constituted vision of "embracing students, inspiring learning, and innovating opportunities." At a monthly department chair meeting, a Google doc was shared that listed the following questions in a graphic organizer: Share assessment data; What is working?; What needs improvement?; What are our next steps as a department/PLC team?; In what ways to we embrace students?; In what was do

we inspire learning?; In what ways do we innovate opportunities? WHS administrators expect department chairs to solicit answers to these questions from their various discipline course-specific PLC teams and condense all responses into a five-minute report. At the mid-year review meeting, the assembled group included all building administrators, department chairs, and a representative from the BSD's central office.

The purpose of this capstone then is to understand how teachers in English 11 and Algebra 1 at WHS make sense of the purpose and focus of PLCs. For the purpose of this capstone study, a PLC team is a grade-level teaching team of a specific course in a designated discipline. For example, all 10th grade English teachers make a PLC team, regardless of the academic tracked level of students. Most teachers at WHS are members of more than one PLC team. The aforementioned 10th grade English teacher might also teach 12th grade English, thus making him a member of two PLC teams. Additionally, a few teachers do not have other teachers in which to participate as a PLC. The drama teacher, for instance, does not have a collaborator at WHS and thus must seek out PLC opportunities with drama teachers at other secondary schools in the BSD. WHS has built-in time during its daily schedule for PLC teams to meet; PLC teams have twice-weekly 35-minute periods to engage in discussion and analysis of student data. The English teacher who has both 10th and 12th grade classes must schedule his twice-weekly PLC time with his colleagues appropriately. Therefore, the problems of practice that I seek to answer in this capstone are as follows:

- Has the focus of PLCs in BSD and WHS stayed consistent since implementation?
- Do the teachers at WHS adhere to the principles of the DuFour and Eaker (1998) model of PLC?

Research Questions

The questions for this capstone study derive from the intersection of Fullan's (1982; 2007) change processes model, the DuFour and Eaker (1998) model of PLC, and the practical implementation of the model at WHS.

1. How is the weekly PLC time used?
    a. How do teachers perceive the use of PLC time?
    b. Does the planning time vary by discipline?
2. What is the current focus of the PLCs at WHS?
    a. In what ways do the PLCs reflect the original focus – standardized test scores?
    b. Does the current work of the PLCs reflect the principles of the DuFour and Eaker (1998) model?

Overview of Methods

This capstone study is a multiple case study (Yin, 2014) that analyzes two PLC teams, English 11 and Algebra 1, in one school context, at WHS. Data for this capstone study includes interviews with teachers and administrators, researcher observations of PLC team meetings, and documents and artifact collection. Data collection occurred across the first and second marking periods of the 2016-2017 academic year. I observed PLC teams for the duration of a unit of study in two

different courses that culminated in a state mandated end-of-course assessment. Chapter 3 contains a complete explanation of the research methodology used for this capstone study. The primary analytic technique for this multiple case study was Miles, Huberman, and Saldaña's (2014) data condensation, data display, and conclusion and verification drawing.

Definition of Terms

The following is a list of definitions of key terms for this capstone study:

- PLCs are Professional Learning Communities.
- PLC Teams are "ongoing groups that meet regularly for the purpose of increasing their own learning and that of their students" (Lieberman & Miller, 2011, p. 16).
- A multiple-case study, according to Yin (2014), "is an empirical inquiry that investigates a contemporary phenomenon in-depth and within its real-world context" (p. 16). In addition, Yin (2014) argues that case studies feature distinctive situations with many variables, multiple sources of evidence that converge in triangulation, and benefit from a preordained theoretical framework.
- Initiation is the first phase of Michael Fullan's (1982; 2007) change process for education. It is the phase of the change process model that deals exclusively with the launching of an innovation.
- Implementation is the second phase of Michael Fullan's (1982; 2007) change process for education. It is the phase that when change leaders

focus on what is needed to put the innovation into practice by planning for and supporting implementation.

- Institutionalization is the final phase of Michael Fullan's (1982; 2007) change process for education. It is the phase when an innovation achieves routinization consistently and accurately within the organization.
- Standardized Tests are assessments that "(1) requires all test takers to answer the same questions, or a selection of questions from common bank of questions, in the same way, and that (2) is scored in a “standard” or consistent manner, which makes it possible to compare the relative performance of individual students or groups of students" (Standardized Test, 2015).
- Performance Assessments "measures students skills based on authentic tasks such as activities, exercises, or problems that require students to show what they can do" (Performance Assessment, 2014).
- 1:1 is a program that provides all students in a school with their own laptop, tablet, or other device. One-to-one refers to one computer for every student. In BSD, all secondary students, grades 6 through 12, receive a laptop.
- Maker Education is an educational reform movement that focuses on "learning by doing." It encourages students to manipulate and combine generic materials to express their ideas and be inventive. Design thinking, prototyping, and the process of making are essential to Maker education rather than a specific learning objective.

- Data condensation is "the process of selecting, focusing, simplifying, abstracting, and/or transforming the data that appear in the full corpus (body) of written-up field notes, interview transcripts, documents and other empirical materials" (Miles et al., 2014, p. 12). This process occurs continuously throughout the study through summaries, codes, and analytic memos, which allows the researcher to clarify and organize data to draw conclusions.
- Data display is the visual display of data and the decisions that researchers make on the creation and use of displays is part of the process of analysis, according to Miles et al. (2014). Data displays may take the form of matrices, graphs, or charts to help organize the data to allow the researcher to make sense of it and draw conclusions in meaningful ways.
- Conclusion drawing/verification occurs over time throughout the research project, as vague conclusions will become more explicit and substantiated by the data corpus. The point of substantiation, argues Miles et al. (2014), which they refer to as verification, comes after a researcher achieves immersion in his or her data corpus.

Summary

This chapter provided background and contextual information related to the problem of practice, provided an overview of the capstone study, and described both the theoretical and conceptual frameworks used to guide this study. Chapter 2 examines the literature on PLCs, specifically the factors that influence effectiveness and sustainability. Chapter 3 outlines the methodology for

these capstones study, including data collection procedures, and data analysis methods. Chapters 4 and 5 detail the findings of the study, implications, and recommendations. Chapter 6 is an action communication about the findings, implications, and recommendations written to WHS.

Review of Literature

Professional Learning Communities (PLCs) are one of the most frequently discussed educational reform topics today (DuFour, 2004; Sims & Penny, 2015; Thompson, Gregg, & Niska, 2004). Discussion and implementation of PLC teams and networks have become both a national and international phenomenon in school change movements (Bolam, et al., 2005; Webb, Vulliamy, Sarja, Hamalainen, & Poikonen, 2009). Cranston (2009) found that there is an overabundance of PLC definitions, which contributes to an oversimplification and misrepresentation of their meaning, role, and importance. DuFour (2004) noted that every conceivable grouping or combination of people focused on education receives the label of PLC, which is problematic because, "the term has been used so ubiquitously that it is in danger of losing all meaning" (p. 6). Grossman, Wineburg, and Woolworth (2001) also lament the murkiness of the term PLC: "there have been terms like community of learners, discourse communities or school communities...yet there are no clear common features shared across the terms" (p. 942). Despite the plethora of definitions, there is no disagreement that PLCs are crucial to educational improvement. Richmond and Manokore (2011) confirm this notion: "The question is not whether teacher PLCs are important, but rather how to build, support, and maintain such communities in complex and challenging settings" (p. 569).

The purpose of this capstone study then is to understand how teachers in English 11 and Algebra 1 at WHS make sense of the purpose and focus of PLCs. The conceptual framework (See Figure 2 on page 10) for this capstone study was informed by the literature and also scaffolds how the author understands the literature. This literature review valued relevance over thoroughness (Maxwell, 2006). Works germane to this capstone study were included in the literature review. This chapter focuses around three questions distilled from both the conceptual framework and the research questions of this capstone study in addition to the work of Bolam et al. (2005):

- What are professional learning communities?
- What makes professional learning communities effective?
- Are effective professional learning communities sustainable?

Theoretical Underpinnings of PLCs

Senge (1990) is widely credited with the foundational thinking behind PLCs (Hipp, Huffman, Pankake, & Olivier, 2008; Rahman, 2011; Thompson et al., 2004; Vescio, Ross, & Adams, 2008; Webb et al., 2009; Wells & Feun, 2007). Although an organizational theorist and not an educator, Senge's belief of an organization as a learning environment influenced him to write *Schools that Learn* (2000) in which he used case studies to highlight successful school change and reform along the lines of organizational thinking. This influence of organizational thinking arose at a time when the standards reform movement and high-stakes testing dominated the national debate about education

(Schechter, 2008). What plagues the effectiveness of organizational thinking reform, though, as Schechter (2008) argues, is that "despite the numerous conceptions of organizational learning in schools they are rarely translated into operational structures and processes in school reality" (p. 156).

There is a tremendous amount of research literature related to PLCs in the context of school reform and restructuring, often situated in large school districts in major urban areas (Hollins, McIntyre, DeBose, Hollins, and Towner, 2004; Marx, 2001; Phillips, 2003; Richmond & Manokore, 2011; Suppovitz & Christman, 2003; Wood, 2007a). This literature tends to utilize single case study research that is discipline-specific (i.e. science teachers) rather than multiple case studies of various PLC teams in one or more schools. In addition to Senge (1990), researchers use Michael Fullan's (1985) change processes to contextualize the birth and growth of PLCs (Marx, 2001; Schechter, 2008; Strahan, 2003). Fullan's (1985) educational change model initially was a continuum of three phases: initiation, implementation, and institutionalization; later amended to a four-phase continuum: initiation, implementation, continuation, and outcome. Because the majority of research literature on PLCs focuses on nascent development and implementation, there is scant discussion of the later phases of Fullan's (1985; 1991) model.

Overview

A search of the literature on PLCs resulted in two (non-comprehensive by author admission) reviews of research, Feger and Arruda (2008) and Vescio et

al., (2008), and a large-scale multiple case study research report in the United Kingdom, Bolam et al. (2005).

Feger and Arruda's (2008) search of various databases yielded 100 PLC related studies, 60 of which were included in their review of research. They presented their findings through 12 guiding questions and ultimately concluded that despite the broad range of publications, "the research on PLCs is limited and largely descriptive, involving case studies of individual programs *in situ*, observations, and interviews" (Feger & Arruda, 2008, p. 17). Vescio et al., (2008) sought to understand the impact of PLCs on teacher practices and student learning. They focused on 11 empirical studies and ultimately concluded that the impact of PLCs had a positive change in the professional culture of schools by fostering collaboration, a focus on student learning, increasing teacher authority within the school, and promoting continuous teacher learning.

Bolam et al. (2005) building upon the work of Stoll et al. (2003), conducted 16 case studies and administered a national survey in the United Kingdom to better understand teacher professional communities. The volume of research makes it the most thorough and rich repository of empirical study on PLCs. These three reports significantly influenced this literature review. They formed the trunk of this literature review and led the author to investigate various branches of PLC research. They were also significant in forming the research questions for this capstone study as well as the questions that guided the literature review.

What are professional learning communities?

If you walked into a room, would you be able to distinguish between a community of teachers and a group of teachers sitting for a meeting? The group of teachers sitting in a room is probably waiting to hear the business items a principal needs to share with his staff or the next initiative they must implement in their classrooms. The community of teachers, on the other hand, is probably engaged in a collaborative and reflective dialogue, possibly about the aforementioned items, but motivated by improvement rather than resenting the time taken out of their hectic schedules. Rahman (2011) argues that schools as organizations typically do not encourage shared thinking; rather, teachers are more like Huberman's (1995) "lone wolf" who are free to make their own pedagogical and content decisions. Even when gathered as a group in a room, the teachers are there simply due to obligation, and have not necessarily achieved any sense of community. Vescio et al. (2008) defend this notion: "Learning communities are not a prescriptive, one-size fits all approach. However, learning communities also cannot be insular, focused only on making explicit the practical wisdom teachers already possess about teaching" (p. 89). Definitions, descriptors, and images of what schools, including PLC networks, should look like are abundant in research literature (Hipp et al., 2008). Louis and Marks (1998), arguing on the benefits of professional communities over insular classrooms, state, "reflection on practice leads to deepened understanding of the process of instruction and the products of teaching and learning" (p. 539).

Definitions of PLCs

Many research articles reviewed here chose to utilize the definitions shared earlier in this proposal by DuFour and Eaker (1998) and Hord (1997), while other researchers studying PLCs offered several different definitions for PLC. Harris and Jones (2010) explained that PLC is "a group of connected and engaged professionals who are responsible for driving change and improvement within, between and across schools that will directly benefit learners" (p. 173). Bolam et al. (2005) defined a PLC as, "a group of people sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented, growth-promoting way" (p. 5). Mason (2003) defined PLCs as, "Professional communities are school-based, teacher-centered organizational structures that are linked to organizational culture in such a way as to promote organizational learning and improvement in schools" (p. 6). An additional definition from Richmond and Manokore (2011): "a PLC is defined as a group of teachers who meet regularly with a common set of teaching and learning goals, shared responsibilities for work to be undertaken, and collaborative development of pedagogical content knowledge (PCK) as a result of the gatherings" (p. 545).

There is plenty of overlap amongst these definitions of PLC as well as connection to the aforementioned ones by DuFour and Eaker (1998) and Hord (1997). Shared concepts of PLC are collaboration, time that is unbounded, work that is ongoing, a growth mindset, a learning focus for both teachers and students, and there is a strong sense of community with no "lone wolves."

Despite the similarity, the prior definitions offer some unique attributes of

PLC teams. Mason (2003) pays homage in her definition to the theoretical underpinnings of PLC by referencing organizational thinking. This perspective allows a reader to understand that PLC teams can scale up or down within an organization, and that a school will have many different types of PLC teams: grade-level, content-focused, departmentally representative, administrative, or guidance, among many others. Related to Mason's (2003) definition, is the one by Harris and Jones (2010), who specifically noted that PLC teams occur within, between, and across schools. Achieving those levels of PLC requires a networked system starting at the school district level. Harris and Jones (2010) do not discuss how to establish that type of network as either a top-down from a superintendent or school board or bottom-up from a group of teachers in a school. The last notable difference in definition was the one promulgated by Richmond and Manokore (2011) who specifically referenced Shulman's (1986) pedagogical content knowledge (PCK). Shulman's notion of PCK expressed a duality of the professional teacher who has both discipline-specific content knowledge as well as the understanding of how to convey effectively that knowledge to students. Most of the definitions reviewed focused on pedagogical knowledge, not content knowledge. Despite these unique components of definitions by researchers, the definition offered by Bolam et al. (2005) above generally encompasses the basic premises of PLC. Based on this understanding of the general cohesion of definitions, the next section presents the assumptions and characteristics of PLCs.

Assumptions About and Characteristics of PLCs

Whereas the definitions mostly delineate the people and objectives of PLC teams, it is also important to understand the qualities that PLC teams must exhibit. Vescio et al. (2008) argue that two assumptions are made about PLCs:

> First, it is assumed that knowledge is situated in the day-to-day lived experiences of teachers and best understood through critical reflection with others who share the same experience. Second, it is assumed that actively engaging teachers in PLCs will increase their professional knowledge and enhance student learning. (p. 81)

The first assumption credits the experience of teachers. The day-to-day, give-and-take of biology teachers makes them uniquely suited to work as PLC. Conversely, a school-wide PLC might include an administrator, a guidance counselor, the librarian, as well as teachers and non-instructional staff in order to understand culture. The second assumption argues that by providing the PLC structure and having teachers bring it to fruition, learning happens for not only students, but also the teachers. Vescio et al. (2008) derived these two assumptions from their PLC review of research. Expanding upon these two assumptions then, research has identified essential characteristics of PLC teams.

Richardson (2015) identified five habits that PLC teams should display: be accountable, make effective use of important skill sets, develop and maintain good relationships, focus on and connect learning and doing, and operate according to a strong sense of passion driven purpose. Richardson (2015) states that PLC teams that exhibit these habits "are more likely to be successful than

professional learning communities that have not developed these actions into habits" (p. 29). Hallam, Smith, Hite, Hite, and Wilcox (2015) and Harris and Jones (2010) concur with Richardson (2015) on the notion that PLC teams must be accountable. They make the distinction, however, between formal and informal accountability. Formal accountability encompasses publicly stated goals with concrete indicators to assess success. Informal accountability rests with the members of PLC teams to hold each other accountable to the group norms and professional practices of educators.

In addition to the aforementioned characteristics of PLC named by DuFour and Eaker (1998) and Hord (1997), Kruse, Louis, and Bryk (1995) identified five characteristics of a PLC: shared values, focus on student learning, collaboration, de-privatized practice, and reflective dialogue. Louis and Marks (1998) confirmed this list, but asserted that these five characteristics do not operate as a hierarchy, meaning that no one characteristic is dominant over the others; they must interplay in order for PLC teams to be effective and successful. Rahman (2011) adds an additional characteristic of PLCs: supportive and shared leadership. This notion of leadership empowers teachers within the structure of PLC teams to have ownership, responsibility, and accountability for curricular, instructional, and assessment decisions with the support and understanding of administrators and district officials. A later section of this literature review on PLC sustainability explores this empowerment.

Perhaps Sackney and Mitchell (2001) sum up the characteristics of PLC best when they observed that PLC teams are, "an active, reflective, collaborative,

learning-oriented and growth-promoting approach toward both the *mysteries and the problems of teaching and learning*" (p. 2).

Work of PLCs

Having examined several overlapping definitions, understood core assumptions about why PLC structures exist, and generated lists of essential characteristics and attributes of PLC teams, attention turns to the actual work of PLC teams.

One of the hallmarks of PLC work focuses on data. This work is contextual to the rise of PLC networks in the age of high-stakes standardized testing and uncertain lever of school reform movement associated with it. The literature is replete with references to PLC teams being "data-based" and making "data-driven" decisions about curriculum, instruction, and assessment (Carpenter, 2015; DuFour & Eaker, 1998; Hallam et al., 2015; Hord, 2004; Mason, 2003; Strahan, 2003; Wood, 2007b). Hallam et al. (2015) encompass this work by stating, "In their PLC function, these teams analyze data generated from common student assessments and use them to develop instructional practices and specific intervention strategies" (p. 195). Sims and Penny (2015) in their case study of failed PLCs, reported that teachers felt that they were merely "data teams" and were wholly unsure of how to gather, organize, and interpret data that it soured them to the entire notion of PLC. Mason (2003) found that teachers' use of data was infrequent, random, and unstructured, but "professional learning communities appear to provide an ideal organizational structure to address the challenges of schools and the needs of teachers as they seek to learn from data

and use it effectively to improve student learning" (p. 25). If leaders want PLC teams to have facility with data usage, then professional development must be implemented to train and support teachers (Mason, 2003).

In addition to analyzing and reflecting on student data from benchmark, district, and state-level assessments, PLCs serve multiple purposes in schools: they propose and undertake school improvement initiatives; improve teacher practice by reading research on bests practices and undertaking lesson study; act as a medium for professional development opportunities; and shape school culture (Bolam et al., 2006; DuFour & Eaker, 1998; Carpenter, 2015; Hofman & Dijkstra, 2010; Hord, 1997; Schechter, 2008; Supovitz, 2002). DuFour and Eaker (1998) laud educators in PLCs who undertake these vast obligations because, "educators whose commitments to working collaboratively in the ongoing processes of collective inquiry and action research achieve better results for the students they serve" (p. 14).

Why is all of this work necessary? According to Vescio et al. (2008), "learning communities support teachers in making decisions based on their contexts, their goals, current and new professional knowledge, and the needs of their students" (p. 89).

Summary

This section of the literature review focused on defining the common attributes of PLCs as well as presenting the work that they do. A review of the literature reveals the following set of common attributes of PLCs:

- A positive climate that is collaborative, reflective, and open
- A focus on teacher and student learning
- Shared values and beliefs
- Orientation towards goals and results

(DuFour & Eaker, 1998; Easton, 2015; Kruse, Louis, & Bryk, 1995; Louis & Marks, 1998; Sackney & Mitchell, 2001; Rahman, 2011; Richardson, 2015).

PLC teams undertake the full balance of the work of the school. A caution was levied that with the emphasis of PLC teams being data-based, teachers need professional development to have facility with data collection, organization and analysis. The next section discusses the factors that make PLCs effective.

What makes professional learning communities effective?

By looking at how research understands each of the common attributes identified in the previous section, it is possible to come to an understanding of what success and effectiveness looks like for PLC teams.

Within most of the research literature, however, the one overarching and dominant benchmark used to evaluate the effectiveness of PLCs remains student achievement data on standardized tests. This continues to harken back to the origins of PLCs in the 1990s during the school reform movement. Vescio et al. (2008) support this argument by stating that benchmarks must be achieved in order to argue effectiveness: "PLCs must be able to articulate their outcomes in terms of data that indicate changed teaching practices and improved student learning, something they have not yet established as common practice" (p. 82). It

has not yet become commonplace for researchers to develop or implement already existing tools to measure other effects of PLCs (Mason, 2003; Schechter, 2008).

Despite the dependence of research to focus on student achievement data to qualify effectiveness, several characteristics of effective PLCs have been put forth: supportive and shared purpose and values, a collaborative culture, problem solving, collective inquiry on teaching and learning, and continuous school improvement (Annenberg Institute for School Reform, 2003; Bolam et al., 2006; Carpenter, 2015; Feger & Arruda, 2008; Phillips, 2003). Both Supovitz and Christman (2003) and Wells and Feun (2007) offer a simple equation for successful and effective PLCs: school administration creates flexible structures such as a schedule with built-in PLC time, teachers research and implement best practices, and effective professional development is embedded with PLCs. Collectively, these structures, strategies, and supports of PLC within a school generate overall school improvement and increased student achievement (Carpenter, 2015).

This section on the effectiveness of PLCs presents four sections that parallel the aforementioned common attributes of PLCs: climate, teacher learning, student learning, and structures. This section then concludes with a summary of the elements that make PLCs effective.

Climate

Many variables can affect the ultimate goal of achieving a positive climate in PLCs: communication, shared vision, collaboration, and trust. The collegiality

of a PLC team has a tremendous impact on the overall level of improved teaching and learning (DuFour & Eaker, 1998; Hord, 2004; Kelly & Cherkowski, 2015). Higher degrees of collegiality within a PLC team engenders an openness or deprivitization of practice and the mutual vulnerability of members (Kruse et al., 1995). At the core of the collegiality of team members is the concept of trust. Hallam et al. (2015) focus on trust and argue that "an effective PLC requires the collaborative efforts of administrators and teams of teachers, and the degree of trust within the school's collaborative culture significantly affects PLC effectiveness relative to the performance of students" (p. 194). In their research, Hallam et al. (2015) elected to study trust within PLC teams, rather than pursue a more typical focus on the level of trust throughout the school. They found that PLC teams who had a developed culture of sharing became mutually more vulnerable and created an overall sense of interdependence (Hallam et al., 2015). Ineffective teams then exhibited distrust and were highly unsuccessful: "Lack of trust prevents a team from meeting important goals, increases teacher vulnerability, impedes communication, inhibits shared understanding, and thus stifles student learning" (Hallam et al., 2015, p. 196). Little (1999) firmly stated that:

> None of the structural support for teacher learning will succeed without compatible values, beliefs, and norms – an overall ethos that supports a vital professional community among teachers and a strong service ethic in relation to students and their parents (p. 253).

In their call for future research, Hallam et al. (2015) argue that continued

research on trust and the practices that foster trust will likely results in schools functioning more effectively.

Teacher Learning

Teaching is the "learning profession" (Darling-Hammond & Sykes, 1999). Because of the constant emergence of new ideas and theories in education, learning needs to be ongoing for professionals in education. PLCs offer the time and space to discuss adoption, implementation, and adaptation of new pedagogical and assessment strategies (Kelly & Cherkowski, 2015; Mason, 2003). Teacher learning happens at both the individual and group levels. Individually, teachers must be willing to self-examine and engage in a critical reflection on their practices (Kelly & Cherkowski, 2015; Mason, 2003). Ideally, the results of the critical reflection on practice will catalyze a more effective organization of the classroom for student learning and improved teacher practice (Andrews & Lewis, 2002; Bolam et al., 2006; Harris & Jones, 2010). Furthermore, Andrews and Lewis (2002) argued that within professional learning communities, "teachers engage in more authentic pedagogy and social support for achievement among students" (p. 27). Ultimately, according to McLaghlin and Talbert (1993), "The path to change in the classroom core lies within and through teachers' professional communities: learning communities which generate knowledge, craft new norms of practice, and sustain participants in their efforts to reflect, examine, experiment, and change" (p. 18).

Teacher learning and the generation of collective knowledge strengthens the whole PLC team and results in equalized expertise amongst the group

members rather than creating a hierarchical model of expertise (Kelly & Cherkowski, 2015). Harris and Jones (2010) further the emphasis on the collective knowledge of a cohesive group by stating that:

> Learning in the context of professional learning communities involves working together towards a common understanding of concepts and practices. The focus is not just on individual teachers' learning but on professional learning within the context of a cohesive group that focuses on collective knowledge and occurs with a context of mutual trust and learning (pp. 175-176).

By cultivating effective PLCs, teachers adopt pedagogical and discipline-specific best practices and student achievement blossoms. Learning as a group also has unanticipated positive effects. Strahan (2003) in his case study found that teachers initially saw improved student test scores as their primary motivation, but over time the notion of good teaching and creating community was the truest goal. Rahman (2011) in his case study introducing the concept of PLC to science teachers initially rated his participants as having poor group membership skills. Over time, as the teachers engaged in their learning and increased collaboration opportunities, they desired to make PLCs a permanent opportunity in their school. Kelly and Cherkowski (2015) found:

> Transformative learning happens when adult learners have opportunities to interact with other learners, have time to talk, are able to reflect and make sense of their learning in relation to their prior experiences, and can connect the learning to their own contexts, purposes, and needs (p. 22).

Change at the classroom level begets systemic change (DuFour & Eaker, 1998; Hord, 2004; Hofman & Dijkstra, 2010; Richmond & Manokore, 2011; Sims & Penny, 2015; Thompson et al., 2004). Networks of educators lead to the professionalization of teaching and increase teacher motivation for success in the field (Hofman & Dijkstra, 2010). Harris and Jones (2010) further found that teachers who engage in PLC networks experienced greater job satisfaction, higher morale, and lower rates of absenteeism.

Student Learning

PLC teams improve the quality of teaching and contribute to sustainable progress in student learning (Bolam et al., 2006; Hallam et al., 2015; Vescio et al., 2008). DuFour and Eaker (1998), Harris and Jones (2010), Hord (1997), and Louis and Kruse (1995) agree that the most effective PLCs have an overarching emphasis on student learning. Unfortunately, the lens by which to capture student learning is narrow, often solely focused on student achievement data. In the existing research on PLCs, studies tend to measure student learning in the gains and losses on standardized tests (Andrews & Lewis, 2002; Carpenter, 2015; Harris & Jones, 2010; Louis & Marks, 1995; Mason, 2003). Easton (2015) argued that, "Professional learning communities demonstrate effectiveness by sharing both qualitative and quantitative data that document improved student achievement and well-being" (p. 25). School improvement efforts benefit from the effective use of data: "The capacity of schools to improve local decision-making, instructional guidance, and student achievement and to sustain school improvement would be enhanced through the systematic use of data" (Mason,

2003, p. 9). The major problem of data use to inform student learning is that teachers are not well versed in the collection, organization, and analysis of data (Carpenter, 2015; Mason, 2003; Sims & Penny, 2015). Both Carpenter (2015) and Mason (2003) found that teacher data use was infrequent, random, and often in isolation. Furthermore, teachers used a limited array of data, mostly confined to school, district, or statewide assessments. Additionally, Sims and Penny (2015), found that teachers wanted to develop facility with data to be able to analyze, interpret, and understand where their students fells on assessment reports. Sims and Penny (2015) in their case study of failed PLCs noted that teachers resented the structure because it made them feel like there were merely data teams. That particular school failed to provide a venue through PLC that was "a rich and deep collaborative discussion of all aspects of the learning environment, teaching practice and outcomes" (Sims & Penny, 2015, p. 44). How then do schools create a data-friendly environment and improve data literacy for teachers? Mason (2003) challenges district-level officials and building-level administrators to create a culture of data use; link data to planning and decision-making; provide professional development on in-house systems and databases; offer data management as staff training; and be explicitly clear on how data results are applied.

Structures

The key figure in the success of PLCs is a school principal (Cranston, 2009). The principal, however, is not "omni-competent" (Carpenter, 2015; Thompson et al., 2004). According to Carpenter (2015), "When this structure

[omni-competence] is present, the school leader views themselves as the all-guiding, all-knowing force in the school that cannot participate in professional activities at the same level of their teachers, thereby removing themselves from the continuous improvement cycle" (p. 689). Rather than relying on a single entity to influence PLC organization, Lam (2005), Supovitz and Christman (2003), and Wells and Feun (2007) argued that the most influential structure that a school's administration can provide is a flexible schedule. This flexible schedule creates devoted and uninterrupted time for teachers to meet as PLC teams. Administrators should also support teachers by facilitating PLC teams within, across, and between schools: "we argue that the most effective professional learning communities should include teachers who work within the same building as well as those from different buildings" (Richmond & Manokore, 2011, p. 568). Ultimately, it is the organization of a school to learn, one of the main jobs of the principal that predicts effectiveness and improvement of the school. Mason (2003) confirmed this assertion:

> The common attributes of school learning organizations and professional learning communities provide the structure and culture conducive to organizational learning by focusing on the following: teaching and learning; collaboration among staff and with external partners; inquiry-based learning and reflection, shared values, norms, and dispositions of teachers, and a commitment to continuous improvement (p. 9).

There are many structural challenges that principals and PLC teams face. With an uncertain time allotment in a school's schedule, teachers may not be willing or

able to carve out time to meet, especially if other professional tasks make demands upon a teacher's daily schedule (DuFour & Eaker, 1998; Carpenter, 2015; Hord, 1997; Rahman, 2011). The culture of a school may not be supportive to change; some teachers may seek to undermine innovation and change for the sake of the status quo (Kelly & Cherkowski, 2015; Rahman, 2011; Sims & Penny, 2015). The school's external environment, from the community or the school district, might impose other initiatives that take precedence or might emphasize other strategies for school improvement and student learning (Cranston, 2009; Richmond & Manokore, 2011). With the uncertainty of structures and the limited approaches to studying the effectiveness of PLCs, Wells and Feun (2007) caution that, "Research is still attempting to determine whether efforts at implementing professional learning communities will result in the types of changes that make a real difference" (p. 143).

Summary

This section presented research on the effectiveness of PLCs. Utilizing common attributes of PLCs, the presentation of effectiveness occurred through the lenses of culture, teacher learning, student learning, and structure. For PLCs to be effective, a school's climate must develop strong bonds of trust, teachers must collaborate and seek to utilize best practices, student learning is mostly measured by achievement test scores, but teachers need better professional development to be effective at using data, and principals are the key figure in PLC success when they provide flexible schedules and avoid the mindset of "omni-competent" leader. The next section looks at research to understand how

effective PLCs can achieve sustainability.

Are effective professional learning communities sustainable?

In the previous two sections, this literature review has used relevant research to define PLCs and to understand the elements of PLCs that make them effective. This final section will look at the sustainability of PLCs. It has been more than 25 years since Senge's (1990) organizational thinking model was applied to education. Either school districts or systems that were early adopters have moved on to the other strategies or initiatives or they are working toward sustaining the work of their PLC networks. As years pass, there should be more and more opportunity to study both successful and failed PLC networks. McLaughlin and Talbert (1993) and Cowen, Fleming, Thompson, & Morrissey (2004) purposely searched for schools that function as professional learning communities; they concluded that there is a lot of research on the transition of schools to PLCs and that there was not much research on existing PLC structures and their sustainability. Easton (2015) argued that five key elements sustain functioning PLCs in schools: (1) a school must develop a culture of teacher learning and collaboration; (2) the professional community of teachers must be interdependent; (3) teachers must be confident in their content knowledge, pedagogical knowledge, and best practices; (4) a system of accountability to peers and district and state measures must not feel punitive; and (5) a shared passion and purpose drive continuous improvement.

The collective wisdom of the research reviewed for this literature review generally aligns with the key elements of Easton (2015). The remainder of this

section will look at the following ways that PLC networks are sustainable networks for:

- Positive student achievement
- Distributed leadership
- Teacher well-being
- Flexible structures
- Positive school culture
- Effective professional development.

Student Achievement

This literature review earlier established that the demands of accountability weigh down the current educational climate. Previously stated, researchers argued that gauging student learning has to encompass more than just standardized test measures, but researchers have yet to invest fully in developing and implementing tools for that type of empirical study. Vescio et al. (2008) argued that, "the viability of PLCs will be determined by their success in enhancing student achievement...it makes it incumbent upon educators to demonstrate how their work in learning communities improves student learning" (p. 86). Research has shown that the value of PLCs is appreciable; students achieve at higher levels with PLC teams that are strong (Carpenter, 2015; Cranston, 2009; DuFour & Eaker, 1998; Hord, 1997; Sims & Penny, 2015; Vescio, Ross, & Adams, 2008). To see improvements in student achievement schools must transition to PLC networks that incorporate elements to make them effective.

Distributed Leadership

A school's principal is the key figure to the success of PLCs (Cranston, 2009). He or she must not assume, however, the role of omni-competent leader (Carpenter, 2015; Thompson, Gregg, & Niska, 2004). PLC offers the chance for the development of teacher leaders within a building (Carpenter, 2015). Through leadership training as well as professional development in PLC implementation for teachers, principals can achieve results for their schools in the realms of increased student achievement on test scores and a culture of motivation and buy-in from teachers under the umbrella of the high-stakes testing environment (Carpenter, 2015; Harris & Jones, 2010). Furthermore, Harris and Jones (2010) found that the distributed leadership amongst teachers in PLC teams and a sense of shared decision-making with administrators led to positive changes in teacher performance in the classroom. Andrews and Crowther (2002) discussed similar notions in their work on parallel leadership, the model that values trust, shared directionality, and individual expression. The most powerful aspect of this model with regard to PLCs and their sustainability is individual expression without fear of reprisal from administration. This model values the importance of the teacher and his or her classroom-level experiences as well as their vital place in the school wide ethos. Because of opportunities for teachers to be leaders, the educational system at the school level democratizes and allows for multiple informed perspectives on a school's continuous improvement.

Teacher Well-Being

The logic behind job satisfaction is simple: if you enjoy your job, you will

come to work, perform your responsibilities, and the company will be better for it. If your company is a school, being better off might mean higher student achievement scores or a positive culture. According to Webb et al. (2009), PLCs can positively impact a teacher's morale and well-being: "Sustaining teachers' motivation, commitment, and enjoyment of their work is a crucial goal in itself as well as a means to improving pupil learning" (p. 419). Schechter (2009) found that there was a significant positive relationship between teachers' commitment to their schools and the extent of organizational learning management in their schools. In high performing schools, Senge (2000) argued that, "a nurturing professional community seems to be the container that holds the culture...teachers feel invigorated, challenged, professionally engaged, and empowered, just because they teacher there" (p. 326). With access to the opportunity of ongoing learning through PLCs, teachers fostered more professional interactions and heightened their sense of loyalty to their organization (Schechter, 2009). The impact of PLCs on the professionalization of teachers is profound. Harris and Jones (2010) found that collaboration through PLCs led to improved teacher efficacy, which generated new classroom behaviors and overall greater teacher retention. Although the benchmark remains grounded in student achievement, the power of high morale within a faculty can transform a school: "Collective teacher efficacy powerfully influences how teachers instruct students, manage their classrooms, and motivate students, all of which have been found to be significantly related to student achievement in elementary, middle, and high schools" (Schechter, 2009, p. 175). Both Richmond and Manokore (2011) and Cranston (2009) expressed a desire for future research

to investigate the potential effects on teacher morale and well-being on human-to-human interactions in PLCs, in particular "teacher talk."

Flexible Structures

Both DuFour and Eaker (1998) and Hord (2010) instruct principals and school system officials that in order for PLCs to take hold and produce effective results, regular time must be set aside during the school day for teachers to be able to work. Lam (2005) refers to this as flexible structure:

> Evidently, flexible structure emancipates teachers from the bureaucratic control, regain their motivation to improve the learning conditions of their students and utilize more of their new found autonomy and time to engage in mutual learning and these will all lead to better students' performance (p. 399).

Lam (2005) also found the reverse to be true, where the rigidity of a school's structure and inflexible schedule stifles the learning capabilities of its teachers and students. Further support comes from Little (1999) who argued, "the school's contribution to teacher learning comes largely in the form of regularly scheduled common time among teachers who share responsibility for students or who otherwise have reason to work with one another" (p. 243). Sims & Penny (2015) argued that a flexible schedule within the school is not the only impact to PLCs; within the PLC team and meeting time itself, the structure should be flexible. In their case study on failed PLC teams, Sims & Penny (2015) found that the PLC teams they studied had too narrowly focused meetings. Administrators forced the teachers to focus solely on data analysis without time for professional

collaboration, and overall the administrators disengaged from the PLC process after dictating meeting agendas (Sims & Penny, 2015). Therefore, to sustain productive PLC teams, regular time has to be set aside for teams to meet, and administrators must allow for teams, as professionals, to generate and dictate their own agendas, designating PLC as an overall flexible space.

School Culture

The culture of a school is comprised of many different elements. Hipp et al. (2008) defined a school's culture as "the shared assumptions, beliefs, values, and habits that constitute the norms for the school that shape how professionals think, feel, and act" (p. 176). Both Hipp et al. (2008) and Schechter (2008) found that when a school's environment, riddled with uncertainty, led teachers to rely on old methods and poor courses of action to accomplish a school's mission, vision, and goals. Schechter (2008) found that a positive relationship between the implementation of PLC networks and professional thinking toward learning and teaching and teachers becoming more committed, efficacious, and motivated to change and adapt.

One of the most studied and commented upon aspects of positive culture is collaboration. Characteristics of school cultures that foster collaboration include teacher interdependence, teacher and student learning, as well as increased student success (DuFour & Eaker, 1998; Hofman & Dijkstra, 2010; Hipp et al., 2008; Hord, 1997). Strahan (2003) found that collaboration is key to success in schools:

> One characteristic of successful schools is that teachers work

> collaboratively. As they do so, they develop stronger instructional strategies, and these strategies enhance student achievement. At the same time, teachers develop a strong professional community, enabling them to provide even more social support for learning (p. 128).

By allowing for multiple opportunities for collaboration between teachers, schools create structures of continuous learning and accountability among members of PLCs (Kelly & Cherkowski, 2015). "Collaborative work opportunities can be a way to breathe new life and energy into teaching and learning" (Kelly & Cherkowski, 2015, p. 4).

Both Richmond and Manokore (2011) and Webb et al. (2009) found that PLC teams are much more vibrant if a positive culture of learning was present not only at the school, but also at the district slevel. Andrews and Lewis (2002) argued that in order to sustain the positive effects of PLC, school systems need to ingrain a wider view of the "new relationships and new understandings about the image of the teacher, student, and their workplace" (pp. 27-28). These findings imply that it may be difficult for a single principal and a single school to establish PLCs from the bottom up as district strategies and initiatives may trump PLC development. It may be possible, though to "re-culture" schools and school systems into new ways of thinking and doing. "Re-culturing" requires that schools understand what happens in the classroom, the PLC team, and the larger organizations of the school and school district (Eaker, DuFour, & Burnette, 2002; Louis & Kruse, 1996; Mason, 2003; Thompson et al., 2004). None of these researchers offers concrete plans and strategies in order to re-culture schools.

Professional Development

The idea behind professional development is to empower teachers with best practices to move them from beyond simply teaching to a high-stakes state or national test or covering the content. The role of PLC teams as hubs for professional development may have been the most commented upon aspect of how to make effective PLCs sustainable. The standard model of professional development reflects an expert transmitting information or strategies to teachers who then expect to return to their classrooms and implement. Van Hover (2008) and Phillips (2003) argue that serious hindrances to professional development are twofold: first that the design and quality of the workshops and institutes is seriously lacking, and second that the information and strategies presented are wholly divorced from any school context. Hofman and Dijkstra (2010) support these assertions:

> Regarding teacher professional development a tendency has been observed to bring experts from outside into the school to improve the instructional qualities of teachers through a one-size-fits-all set of solutions that often fail to distinguish between different teaching styles, schools or classrooms' contexts, or between the needs of novice and experienced teachers (p. 1031).

The culminating positive effect of this professional development is minimal. Phillips (2003) characterizes most professional development as “intellectually superficial, disconnected from deep issues of curriculum and learning, fragmented, and noncumulative” (p. 241).

What then should professional development look like? Sykes (1996) argued, "Teacher learning must be at the heart of any effort to improve education in our society" (p. 464). Better trained and prepared teachers handle the pedagogical and content rigors of the classroom and children's education and learning experiences are richer and more authentic. The professional development model, however, need not be turned on its head; Sykes (1999) recommended five general guidelines for all professional development: (a) select and design professional development based on the teacher-student learning connection; (b) ensure that professional development is embedded in the specific content of the curriculum; (c) integrate the examination of student learning into professional development; (d) attend to student learning associated with the implementation of curricular and/or instructional innovations; and (e) reference both formative and summative evaluation of professional development to student learning. PLC teams offer an arena where teachers take ownership of their learning and foster their own professional development akin to the model presented by Sykes (Harris & Jones, 2010; Hofman & Dijkstra, 2010; Kelly & Cherkowski, 2015; Phillips, 2003). Customized school-based reform needs to account for all stakeholders, climate, and culture, but PLCs can serve as a framework across schools and school systems.

One study by Richmond and Manokore (2011), specifically addressed threats that to the sustainability of PLCs. The first threat mentioned was when PLC teams become dependent on external facilitation. Richmond and Manokore's (2011) case study introduced the PLC concept to a school. The

teachers who thrived under the guidance of a university facilitator were concerned at the conclusion of the study that PLC would fall by the wayside. A second threat that they found was that of singleton PLC membership. This study focused on PLCs of teachers across schools; when individual teachers returned to their buildings there was a fear that administers would not buy into the program and implement the components to ensure effective PLC networks. Finally, the authors cited voluntary participation as a threat to the sustainability of PLCs. If allowed to participate optionally in PLC, there would be a greater portion of teacher "free riders" that use dedicated PLC time for anything other than collaboration toward continuous improvement. If a school or school system is initiating PLC teams, it must be mandatory for all teachers.

Several studies lamented that there is no clear progression or continuum for development of PLC networks (Kelly & Cherkowski, 2015; Hipp et al., 2008; Wells & Feun, 2007). The development of PLC itself was not the end goal, but a limitless quest with constant striving for continuous improvement.

Summary

This section focused on how to sustain effective PLCs. Because there is a dearth of longitudinal research on PLC sustainability, most of the arguments made by researchers was speculative with regard to the context of their studies. In order to engrain effective PLC networks into the fabric of schools and school systems, the sustainability of those networks causes the following effects:

- Schools see positive student achievement
- Administrators and teachers shared distributed leadership

- Teachers experience a greater sense of overall well-being
- Traditional school organization gives way to more flexible structures
- The culture of a school improves positively for all stakeholders
- Teachers experience high quality and effective professional development

Conclusion

This literature review attempted to look at PLCs from multiple angles. First, the review examined the theoretical underpinnings of PLC. Then, the review briefly presented the two dominant models of PLC. The remainder of the literature review divided into three sections, based on questions distilled from the conceptual framework, the research questions, and the extensive research report of Bolam et al. (2005):

- What are professional learning communities?
- What makes professional learning communities effective?
- Are effective professional learning communities sustainable?

Relevant study of the literature about professional learning communities has led to the following key points, which influence the conceptual framework of this capstone study:

- Discussion and implementation of PLC teams and networks have become both a national and international phenomenon in school reform and change movements (Bolam, et al., 2005; Webb et al., 2009).
- The theory behind PLC arose from the organizational learning movement that coincided with the standards reform and high-stakes testing movement of the 1990s to the present day (Senge, 1990; Fullan, 1985,

1991; Hipp et al., 2008; Mason, 2003; Thompson et al., 2004; Vescio et al., 2008; Web et al., 2009; Wells & Feun, 2007).

- Hord (1997) and DuFour and Eaker (1998) have emerged as the dominant voices of PLC models in research on developing and assessing the effectiveness of PLC teams (Rahman, 2011).
- A review of the literature reveals the following set of common attributes of PLCs: a positive climate that is collaborative, reflective, and open; a focus on teacher and student learning; shared values and beliefs; and oriented toward goals and results (DuFour & Eaker, 1998; Easton, 2015; Kruse, Louis, & Bryk, 1995; Louis & Marks, 1998; Sackney & Mitchell, 2001; Rahman, 2011; Richardson, 2015).
- Despite the tendency of research to focus on student achievement data to quantify effectiveness, several characteristics of effective PLCs have been put forth: supportive, shared purpose and values; collaborative culture; collective inquiry on teaching and learning; and continuous school improvement (Annenberg Institute for School Reform, 2003; Bolam et al., 2006; Carpenter, 2015; Feger & Arruda, 2008; Phillips, 2003).
- Easton (2015) argued that five key elements are necessary to sustain functioning PLCs in schools: (1) a school must develop a culture of teacher learning and collaboration; (2) the professional community of teachers must be interdependent; (3) teachers must be confident in their content knowledge, pedagogical knowledge, and best practices; (4) a system of accountability to peers and district and state measures must not feel punitive; and (5) a shared passion and purpose drive continuous

improvement.

The literature on professional learning communities undoubtedly has gaps. There is an overreliance on student achievement data in order to determine the success of PLC networks. Several studies call for the development, testing, and implementation of other tools to measure student success outside of achievement data. In addition to measuring student learning, studies and measures to study teacher and student learning have yet to be developed. The literature presented here encompasses the varied aspects of schools, but almost none of the studies measure the relationship of success and PLC work. Despite PLC networks being a popular topic of educational reform, few longitudinal studies look at the birth, growth, and development of PLC teams within, between, and across schools. Longitudinal research would greatly impact the collective knowledge on how to sustain effective PLCs over time. Finally, researchers have hardly examined the work of teachers within PLC teams. In order for teachers to implement concretely conceptual elements of PLC work, researchers need to investigate teacher talk and action.

Research Design and Methodology

This chapter discusses the research design and methodology for this capstone study. Specifically, the chapter addresses the research approach, the research site and participants, data collection methods, data analysis methods, trustworthiness, ethical considerations, research bias and assumptions, and limitations.

Purpose and Research Questions

In this capstone study, I explored how teachers in the core disciplines of English and Math at Wheatland High School (WHS) implement weekly PLC meetings over the course of a unit of study in a discipline-specific course. The research questions for this capstone study are the product of the intersections of Fullan's (1982/2007) change processes model, DuFour & Eaker's (1998) model of PLC, and the practical implementation of PLCs at WHS, which I discussed in the first chapter.

1. How is the weekly PLC time used?
    a. How do teachers perceive the use of PLC time?
    b. Does the planning time vary by discipline?
2. What is the current focus of the PLCs at WHS?

a. In what ways do the PLCs reflect the original focus – standardized test scores?
b. Does the current work of the PLCs reflect the principles of the DuFour and Eaker (1998) model?

Because this capstone study is situated in a school and a school district that have already established PLCs, the viability and efficacy of the PLC teams and their meetings were the focus under examination.

Methodology

This capstone study is a multiple-case study (Yin, 2014) of two PLC teams in one school. Yin (2014) defines case studies based on their scope and features. According to Yin (2014), the scope of "a case study is an empirical inquiry that investigates a contemporary phenomenon in-depth and within its real-world context" (p. 16). In addition, Yin (2014) argues that case studies feature distinctive situations with many variables, multiple sources of evidence that converge in triangulation, and benefit from a preordained theoretical framework. Case study methodology is the most appropriate approach for this capstone study because of the research questions and the contextual nature of the PLCs at WHS. The research questions are of the "how" and "what" orientation that sought to be exploratory and not about the prevalence of a phenomenon, or to be predictive of its outcomes (Yin, 2014). The research questions, rather, seek to examine contemporary events and relevant behaviors that the researcher cannot manipulate (Yin, 2014). The ultimate benefit to using case study methodology then, according to Marshall and Rossman (2011) is that "case studies take the

reader into the setting with a vividness and detail not typically present in more analytic reporting formats" (p. 267).

This capstone study utilizes a multiple-case study design (see Figure 3 below). Yin (2014) identifies distinct advantages and disadvantages to multiple-case study design. The main advantage of a multiple-case study design is that the evidence collected is more compelling and the overall study more robust than that of a single-case study. The main disadvantages are that multiple-case study approaches often take more time and resources to implement.

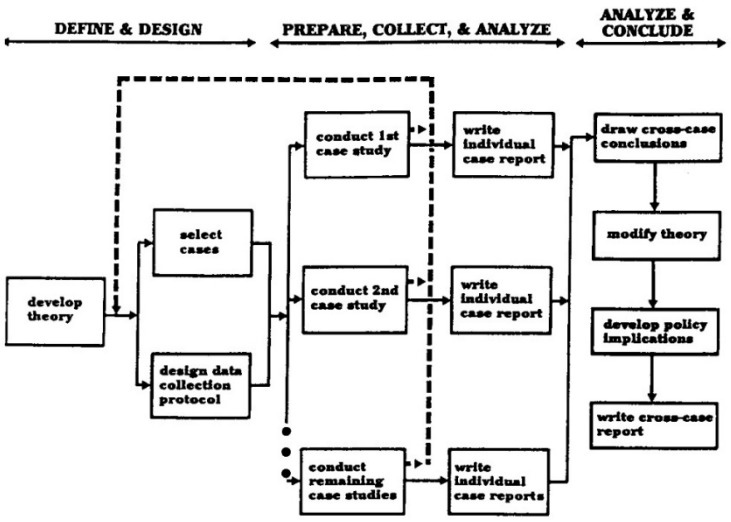


Figure 3. Multiple-case study procedure (Yin, 2014, p. 60). This figure illustrates the three main stages of multiple-case study procedure: define and design; prepare, collect, and analyze; and analyze and conclude.

Discretionary judgment was used by the researcher for the number of cases in this capstone study. The two cases selected represent core academic departments in a traditional, comprehensive high school in the United States.

Because WHS determines teacher membership on a PLC team by the specific course taught, and because one of the points of research under examination was PLC team focus related to standardized tests, the PLC teams chosen taught a course that culminated in a state end-of-course standardized test. By comparing and contrasting the PLC operations of teams within these core academic departments, future research and analysis can potentially correlate specific PLC behaviors and student achievement.

This multiple-case study design utilizes replication to strengthen the robustness of the findings (Yin, 2014). Each case of the PLC teams was first treated individually as a unique case study and then the cases were compared (See Figure 4 below). The presence or absence of replication findings from each individual case will strengthen the overall conclusions of the study (Yin, 2014).

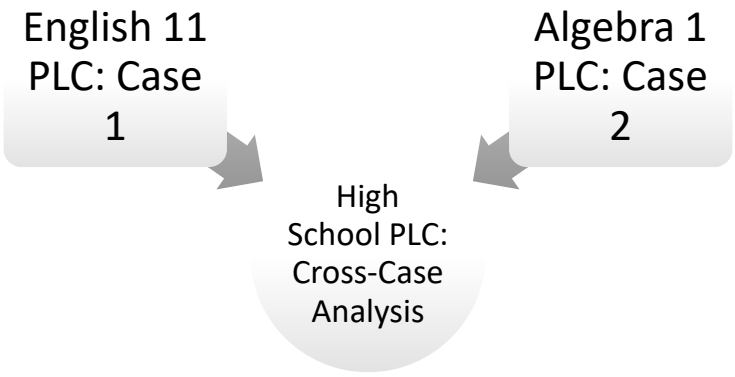


Figure 4. Capstone study design. This figure illustrates the study design for a multiple-case study.

Research Site, Participants, and Access

The focus of this capstone study is Wheatland High School (WHS), a secondary school in the Buchanan School District (BSD). In this section, I present a general overview of both the school district and high school. Table 1 on page 56 presents a comparison of student demographics and total enrollment.

Buchanan School District

BSD serves almost 14,000 students from a large county in a southeastern state. Students in the district hail from 60 countries and speak 80 different languages. The 26 schools that comprise the school district spread out over 800 miles in a diverse mix of rural, suburban, and urban settings. There are 16 elementary schools (PK-5), 5 middle schools (6-8), and 3 comprehensive high schools (9-12). The school district also has a charter middle school (6-8) and a charter high school (9-12). The almost 1300 teachers in BSD average 14 years of teaching experience. The operating budget for BSD during the 2015-2016 academic year was more than $167 million with a per pupil expenditure of $12,365. This mission of the school district is to "Establish a community of learners and learning, through relationships, relevance and rigor, one student at a time." The school district's vision is that "All learners believe in their power to embrace learning, to excel, and to own their future."

BSD had above state average rates during the 2014-2015 academic year in the following categories: on-time graduation rate, graduates who earned an advanced studies diploma, SAT verbal, math, and writing scores, and students who earned a passing score on an AP Exam. The dropout rate for BSD was less

than half of the state average. 86% of the 973 high school graduates in 2015 planned to pursue higher education

BSD implemented the DuFour model of PLC at the onset of the 2003-2004 academic year. Central Office staff, building administrators, and selected teaching faculty participated in workshops about the model. These stakeholders where then expected to disseminate the acquired knowledge to their respective departments and schools. In ensuing academic years, new teachers participated in workshops in the DuFour and Eaker (1998) model during pre-school orientation and principals had leeway to implement PLC expectations at their discretion in their buildings. BSD maintains a PLC website in the professional development division of its department of instruction. It has a wide range of conceptual and theoretical resources for PLC teams to use.

Table 1

Comparison of Student Demographics

Category	Buchanan School District	Wheatland High School
Total Enrollment	13.737	1,148
Male	51.0%	49.3%
Female	49.0%	50.7%
Black	11.3%	13.2%
Hispanic	11.7%	12.1%
White	66.4%	66.6%
Limited English Proficiency	8.4%	5.7%
Disadvantaged	28.8%	31.8%
Students with Disabilities	10.5%	11.7%
Gifted	9.6%	14.7%

Note. "Disadvantaged" students are those who receive free and reduced price meals under the federal program. "Students with Disabilities" are those identified for special education services, from speech pathology and learning disabilities to severe and profound disabilities.

Wheatland High School

WHS is a comprehensive high school with 145 faculty and staff members serving students in 9th-12th grade. The total enrollment of students during the 2015-2016 academic year was 1,148. A demographic breakdown of the student body at WHS is available in Table 1 on page 56. WHS is located on 70 acres in the southern end of a large county in a southeastern state. The school's facilities comprise four academic wings, an auditorium, a forum, two gymnasiums, a football and track and field stadium. The building also contains photography and engineering labs and a nationally recognized media center. In 2015, Edutopia recognized WHS in the "Schools that Work" series for innovative work.

WHS operates on a modified block schedule. Most classes occur yearlong, meeting every other day, but some meet only for one semester, meeting every day. Figure 5 below shows the daily bell schedule for WHS.

Class Period	Time
"0" Period (Before School)	7:40AM – 8:40AM
1st Period (Including Announcements)	8:55AM – 10:25AM
PLC/Remediation/Enrichment	10:30AM-11:05AM
2nd Period (Including Lunches)	11:10AM – 1:05PM
3rd Period	1:10PM – 2:30PM
4th Period	2:35PM – 3:55PM

Figure 5. Daily bell schedule for WHS.

In addition to the core academic curriculum and elective courses, WHS offers several specialty programs for students. There is a wide range of courses offered at the Honors, Advanced Placement (AP), and Dual-Enrollment (community college) levels. WHS is a partner with a regional technical education center

where students can study anything from pharmacy technology to culinary arts to building trades. Additionally, WHS runs Advancement Via Individual Determination (AVID), a national college readiness system for students. Lastly, WHS operates a health sciences academy, which prepares students for college and/or career pathways in the health sciences.

WHS students scored above the state and national averages during the 2015-2016 academic year on the SAT in critical reading and math. Their writing scores surpassed the national average, but fell just below the state average. Out of the 626 AP tests that were taken, 60% scored 3 or higher on the 5-point scale, and 30% score at level 4 or 5. With regard to graduates' plans, 85% of students intended to matriculate to post-secondary education, with the remaining 15% entering the workforce or the military.

WHS implemented PLC teams during the 2005-2006 academic year. WHS changed its bell schedule to create a 30-minute period each day for students and teachers resulting in an eight-minute reduction in each of the four class periods every day. Beginning during the 2016-2017 academic year, PLC was extended to 35 minutes as a result of the overall lengthening of the school day. Two out of five days during the week, teachers have 30 minutes to meet in PLC teams. The meeting schedule of PLC teams stayed consistent from 2005 through the 2016 academic year (see Table 2 on page 60). At the start of the 2016-2017 academic year, the administration of WHS altered the PLC schedule, shifting from department-specific days to course-specific days. Social Studies teachers, for example, used to meet with their PLC teams on Tuesdays and Fridays during

a school week. Table 3 on page 60 shows when social studies PLC teams currently meet during the week. This schedule ideally works for a teacher who has two class preps, because it clearly establishes his PLC days. A teacher with one class prep has an assigned day in the schedule, but he must coordinate with his other PLC members to gauge when their other PLC teams meet in order collaborate. A teacher with three or more class preps not only has to coordinate with his other PLC members, but also has to meet outside of designated PLC time because teachers only have two PLC sessions per week. The majority of WHS teachers have multiple class preps and therefore meet with different PLC teams during their scheduled PLC team days. This means that a teacher can, and usually is, a member of multiple PLC teams, which are course- as opposed to discipline-based. On each of the other three days during the week when PLC teams are not meeting, teachers hold a remediation period in their classrooms with students that they "drafted." Ostensibly, data analysis and discussions during PLC team meetings affect which students are "drafted." WHS is unique within BSD for its schedule of dedicated PLC time. The other high schools in BSD ask their teachers to meet as PLC teams, but do not always provide dedicated time within the schedule for teachers to meet.

Table 2

PLC, Remediation, and Enrichment Days at Wheatland High School 2005-2016

Department	PLC Days	Remed & Enrich Days
Career & Tech. Education	Mon, Thurs	Tue, Wed, Fri
English	Mon, Thurs	Tues, Wed, Fri
Fine Arts	Wed, Fri	Mon, Tues, Thurs
Health & Physical Education	Mon, Fri	Tues, Wed, Thurs
Math	Tues, Thurs	Mon, Wed, Fri
Science	Wed, Fri	Mon, Tue, Thurs
Social Studies	Tues, Fri	Mon, Wed, Thu
Special Education	Tues, Thurs	Mon, Wed, Fri
World Languages	Tues, Wed	Mon, Thurs, Fri

Note. Special Education teachers may alter their PLC days to accommodate the departments in which they collaborate.

Table 3

PLC, Remediation, and Enrichment Days at Wheatland High School 2016-2017

PLC Day	PLC Teams
Monday	World Geography, English Skills, Health, English 12, Design, Calculus
Tuesday	Geometry, Government, English 9, Chemistry, Spanish 3, Algebra 1
Wednesday	Upper-level Math, Biology, AVID, Spanish 2, US History, Design
Thursday	English 10, English 11, Algebra 1, German, Earth Science
Friday	AFDA, World History, Algebra 2, SPED, ESOL

Participants

For this capstone study, convenience sampling was used to identify the participants (Marshall & Rossman, 2011). The selection of the participants occurred because of their convenient accessibility and proximity to the researcher. Even though the participants are not representative of the entire population, and this limits generalization and inference making about the entire population, Yin (2014) argues that case study research should not focus on

making statistical generalizations because sampling units will always be too small in number in reference to a larger population. Yin (2014) argues that case study research should focus on analytic generalizations, which he defines as the "opportunity to shed empirical light about some theoretical concepts or principles, not unlike the motive of a laboratory investigator in conceiving of and then conduction a new experiment" (p. 40). Furthermore, Yin (2014) notes that the aim of analytic generalizations is still to be able to generalize to other concrete situations and may be applicable to a variety of other situations of like-cases. In the next section, I will describe the participants, the PLC setting and operation, and the courses that comprise the Algebra 1 and English 11 offerings.

English 11 PLC. The members of the English 11 PLC team are three core content teachers, one student teacher from a local university in the same town as WHS, and one special education teacher. Table 4 below outlines the information about the members of this PLC team:

Table 4

English 11 PLC Team Members[1]

Teacher	Age	Courses	Experience
Mrs. O'Connor	32	Honors English 11	5 years
Mr. Roth	52	Honors English 11 AP Language & Composition	26 years
Mrs. Cather	35	Standard English 11 Academic English 11	12 years
Mrs. Wharton	46	Special Education Standard English 11 Academic English 11	21 years

[1] All names of people, schools, and school districts in this report are pseudonyms

Ms. Lee	21	Honors English 11 AP Language & Composition	Student Teacher with Mr. Roth

The English 11 PLC team meets weekly on Thursdays from 10:30 – 11:05AM in the upstairs red cubby. The designation for the four academic classroom wings is color-based: blue, green, red, and purple. Generally, the red wing houses the 11th grade teachers and classrooms. Each wing divides into an upstairs and downstairs level and each floor has a centrally located cubby for teachers. The upstairs red cubby has six teacher cubicles, a computer station with a shared printer, a round table for meeting and eating lunch, and a kitchenette that includes a sink, a coffee maker, a small refrigerator, a microwave, and four large cabinets. The cubby areas are off-limits to students and the English 11 PLC team meets there so students, colleagues, or administrators will not interrupt them during their reserved PLC time. I observed the English 11 PLC team six times between October 13 and December 8, 2016. Twice during this span (October 27 and December 8), there was an English-wide department meeting that I did not observe, and school was closed on Thursday November 24 in observance of the Thanksgiving holiday.

11th grade students at WHS can take one of four tracked English levels: Standard, Academic, Honors, or Advanced Placement (AP). Generally, students who take the Standard-level English 11 course read well below grade level and have a poor track record of passing state standardized tests required for graduation. Students who take the AP course are generally seeking an advanced studies diplomas from the state for graduation and look to apply to competitive

colleges and universities. The students who take the Academic or Honors course option fall in the middle: they may be seeking a standard or an advanced studies diploma; they may go into the workforce after high school, apply to the local community college, or still seek a four-year college or university; and they read at or near grade level. The courses represented in the PLC were Standard, Academic, and Honors. Mr. Roth, who teachers both Honors 11th grade English and AP, focused his attention during PLC on the Honors course and its students rather than the AP course and its students because the AP course culminates with a national exam that did not parallel the state standardized test (Roth, interview, October 14, 2016). The next section introduces the members of the Algebra 1 PLC as well as discussing the different Algebra 1 courses and the metrics that influence how students are placed in them and the logistics of their meetings.

Algebra 1 PLC. The Algebra 1 PLC team is comprised of four core content teachers and three special education teachers. Table 5 on page 64 outlines information about the members the Algebra 1 PLC team:

Table 5

Algebra 1 PLC Team Members

Teacher	Age	Courses	Experience
Mrs. Noether	51	Math Skills 1 & 2 Algebra 1 Lab	15 years
Mr. Boole	39	Math Skills 2 Algebra 1 Lab Academic Algebra 1	14 years
Mr. Descartes	___	Algebra 1 XS Algebra 1 Lab	7 years
Mrs. Germain	___	Academic Algebra 1 Algebra 1 Lab	3 years
Mr. Nash	34	Special Education Math Skills 1 & 2	12 years
Ms. Lovelace	___	Special Education Math Skills 2	
Mr. Babbage	___	Special Education Algebra 1 Lab	13 years

Note. Teachers without a reported age either wishes not to answer that question, or the researcher omitted the question.

Generally, one-third of the incoming 9th grade class, which averages between 250-300 students at WHS, needs to complete Algebra 1. The other two-thirds of the incoming class have already taken the course in either 7th or 8th grade at a feeder middle school. Students who need to complete Algebra 1 in high school can take one of four tracks to complete the credit. Figure 6 on page 65 displays the Algebra 1 course sequences at WHS:

	Algebra 1 Course Sequences for 9th Grade Students Entering WHS			
	Fall Semester 9th Grade	**Spring Semester 9th Grade**	**Fall Semester 10th Grade**	**Spring Semester 10th Grade**
4 Semester Plan	Math Skills 1	Math Skills 2	Algebra 1 Lab	Academic Algebra 1
3 Semester Plan	Math Skills 2	Algebra 1 Lab	Academic Algebra 1	Algebra Functions Data Analysis
2 Semester Plan	Algebra 1 Lab	Academic Algebra 1	Advanced Geometry (year-long)	
1 year plan	Algebra 1 XS		Advanced or Honors Geometry (year-long)	

Figure 6. Algebra 1 sequences tracks for incoming 9th grade students.

The following are brief course descriptions of the different Algebra 1 and related courses. Figure 7 on page 66 displays the placement benchmarks for students at WHS.

- Math Skills 1: a pre-algebra course for the lowest achieving math students entering high school. This course meets every day for the fall semester of the 9th grade year. These students take the Algebra 1 state standardized tests in the spring of their sophomore year.
- Math Skills 2: a pre-algebra course for students who do not need the extent of remedial math in Math Skills 1. Some 9th grade students take this course in the fall semester if they are on the three-semester track, while others take it in the spring semester if they are on the four-semester track. These students take the Algebra 1 state standardized tests at the end of the fall semester of their sophomore year.
- Algebra 1 Lab: this course introduces students to the topics and concepts of Algebra 1 and is the precursor to the Algebra 1 course that carries the

state standardized test. Both 9th and 10th grade students may take this course, but WHS teachers try to separate the grades so that classes are only comprised of either one or the other. There are several different testing windows for the students depending on which Algebra 1 track they are on when they enter WHS.

- Academic Algebra 1: this is the math course that counts toward graduation and passing the state standardized testing awards the verified credit. Depending on their track and their performance in math classes, 9th through 12th graders may take this class.
- Academic Algebra 1 XS: this Algebra 1 course meets every other day over the course of the 9th grade academic year. Most students, upward of 80 percent enrolled take this course as a "redo" to get a better overall grade from their 8th grade year (Noether, personal communication, January 17, 2017).

For students in 8th Grade Math, please recommend for:

a. **Skills Development I (fall)/Skills Development II (spring): Math 8 SOL Score < 370, Map Score < 210**

b. **Skills Development II (fall)/Alg Lab (spring): Math 8 SOL Score 340 – 370, Map Score 210 – 223**

c. **Alg Lab (fall)/Advanced Alg I (spring): Math 8 SOL Score 400 – 420. OR a combination of Math 8 SOL Score 370 – 399 with MAP Score between 223 – 240**

d. **Alg 1 XS (fall): Math 8 SOL Score > 440 OR a combination of a 420 – 440 Math 8 SOL with a MAP Score > 240** (Limit calculator dependency, increase number sense.)

Figure 7. Algebra 1 placement benchmarks for rising 9th grade students.

The Algebra 1 PLC team meets twice weekly on Tuesdays and Thursdays from 10:30 – 11:05AM in Room 103 of the purple hallway. This PLC team is able to meet twice during a school week because the teachers on the team only teach Algebra 1 courses with the exception of Mrs. Germain who teaches one section of Honor Algebra 2. She does not attend the Algebra 2 PLC, but is able to check-in with other Algebra 2 teachers during her planning period (Germain, personal communication, October 28, 2016).

Room 103 is Mrs. Noether's classroom, a very large rectangular room that measures approximately 25" by 15". It has a side room that measures approximately 5" by 15" used for storage. The layout of the room consists of 25 student desks arranged in an arc pattern through the middle of the room. Mrs. Noether's desk is in the back right corner of the room, caddy-cornered from the three wall-mounted whiteboards. The walls and the flooring are primarily white, but colorful posters and a plethora of displayed student work have offset the starkness. A large floor-to-ceiling window looks out onto a forest. During the 2003-2004 academic year, expanded by building the purple hall. Generally, the purple hall houses 12th grade teachers and classrooms.

Because the English 11 PLC only met on Thursdays, I primarily observed the Algebra 1 PLC on Tuesdays. This was also convenient, because all members of the PLC met on Tuesdays. Mrs. Noether did not attend the Thursday PLC sessions because she was remediating Algebra 1 students during PLC time in preparation for the January 2017 state standardized testing session. The Thursday Algebra 1 PLC team met in Room 105, Mrs. Germain's classroom. I

observed the Algebra 1 PLC team ten times between October 18 and December 8, 2016.

Access

I was a social studies teacher at WHS from 2004 through 2010. I returned to teach at WHS in 2012 as a social studies teacher and continue to work there now as the gifted resource teacher. I was a teacher at WHS when the DuFour and Eaker (1998) model of PLC was implemented as part of the daily schedule. Prior to its official school implementation, I was one of three social studies teachers who participated in a workshop held by Rick and Becky DuFour at WHS about establishing PLCs. Currently, I am the Gifted Resource Teacher at WHS as well as the Social Studies Department Chair. I teach one section of AP US History and am a member of the US History PLC team. The US History PLC team was not one of the teams under examination in this capstone study.

Data Collection Methods

Data sources for the case studies included interviews, observations of PLC team meetings, and documents (Marshall & Rossman, 2011; Yin, 2014). Multiple sources of data were used to enhance the credibility of the findings of the capstone study (Marshall & Rossman, 2011; Yin, 2014). Marshall and Rossman (2011) identify four procedures to help ensure the validity and credibility of qualitative research: (1) prolonged engagement in the setting, (2) share data with participants through member checks, (3) triangulate data from multiple sources, and (4) discuss emergent findings with peer debriefing resulting in analyses grounded in the data. This capstone study used all four procedures and I

triangulated data from the interviews, observations, and documents generated by PLC teams to enhance credibility and validity of the findings. I collected data over a 13-week period from October 2016 through January 2017. Yin (2014) notes, "any case study finding or conclusion is likely to be more convincing and accurate if it is based on several different sources of information, following a similar convergence" (p. 120). A full log of all data collected for the interviews, observations, and documents is located in each respective section of this chapter.

Interviews

Interviews are the most typical type of data source collected in qualitative studies (Marshall & Rossman, 2011). The benefits to using interviews as a data source for qualitative research are that the process yields data in quantity quickly and during the process immediate follow-up and clarification are possible (Marshall & Rossman, 2011). Yin (2014) also notes that interviews allow a researcher to target and specifically address case study topics as well as to provide insight into the phenomenon under investigation by providing explanations and personal views of interviewees to understand better their perceptions, attitudes, and meanings. The combination of interviews with observations allows researchers to understand the meanings of everyday activities that people hold (Marshall & Rossman, 2011). The use of interviews is particularly suited for case study research because it allows for the emic perspective to emerge, or how the participant understands the phenomenon of interest to unfold (Marshall & Rossman, 2011). In this capstone study, the purpose of the interviews as a data source was to collect information on the

thought processes of administrators and teachers. Although the interviews were structured, with questions prepared in advance (see Appendices A, B, and C), Yin (2014) implores the researcher to understand interviews as guided conversations rather than structured queries, and therefore follow-up and clarification questions were employed. I designed the sequence of interview questions so as not to lead the teacher and administrator participants' responses (Patton, 2002). This sequence resulted in a specific order of questions, with noncontroversial questions at the start of the interview, followed by questions that are more specific to the phenomenon under investigation (Patton, 2002). Additionally, because Patton (2002) argues that interviews are an intervention because they engage participants in the reflective process that could result in change. The structure of this study attempted to minimize the impact of interviews by scheduling pre- and post-observation interviews directly before and after the observation period so that teacher participants did not change the focus and direction of their PLC team meetings. The interviews geared toward collecting data for research questions 2a and 2b, which focused on the function and purpose of PLC time at WHS and an understanding of the DuFour and Eaker (1998) PLC model. Table 6 on page 72 displays the interview data collection.

I handled the interviews for administrators and teachers differently. I interviewed administrators only once at a convenient point during the duration of the capstone multiple-case study. The interview for administrators was structured, but allowed for follow-up questions and clarification. WHS has four administrators, a principal, an associate principal, and two assistant principals.

Each administrator, with the one exception of an assistant principal whose schedule did not make it convenient to interview, was interviewed independently and the interview sought to understand their emic perspective on the operation of PLC at a school-wide level and the DuFour and Eaker (1998) model in general. The interview protocol for administrators is located in Appendix A.

I interviewed teachers twice. The initial interview occurred at the beginning of the capstone study prior to observations of the PLC teams. The initial interview for teachers was structured, but allowed for follow-up questions and clarification. It sought to collect demographic data about the teacher's professional experience, their experiences with PLCs, and their knowledge and understanding of the DuFour and Eaker (1998) model of PLC. The interview protocol for the initial teacher interview is located in Appendix B.

The second interview of teachers occurred at the conclusion of the unit of study in January 2017. It was semi-structured to allow for open-ended, reflective questions on how the PLC team meetings influenced instruction and assessment during the unit of study, as well as successes, limitations, strengths, and weaknesses of the DuFour and Eaker (1998) model of PLC. The concluding interview protocol for teachers is located in Appendix C.

All in-person interviews were audio recorded and transcribed, as is best practice in qualitative research (Marshall & Rossman, 2011). During the transcription, I removed all personally identifiable information and assigned pseudonyms to preserve the confidentiality of the participants and the schools.

Table 6

Data Collection – Interviews

Participant (Course)	Number of Interviews	Interview Dates
Mr. Roth (English 11)	2	Pre-Observation: 10/14/16 Post-Observation: 1/3/17
Mrs. O'Connor (English 11)	2	Pre-Observation: 10/13/16 Post-Observation: 1/3/17
Mrs. Cather (English 11)	2	Pre-Observation: 10/12/16 Post-Observation: 1/3/17
Mrs. Wharton (English 11)	2	Pre-Observation: 10/12/16 Post-Observation: 1/3/17
Ms. Lee (English 11)	2	Pre-Observation: 10/13/16 Post-Observation: 12/8/16
Mrs. Noether (Algebra 1)	2	Pre-Observation: 10/13/16 Post-Observation: 1/4/17
Mr. Descartes (Algebra 1)	2	Pre-Observation: 10/12/16 Post-Observation: 1/4/17
Mr. Boole (Algebra 1)	2	Pre-Observation: 10/12/16 Post-Observation: 1/4/17
Mrs. Germain (Algebra 1)	2	Pre-Observation: 10/14/16 Post-Observation: 1/4/17
Mr. Nash (Algebra 1)	2	Pre-Observation: 10/12/16 Post-Observation: 1/4/17
Ms. Lovelace (Algebra 1)	2	Pre-Observation: 10/21/16 Post-Observation: 1/6/17
Mr. Babbage (Algebra 1)	2	Pre-Observation: 10/12/16 Post-Observation: 1/6/17
Administrator A	1	12/8/16
Administrator B	1	12/16/16
Administrator C	1	12/8/16

Observations

According to Marshall and Rossman (2011), observations are "the systematic noting and recording of events, behaviors, and artifacts (objects) in the social setting ... that are used to discover complex interactions in natural social settings" (pp. 139-140). Observations are fundamental to qualitative research and reflect a highly important method of data collection (Marshall & Rossman, 2011; Yin, 2014). The observations of PLC team meetings occurred after the initial teacher interviews, weekly, from the week of October 10 through the week of December 5, 2016. Because the interpretation of actions and interactions is difficult, the intersection of interviews and observations in this capstone study is representative of best practices in qualitative research (Marshall & Rossman, 2011). Initially, observations were open-ended in order to allow the possibility to discover recurring patterns of behaviors and relationships. During the observational period, through analysis of field notes, I identified and described patterns. The observation protocol was amended to be more formal and include checklists of these patterns (Marshall & Rossman, 2011).

During the observations of the PLC team meetings, the researcher kept field notes. The field notes included data on the setting, the participants, activities and interactions, conversations, and the presence of the researcher (Marshall & Rossman, 2011). The structure of the observation protocol, located in Appendix D, allowed for strict observational notes as well as observer comments. In the best effort to gain immersion in the settings, the role of the researcher was participant as observer (Yin, 2014). In order to counterbalance

the reflexivity of observations, the researcher attended multiple PLC team meetings over 10 weeks. The observations collected data for all research questions, but in particular, 1a and 1b, which focus on the function and purpose of PLC time at WHS. I took the field notes by hand and typed them up the same day. The field notes did not include personally identifiable data as to preserve the confidentiality of both the participants and the schools. Table 7 below displays the observation data collection.

Table 7

Data Collection – Observations

PLC Team	Number of Observations	Observation Dates
English 11	6	10/13/2016 10/20/2016 11/03/2016 11/10/2016 11/17/2016 12/01/2016
Algebra 1	10	10/18/2016 10/25/2016 10/27/2016 10/28/2016 11/01/2016 11/15/2016 11/22/2016 11/29/2016 12/06/2016 12/08/2016

Documents & Artifacts

The third and final method of data collection was the gathering of documentation produced by or related to the PLC team meetings. Documentation, in conjunction with interviews and observations, allows for the corroboration and augmentation of evidence (Yin, 2014). Documents also allow

background information to be collected on the organization and phenomenon under study without disrupting the setting while the researcher is participant as observer (Marshall & Rossman, 2011). Additional strengths of documentation collection are that the artifacts are stable and can be reviewed repeatedly; they are unobtrusive, as they not created as a result of the case study; and they can be helpful in painting broad and specific strokes about the values and beliefs of participants and a greater understanding of the organization or phenomenon under investigation in the case study (Yin, 2014). Documents allow the researcher to make inferences, but must be carefully aware of his or her positionality that colors the interpretation of the document (Marshall & Rossman, 2011; Yin, 2014).

For this capstone study, the documents collected were PLC meeting agendas and minutes, data analysis memos and reports, administrative documents, lesson plans, assessments, and e-mails. I logged the collected documents by date and PLC team (See Table 8 below). The purpose of collecting the documents allowed for collecting data for all research questions. I scrubbed the documents reviewed of any personally identifiable data to preserve participant confidentiality.

Table 8

Data Collection – Documents

PLC Team	Observation Date	Document Collected
English 11	10/13/2016	WIDA student list WIDA accommodations list E-mail follow-up from ESOL teacher
	10/20/2016	Body Biography assignment
	11/03/2016	Audience/Tone/Purpose/Voice PowerPoint presentation Allusion PowerPoint presentation
	11/10/2016	Midterm Terms Google Doc
	11/17/2016	Business Writing Unit – Work Keys Google Doc Reading Showcase Words & Phrases
	12/01/2016	None
Algebra 1	10/18/2016	WIDA student list WIDA accommodations list Algebra 1 Unit 2 Test Matrix Report Algebra 1 Pacing Guide
	10/25/2016	Algebra 1 Midterm Exam
	10/27/2016	Midterm Reflection e-mail from Mrs. Noether
	10/28/2016	Algebra 1 Unit 3 draft assessment
	11/01/2016	Algebra 1 Unit 3 Pacing Calendar WHS Midterm Exam Bel Schedule
	11/15/2016	Algebra 1 Unit 3 draft assessment, second version

11/22/2016	Algebra 1 Unit 3 assessment in online testing format Algebra 1 Unit 3 assessment, Plain English format
11/29/2016	Algebra 1 Unit 3 assessment review packet Student Performance by Question category analysis
12/06/2016	Algebra 1 Unit 3 Test Matrix Report
12/08/2016	Algebra 1 Final Exam planning Google Doc Rising 9th Grade Math Placement documents

Summary of Data Collection Methods

I used multiple methods of data collection in this capstone study in order to be able to triangulate data to support findings. Prior to observations, the researcher interviewed teachers. Interviews of the administrators took place in December 2016 near the end of the PLC team observational period. I conducted PLC team observations twice a week, the English 11 PLC team on Tuesdays and the Algebra 1 PLC team on Thursdays. I held a second round of reflective teacher interviews after the final PLC team observations in January 2017, concomitant with the end of the unit of study. I collected documents and artifacts during the observation period. A log of all collected data is presented in Table 6 on page 72, Table 7 on page 74, and Table 8 on pages 76-77.

Data Analysis Methods

I conducted data collection and data analysis simultaneously during this capstone multiple-case study (Miles, Huberman, Saldaña, 2014). The data

analysis methods utilized in this capstone study are the ones offered by Miles et al. (2014): data condensation, data display (including analytic memos), and conclusion drawing/verification.

Data Condensation

The beginning of the data analysis process is, according to Miles et al. (2014), data condensation (See Figure 8 on page 82). They define data condensation as, "the process of selecting, focusing, simplifying, abstracting, and/or transforming the data that appear in the full corpus (body) of written-up field notes, interview transcripts, documents and other empirical materials" (Miles et al., 2014, p. 12). This process occurs continuously throughout the study through summaries, codes, and analytic memos, which allows the researcher to clarify and organize data to draw conclusions.

During the process of this capstone multiple-case study, I took field notes during interviews and PLC team meetings. I typed these notes the same day when these events occurred. These events were also audio-recorded, and then transcribed by a reputable online transcription service. I then merged the typed field notes and the transcriptions into a single document and wrote a reflective summary to create a full record of each event. I used hand-coding analysis on all interview notes and transcripts, field notes of PLC team observations and transcripts, and documents and artifacts. The inductive analysis that I used to locate recurring patterns in the data began with start codes developed from the theoretical and conceptual frameworks and the literature review, which Table 9 on page 79 displays.

Table 9

Start codes

Code	Definition	Description
DE – M, V, V	DuFour & Eaker – Mission, Vision, Values	Reference or connection made to the mission, vision, or values of BSD or WHS.
DE – I	DuFour & Eaker – Collective Inquiry	Seeking, testing, or reflecting on new methods
DE – C	DuFour & Eaker – Collaborative Teams	Team learning
DE – A	DuFour & Eaker – Action or Experimental Orientation	Developing and testing hypotheses
DE – CI	DuFour & Eaker – Continuous Improvement	Focus on purpose and achievement
DE – R	DuFour & Eaker – Results Orientation	Engaged with tangible results

After the first observation of the English 11 and Algebra 1 PLC teams, I began to populate a list of additional, emergent codes that provided meaning for my research questions by reading through the combination field notes and transcripts and categorizing the data into patterns, trends, and themes. This open coding process allowed me to develop distinct concepts and categories in the data. By using start codes and allowing for emergent codes, Miles et al. (2014) argues that these deductive and inductive processes allow for strong data analysis. As the capstone study progressed, the status of codes developed: some codes combined, new codes emerged and some deleted. I used analytic memos to record modifications to the coding process and registered them in the study's comprehensive methodological log. As I collected data and coded it with my start

codes and emergent codes, the interplay of both types of codes resulted in the development of pattern codes (Miles et al., 2014). Pattern codes are, "categories or themes, causes/explanations, relationships among people, or theoretical constructs" (Miles et al., 2014, p. 87). The capstone study's pattern codes detailed over the course of several analytic memos and recorded in the study's methodological log. In order to member check, I shared the start and emergent codes and my thinking behind their development with the participants. Additionally, a peer reviewer met with me to discuss the codes and their definitions as well as reviewing coded field notes and interview transcripts. A listing of start, emergent and pattern codes is available in Appendix F.

Data Display

The visual display of data and the decisions that researchers make on the creation and use of displays is part of the process of analysis, according to Miles et al. (2014). Data displays may take the form of matrices, graphs, or charts to help organize the data to allow the researcher to make sense of it and draw conclusions in meaningful ways (See Figure 8 on page 82). I used matrices and charts for this capstone study because they conducted both the descriptive nature of the qualitative research questions and the chronological approach to the focus and progress of PLC teams. As with the coding process, I used analytic memos in conjunction with the matrices and charts to capture the analytical and organization process of seeing the data. The combination of the list of codes, the analytic memos, and the charts and matrices served as the basis for the findings outlined in Chapter 4. I shared the charts, matrices, and analytic memos

regarding data display with a peer reviewer to demonstrate the clarity and logic of my analytical process.

Conclusion Drawing & Verification

Conclusion drawing, like developing codes and displaying data, is an iterative process and the final analytic process of this capstone study (See Figure 8 on page 82). I began to think about conclusions before I immersed myself in the setting, due to my extensive experience as a member of various PLC teams, but I held those conclusions with healthy skepticism and recorded my thinking in analytic memos. According to Miles et al. (2014), the tactics for drawing conclusions are making meaning including counting, noting patterns, and themes, and making conceptual coherence. When the final pattern codes were developed, I used counting to examine all of the PLC team meetings to identify the frequency of each pattern code. I developed charts and matrices over the course of observations and interviews of the participants to help outline visible patterns in the data. During all steps of these analytical processes, I constantly returned to the conceptual framework that informed this study. It was at this point that I fulfilled the state of substantiation, which Miles et al. (2014) refer to as verification, the full immersion by a researcher in his or her data corpus. The display of analytic memos, charts, and matrices influenced the achievement of conclusion drawing and verification.

Summary of Data Analysis Methods

Data collection and data analysis occurred simultaneously during this capstone study (Miles et al., 2014). As I collected data, it condensed by using

both start codes and emergent codes, followed by pattern codes. I employed analytic memos and data displays via charts, clusters, and matrices to pinpoint relationships in the data in order to draw and verify of conclusions. The visual represented in Figure 8 below is the outline of the data analysis methodology for this capstone study, based on the work of Miles et al. (2014). A methodological log documented all decisions related to data collection and analysis. I used a peer reviewer along all steps of the data collection and analysis process; participants perform member checks frequently during the process. Through the process of data analysis, the researcher sought triangulation of evidence from multiple sources in order to verify conclusions and search for both confirming and disconfirming evidence of the findings (Marshall & Rossman, 2011; Miles et al., 2014; Yin, 2014). These case studies were analyzed and presented both within-case and across-cases.

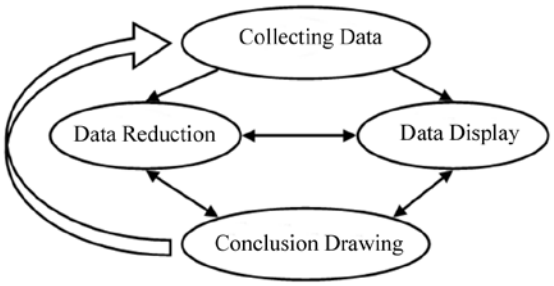


Figure 8. Components of Data Analysis: Interactive Model (Miles, Huberman, & Saldaña, 2014, p. 14). This figure illustrates the interactive nature of the qualitative data analysis process.

Standards of Quality

One way to assess the goodness or trustworthiness of a qualitative research report as defined by Guba and Lincon (1994) is comprised of credibility, transferability, dependability, and confirmability. This capstone multiple-case study attempted to maximize trustworthiness by reacting to each of the factors.

Credibility

Credibility refers to both whether or not the findings of the study make sense and as to whether or not the portrait of the phenomenon under investigation is authentic (Miles et al., 2014). In order to maintain the credibility of this capstone study, the researcher utilized several techniques identified by Marshall and Rossman (2011), Maxwell (2008), and Yin (2014): immersion in the setting, triangulation of data, member checks, and peer debriefing. In order to immerse myself, I spent 10 weeks in the research setting, interviewing administrators and then teachers twice as well as attending weekly PLC meetings over the course of a unit of study. Additionally, I have been a faculty member at WHS since the 2004 academic year and all participants were very familiar with me. I based the findings of the case study on the interviews, observations of PLC team meetings, and document and artifact analysis. Because this study was of multiple cases, additional credibility and robustness of findings is likely. Additionally, when applicable teachers shared their PLC team meeting minutes and the researcher shared his observation notes and analytic memos to confirm a convergence of perception. By incorporating these member checks, the teachers who were participants in this study hopefully will be more willing to accept

recommendations based on the findings. Lastly, I had the assistance of a disinterested peer, who is a doctoral student at a different university, to engage in analytical sessions as peer debriefing. This activity helped explore all aspects of the study, especially those that may have become numb or dulled to the researcher by saturation. Merriam (2009) states that data from a study achieves saturation when nothing new arises during data collection. Because data collection and analysis occurs simultaneously, I clearly identified data saturation and data collection beyond that point confirmed saturation.

Transferability

Transferability attests to the instance when the results of a study have applicability in other contexts (Cohen & Crabtree, 2006). Transferability is not equivalent to generalizability; as Yin (2014) notes, a case study report is not attempting to create inferences about a population, and rather it presents findings that may apply to similar settings and participants. Furthermore, Maxwell (2008) notes that transferability often results from the development and extension of a theory than can be extended to other cases. A barometer for establishing the transferability of a research study is using rich or thick description (Cohen & Crabtree, 2006; Maxwell, 2008). The use of rich description allows consumers of the research report to make determinations as to whether or not their experience and the experience detailed can be transferred (Cohen & Crabtree, 2006). In this study, I used thick, rich description of what I heard and observed when taking field notes of PLC team meetings and during the interviews. I also used transcripts of the audio recording of observations and

interviews to supplement this portion of the data corpus by adding details and making it more comprehensive. I shared these field notes with both PLC team members and my disinterred peer reviewer in order to gauge the level of detail and comprehensiveness. Excerpts from the field notes and interviews are included in Chapter 4.

Dependability

The dependability of a study rests on whether or not the findings are consistent with the data collected and the inquiry could be repeated (Cohen & Crabtree, 2006). Miles et al. (2014) list several aspects for researchers to consider when addressing dependability: clear research questions, a congruent design, explicit discussion of the researcher's role, findings are parallel across data sources, the study and its findings are connected to theory, and peer reviews are put in place. For the purpose of dependability in this capstone study, the capstone committee served to audit the structure, process, and components of the study. Additionally, the Institutional Review Board (IRB) process assigned me an advisor who edited and audited the observational and interview protocols as well as the letter of consent. Additionally, as mentioned previously under credibility, I engaged with a peer reviewer in an external audit of the process and product of the study (Cohen & Crabtree, 2006). The peer reviewer and I met in-person and communicated via e-mail almost weekly. The peer reviewer provided me feedback on my process of data collection and analysis and the products that I was forming. Field notes and transcripts, interview notes and transcripts, codes

and coding, analytic memos, the methodological log, and findings were all accessible to the peer reviewer.

Confirmability

Confirmability refers to the neutrality or lack of researcher bias in a study (Miles et al., 2014). Cohen and Crabtree (2006) define confirmability as, "a degree of neutrality or the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation, or interest." Miles et al. (2014) present several points in order to establish confirmability: methods and procedures described explicitly and in detail; the path of data analysis is paved; conclusions linked to data; the researcher expressed reflexivity; both confirming and disconfirming evidence are considered; and data is available for others to review and reanalyze. The previous sections of this chapter detail the aforementioned checks by Miles et al. (2014). Additionally as part of my methodological journal that attended to both data collection methods as well as data analysis methods, I kept a running, chronological log of my reflections. After each interview and observation, I included a section to document my reflections. I transferred all of my reflections over the course of this study into the full methodological log for continual review by the peer reviewer and myself. Furthermore, my capstone committee and peer reviewer were very helpful from the proposal stage through the final report in helping me see my biases, assumptions, and role as a researcher and crafting language to relay that to the readers of this study.

Ethical Considerations

Davies and Dodd (2002) argued that "ethics are an essential part of rigorous research ... ethics are more than a set of principles or abstract rules that sit as an overarching entity guiding or research ... ethics exist in our actions and in our ways of doing and practicing our research" (as cited in Marshall & Rossman, 2011, p. 44). The most significant ethical consideration of this capstone study is keeping the identity of the participants and research setting confidential. In order to preserve this confidentiality, I scrubbed any personally identifiable information from the collected interviews, observations, and documents and artifacts. Additionally, each participant received a pseudonym. This process prevents any reader of the report from identifying the research site and participants. Furthermore, this capstone study was subject to the recommendations of the capstone committee and the Institutional Review Board (IRB) at the University of Virginia. IRB at the University of Virginia approved the proposal for this study on October 5, 2016. As is protocol with IRB, I provided all participants informed consent forms that outline the study and any associated risks (see Appendix E). In addition to IRB at the University of Virginia, the principal of WHS gave consent to the study on October 6, 2016 and the central office department for research in BSD consented to the study on October 7, 2016.

During the course of this study, I did disclose the purpose of the study, but not give the particular research questions to the participants. Additionally, no participants, including administrators saw the raw data corpus. Recommendations made in Chapter 5 are not specific to teachers or PLC teams,

but to the generalized process and results. The only foreseeable risk to this study was a loss of confidentiality. All participants and the research site were assigned pseudonyms and the geographic location of the school and school district was highly generalized. In order to further protect this confidentiality, all word-processed materials related to this capstone study are stored in a password-protected file on a password-protected computer. The audio recordings of participant interviews and PLC team observations are also stored in a password-protected file on a password-protected computer. At the final approval of this capstone study, I will destroy all audio recordings. Ideally, any participant discomfort is outweighed by the opportunity to member check, receive recommendations for improvement of practice, reflect on their current practices, and become more knowledgeable about the DuFour and Eaker (1998) PLC model.

Researcher Bias and Assumptions

In a qualitative research study, Marshall and Rossman (2011) argue that it is important for researchers to "come clean with assumptions, any prior observations or associations that might influence research, and any personal connections and histories that could be useful, or, conversely, could be seen as harmful bias" (p. 97). Because the researcher's role in this capstone study is participant as observer, it is impossible to subdue personal biases and assumptions. I was a social studies teacher at WHS when the DuFour and Eaker (1998) model of PLC was implemented as part of the daily schedule. As a member of the social studies department, I had the opportunity to take a

workshop with the DuFours in the philosophy and practical functioning of PLC teams. I participated as a member of several different PLC teams at the school and school district level between 2004-2010 and then again since 2012. Currently, I am the Gifted Resource Teacher at WHS as well as the Social Studies Department Chair. I also teach one section of AP US History and am a member of the US History PLC team. Neither the US History PLC team nor any social studies PLC team was not under examination in this capstone study. These experiences peaked my interest in exploring PLC. I have a strong interest in the theoretical and conceptual frameworks of PLC and see value in improving and sustaining the PLC model at WHS. Finally, I have an already established professional relationship that is non-evaluative with the participants in the study, which will continue after the conclusion of the capstone study.

Summary

This capstone study is a multiple-case study of two PLC teams in a single school. The data collection methods included interviews, observations, and document and artifacts. Data analysis was based on the Miles et al. (2014) framework of data condensation, data display and conclusions drawing/verification (See Figure 8 on page 82). This capstone study addresses the four components of Guba and Lincoln's (1994) trustworthiness: credibility, transferability, dependability, and confirmability. I have clearly delineated ethical considerations, in particular of confidentiality. The researcher has made plain his biases and assumptions. In the next chapter, I present the analysis and findings of this capstone study.

Analysis and Findings

This capstone study explored how teachers at Wheatland High School (WHS) used their weekly PLC time, the focus of the PLC meetings, and the PLC team's adherence to the DuFour and Eaker (1998) model of PLC. The findings and recommendations that resulted from this case study provide WHS with information about its practices to help the organization make informed decisions. The following research questions guided this capstone study:

1. How is the weekly PLC time used?
    a. How do teachers perceive the use of PLC time?
    b. Does the planning time vary by discipline?
2. What is the current focus of the PLCs at WHS?
    a. In what ways do the PLCs reflect the original focus – standardized tests scores?
    b. Does the current work of the PLCs reflect the principles of the DuFour and Eaker (1998) model?

In this chapter, I first describe the participants and setting through vignettes of typical PLC team meetings for English 11 and Algebra 1, as well as the unit of study that occurred in each discipline during my observation period. Following the vignettes, I explore the findings that resulted from my data collection and

analysis. I present implications and recommendations based on the findings in Chapter 5.

Teachers, regardless of discipline, are allotted time for PLC meetings twice weekly. The WHS administration scheduled and assigned PLC team meeting days and times for the 2016-2017 academic year (see Table 3 on page 60). This change was significant because the PLC schedule for departments shifted from being very flexible for teams to meet twice a week to a rigid structure of assigned days to allow for greater accountability. The administration's reasons behind the schedule change included the following: 1) improve the ability for administrators to participate, 2) maximize the ability of special education teachers to participate, 3) increase the ability of teachers who have 2 or more PLC teams to participate, 4) increase accountability, and 5) attempt to balance the number of teachers in PLC versus the number of students who are being remediated by teachers not in PLC team meetings (WHS administration, personal communication, February 25, 2017). Each PLC team meeting is 35 minutes long, running from 10:30-11:05AM. On the days when teachers do not have PLC team meetings, they work with their current students in a remedial period. In a regular five-day school week, teachers have 70 minutes of PLC time and 105 minutes of remediation time with their students.

English 11

The English 11 PLC team met on Thursdays. For two of the members, Mr. Roth and Mrs. Cather, English 11 is the only PLC team to which they belong. Mrs. O'Connor, however, is also a member of the 12th grade English PLC team.

Mrs. Wharton, a special education teacher, also participates in 9th grade and 12th grade English PLC teams. I observed the English 11 PLC team six times between October 13 and December 8, 2016. Twice during this span of observation (October 27 and December 8), there was an English-wide department meeting that I did not observe, and then school was closed on Thursday November 24 in observance of the Thanksgiving holiday. Next, I present a description of the unit of study that occurred in English 11 while I observed their PLC team meetings followed by a vignette of a typical English 11 PLC team meeting.

Unit description

The basis of commonality amongst the different academic levels of English 11 was the *skills* that the teachers presented and not the *content*. Both Mrs. O'Connor and Mrs. Cather situated their units in the literature of the American Revolution and the Early Republic of the United States, but they utilized different texts leveled appropriately to the academic tracks of their students (O'Connor, interview, January 3, 2017). Mrs. Cather, who teaches the Standard and Academic levels of English 11, had her students read *The Scarlett Letter* (Cather, interview, January 3, 2017). Mrs. O'Connor elected to use a series of Young Adult genre novels about slavery and indentured servitude (O'Connor, interview, January 3, 2017). Mr. Roth's unit revolved around the theme of the family, was not chronologically placed during the American Revolution and the Early Republic of the United States, and utilized a collection of fiction and non-fiction works, which he did not identify (Roth, interview, January 3, 2017). The skills that were common amongst the teachers during their respective units was the

collection of 30 literary terms culled from the state curriculum framework and were likely to be included on the end-of-course state standardized test (see Table 10 below).

Table 10

Sample Common English 11 Literary Terms

Term	Definition	Example
Personification	Giving non-human humanlike features.	"My heart jumped for joy."
Apostrophe	Turning away from the conversation to an item or a person who is not present.	The chorus sings "Alexander Hamilton, America sings for you," even though he is not onstage.
Onomatopoeia	A word used to describe a sound.	BOOM.
Word Root	Parts of the word that hint at its biography or meaning.	Chronos = time; numer = number. Mono = one; dia = two; pre = before; post = after.
Analogy	Using a small story or symbol to explain a larger story or symbol.	Hamilton uses the hurricane as an analogy to describe the chaos in his life.

Mrs. Cather and Mrs. O'Connor used both the core unit texts as well as lyrics from the musical "Hamilton" to help students identify and understand the literary terms (O'Connor, interview, January 3, 2017). Mr. Roth presented the

different terms in conjunction with the fiction and non-fiction texts of his unit on the family (Roth, interview, January 3, 2017).

Vignette 1 describes a typical weekly PLC meeting of the English 11 team of Mrs. O'Conner, Mrs. Cather, Mr. Roth, Mrs. Wharton, and Ms. Lee. I based the vignette on my field notes collected during the case study.

The bell rings at 10:25AM ending first period on Thursday. Students leave their classes and if they have an assignment for the remediation period that begins at 10:30 and runs until 11:05AM, they report to that teacher's room, otherwise they congregate in common areas like the Media Center, Cafeteria, or Gymnasium. Teachers who do not have a remediation period with students on Thursday mornings, such as the members of the English 11 team, report to their PLC location. For the English 11 team, they meet in the teacher workroom in the upstairs red hallway because it is a convenient space for all members whose classrooms are in the red hallway. The workroom is the size of a small classroom, and houses six teacher cubicles. There is also a common space that includes a small kitchenette, a work center with a printer, and a round table with chairs.

I leave my classroom in the downstairs purple hallway, which borders the red hallway, and head to the upstairs red teacher workroom. I arrive a few minutes before 10:30 to get set up for my observation so as not to distract or disrupt the beginning of the meeting and I am usually the first person in the room. In rapid succession, Mrs. Wharton and Mrs. O'Connor arrive, who have both just had a planning period. Mr. Roth and his student teacher Ms. Lee

arrive together, also having just had a planning period. Mrs. Cather is usually the last to arrive; her first period class on Thursdays is an Academic English 11 class.

The English 11 PLC team meetings tend to follow the same structure each week, although members do not usually send an agenda in advance. For the first several minutes of the PLC team meeting, the teachers catch-up about the progress of the week as well as checking-in with each other regarding personal matters. When all members have had a chance to offer personal thoughts, the team members transition to a roundtable sharing session where they recount the lessons and activities that they are currently implementing, as well as what is on the horizon for their classes. Mrs. Cather, who is new to WHS and to teaching English 11, is usually the first teacher to share. She is also eager to ask probing questions of the other teachers about ideas for activities or ways to modify the lessons she is putting in place. Ms. Lee, a student teacher, is also very eager to participate and seek the advice of her colleagues. For most of my observation period, Ms. Lee has been leading the Honors English 11 classes that she and Mr. Roth share, and her comments during the PLC meetings suggest that she has wide latitude to implement lessons and activities. Mrs. O'Connor is not always present at the English 11 PLC team meetings as she has a competing PLC team meeting with English 12, but when she attends, she readily shares out about her Honors English 11 class. Additionally, as the department chair, she occasionally shares pertinent school information. Less participatory are Mrs. Wharton and Mr. Roth, probably due to their English 11 partnerships. Mrs.

Wharton is the special education collaborative teacher with Mrs. Cather, and Mr. Roth sponsors Ms. Lee's student teaching internship. Occasionally there is a predetermined agenda item for the meeting, such as when the ESOL teacher visited to discuss student-testing accommodations, but otherwise this professional sharing takes up the bulk of the PLC team meeting time.

Near the end of my observational period, as the school calendar approached winter break, the English 11 PLC team shifted his focus toward the common midterm examination. The team made decisions about the exam's format, delivery, and content through discussion, but the actual creation of the assessment happened outside of the PLC team meeting during common planning periods shared by Mrs. O'Connor and Mrs. Cather.

The English 11 PLC team meetings usually ran until the bell sounded for the start of second period. Often teachers would linger after the bell to finish conversations about instructional activities, or to finish a personal conversation that started earlier in the meeting and was unfinished. The atmosphere of the English 11 PLC team meetings was warm and collegial.

In the next section, I present my schedule of observations of the Algebra 1 PLC team, a description of the unit of study that I observed, and a vignette that describes a typical Algebra 1 PLC team meeting.

Algebra 1

The Algebra 1 PLC team met on both Tuesdays and Thursdays, but because the English 11 PLC only met on Thursdays, I primarily observed the

Algebra 1 PLC on Tuesdays. This was also convenient, because all members of the PLC met on Tuesdays. Mrs. Noether did not attend the Thursday PLC sessions because she was remediating Algebra 1 students during PLC time in preparation for the January 2017 state standardized testing session. The Thursday Algebra 1 PLC team met in Room 105, Mrs. Germain's classroom. I observed the Algebra 1 PLC team ten times between October 18 and December 8, 2016.

Unit Description

The unit of study that I observed during my observations of the Algebra 1 PLC team was on solving equations and inequalities (see Figure 9 on page 98). This content included solving single and multiple-step equations as well as graphing those equations. The Algebra 1 teachers reconfigured this unit after the 2015-2016 academic year. The teachers made the adjustment based on the focus of the state standardized end-of-course tests. Previously "solving multiple-step equations and inequalities" was a separate unit taught at the beginning of the second semester. For the 2016-2017 academic year, the "Solving Multiple-Step Equations and Inequalities" unit merged with the beginning portion of the unit entitled "Solving Linear Equations" and became the third of four units in the first semester of the Algebra Lab and Algebra 1 XS classes (see Figure 10 on page 98).

Algebra 1 Pacing Guide (Fall 2015)

A.4.b, d, f 1 - 2 Days	**Unit 4: Solving Multi-Step Equations and Inequalities** **4.1 Solving Multi-Step Equations without Fractions** **Key Concepts:** ✓ Understand and apply the axioms of equality and inverse properties ✓ Understand how to check their solution for accuracy ✓ Translate verbal to algebraic sentence and solve real world application **Key Questions:** ? What does the solution to an equation represent? ? What is the difference between and equality property and the inverse property?	
1 – 2 Days	**4.2 Solving Multi-Step Equations with Fractions** **Key Concepts:** ✓ Understand how to eliminate fractions by finding a LCM ✓ Understand how to add and subtract fractions ✓ Understand how to apply cross multiplying to solve equations and when it is appropriate **Key Questions:** ? How do you eliminate fractions? ? How do you add and subtract fractions? ? When can you apply cross multiplication to solve equations?	
2 Days	**4.3 Solving Multi-Step Equations with Distributing and Fractions** **Key Concepts:** ✓ Understand how to distribute a fraction ✓ Understand how to combine like terms	
2 – 3 Days	**4.4 Solving Multi-Step Equations with Variables on Both Sides** **Key Concepts:** ✓	
A.5.a - c 2 – 3 Days	**4.5 Solving Multi-Step Inequalities** **Key Concepts:** ✓ Understand when to change the direction of the inequality. ✓ Real world application	

Figure 9. Solving Multi-Step Equations and Inequalities unit moved from start of second semester to end of first semester.

20 – 26 Days	**Unit 2 Test** Move Solving equations here (10 days)	
4.b 1 Day	**Unit 3: Solving Linear Equations** **3.1 Justify properties and axioms of equality** **Key Concepts:** ✓ Understand the difference between properties and axioms ✓ Apply the properties and axioms as 'proofs' when solving literal equations. **Key Questions:** ✓ What are the 4 axioms of equality? ✓ What is the difference between an identity and an inverse? ✓ Give examples of the reflexive, symmetric and transitive properties.	
4.a 3 days unit 3 Test	**3.2 Solve Literal Equations to include proofs** **Key Concepts:** ✓ Understand Wrapping and Unwrapping ✓ Apply the properties when solving	
3 Days	**3.3 Graphing Linear Equations through tables** **Key Concepts:** ✓ The x and y in an equation represent any point on the graph of a line	**Incorporate connected math**

Figure 10. Original third unit reconfigured to incorporate solving multi-step equations and inequalities for the 2016-2017 academic year.

Vignette 2 describes a typical weekly PLC meeting of the Algebra 1 team of Mrs. Noether, Mrs. Germain, Mr. Boole, Mr. Descartes, Ms. Lovelace, Mr.

Wharton, and Mr. Babbage. I based the vignette on my field notes collected during the case study.

The Algebra 1 team meets in Mrs. Noether's classroom, P103, which is on the first floor of the purple hallway. The classroom is very large, rectangular in shape, with a walk-in storage room. Over the years at WHS, P103 has been a computer lab, the yearbook room, the gifted resource room, but now it is a math classroom.

My classroom and office are directly across the hall from Mrs. Noether's room. I arrive immediately after the 10:25AM bell that ends first period. Mrs. Noether is usually working with one of her students explaining a concept, or talking with a student about a matter at her desk. I setup my audio recorder and note-taking protocol in the back of the room at a standing café table. By the time the 10:30AM bell rings, all of the members of the Algebra 1 PLC team have arrived and are setup for their meeting. On several occasions during my observational period, the WHS assistant principal who oversees the math department attended the PLC team meeting.

Mrs. Noether begins the Algebra 1 PLC team meeting promptly at 10:30AM each Tuesday. The agenda for each meeting is loosely set at the end of the previous meeting and then solidified and e-mailed by Mrs. Noether on the Friday before the meeting. Usually first on the meeting agenda is a dissemination of school and department information pertinent to teachers. After that informational introduction, the Algebra 1 PLC team moves on to working through the creation of the common assessment at hand. For most of

my observational period, the Algebra 1 PLC team was creating their Unit Three assessment on solving linear equations and inequalities. They began the process by comparing their course-pacing guide to the student performance by question analysis sheet provided by the WHS testing coordinator. These sheets are reflective of the most recent testing cycle, summer 2016, and prove to be an invaluable resource in designing assessments that mirror the state end-of-course ones. This is also an effort by the team to ensure that their pacing emphasis reflects the testing emphasis of the state end-of-course assessment. After they are satisfied with the revisions to the pacing guide, they distribute assessment question topics and create or find problem sets to contribute to a shared Google doc. In subsequent meetings, they work through the questions and answers, making sure that they are providing respective topical coverage to the pacing guide, and discussing question difficulty. One test construction topic constantly debated by the group is what percentage of the assessment is cumulative to past units so that students are constantly engaging in "old" material. This process of vetting the test material often spans over multiple PLC team meetings and when completed the meeting focus shifts to the delivery of the assessment via the online testing platform.

The teachers at WHS have access to an online testing platform, and the Algebra 1 PLC makes wide use of it to deliver all summative assessments. During the current 2016-2017 academic year, the PLC team adopted the goal of using the online testing platform to mimic question presentation on the state end-of-course assessment. One example of this shift is to incorporate multiple-

response questions on the unit assessments. The Algebra 1 PLC team utilized central office staff from BSD to become more knowledgeable and proficient in the online testing platform. Beginning with the Unit Three assessment, the Algebra 1 teachers were able to incorporate multiple-response questions into their summative assessments.

In the last ten minutes of the PLC team meeting, the members will divert their attention from assessment design to instructional sharing. It is common for the veteran teachers to share project ideas with the newer teachers as a method for reinforcing concepts and skills with real-life application. One project that is widely discussed is "Slope in Real Life." For this project students find examples of slopes at WHS, calculate them, and then present them in digital format. The teachers are positive when they talk about sharing resources. The Algebra 1 team also has a common repository of curricular, instructional, and assessment resources through an online file management system.

The Algebra 1 PLC team meetings end with a recap of their daily accomplishments and a look ahead to what the next meeting will bring. The Algebra 1 team keeps a steady pace of productivity for the duration of their meeting. There was virtually no wasted time and the team handled agenda matters efficiently. Unlike the English 11 PLC team, Algebra 1 members do not linger after the bell rings at 11:05.

This PLC team meeting, in addition to the English 11 PLC team meeting, was part of the professional expectations of teachers at Wheatland High School. The focus of this multiple-case study is PLC at Wheatland High School. I was

highly interested in whether PLC teams reflected the DuFour and Eaker (1998) model that BSD initially implemented beginning during the 2003-2004 academic year. The PLC teams did reflect certain aspects of the DuFour and Eaker (1998) model, but only to a small extent, and it varied between the English 11 and Algebra 1 teams. When the PLC teams reflected aspects of the DuFour and Eaker (1998) model it was because of other factors, not due to any awareness of the model. In the next section of this chapter, I present the findings and the data analysis that led to them.

Findings

The findings of the case study are the outcome of careful, rigorous analysis guided by the research questions. In this section, I present the findings (see Table 11 below) and the data analysis that led to them and situate the findings in the conceptual framework of the study (see Figure 2 on page 10).

Table 11

Summary of Findings

	Findings
Finding 1	PLC team meetings at WHS did not reflect many of the core elements of the DuFour and Eaker (1998) model. Based on teacher actions during PLC team meetings and interview responses there was no evidence to suggest that teachers were familiar with the DuFour and Eaker (1998) model of PLC. As a result, teachers used the PLC time to discuss and act in four broad ways: school logistics, extra-curricular discussion, instructional, and assessment.
Finding 2	The focus of the PLC teams differed. The Algebra 1 PLC team largely focused on the state-mandated end-of-course standardized tests, while the English PLC team focused on developing team collegiality and a singular common assessment.

There was no evidence to suggest that teachers were familiar with the characteristics of the DuFour and Eaker (1998) model of PLC. Most of the teachers indicated in interviews that they had received no training or professional development in the DuFour and Eaker (1998) model of PLC. With the exception of Mr. Descartes, who had previously worked in the BSD during the early years of PLC adoption, the other Algebra 1 PLC team members had come to WHS from other schools and school districts that did not utilize the PLC model. Similar to the Algebra 1 PLC team, the English 11 PLC had three members who had received no training or professional development in the DuFour and Eaker (1998) model of PLC. Although Mr. Roth and Mrs. Wharton were teachers when BSD and WHS introduced the PLC model, in their interviews they both indicated that they had not recently received training or professional development in the PLC model, and felt that PLC had drifted from its original purpose and focus.

The members of the Algebra 1 PLC team made decisions about how they used their PLC time based on the state's curriculum and accompanying high-stakes assessment. The English 11 PLC team, however, made decisions about how they used their time differently from the Algebra 1 PLC team. Because two of the four core members of the PLC had never before taught English 11, and because there was a student teacher who also participated on the PLC team, the team used its time to both develop rapport amongst the members by sharing instructional resources around a new curriculum and to develop a singular common midterm assessment. Test-scores on the high stakes assessments seemed to play a role in determining the focus of the PLCs (see Figure 12 on page

140 and Figure 13 on page 142). The following sections explore these findings in depth.

Finding One

The first finding of this capstone study explores the ways in which the PLC teams under investigation understood the DuFour and Eaker (1998) model of PLC and used their PLC team meeting time. First, I examine team awareness of and adherence to the DuFour and Eaker (1998) model of PLC. Then I report on teacher historical experiences with PLC, how they define it, and see its role at WHS. Finally, I discuss how the teachers at WHS used their weekly PLC time based on the field notes and transcripts from my observations. I found four broad areas of usage: school logistics, extra-curricular discussion, instruction, and assessment. Each of these themes is defined and related to the Algebra 1 and English 11 PLC teams.

DuFour and Eaker (1998) model of PLC

In addition to gathering teachers' basic knowledge about PLC and its role in their departments, in my pre-observation interview I explored how knowledgeable the teachers were in the specific components of the DuFour and Eaker (1998) model of PLC and what, if any, training or professional development they had received.

Mrs. O'Connor, Mrs. Cather, and Ms. Lee were unfamiliar with the researchers and their model of PLC. None of those three teachers had received any training or professional development in the model either. Mrs. O'Connor

noted that during pre-service week for teachers, the WHS administration set aside hours for PLC teams to meet and asked for the teams to send their locations and the norms they developed, but they did not present an overview or a primer on PLC for either the new teachers at WHS or for the returning faculty (O'Connor, interview, October 13, 2016). Mrs. Cather speculated that this responsibility fell to the department chair to present in a department meeting (Cather, interview, October 12, 2016).

For Mr. Roth and Mrs. Wharton, they had received training and professional development at the onset of the implementation of the DuFour and Eaker (1998) model at WHS during the 2005-2006 academic year. Mrs. Wharton explained the model: "It's a way for teachers to support each other and the requirements are the time together to look at instruction and to look at the different products that the students are producing to see where you could best individually help kids" (Wharton, interview, October 12, 2016). She remembered taking a class from the DuFours when they visited WHS during the 2004-2005 academic year and then receiving staff training and development at faculty meetings and through department meetings. Mr. Roth understood the DuFour and Eaker (1998) PLC model to be, "a collaborative effort of teachers in a similar discipline with similar students that has established norms, protocols for data analysis, and a major objective being that there is some alignment of what is being taught" (Roth, interview, October 14, 2016). Mr. Roth also remembered receiving staff development in the early years of the implementation of PLC, but not any training or a PLC refresher recently. For Mr. Roth, administrators deem

a PLC team effective when "instruction is based on and reflects standardized testing data" (Roth, interview, October 14, 2016).

None of the Algebra 1 teachers had any familiarity with the DuFour and Eaker (1998) model of PLC. Additionally, when asked if they had received any training in the DuFour and Eaker (1998) model of PLC, all Algebra 1 teachers responded that they had not. Furthermore, none of the Algebra 1 teachers recalled receiving professional development in the DuFour and Eaker (1998) model of PLC during their time at WHS. As evidenced earlier, the Algebra 1 teachers had established understandings and definitions of PLC, but they were completely unfamiliar with the specific DuFour and Eaker (1998) model of PLC.

Although the teachers could not articulate the definition of the DuFour and Eaker (1998) model of PLC or identify its core characteristics, through my observations of the team meetings I looked to see if the team displayed any of the unnamed characteristics. The six core attributes of the DuFour and Eaker (1998) model are: shared mission, vision, values, and goals; a collaborative culture; best practices inquiry; action orientation; continuous improvement; and a results orientation. The codes that I initially used on my observation notes and the transcripts of the meetings reflected the six core characteristics of the DuFour and Eaker (1998) model. Coding of my PLC team observations resulted in a heavy representation of collaborative culture and action orientation for the English 11 PLC team and collaborative culture, action orientation, and results orientation for the Algebra 1 PLC team. Neither team displayed shared mission, vision, values, and goals.

Shared mission, vision, values, and goals. The shared mission and vision is the core of the PLC and is a "collective commitment to guiding principles that articulate what the people in the school believe and what they seek to create" (DuFour & Eaker, 1998, p. 25). The mission of BSD is to "establish a community of learners and learning, through relationships, relevance and rigor, one student at a time." Complementary to the BSD mission, WHS seeks to "Embrace Students, Inspire Learning, and Innovate Opportunities." Over the course of my observations of both the English 11 and Algebra 1 PLC teams, I did not encounter an instance where the team engaged in a discussion of either the BSD or WHS mission or connected a unit, lesson, activity, or assessment to those missions. As part of the mid-year review process, the English 11 and Algebra 1 PLC teams would have had to reflect on its first semester actions and connect them to the WHS mission (See Figure 11 on page 121).

Collaborative culture. Collaborative teams share a common purpose and although individual growth is a likely outcome, growth for the PLC team and the school as a whole requires professional cooperation. Both the English 11 and Algebra 1 PLC teams displayed a high degree of collaborative culture.

The English 11 PLC team mainly focused its collaborative culture on developing a close-knit working relationship due to the newness of the members by sharing instructional resources. For Mrs. Cather and Mrs. O'Connor they were able to continue their collaborative connection outside of PLC due to a common planning period that they shared. Later in my observational cycle, the English 11 PLC team focused its meeting discussions on the common midterm examination.

Once again, they exhibited a high degree of collaborative culture as they discussed and debated the format and content of the examination and shared teaching resources related to the skills and content on the common midterm examination.

The Algebra 1 PLC team also displayed a high degree of collaborative culture through the creation of common assessments, the revision of the course-pacing guide, and the sharing of instructional resources and activities. Due to the time constraints of PLC meeting time, the method of operation that the Algebra 1 PLC team took in the creation and revision of these curricular and assessment was to "divide and conquer." Teachers created different types of questions for assessments and then collectively during PLC team meetings all members would vet the products. There was wide participation of all seven PLC team members offering edits and criticisms, usually tied back to the state standards.

Collective inquiry. The driving force behind collective inquiry is curiosity. Questioning the *status quo* is encouraged, as are new methods, with the process of searching for an answer being more significant than achieving the answer. Neither the English 11 nor Algebra 1 PLC team exhibited a strand of collective inquiry during my observations of their meetings; I did not use this code once over the course of my 16 collective observations of both teams. Individual teachers sought new methods for courses that they had not previously taught, but there was not a collective action of the PLC team to uncover new instructional or assessment methods for their students. Rather than an inquiry base to the PLC teams, the members exhibited a highly collegial sharing base of

resources. Both PLC teams focused on developing common assessments, and the English 11 PLC team was forging professional bonds, which dominated their agendas and did not provide time or opportunity for inquiry.

Action orientation. Action orientation and experimentation work concomitantly so that teachers have the comfort to try and do, with the risk of failure, but the expectation that the same cycle will continue. For both PLC teams, their action orientation geared toward the development of common assessments, and in particular, using the online testing platform available in BSD.

For the Algebra 1 PLC team, they had previously used the online testing platform to administer assessments. Their action orientation during my observational period dealt with using new and different formats within the online testing platform, such as multiple response questions and horizontal problem solving. Although they were not able to incorporate horizontal problem solving, by reaching out to BSD central office staff through an in-service session, the Algebra 1 teachers developed and implemented multiple response questions in the Unit 3 common assessment. This action orientation of the Algebra 1 PLC team was assessment driven; influenced by the methods utilized in the state end-of-course assessments.

The English 11 PLC team's action orientation also revolved around assessment. Unlike the Algebra 1 PLC team, the English 11 PLC was new to using the BSD online testing platform. The English 11 teachers used their PLC meetings to discuss the content and format of the common midterm assessment,

but had to use planning time to learn, manipulate, and produce the assessment. Once again similar to the Algebra 1 PLC team, the English 11 PLC team's motivation for action orientation was the state end-of-course assessment. Whereas Algebra 1 had familiarity with the online testing platform and was adjusting to new types of question formats, the English 11 teachers were just beginning the process of transitioning to the online testing platform to help prepare their students for the end-of-course assessment in reading.

Continuous improvement. Continuous improvement builds upon the ideas of action orientation and experimentation, but implies the understanding that mission and vision are lofty goals to work toward and not necessarily ever fully accomplish. As noted previously, I did not find any discussion or connection of the mission statements or ideology of BSD or WHS during my observational period of both PLC teams. For both the English 11 and Algebra 1 PLC teams, the movement for continuous improvement focused on assessment and not instruction. The action orientation and experimentation revolved around the online testing platform and not the instruction teachers were delivering in the classroom. Although instructional resources were widely shared in both PLC teams, there was not any significant discussion or debate about best practices and methods, nor any concerted effort to develop instructional resources reflecting continuous improvement. Due to the high-stakes importance of both the Algebra 1 and English 11 reading end-of-course assessments on student graduation and school accreditation, the efforts at continuous improvement steer toward assessment and not instruction.

Results orientation. Results orientation is a harbinger of the data-driven standards movement of the 1990s: "Unless initiatives are subject to ongoing assessment on the basis of tangible results, they represent random groping in the dark rather than purposeful movement" (DuFour & Eaker, 1998, p. 29). Although both PLC teams had an assessment focus during my observational period, the English 11 PLC team spent little to no time in the discussion of collected data, whereas the Algebra 1 PLC team spent the PLC team meeting after an assessment analyzing student results.

The English 11 PLC team administered their common midterm assessment after my observational period ended. Because this was their only common assessment of the first semester, I was unable to observe how they collected, organized, and analyzed the data. In my post-observation interview with Mr. Roth, he spoke of the looming importance of the common midterm, "It's got weight and therefore, I feel as though there's some voracity behind the data I'll get from that" (Roth, interview, January 3, 2017). In her post-observation interview, Mrs. O'Connor remarked that she was glad that the English 11 PLC team had come together to develop the common midterm examination, but admitted that she had no conception of how her students would do on it (O'Connor, interview, January 3, 2017). She indicated that her style of assessment would have had students undertake a more qualitative project that was not reflective of the state reading end-of-course assessment (O'Connor, interview, January 3, 2017).

During my observational period, I witnessed the Algebra 1 PLC team analyze student data on three occasions: first, during my initial observation, which directly followed the Unit 2 assessment; secondly, during my fourth observation after the midterm assessment; and third, during my last observation after the Unit 3 assessment. In order to collect and organize student data, teacher input question-by-question results into a shared Google doc before PLC team meetings. At PLC team meetings, the Algebra 1 teachers scoured the most-missed questions, revisited the state curriculum framework and their pacing guides, and ultimately collected questions, topics, and concepts to review and remediate with students. These collected resources appeared formative "warm-up" assessments in class daily and again on summative unit assessments. I was not aware of a recording system that identified and populated a profile of individual student weaknesses; the teachers reviewed the most-missed data with all students.

Summary. In this section, using my field notes and transcripts of the PLC team meetings, I looked for the core characteristics of the DuFour and Eaker (1998) model of PLC. Because almost all teachers had neither training nor professional development in the DuFour and Eaker (1998) model of PLC, there was no evidence to suggest that teachers were familiar with it and teacher professional behaviors during meetings reflected what was primary to their current classroom contexts: the state's end-of-course assessment for Algebra 1 and building team rapport and "getting to know" the curriculum for English 11. In the next section of this first finding, through interview data, I examine teacher

historical experiences with PLC and seek to understand how teachers define and see the role of PLC.

Teacher Historical Experience

The amount of experience that teachers had in PLCs varied widely. In English 11, Both Mr. Roth and Mrs. Wharton had over 10 years of experience in PLC teams at WHS. They worked at WHS at the time the daily bell schedule changed to include a dedicated PLC meeting period. Mrs. Wharton, as a special education teacher, has worked on PLC teams in all core departments at WHS. Her most extensive experience is with the English department in which she has served as a PLC team member in each grade, ninth through twelfth. Mrs. O'Connor, who first served as a student teacher at WHS with Mr. Roth before becoming full-time faculty, had five years of PLC team experience in tenth and twelfth grade. Mrs. Cather and Ms. Lee, a student teacher with Mr. Roth, were both in their first year of PLC experience at WHS.

The Algebra 1 team had less overall PLC experience in number of years than the English 11 team. Mr. Nash had the longest tenure at WHS and as a special education teacher had worked with PLC teams in the social studies, science, and math departments. Mrs. Noether and Mr. Boole had four and three years of teaching experience respectively at WHS and their PLC team experience was solely within the Algebra 1 PLC team. The 2016-2017 academic is the first year that Mr. Descartes was full-time at WHS; he served as a long-term substitute teacher during the 2015-2016 academic year at WHS. He previously taught at a middle school within the BSD and had operated within the DuFour and Eaker

(1998) model of PLC in the context of that school. The remaining teachers on the Algebra 1 PLC team – Mrs. Germain, Ms. Lovelace, and Mr. Babbage – were new to WHS during the 2016-2017 academic year and had no prior PLC experience at the other schools where they taught.

The "doing" of PLC. In the pre-observation interviews of teachers, I asked them, based on their understanding of PLC, what should teachers be doing during that time? All four members of the English 11 PLC team mentioned that they should be designing common assessments and analyzing the collected data from those assessments. Both Mr. Roth and Mrs. O'Connor further noted that the data from those common assessments is important to use to inform instruction. Mr. Roth, discussing the use of data, noted,

> We address either past diagnostics that we're given, how well we've performed, and what we might need to do to improve on that performance, as well as common assessments, which we might need to create, in order to ensure that when we do got to the end-of-course test, we've covered everything that we need to cover (Roth, interview, October 14, 2016).

Mr. O'Connor also confirmed this notion of using data to inform instruction, "Through talking about the data, you would learn how you could do something differently; it would inform instruction" (O'Connor, interview, October 13, 2016). Furthermore, all four members of the English 11 PLC team also mentioned that during PLC team meetings they should be sharing instructional ideas. Mrs. Wharton, the special education collaborative teacher to Mrs. Cather, specifically

noted that teachers should be sharing discipline-specific best practices (Wharton, interview, October 12, 2016). Additionally, Mrs. Wharton emphasized that the members of the PLC team should be looking at individual students in order to better reach the student for success in the classroom (Wharton, interview, October 12, 2016). Lastly, Mrs. Cather and Mrs. O'Connor both felt that PLC team meetings were a time for members to share ideas and efforts in the classroom so that if a colleague were stuck with a content topic, a strategy, or a student or group, the collective experience of other members would be able to offer suggestions. Mrs. Cather stated during her post-0bservation interview:

> I thought PLC was very effective. I like the opportunity to get together with other teachers and actually develop the plans and ideas and the assessments. It felt much easier and it was very positive experience working with the other teachers (Cather, interview, January 3, 2017).

Mrs. O'Connor further commented on the sharing of the English 11 PLC team by stating, "It's just a positive community of idea sharing and creativity that comes from hearing many professional voices talk through something" (O'Connor, interview, January 3, 2017).

When I conducted the pre-observation interviews with the Algebra 1 PLC team about what they thought teachers should be doing during their allotted PLC time I found that across the responses of the seven teachers (four general education and three special education collaborators) there were several common responses: collaboration amongst members, sharing of instructional strategies, analysis of data from common assessments, and discussing individual student

needs. Mr. Boole emphasized the importance of collaboration in the PLC team because it provided an outlet for members to "plan and work together so the burden of everything is not on the shoulders of one person" (Boole, interview, October 12, 2016). Mrs. Noether specifically valued the individual and collective voice of PLC members:

> If there's ownership within the PLC team then the people within the PLC are more likely to be on board with the common assessments and sharing ideas, instead of it just being one person saying, 'Well, this is how you're going to do it' (Noether, interview, October 13, 2016).

Both Mr. Descartes and Mrs. Germain, both new to WHS, but not to teaching, valued the PLC team for the sharing of instructional resources. Neither teacher was new to teaching Algebra 1, but appreciated that the Algebra 1 PLC team spent portions of each meeting sharing-out. Mrs. Germain relayed an anecdote about a meeting that occurred prior to the start of my observation period. She had attempted to use stations in her class, but the students did not respond well to that strategy. At a subsequent PLC team meeting, she was able to broach the topic and solicit strategies from the other teachers about activities for the same content that did not involve stations (Germain, interview, October 14, 2016). All members of the Algebra 1 PLC team referred to data analysis as an on-going aspect of the meetings. All unit assessments in Algebra 1 are common and collaboratively designed. After each unit assessment is completed, teachers analyze student performance on each question as well as groups of questions that coordinate around state curriculum standards. Finally, Mr. Descartes and Mr.

Germain, as well as the special education collaborating teachers, Mrs. Lovelace and Mr. Babbage, noted that the PLC team should spend time looking at individual students and groups of students. The importance of this aspect of PLC for Mr. Descartes was supporting students holistically to be successful in class: "I think the best thing during PLC is just to discuss individual student needs or maybe group needs and figure out the best ways to support and lead the students to more understanding of whatever topic that we're talking about" (Descartes, interview, October 12, 2016).

The responses by teachers about what they should be doing during PLC team meetings by the Algebra 1 and English 11 PLC team members were highly similar, with an emphasis on common assessments, data analysis, instructional best practices, and individual students as foci. Knowing that adherence to the DuFour and Eaker (1998) model of PLC by the English 11 and Algebra 1 teams is accidental, combined with the historical experiences of teachers as members of PLC teams and their perceptions of what teachers should be doing during PLC meetings, I next look at how teachers define PLCs and what role they see PLCs playing in their department and school primarily by examining teacher interviews.

Definition and Role of PLC

The English 11 PLC defined PLC in a wide variety of ways. The one commonality within the definitions given by the English 11 teachers was the concept of collaboration. Ms. Lee encapsulated this notion of collaboration by defining PLC as, "Teachers who are teaching similar or have the same subjects

who can meet and collaborate" (Lee, interview, October 13, 2016). Mrs. O'Connor furthered the notion of collaboration by envisioning the PLC as a team. She defined PLC as, "A team of teachers helping others get on the same page around curriculum, content, and assessments" (O'Connor, interview, October 13, 2016). Beyond the teamwork of collaboration by colleagues, the English 11 teachers emphasized different PLC efforts of teachers to define the model. For Mrs. O'Connor, all English PLC collaboration centers on skills. She cited the example of a previous discussion of English teachers in a PLC around the definition of a theme. Some teachers wanted students to identify a theme as a full sentence, while others only sought a single word. The PLC team discussions and debates allowed the teachers to get on the same page and the students received a consistent message from all teachers across the grade level (O'Connor, interview, October 13, 2016). Both Mrs. Cather and Mrs. Wharton saw PLC as an opportunity to share lessons, resources, and best practices. From the perspective of Mr. Roth, the PLC was the bastion of benchmark testing data analysis. PLC meetings according to Mr. Roth were for the purpose of, "Making everyone aware of testing needs, topics, and the skills to address to ensure success on standardized benchmark tests" (Roth, interview, October 14, 2016). For the English 11 teachers, their definitions of PLC reflected what they saw as the role of that team within the department and the school. Collaboration was the central element of the PLC operations, but the teachers varied on whether the PLC's purpose was curricular, instructional, or assessment-driven.

Similar to the English 11 PLC team, the Algebra 1 PLC team members emphasized collaboration as the central element of the definition of PLC. Mrs. Noether defined PLC as:

> A group of professionals or a team of teachers – it could be the same content but doesn't necessarily have to be in the same content – that gets together to collaborate, share ideas on teaching, successes, failures, discuss concerns about students (Noether, interview, October 13, 2016).

In addition to collaboration, different members of the Algebra 1 PLC team highlighted varied aspects of PLC teams. Mr. Boole and Mr. Nash emphasized the purpose of PLC as to share instructional resources and to focus on developing and refining the pacing of a course. Mr. Nash noted that the framework of PLC is highly flexible depending on the needs of the teacher members, but the importance of PLC work revolves around, "teachers talking – what's works, what's not working – to help define where the kids and who is struggling" (Nash, interview, October 12, 2016). Three members of the Algebra 1 PLC team who were new to WHS – Mrs. Germain, Ms. Lovelace, and Mr. Babbage – all solely defined PLC in terms of their experiences at WHS during the current 2016-2017 academic year. For Mrs. Germain her PLC experience was only with the Algebra 1 team, whereas Ms. Lovelace and Mr. Babbage, who are special education teachers, experienced PLC in other departments outside of math. They all understood PLC as a time for teachers to talk about their classes, design lessons, adjust pacing, and talk about assessment data. Mrs. Germain reflected that these PLC actions lacked a formal structure in the other schools at which she taught in

order for teachers to accomplish the same tasks. She noted that she was glad to have the built-in time during the daily schedule for teachers to meet and accomplish these goals (Germain, interview, January 4, 2017). With regard to the role of PLC in the department, the definitions that teachers gave of PLC actions mirrored what the teachers saw as the role in the department: revise pacing, design instructional activities, develop common assessments, and analyze student data. For Mrs. Noether, who serves as the Math Department Chair, PLC allows all members of the department to have a say in the creation and revision of all curricular, instructional, and assessment decisions. This openness of voice, according to Mrs. Noether, develops PLC team and department-wide collegiality and which fosters collaboration (Noether, interview, October 13, 2016). Similar to the English 11 PLC team, the Algebra 1 PLC team saw collaboration as the central element of the PLC operations. The Algebra 1 teachers had a more comprehensive definition of PLC than English 11 teachers that revolved around curriculum, instruction, and assessment.

Both the English and Math Departments had no delineated expectations of PLC operation outside of meeting on the assigned day and time. This basic rule was also the expectation of the administration at WHS with one additional requirement: mid-year review. The mid-year review process asks each PLC team in each department to submit a report on their activities for the first semester in a variety of arenas (See Figure 11 on page 121). Department chairs then collate the information from the several PLC teams and delivering a “state of the department” presentation at a meeting of all departments and administrators,

called the mid-year review. The mid-year review for WHS occurred on Thursday February 9, 2017.

Knowing how teachers define PLC and see the role of it in their departments and within their school, I next sought to understand the influence of PLC on teacher's instruction, assessment and data analysis.

WHS Mid-Year 2016-17

(Here is a guide to use for the 5 minute elevator speech about each department)

Item	Information to Share
Assessment Data • *Provide any assessment data (SOL predictors, performance tasks, and/or common assessment data)*	•
What is working? • *Identify what is working and what the team would like to maintain and build upon.* • *What is the team proud of?*	•
What needs improvement? • *Identify opportunities for improvement*	•
What are our next steps, as a department/team? • *What can be acted upon?*	•
What support do we need to make our next steps plan happen?	•
In what ways do we embrace students, inspire learning, and innovate opportunities? • *How do we build relationships with our students and be accepting of all students?* • *How do we motivate students, spark curiosity, etc...* • *How do we create learning opportunities that support the 21st century student?*	•

Figure 11. The WHS mid-year review graphic organizer that PLC teams completed and shared with department chairs.

Perceived Usage and Influence of PLC

After the pre-0bservation interviews, I observed the Algebra 1 and English 11 PLC teams over the course of a unit of study, for approximately two months from October to December 2016. I then conducted post-observation interviews with each of the teachers. In those post-observation interviews of teachers, I asked them to think back on the PLC team meetings and describe how they used

that time. Additionally, I asked the teachers how the time spent in PLC team meetings influenced their instruction, assessment, and data analysis when they returned to their classrooms.

The usage of PLC time. All seven of the Algebra 1 PLC team members responded that the vast majority of their PLC team meeting time was used on the development and vetting of common assessments. During my observational period, the team devised the Unit 3 "Solving Equations and Inequalities" assessment as well as the midterm and final examinations. The process that the Algebra 1 PLC team followed for creating and vetting assessments was straightforward; starting with the previous iteration of the common assessment, the teachers used the Algebra 1 state standards, their pacing guides, and student performance by question reports generated by the WHS testing coordinator. When the team decided upon the total number of questions for the assessment, they equally distributed the work of creating new questions to all members. In subsequent meetings, the team vetted the submitted questions for correctness, difficulty, and adherence to the standards. According to Mr. Boole, this process was the same for the first two units, and during my observations, the team repeated the process for the development of the midterm and final examinations (Boole, interview, January 4, 2017). Mrs. Noether pointed out in her post-observation interview that the team was committed to utilizing backwards design for all common assessments, although the team only had one collective PLC team meeting during the week for 35 minutes, and not all teachers had a common planning period (Noether, interview, January 4, 2017). The effect of fewer

minutes of PLC time and the disjointed planning periods resulted in PLC team meetings dominated by the discussion of assessment and not of individual students. This time structure also influenced the discussion of assessment data. The December 8 PLC team meeting was the only time that the team discussed the results of the Unit 3 assessment. This was in part due to the WHS schedule as the following week of December 12 was midterm week and the adjusted bell schedule precluded time for PLC team meetings. Prior to the Algebra 1 PLC team meeting on December 8, the teachers input assessment data into a shared Google spreadsheet. The data did not reflect individuals, but rather class performance by individual question. The teachers used this data and the assessment to review difficulty of questions.

In addition to, but correlated with the assessment development, the Algebra 1 PLC continually referenced and adjusted their pacing guide. Part of each week's PLC team meeting was spent revisiting the pacing guide, making sure that team members were within at least a class period of each other, and making adjustments to the amount of time spent on particular topics. Mrs. Germain noted that the creation of the common assessments prior to the start of the unit of study made discussions during PLC team meetings more productive with regard to adjusting pacing:

> We would discuss, and not only during PLC, but we would meet back and discuss, 'Oh this is going good, but this really stinks. We need to do an extra day here or an extra day there to try and fix any errors that are popping up' (Germain, interview, January 4, 2017).

Near the end of my observation period, during the November 29 and December 6, 2016 observations, the Algebra 1 PLC team mapped out the remaining class sessions, the content, and the potential performance assessments of the final unit that they would include before the end of the first semester.

All four members of the English 11 PLC team mentioned that the meetings revolved around listening and hearing where everyone else was in their unit of study; what they were doing instructionally with their students. Mrs. Cather encompassed this sentiment about the PLC meetings when she stated, "It wasn't really focused on, 'How's the Middle Passage going?' We needed to make sure that we were teaching audience, tone, and purpose, and oh by the way here's a cool way to do that if you want it" (Cather, interview, January 3, 2017). Mrs. O'Connor noted that the members of the English 11 PLC team were a new group who needed time to gel, and the later focus of the PLC meetings being on the common midterm assessment helped build a collegial community (O'Connor, interview, January 3, 2017).

After observing how the teachers used their PLC time, I next sought to examine how the time spent in PLC influenced their individual actions in the classroom.

The influence of PLC team meetings. Lastly, I asked teachers in the post-observation interview how the time spent in PLC team meetings influenced their instruction, assessment, and data analysis when they returned to their classrooms.

Instruction. Mr. Boole, Mr. Descartes, and Mrs. Germain all saw an influence of the PLC team on their classroom instruction. For Mr. Boole, it was the sharing of the warm-up activities that helped him incorporate previous content at the forefront of student thinking and influenced him to reiterate conceptual connections (Boole, interview, January 4, 2017). Both Mr. Descartes (interview, January 4, 2017) and Mrs. Germain (interview, January 4, 2017) noted that they fell behind pace during the unit and the PLC team meetings offered them a chance to hear other teachers' struggles and that influenced how they instructionally approach content as well as how much time they allotted in a given class period as well as over the course of the unit. Mrs. Germain gave an example of this when talking generally about content instruction:

> A lot of times what we would do is we'd pop up like, 'Hey I started this yesterday and here's where my kids are having issues,' so that if someone was starting it a day later, they knew the issues to be ready ahead of time with the stuff that we've found to help fix those issues (Germain, interview, January 4, 2017).

Mr. Nash, a special education collaborating teacher with Mrs. Noether, remarked that the PLC team did not have an appreciable impact on the type of instruction they delivered in class, as they planned and discussed instruction outside of class, and PLC team meetings focused more on the development of common assessments (Nash, interview, January 4, 2017).

For Mrs. Cather, who is new to WHS and to teaching English 11, noted that the PLC team influenced her instruction. Her colleague, Mrs. O'Connor, who

teaches a section of Honors English 11, shared activities that Mrs. Cather could modify or scaffold for her Standard and Academic-level English 11 students. Mrs. Cather further elaborated that she trusted Mrs. O'Connor in part because she served as the department chair, but also because of their collaboration on units had provided a high-level of support (Cather, interview, January 3, 2017). Mr. Roth also described the impact that the PLC team had on his instruction, "It more informed the types of elements that I needed to touch on within what I was delivering to ensure that the kids were exposed to what it was that we'd be testing them on" (Roth, interview, January 3, 2017).

Assessment. The Algebra 1 PLC team creates and administers common summative assessments for each unit of study. Each member of the team has the discretion to administer his or her own formative assessments. During PLC team meetings, teachers shared both warm-up problem sets and quizzes. For Mr. Boole, the sharing of these resources influenced the material that appeared on all formative assessments: "I definitely tried to give examples of the types of questions that they would see in class to prepare them for the test" (Boole, interview, January 4, 2017). Mr. Descartes also valued the shared formative assessment resources: "I knew that it would be consistent with whatever else the other teachers were doing, so therefore the assessing would be somewhat consistent because the students were doing the same problems" (Descartes, interview, January 4, 2017). The backwards design of the summative assessments trickled down into teacher formative assessments, whether warm-up activities or unit quizzes.

Although Mrs. Cather did not mention the PLC team's impact on assessment and data analysis, Mr. Roth, Mrs. O'Connor, and Mrs. Wharton all pointed to the common midterm assessment and its importance as a predictor of the state standardized assessment in reading that their English 11 students will take in the spring of 2017. For Mr. Roth, the common midterm assessment was valuable because, "It's got weight and therefore, I feel as though there's some voracity behind the data I'll get from that" (Roth, interview, January 3, 2017). Mrs. Wharton valued the predictive nature of the common midterm assessment, "We can look at the area specifically on the [high-stakes end-of-course assessment], where students did well or did not do as well, and then make sure that we do some review and some mini-lessons with those areas" (Wharton, interview, January 3, 2017).

Data analysis. From the post-observation interviews and observations of PLC team meetings, the teachers tended to analyze data at the question-level. For the teachers, this information allowed them to make decisions about what types of questions and concepts to remediate. For Mr. Boole, this information influenced the creation of future warm-up activities; continually connecting previous content and concepts to current ones (Boole, interview, January 4, 2017). Mr. Nash also spoke to the influence of this data as a benchmark for assigning struggling students to the remediation period that WHS offers during the week (Nash, interview, January 4, 2017). Teachers host this remediation period three times a week for their students in their rooms when they do not have PLC team meetings. Additionally, the teachers offer a "boot camp" in specific

math courses (i.e. Algebra 1) for students weekly after school from 4:00 – 5:30PM starting in March in preparation for the May administration of the state end-of-course assessment. For Mrs. Noether, she not only looked at student performance by question, but also solicited student feedback on the assessment (Noether, interview, January 4, 2017). When she asked her students how they felt about the test, they collectively responded that it was hard. When she analyzed the student work on the assessment problems, she noticed that the students made minor mistakes, such as sign or computational errors, and not conceptual mistakes. This data provided rich information on what needed to be reviewed and retaught. The effect of this individual process, when shared with the PLC team, was that the group can "brainstorm ideas of either projects, activities, reviews, workstations that we can utilize to reinforce the concepts that the students didn't understand" (Noether, interview, January 4, 2017).

Mrs. O'Connor expressed the value of the common midterm and the subsequent data analysis by the English 11 PLC team by noting that the information will help her identify students who are in need of remediation well before the state assessments (O'Connor, interview, January 3, 2017). Additionally, although the structure of the PLC model at WHS forces teachers to get into a room together, the data from the common midterm assessment will for the PLC team, "for the first time all year actually have something to talk about in our PLC, real data on how kids did and what we can do differently in classes" (O'Connor, interview, January 3, 2017). Mrs. Wharton also identified the common midterm assessment and its data collection as an opportunity not only

to identify the spectrum of student achievement, but also noted that the data collection would inform future instruction in the second semester for all students by cycling back through skills learned in the first semester (Wharton, interview, January 3, 2017).

Over the course of my 10 observations of the Algebra 1 PLC team, the teachers spent their time developing common assessments and revising the content and timing of their pacing guide. During my six observations of the English 11 PLC team, the teachers spent their time discussing instruction through the sharing of lesson activities for various content skills and discussing and developing the common midterm assessment, which was a released version of a state standardized test on reading. For both PLC teams, during the teacher interview, their remembrances of the PLC team meetings paralleled my observations. This time spent accurately reflected how the teachers responded to questions about what teachers should be doing in their PLC team meetings, how they remembered the PLC time being used, and how the PLC team impacted their instruction, assessment, and data analysis.

In the final section of the first finding, I explore the ways in which the PLCS used their time. Analysis of observations revealed four broad categories: school logistics, extracurricular discussion, instruction, and assessment.

Observed Usage of PLC Time

In this section, I present how I understood the English 11 and Algebra 1 PLC teams used their meeting time. Between October 13 and December 8, 2016, I observed the English 11 PLC team six times and the Algebra 1 PLC team ten

times. After each of my observations, I would type my field notes and chart the topics that the PLC team discussed. These topics developed into codes that I used at the conclusion of each observation. Over time, I grouped the topics and codes on my list and derived categories, or pattern codes, for them (See Appendix F). Ultimately, the list organized around four broad categories: school logistics, extracurricular discussion, instruction, and assessment.

Definitions. This section defines the four broad categories around which the collected data revolved. I define each broad category and provide concrete examples from interviews and observations.

School logistics. School logistics were topics that related to the operation of the school and their effects on the classroom. Topics in the category included daily schedules, such as for the PSAT or Midterm examinations, the remediation and testing of students for the state standardized tests, course recommendations for the 2017-2018 academic year, and filling out forms to identify accommodations for students who participate in the English as a Second or Other Language program. For example, during the October 13, 2016 observation of the English 11 PLC team, the WHS ESOL teacher visited to discuss ESOL accommodations. She presented a list of ESOL students enrolled in English 11 classes organized by teacher. She then asked the teachers to identify the accommodations used during classroom instruction and assessment for ESOL students, because the spring 2017 end-of-course assessments include these accommodations for the students. The discussion of ESOL accommodations took over 20 minutes of the 35-minute PLC team meeting, but the ESOL teacher

emphasized its importance by noting, “We need to have these accommodations in place now and continue to practice them over the course of the school year, to ensure that our ESOL have a level playing field on the state tests” (ESOL teacher, observation, October 13, 2016). This discussion of these topics in PLC tended to occur at the beginning or end of PLC team meeting.

Extra-curricular discussion. Extra-curricular topics were those that had nothing to do with students, curriculum, instruction, or assessment of 11th grade English or Algebra 1. The 2016 presidential election occurred in the middle of my observation window and discussions related to that event occurred frequently in the weeks leading up to and following it. On November 9, 2016 the WHS drama teacher sent out an all-staff e-mail titled “Election Fallout” (Drama teacher, personal communication, November 9, 2016). The e-mail indicated that some groups of students felt unsafe and asked teachers who voted for Donald Trump not to mention it. Additionally, it asked all teachers to be sensitive (Drama teacher, personal communication, November 9, 2016). Mr. Roth took exception to the e-mail and shared how he broached the topic of the election with his classes during my November 10, 2016 observation:

> I am not, not going to talk about the election. We talk about current events every day and that was the biggest current event of the year. I shared with my students how I talked about the results with my oldest son, who will be able to vote in the next presidential election. I want to talk about it with my students so that if they are scared or enthusiastic, they go out and

participate in politics after high school ends (Roth, observation, November 10, 2016).

Other extra-curricular topics included discussing one's personal life, such as weekend plans, and sporting events. This discussion topic in PLC tended to occur at the end of a PLC team meeting.

Instruction. Instruction was a topic discussed in the form of sharing current practices. At five of the six meetings, after initial extra-curricular discussion ended, English 11 PLC team participants used a roundtable sharing method to talk about what they were doing in their classrooms. The Algebra 1 PLC set aside time during teach team meeting to share instructional practices that were successful. Although most of the Algebra 1 PLC team meeting on November 1 focused on analyzing and revising the course-pacing guide for the next two units before the final exam, the end of the meeting afforded teachers the opportunity to share some instructional strategies. Both Mrs. Noether and Mr. Boole, the veteran Algebra 1 teachers, discussed the upcoming "Stained Glass" and "Real World Slope" projects, but it was Mrs. Germain who drew the biggest positive response from the group with her review activity. From the most recent quiz, she took incorrectly solved equations by students and typed them out so students would not recognize their handwriting. She assigned particular problems, which the students worked individually, and then collaborated with another student to explain their work. As she monitored their collaboration, Mrs. Germain noted, "the students quickly found the equation errors, talked about math, were patient when someone did not understand and explained the

processes competently" (Germain, observation, November 1, 2016). The Algebra 1 PLC team positively received this instructional strategy, particularly Mr. Descartes, who asked for a copy of the worksheet and indicated he would implement the idea very soon (Descartes, observation, November 10, 2016).

Assessment. This discussion of assessment topics occasionally took on a similar form to the discussion of instruction (i.e. sharing), but most of the assessment discussion in the English 11 PLC focused on the common midterm examination. With regard to the Algebra 1 PLC team, the assessment discussion that primarily occurred was in creating and revising the unit test on solving equations and inequalities. Additionally, the Algebra 1 PLC team focused some of their attention on the midterm examination, which for the students occurred in January 2017.

Out of a list of over 50 topics recorded during observations of the English 11 and Algebra 1 PLC teams, these 4 main categories easily emerged as an organizational method of pattern codes.

Broad areas present in PLC meetings. While not every broad category was present in each English 11 PLC team meeting observed, Table 12 on page 134 shows which broad category appeared on specific meeting dates.

Table 12

Categories of PLC Topics During Observed Meetings

	School Logistics	Extra-Curricular	Instruction	Assessment
October 13	X		X	
October 20		X	X	X
November 3	X		X	X
November 10		X	X	X
November 17		X	X	X
December 1	X			X

The distribution of broad topics over the course of my six observations of the English 11 PLC team was fairly even. The topics of instruction and assessment were almost universal across the observations; while only during half of the observations did I encounter the English 11 teachers talking about school logistics and extra-curricular topics. The English 11 PLC team grappled with school logistics that focused on WIDA testing for ESOL students initially during my observations. One of the WHS ESOL teachers presented a census of students currently enrolled in English 11 who qualified for ESOL accommodations. During the November 3 observation, the English 11 PLC team discussed the potential for a field trip to a local theater for students to watch a play. The team discussed the pros and cons of that field trip, as well as what information the WHS administration would need in order to approve the excursion. Finally, the December 1 observation served as the final PLC team meeting before the administration of the midterm examination. In addition to the bell schedule, the team discussed the procedures for administering the examination through the online testing platform. The English 11 PLC team did not lose a lot of time discussing extra-curricular topics during PLC team meetings. At each of the

meetings when this broad topic emerged (October 20, November 10, and November 17) the discussion began the meeting when it was in session by the clock, but before all members were present. The dominant thread was the United States presidential election and the impact that it might have in the classroom. I cross classified this topic as instruction because the English 11 teachers also state that they incorporated current events topics into their daily instructional routine. The dominant broad categories of discussion were instruction and assessment. With regards to instruction, a common procedure that occurred in five of the six PLC team meetings that I observed (October 13, October 20, November 3, November 10, and November 17), the English 11 PLC team used a round table discussion format for sharing instructional strategies. Usually after presenting the current instructional topic or activity, the teacher would ask for suggestions for additional strategies or resources. The teachers who most commonly shared instruction were Mrs. Cather, a veteran English teacher but new to teaching English 11, and Ms. Lee, a student teacher who worked with Mr. Roth. Occasionally, Mrs. Wharton, special education collaborating teacher with Mrs. Cather, contributed anecdotes from class, and Mr. Roth almost never shared instructional points. When in attendance, Mrs. O'Connor contributed instructional ideas, which usually coincided with Mrs. Cather as they commonly planned together outside of the English 11 PLC time. The final broad category of discussion, assessment, solely revolved around the common midterm assessment. During the October 20, 2016, there was a mention of common skills assessments at the mid-point and end of each marking period, but the team tabled the topic and did not revisit it during my observational cycle. I asked each

of the English teachers in their post-observation interviews about the common skills assessments, and they all noted that the midterm served as the common assessment for the second marking period due to the various calendar interruptions for holiday breaks. The assessment discussion revolved around the literary terms that were present in the state standards for the reading standardized tests that the 11th grade students were to take. As a group, the English 11 PLC team analyzed several resources about literary terms that influenced how they taught the terms. The production of the common midterm, a released state standardized test that the teachers administered online, occurred during the common planning period that Mrs. O'Connor and Mrs. Cather shared. All of the English teachers delivered this common midterm during the examination week of December 12, 2016, which directly preceded WHS's winter break. The English 11 PLC team had a collegial atmosphere where they debated school logistics, the sharing of instructional ideas was encouraged, they debated the common assessments, and little time was lost to non-topical, extra-curricular discussion.

While not every category was present in each Algebra 1 PLC team meeting observed, Table 130 on page 137 shows which broad category appeared on specific meeting dates.

Table 13

Categories of PLC Topics During Observed Meetings

	School Logistics	Extra-Curricular	Instruction	Assessment
October 18	X			X
October 25	X			X
October 27	X		X	X
October 28				X
November 1	X		X	X
November 15		X	X	X
November 22				X
November 29			X	X
December 6			X	X
December 8		X	X	X

Over the course of my 10 observations of the Algebra 1 PLC team, and similar to English 11, my field notes reflected a strong emphasis on the broad topics of instruction and assessment. During the first half of my observations, the team also grappled with school logistics that influenced their students and their classrooms. Those school logistics topics ranged from the accommodations for ESOL students, teacher goals for their performance appraisals, BSD required performance tasks, and the WHS schedules for midterm and final exams. Within the broad topic of instruction, teachers occasionally shared Algebra 1 instructional ideas, but more often than not, the discussion of this topic revolved around examining the course-pacing guide as well as the types of potentially assigned projects to students. The combination of the teachers' collective experience of previous iterations of the course as well as feedback from the previous academic year's state test results generated modifications to the course-pacing guide. The unit of study that I observed was a product of this review and revision earlier in the semester. In part because two of the four Algebra 1

teachers on the PLC team were new to WHS, the veteran teachers presented projects that correlated with the curriculum. These projects included having students find and present slopes in the real world and a stained-glass project based on solving equations. The broad topic consistently present throughout my observations of the Algebra 1 PLC team was assessment. The primary focus of the assessment topic was the unit assessment on "Solving Multiple-Step Equations and Inequalities." This involved a distribution of responsibility for creating questions, the collective vetting of questions and answers, and the discussion of results after the administration of the unit test. The Algebra 1 teachers administered the test online through the BSD testing platform. In order to become more fully functional with the platform, the Algebra 1 team invited a BSD central office staffer to run a crash course on October 28, 2016 during a teacher workday. When discussing the unit assessment, the teachers continually referred to the format, blueprints, and crosswalk documents of the state end-of-course test and made adjustments based on them. An example of this is that all Algebra 1 sections offer all unit assessments in standard format as well as in a Plain English format for ESOL students (See Figure 18 on page 150). Additionally, due to some new software that BSD pushed out to all of its student and teacher computers, the Algebra 1 team is investigating the ability to offer audio of each unit assessment. The one broad topic that was generally lacking in representation during the PLC team meetings was extra-curricular. In reviewing my observation notes as well as the meeting transcripts, I could not find many major or minor diversions into non-school related material within meeting

discussion. The Algebra 1 PLC team meetings started promptly and the content of the meetings generally took up more time than was allotted.

Summary

The first finding of this capstone study explored the ways in which the PLC teams under investigation used their PLC team meeting time. Because teachers had little to no training or professional development in the DuFour and Eaker (1998) model of PLC, their behaviors and actions during PLC team meetings did not closely adhere to the model. The actions that did reflect that model were accidental and reflected the contextual influences of the state curriculum and assessments for Algebra 1 and team building and "getting to know" the English 11 curriculum. I examined teacher historical experiences with, how they define, and see the role of PLC at WHS. Only 2 of the 12 teachers interviewed had institutional knowledge of the DuFour and Eaker (1998) model of PLC at WHS. Teachers generally saw the role of PLC as being an opportunity for collaboration on common assessments and a vehicle for sharing instructional resources. Teachers at WHS did make good use of their PLC time and focused their actions in four broad areas of usage: school logistics, extra-curricular discussion, instruction, and assessment. In Finding Two I explore the specific focus of both the English 11 and Algebra 1 PLC teams.

Finding Two

The second finding of this capstone study relates to the focus of each of the PLC teams that were under investigation.

Overview

The members of the Algebra 1 PLC team made decisions about how they used their PLC time based on the state's curriculum and assessment. The state curriculum framework influenced the Algebra 1 PLC team's pacing guide, and the state's end-of-course assessment influenced the development of unit-based common assessments. These two tasks, the revision of the course-pacing guide and common assessments, dominated the weekly Algebra 1 PLC team meetings. Because the state curriculum and assessment for Algebra 1 influenced the usage, passing the state's end-of-course assessment heavily influenced the focus of the Algebra 1 PLC team. Figure 12 below displays the pass rates in Algebra 1 for WHS since the 2012-2013 academic year.

Subject	Year	Total	
		N	Pass
Algebra 1	2015-16	500	75.0%
	2014-15	538	75.8%
	2013-14	523	79.3%
	2012-13	534	69.7%

Figure 12. Algebra 1 pass rates at WHS since the 2012-2013 academic year.

Similar to the Algebra 1 PLC team, the English 11 PLC had three members who had received no training or professional development in the DuFour and Eaker (1998) model of PLC. Although when WHS introduced the PLC model, Mr. Roth and Mrs. Wharton were teachers at WHS, in their interviews they both indicated that they had not recently received training or professional development in the PLC model, and felt that PLC had drifted from its original

purpose and focus. The members of the English 11 PLC team made decisions about how they used their time differently from the Algebra 1 PLC team. Because two of the four core members of the PLC had never before taught English 11, and because there was a student teacher who also participated on the PLC team, the team used its time to both develop rapport amongst the members as well as to share instructional resources around a new curriculum.

Since the 2012-2013 academic year, the pass rate for WHS students on the state's reading end-of-course assessment has hovered near 90% (See Figure 13 on page 142). For the English 11 PLC team, this meant that there was less of an emphasis on the end-of-course state assessments. Additionally, because of the "newness" of the teachers on the English 11 team, they used the time to build rapport amongst themselves and share instructional resources around the common texts and skills. Near the end of my observational period, the English 11 team shifted its focus to the development of a common midterm assessment, influenced by the literary terms prevalent in the state's reading curriculum. The focus of the English 11 PLC team then was initially on group dynamics around "getting to know" the English 11 course, but it shifted in proximity to the end of the first semester toward a common midterm assessment that mimicked the state assessment.

Subject	Year	Total	
		N	*Pass*
Reading/Lit	2015-16	297	88.2%
	2014-15	279	87.8%
	2013-14	252	90.1%
	2012-13	282	87.2%

Figure 13. English 11 pass rates at WHS since the 2012-2013 academic year. This figure illustrates the numbers of students and the pass rate in English 11 at WHS since the 2012-2013 academic year.

The focus of the English 11 and Algebra 1 PLC teams under investigation in this capstone study differed. The Algebra 1 PLC team largely focused on the state-mandated standardized tests, while the English PLC team had a dual-focus of developing team collegiality amongst members and developing a common midterm assessment. The arrangement of this second finding focuses on the Algebra 1 team followed by the English 11 team.

Algebra 1 PLC Focus

Over the course of my 10 observations of the Algebra 1 PLC team there were three major agenda items: the midterm examination, the Unit 3 "Solving Linear Equations and Inequalities" unit assessment, and the final examination. The PLC team created, vetted, and implemented each of these three assessments in the image of the state standardized end-of-course test for Algebra 1. Mr. Boole, in his post-observation interview, commented that for each assessment in Algebra 1:

> We want to try to align with the state objectives so that we can have an appropriate percentage of questions that align, and talk about how to make that assessment as preparatory as possible and also as a predictor of hopeful success on the end-of-course assessment" (Boole, interview, January 4, 2017).

Midterm examination. My first observation of the Algebra 1 PLC team on October 18, 2017 was the final time that the team met before they administered their midterm examination. That meeting coincided with a scheduled visit from one of WHS's ESOL teachers who was presenting the teachers with the testing accommodations that ESOL students would receive on the state standardized assessments in the spring of 2017. Teachers signed-off on the accommodations that they provided students, which would mimic what the students received during the formal administration of the standardized assessments. A new accommodation that the Algebra 1 PLC team implemented for the 2016-2017 academic year was a plain English version of each summative assessment. This accommodation was implemented to meet the needs of a growing population of ESOL students in Algebra 1 and because it was an available accommodation on the end-of-course state standardized assessment. After the presentation by the ESOL teacher, the Algebra 1 PLC finished vetting the questions for the midterm. In addition to reviewing the accuracy of question stems and answer choices, the team spent time during the PLC meeting discussing the formatting and wording of the questions' directions. The teachers

wanted both the format of questions and the wording of the directions to match exactly that of the state standardized assessment for Algebra 1.

The final point of discussion amongst the team members was regarding the collective difficulty of the questions. Mr. Babbage, a special education collaborative teacher with Mr. Germain, thought that the end-of-course assessment followed a format whereby the questions get progressively harder over the course of the assessment. Mrs. Noether and Mr. Boole both rejected this notion and confirmed with the state department of education website that there is no progression of difficulty of the questions. The administration of the midterm examination occurred during the Week of October 24, 2016. Student data and question results were analyzed during the Thursday November 3, 2016 Algebra 1 PLC team meeting, which I was unable to attend as that day I was observing the regular English 11 PLC team meeting.

Final examination. The final two observations that I made of the Algebra 1 PLC team focused on the initial development of the final examination, which occurred on Tuesday December 6, 2016 and Thursday December 8. At the December 6 meeting, the teachers began the process by choosing a set number of test questions (30) and attempted to match the percentage of those questions to the course curriculum blueprint and the previous academic year's student performance by question reports. The final examination would be a cumulative assessment, but it would also incorporate new content from Unit 4 "Graphing Linear Equations," which would not have its own separate summative assessment. Additionally there was debate over the format of the final

examination, on whether to make it a fully online-delivered assessment, or to split it between an online and paper pencil format. Ultimately, the teachers decided to divide the final examination into a two-part assessment, with the first part being an online assessment through BSD's online testing platform, and the second part being a paper-pencil portion. The December 8, 2016 Algebra 1 PLC team meeting focused on the division of labor for creating the final examination questions. The subsequent PLC team meetings, which I did not observe, followed the process of teachers presenting their created questions and the team vetting them for accuracy and relevancy (Noether, personal communication, January 10, 2017). Algebra 1 students took the final examination during the Week of January 13.

Solving linear equations and inequalities unit test. At my initial observation of the Algebra 1 PLC team on October 18, 2016, the team spent the final part of the meeting discussing the lack data analysis from the Unit 2 "Polynomial Operations" test. Specifically, the team members lamented that BSD official who worked in data analytics had not yet returned a report on student performance. The teachers had collectively reported student grades on the test into a shared Google document, but the teachers had hoped to have analysis on the most-missed questions to inform their warm-ups and review quizzes going forward into Unit 3 "Solving Linear Equations and Inequalities." Beginning with my October 25 observation and carrying on until the November 29, 2016 observation, the Algebra 1 PLC team mainly focused on creating, vetting, and implementing the Unit 3 assessment. During that time, their discussions on how

best to design the assessment continually referenced and reflected upon the importance of alignment to the state standards and the end-of-course assessment in Algebra 1. The state standards and end-of-course assessment in Algebra 1 influenced the discussions and actions of the Algebra 1 PLC team with regard to the test structure, format, and delivery of the Unit 3 assessment.

Test structure. There were 30 questions on the Unit 3 assessment, which is half of the number of items that students will encounter on the end-of-course assessment in Algebra 1. According to Mrs. Noether, each unit assessment in Algebra 1 reflects roughly an 80/20 split with regard to new content versus review content (Noether, interview, January 4, 2017). The old content that appears on unit tests reflects the most-missed questions from previous assessments. Students encounter this review material almost daily during warm-up activities at the start of their Algebra 1 classes. The new content that the teachers include on the unit assessments is influenced in three ways, two of which directly reflect the influence of the state standards: first, by teacher feedback and reflection from the previous academic year's assessment, secondly by the test blueprint that delineates the different reporting categories whereby the state standards are organized (See Figure 14 on page 147), and finally by analyzing the student performance by question analysis sheets that the state department of education produces for each student's testing session and that are conveyed by the WHS testing coordinator. These question analysis sheets itemize the Algebra 1 standards into their sub-standard components and identify the types of questions that the state asked of students on its end-of-course

assessments (See Figure 15 below). The Algebra 1 PLC uses all three of these resources to design unit assessments and are reflective of the backwards design process.

Algebra I
Test Blueprint Summary Table

Reporting Category	Algebra I SOL	Number of Items
Expressions and Operations	**A.1** **A.2a-c** **A.3**	**12**
Equations and Inequalities	**A.4a-f** **A.5a-d** **A.6a-b**	**18**
Functions and Statistics	**A.7a-f** **A.8** **A.9** **A.10** **A.11**	**20**
Excluded from Testing	**None**	
Number of Operational Items		**50**
Number of Field-Test Items*		**10**
Total Number of Items on Test		**60**

*Field-test items are being tried out with students for potential use on subsequent tests and will not be used to compute students' scores on the test.

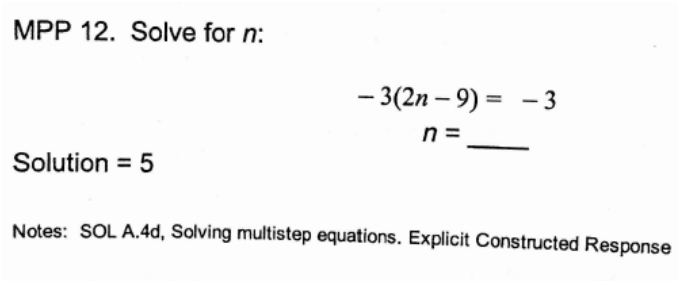
Figure 14. Algebra 1 test blueprint summary table.

Reporting Category **Equations and Inequalities**			Scaled Score **27**
Item Difficulty H	M	L	**Item Descriptor**
✕			Find solutions to a system of inequalities.
✕			Justify steps when solving an inequality.
	✕		Find the algebraic solution to a quadratic equation.
	✕		Find the solution to a system of equations modeled by a real-world situation.
	✕		Identify a property of equality.
	✕		Find solutions to an inequality modeled by a real-world situation.
	✕		Generate the equation of a line given its intercepts.
	✕		Find the solution to a multistep linear equation.
	✕		Find the algebraic solution to a multistep inequality.
		✕	Find the solution to a system of equations modeled by a real-world situation.
		✕	Graph the solution to a two-variable inequality.
	✓		Solve a literal equation for a variable.
	✓		Find the algebraic solution to a system of linear equations.
	✓		Determine the slope of a line given its graph.
	✓		Find the solutions to a quadratic equation given its graph.
		✓	Generate the equation of a line given its graph.
		✓	Find the algebraic solution to a multistep inequality.
		✓	Find the solution to a multistep linear equation.

Figure 15. Equations and inequalities reporting category from an Algebra 1 student performance by question analysis sheet.

Format. After the initial structure of the unit assessment is decided upon and mapped out, the Algebra 1 PLC team moves on into specific content construction. At this point in the process, the team adopts a division of labor approach whereby they assign each general education and special education teacher a portion of the content to develop for the unit assessment. The objectives for the teachers are not only to create problems that reflect similar content to what students will see on the state end-of-course Algebra 1 examination, but also to reflect mimicked wording, directions, and problem layout. Through a Google doc, teachers share their creations and specifically label their problems aligned to the state standard that they represent (See Figure 16 on page 149).

During the October 25 Algebra 1 PLC team meeting, the teachers discussed two types of problems that now appear on the state end-of-course assessment: horizontal problem solving and multiple response questions. The Algebra 1 PLC team did not end up including a problem that reflected horizontal solving due to technical problems with the BSD online testing platform, but they were able to include a multiple response problem (See Figure 17 on page 149).


MPP 12. Solve for n:

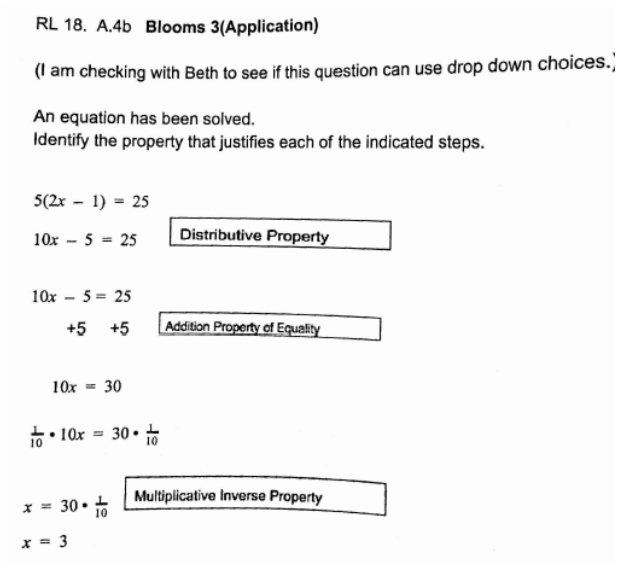
$$-3(2n-9) = -3$$

$n =$ _____

Solution = 5

Notes: SOL A.4d, Solving multistep equations. Explicit Constructed Response

Figure 16. A multi-step equation designed by Mr. Boole for the Unit 3 assessment.


RL 18. A.4b **Blooms 3(Application)**

(I am checking with Beth to see if this question can use drop down choices.)

An equation has been solved.
Identify the property that justifies each of the indicated steps.

$5(2x - 1) = 25$

$10x - 5 = 25$ Distributive Property

$10x - 5 = 25$

$+5 \quad +5$ Addition Property of Equality

$10x = 30$

$\frac{1}{10} \cdot 10x = 30 \cdot \frac{1}{10}$

$x = 30 \cdot \frac{1}{10}$ Multiplicative Inverse Property

$x = 3$

Figure 17. A multiple response question designed by Mrs. Noether for the Unit 3 assessment.

A final formatting consideration of the Algebra 1 PLC team directly influenced by the state standards and that was considered necessary to meet the needs of the growing ESOL population at WHS enrolled in Algebra 1 was creating Plain English versions of assessments. The state department of education offers Plain English versions of their end-of-course assessments, and because students

were receiving that accommodation from the state, the Algebra 1 PLC team decided to offer it, too (See Figure 18 below).

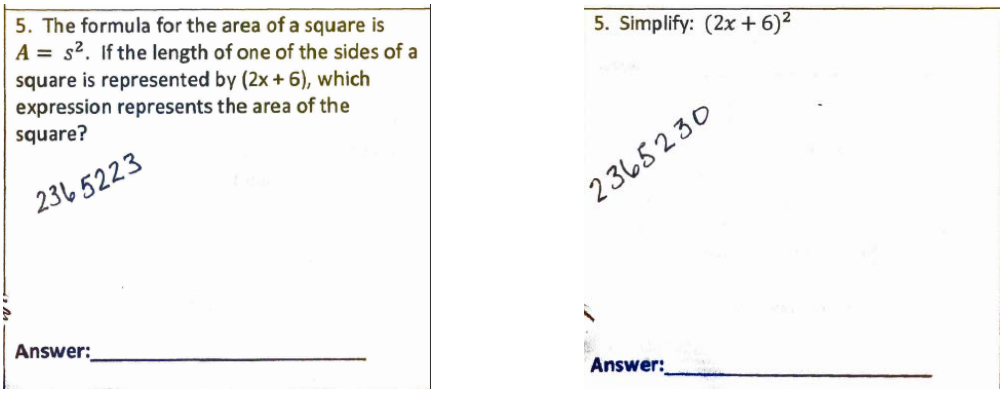


Figure 18. A word problem that appeared on the Unit 3 assessment on the left and its Plain English version on the right.

Delivery. WHS administers all state end-of-course standardized assessments online. In order to help students develop more facility with the format, the Algebra 1 PLC team has adopted the BSD's online testing platform to deliver its assessments. On Friday October 28, 2016, a teacher in-service day, the Algebra 1 PLC invited a BSD central office staff person, who specializes in the online testing platform, to lead a workshop on using the platform and developing assessments in it. The workshop lasted for 90 minutes, and the central office staffer was able to show the Algebra 1 PLC how to search for already existing questions by state curriculum standard, as well as how to create questions within the online testing platform. It was at this October 28, 2016 observation that the Algebra 1 PLC team learned that it would be able to incorporate a multiple response question, but not a horizontal problem-solving question. Furthermore,

the Algebra 1 team requested that the BSD central office staffer modify the wording of directions and problems to reflect the state end-of-course assessments, and the central office staffer invited the team members to vet existing questions to reflect the end-of-course assessment.

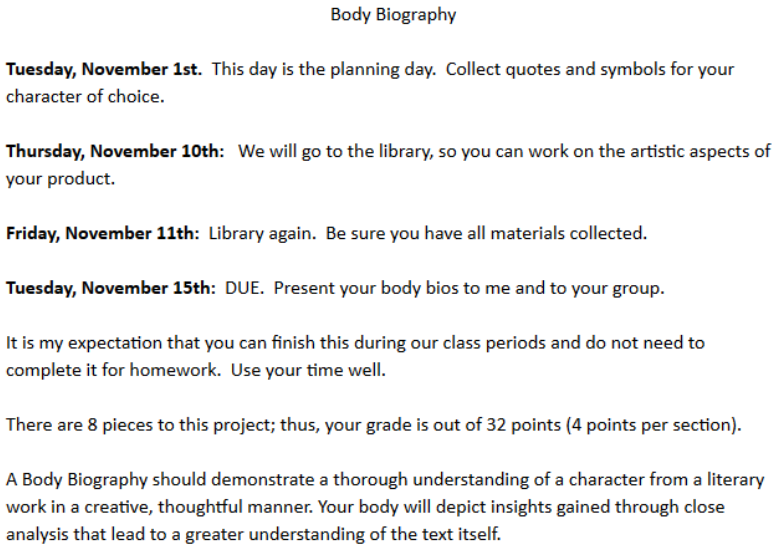
Algebra 1 summary. The Algebra 1 PLC team has an overarching focus on the state end-of-course assessment. The structure, format, and delivery of assessments strives to mimic highly the state end-of-course assessment. The Algebra 1 PLC team members use a variety of resources from both the state department of education and BSD in order to achieve this mimicry.

English 11 PLC Focus

Over the course of my six observations, the English 11 PLC team did not have as clear an agenda or as strident a focus on the state standards and end-of-course assessment as did the Algebra 1 PLC team. Whereas assessments drove the work of the Algebra 1 PLC team, the English 11 PLC team primarily focused on building a cohesive team of teachers by reporting out on class activities and sharing resources. There was a considerable amount of discussion related to the common midterm examination, molded in the image of the state end-of-course assessment in reading. Mrs. O'Connor and Mrs. Cather completed the construction of the midterm outside of PLC team meetings during a common planning period.

Team building. The English 11 PLC team is comprised of four members and only Mrs. Wharton had long-standing institutional knowledge of the team because Mr. Roth, who primarily teaches AP English Language and Composition,

did not regularly participate in the English 11 PLC during previous academic years. Both Mrs. O'Connor and Mrs. Cather were new to teaching English 11, and Ms. Lee, a student teacher with Mr. Roth, had never before participated as a member of a PLC team. All members of the English 11 PLC team made note of its "newness" in the post-observation interviews when I asked them to describe and rate the effectiveness of their team. Both Mr. Roth and Mrs. Cather noted in their post-observation interviews that due in large part to the novelty of the collection of personalities in the English 11 PLC team, they felt than an important aspect of the development of the team was focused on sharing classroom experiences, current instructional activities, and reaching out for suggestions and ideas to develop a strong sense of collegiality. One example of a shared instructional and assessment strategy was the "body biography." It is a symbolic thinking activity where students have to envision symbols that capture a character's virtue, or trait, or quality around it. During my November 3, 2016 observation, Mrs. O'Connor and Mrs. Cather shared their planning and discussion of the activity. Mrs. Cather explained how she modified the assignment for her standard and academic-level students and shared a Google doc related to how she structured the assignment for her students (See Figure 19 on page 153). This instructional activity not only allowed for a collaborative activity for the English 11 PLC team, but it also reinforced tested topics relevant to the state reading end-of-course assessment.



Body Biography

Tuesday, November 1st. This day is the planning day. Collect quotes and symbols for your character of choice.

Thursday, November 10th: We will go to the library, so you can work on the artistic aspects of your product.

Friday, November 11th: Library again. Be sure you have all materials collected.

Tuesday, November 15th: DUE. Present your body bios to me and to your group.

It is my expectation that you can finish this during our class periods and do not need to complete it for homework. Use your time well.

There are 8 pieces to this project; thus, your grade is out of 32 points (4 points per section).

A Body Biography should demonstrate a thorough understanding of a character from a literary work in a creative, thoughtful manner. Your body will depict insights gained through close analysis that lead to a greater understanding of the text itself.

Figure 19. Body Biography assignment that the English 11 PLC team shared and structured collaboratively.

My observations of the English 11 PLC team reinforced these statements by the teachers; I found that in five of my six observations the team spent a considerable portion of their 35-minute meeting time sharing current instructional activities and asking for input or advice on those activities or on individual students. Mrs. O'Connor, who also serves as the department chair for English, noted in her post-observation interview that at the start of the 2016-2017 academic year, the English 11 team spent time during their pre-service week and during the first few PLC team meetings establishing a norms framework within which the group would operate (O'Connor, interview, January 3, 2017). She contrasted the establishment of the English 11 PLC team with that of her 12th AP English Literature PLC team, which has operated as a duo over the course of several years, and has clearly developed norms and structures (O'Connor, interview, January 3, 2017). In addition to developing a sense of community

amongst the English 11 PLC team members, the creation of a midterm common assessment that reflected the state end-of-course assessment in reading occupied the efforts of the team.

Common midterm assessment. English 11 classes do not follow a common pacing guide by chronology, content, or literature. All members of the English 11 PLC team in their post-observation interviews referred to the practice of teachers using different literature, but teaching similar skills, such as identifying audience or tone. In her pre-observation interview, Mrs. O'Connor made reference to a previous department chair and assistance principal who oversaw the English department, and the practice of creating and sharing common assessments (O'Connor, interview, October 13, 2016). Because the English 11 teachers do not follow a common pacing guide for content, they deliver common assessments based on English skills. During the period of my observations of the English 11 PLC team, the common assessment that they developed and implemented was the midterm assessment; there was not a common assessment for the unit of instruction that occurred when I observed the English 11 PLC team meetings. When the English 11 PLC team concentrated on developing this common midterm assessment, the English reading state curriculum and its reading end-of-course assessment colored their focus. This focus influenced the schedule of delivery of all common assessments, delivery of the midterm assessment, and the content and format of the midterm assessment to English 11 students.

Schedule. At the onset of my observations of the English 11 PLC team, they discussed the possibility of using a regular schedule of common assessments, but had not yet developed any to deliver across English 11 classrooms. Both Mr. Roth and Mrs. O'Connor in their post-observation interviews referenced a schedule of delivering common assessments, based on English skills, at the mid-point and end-point of each marking period. My observations of the English 11 PLC team overlapped with the end of the first marking period and the mid-point of the second marking period, but ended prior to the end of the second marking period and thus the first semester. The English 11 PLC team did not administer an end of the first marking period or mid-point second marking period common assessment and this was probably due to the disrupted schedule of holidays as well as the fact that WHS administered midterm examinations prior to winter break. In a post-observation discussion with Mrs. O'Connor, she explained that the only common assessment across English 11 classes was the midterm examination and that the goal for the spring semester was to deliver a monthly common assessment developed by the PLC team (O'Connor, personal communication, January 10, 2017).

Delivery. English 11 students took the common midterm assessment via BSD's online testing platform. The English 11 PLC team originally sought to deliver the midterm examination through the testing platform that the state uses to administer end-of-course assessments, but technical issues prevented that implementation. All WHS students have a personal laptop due to BSD's 1:1 computer initiative. All student laptops have the state's testing software installed

on them. Part of this software package allows for students to access practice tests to simulate the testing content. The primary benefit to using the state platform was that teachers could create a high-stakes testing simulation of directions, questions, and environment for students. During my observations on October 20 and October 27, 2016 Mrs. Cather, who teaches the standard and academic tracked English 11 students noted that she wanted to help students develop stamina in the testing environments. The primary drawback to using the practice version of the state testing platform, and the reason why the teachers abandoned it, was that student data from testing could not be saved or recorded in a functional way. Hand recording and self-report would have been required from students as they progressed through the midterm examination and on the back end of this process, teachers would have had to reenter student data to complete any analysis work. Therefore, the functionality of the BSD testing platform allowed teachers a lot of flexibility in the design of the midterm examination as well as convenience in collecting, storing, and analyzing data. For the English 11 teachers, however, there was the significant upfront capital cost of learning the ins-and-outs of the testing platform. Mrs. O'Connor, in her post-observation interview, estimated that she spent over two hours outside of PLC with both Mrs. Cather and Mr. Roth learning the testing platform (O'Connor, interview, January 3, 2017). In her post-observation interview, when I asked Mrs. O'Connor about giving an assessment online, she remarked that just learning the BSD online platform with the entire English 11 PLC team could easily have taken up the entirety of the PCL meeting time during the first semester (O'Connor, interview, January 3, 2017). In follow-up conversations with the English 11 teachers, there

was no functionality breakdown when during the administration of the midterm examination. English 11 students at the standard, academic, and honors levels took the common midterm assessment during the week of December 12, 2016. Data analysis and discussion took place after my period of observation ended when WHS teachers returned from their winter break.

Content and format. The successful completion of both the reading and writing state standardized end-of-course assessment is part of what determines high school graduation for WHS students. Students, regardless of whether they seek a standard or advanced studies diploma, need successfully to complete both of these English end-of-course assessments. WHS students take the writing end-of-course assessment in their sophomore year and the reading assessment in their junior year. The rates of student success on the reading assessment are part of the measurement by which WHS receives accreditation by the state and federal government. Because the English 11 teachers are responsible for preparing students to be successful on the state end-of-course reading assessment, they decided that the midterm common assessment would mimic this high-stakes assessment in content and to some extent in format.

Content. Beginning with my November 3, 2016 observation, the English 11 PLC team started work on aligning the midterm examination to the state curriculum standards. The teachers determined at this meeting that the midterm examination would focus on the literary terms that appeared on released end-of-course assessments from 2010 and 2014. Mr. Roth shared a Google Doc that listed words or phrases that appeared on the released versions of those tests (See

Figure 20 on page 159). After the team's decision about the content of the midterm examination, the work of constructing the midterm happened outside of the PLC team meetings during teacher planning periods. During the remainder of my observations of the English 11 PLC team, there was no discussion or vetting of the content of the common midterm examination. My final observation occurred on Thursday December 1, 2016; there was an English Department meeting on Thursday December 8; and the English 11 teacher administered the common midterm assessment during the week of December 12, 2016 prior to the WHS winter break.

Format. At the same time that teachers began deciding upon the content of common midterm, they also discussed the format of the examination. At the November 3, 2016 PLC team meeting, the teachers quickly scraped the idea of an organic assessment and instead settled on delivering a released state reading end-of-course assessment. The teachers scraped the organic assessment due to time considerations. The WHS administration decided to have courses give midterms prior to winter break. The English 11 teachers began their contemplation of the midterm examination after the end of the first marking period in early November 2016. The disrupted school calendar due to Election Day and Thanksgiving meant that PLC team meetings and the time to hone an assessment was fleeting. After deciding upon a released state reading end-of-course assessment, the teachers discussed whether or not they were allowed to administer a released state reading assessment as the midterm, and at the following November 10, 2016 PLC team meeting they decided to use elements

from both available released state assessments and combine them to form a combination midterm assessment. Additionally, the teachers decided not to refer to the midterm as a released state assessment, as there was some concern that WHS administration would nix that approach due to an unclear policy, but rather call it a reading midterm with grade-level appropriate passages. The English 11 PLC team spent the remaining meetings in November and December 2016 discussing the common midterm examination, but not vetting the questions during that time.

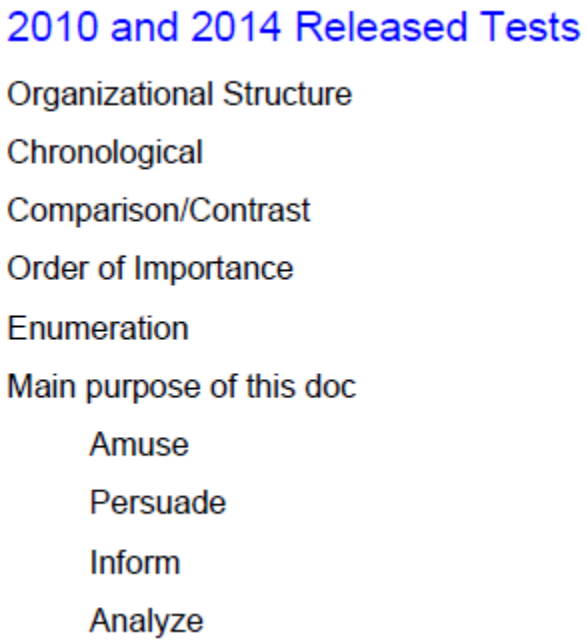


Figure 20. A portion of the reference document that the English 11 PLC team used to align their common midterm assessment.

English 11 Summary. The English 11 PLC team divided its focus between developing a collegial cohesion amongst its teachers as well as creating a common midterm assessment that reflected the state reading end-of-course

assessment. In order to develop a collegial cohesion amongst members, the PLC team engaged in open sharing of practices, strategies, and activities at its weekly meetings. Because of the importance of the reading end-of-course assessment for student graduation and school accreditation, the English 11 PLC used released state assessments to mold their common midterm assessment.

Summary

There were two main findings of this capstone multiple-case study. First, the Algebra 1 and English 11 PLC team meetings did not reflect many of the core elements of the DuFour and Eaker (1998) model of PLC. Based on the actions that the teachers took during their PLC team meetings and the responses they gave during their interviews demonstrated that there was no evidence to suggest that teachers were familiar with the DuFour and Eaker (1998) model of PLC. The teachers, therefore, used their PLC meeting time to discuss and act in four broad ways: school logistics, extra-curricular discussion, instructional, and assessment. A second finding of this capstone study was that the focus of the English 11 and Algebra 1 teams differed. The Algebra 1 team largely focused on the state curriculum and high-stakes end-of-course assessment, while the English 11 team had the dual-focus of building collegiality amongst members and developing a singular common midterm assessment. The findings are specific to the case studies, but carry implications for BSD and WHS as a whole. I discuss implications and recommendations to BSD and WHS in Chapter 5.

Implications and Recommendations

The findings of this capstone study address the way that PLC teams focus their meetings and use their dedicated time, which has implications for current work in the Buchanan School District (BSD) and at Wheatland High School (WHS) (see Table 11, p. 102). The problems of practice examined in this capstone study were twofold: has the focus of PLCs stayed consistent since their implementation, and do the teachers at WHS adhere to the principles of the DuFour and Eaker (1998) model of PLC? The implementation of PLC in BSD and at WHS began more than a decade ago. In order to address the lack of purposeful collaboration as well as to increase student achievement on state end-of-course standardized tests, BSD chose to study the DuFour and Eaker (1998) model of PLCs across all schools, beginning during the 2003-2004 academic year, with implementation beginning during the 2005-2006 academic year. WHS was one of only a few schools that altered its daily schedule to provide dedicated weekly PLC time to teachers. This capstone study used a multiple-case study approach to explore the way that two different PLC teams, in Algebra 1 and in English 11, which both culminate in a state standardized end-of-course assessment that factor into graduation for students and accreditation for WHS, focus and use their dedicated collaborative time. In this capstone study, I explored how teachers used their PLC meeting time and did not seek to connect that time to teacher instructional practices or student learning outcomes.

The conceptual framework that guides this capstone study (see Figure 2, p. 10) is of a nested cups design. The outermost cup is the DuFour and Eaker (1998) model of PLC, which consists of six core characteristics: share mission, vision, and values, collective inquiry, collaborative teams, action orientation and experimentation, continuous improvement, and results orientation. The inner cups reflect the layers of organization within BSD. This study focuses on the actions of English 11 and Algebra 1 teachers in their respective PLC teams.

The theoretical framework that guides this capstone study (see Figure 1, p. 9) is Fullan's (1982; 2007) work on educational change. While much of Fullan's work focuses on the perspectives of change agents who are stakeholders in educational communities, this capstone study uses his continuum of the phases of the change process. Fullan (1982; 2007) identifies three broad phases of the change process for education: initiation, implementation, and institutionalization.

Implications

The connection between the two findings of this capstone study rests on the professionalism of the teachers. Teachers, afforded time weekly to collaborate with colleagues in a discipline- and course-specific team, discussed and acted in broad ways to address school and classroom contextual responsibilities. The focus of the teams ultimately differed, but reflected the most pressing concerns for each group.

Finding One

The English 11 and Algebra 1 PLC teams did not reflect many of the core characteristics of the DuFour and Eaker (1998) model of PLC. There was no evidence to suggest that teachers were familiar with the characteristics of the model, as the teachers reported that they had little to no training or professional development in the DuFour and Eaker (1998) model of PLC. During PLC team meetings, teachers reported that what they should be doing was developing common assessments, analyzing student data from those common assessments, discussing and sharing discipline-specific best practices, and examining the performance individual students. The characteristics of the DuFour and Eaker (1998) model that the PLC teams did reflect were accidental. The characteristics that did arise happened as the result of the teachers recognizing that PLC team meetings offered the opportunity to explore the most pressing aspects of their classroom contexts. Over the course of my observations, I found that teachers used their PLC team meeting time in four ways: handling school logistics, extra-curricular discussion, instruction, and assessment.

Finding Two

The second finding of this capstone study relates the focus of each of the PLC teams that were under investigation. The focus of the English 11 and Algebra 1 PLC teams differed. The Algebra 1 PLC team largely focused on the state curriculum and end-of-course standardized tests, while the English PLC team focused on developing collegiality and then a singular common assessment. The Algebra 1 PLC team has an overarching focus on the state end-of-course

assessment. The structure, format, and delivery of assessments highly strove to mimic the state end-of-course assessment. The Algebra 1 PLC team members use a variety of resources from both the state department of education and BSD in order to achieve this mimicry. The English 11 PLC team divided its focus between developing a collegial cohesion amongst its teachers as well as creating a common midterm assessment that reflected the state reading end-of-course assessment. In order to develop a collegial cohesion amongst members, the PLC team engaged in open sharing of practices, strategies, and activities at its weekly meetings. Because of the importance of the reading end-of-course assessment for student graduation and school accreditation, the English 11 PLC used released state assessments to mold their common midterm assessment.

Limitations

Several limitations affect the findings, recommendations, and usefulness of this capstone study. First, my presence at PLC team meetings may have altered the implementation and function of the Algebra 1 and English 11 PLC teams. Additionally, in the interviews that I conducted, my presence may have further caused participants to give the answer they thought was "correct." Second, I did not observe every PLC team at WHS, and so the conclusions and recommendations may not apply to the non-observed PLC teams. Third, the findings and recommendations are possibly transferable to other similar research settings, but they are not generalizable to all PLC networks within BSD or in schools and school districts that utilize the DuFour and Eaker (1998) model of PLC. Fourth, and similar to the previous limitation, this capstone study focuses

only on PLC teams in English and Math at WHS and not the other departments, which implement and maintain PLC teams: Science, Social Studies, Career & Technical Education, Counseling, Media Center, Fine Arts, Health & Physical Education, Special Education, and World Languages. Lastly, because I based my findings and recommendations my interpretation of events, it is possible that others who implement this capstone study would arrive at different conclusions and recommendations.

Recommendations

In this section, I present specific recommendations for action on the part of BSD and WHS, as well as the challenges that may impede the implementation of the recommendations. Table 14 below summarizes the recommendations.

Table 14

Summary of Recommendations

Recommendations	
Recommendation 1	Both BSD and WHS should clarify the purpose and focus of PLC teams as well as identify the optimal use of PLC time within the context of the goals of the school division.
Recommendation 2	WHS should provide sustained and differentiated professional development to teachers in the DuFour and Eaker (1998) model of PLC.

Recommendation One

Recommendation One: Both BSD and WHS should clarify the purpose and focus of PLC teams as well as identify the optimal use of PLC time within the context of the goals of the school division.

The implementation of the DuFour and Eaker (1998) model of PLC occurred more than a decade ago in BSD. In that time, there has been turnover in the ranks of administrators and teaching faculty. It may be necessary for BSD to engage in a process to inform and engage all stakeholders as to how the work of PLC teams reflects the mission, vision, and values of the school division. At the same time, the WHS administration may also want to perform the same process to show how PLC work reflects the school's vision to embrace students, inspire learning, and innovate opportunities.

In addition to purpose, both BSD and WHS must grapple with the intended focus of PLC teams. The original focus of PLC teams was to reduce student subgroup variance on state end-of-course assessments. These state assessments continue to impact school accreditation and student graduation rates. In the time since PLC implementation, BSD has adopted a wide variety of curricular, instructional, and assessment-related initiatives. It is beneficial if BSD identifies a singular focus of PLC teams, or differentiates it based on level (elementary, middle, and high). High schools, for instance, still bear the burden of preparing students to pass state end-of-course assessments that impact accreditation and graduation rates. This is true despite members of the BSD school board and the central office publicly stating that they intended to petition

the state for permission to use district developed performance assessments to replace the required state standardized tests in order to meet graduation requirements. There has recently been discussion in the state legislature and by the state superintendent for public education of moving away from the state end-of-course assessments in favor of locally developed ones, such as the BSD performance assessments, but until affirmed, high schools bear the weight of the impactful state assessments.

Finally, after addressing and clarifying the purpose and focus of PLC teams, both BSD and WHS should identify the optimal use of PLC time. This might include informational materials that highlight and describe actions that individual teachers and PLC teams should take. The school division and school may also want to highlight "model" PLC teams. Presentations, workshops, or consulting by these teams within and across schools could help disseminate effective functionality of PLC teams as well as creating dispersed leadership opportunities for teachers. Lastly, a clear list of expectations for PLC teams, at both the division and school level, would improve efficiency and effectiveness of operation. The genesis of all of these materials is also an opportunity for administrators and teachers to work collaboratively in dispersed leadership roles.

This first recommendation emphasized a renewal of clarity for PLC teams. An alignment of expectations and operations from the school division down to individual schools helps clarity and underscores the importance of PLC work. This notion is underscored by Richmond and Manokore (2011) who argued that PLCs are crucial to educational improvement, "The question is not whether

teacher PLCs are important, but rather how to build, support, and maintain such communities in complex and challenging situations" (p. 569).

Recommendation Two

Recommendation Two: WHS should provide sustained and differentiated professional development to teachers in the DuFour and Eaker (1998) model of PLC.

Because the needs of students is contextual to each school setting, the professional development around PLCs should be developed and directed by specific schools. Both Sykes (1996) and Valli and Stout (2004) emphasize the need for professional development to be teacher- and student-centered as well as continuous in order to create a supportive framework that ultimately could result in positive school change. Although the DuFour and Eaker (1998) model of PLC is utilized division-wide, the professional development in the model at WHS should be devised and directed by school-specific administration and staff to reflect the needs of WHS students. What follows is a suggested plan for incorporating sustained and differentiated professional development to the faculty of WHS over the course of several phases during the academic year.

Phase One: Pre-Assessment. Beginning with the existing faculty, administrators should pre-assess the experiences and understanding of WHS teachers in the DuFour and Eaker (1998) model of PLC in the late spring before the end of the academic year. The results of this pre-assessment can inform the planning for the professional development for the subsequent academic year, which occurs over the summer for WHS administrators. For new teaching hires

to WHS, the delivery of the pre-assessment can happen after school board approval in order to inform the next phase of professional development: new teacher orientation. This pre-assessment phase is sustainable, because yearly there are new hires to the school, and veteran teachers can continually reflect on areas for improvement in order to focus on weak areas, or areas not addressed in several years.

Phase Two: New Teacher Orientation. The new teacher orientation for BSD hires occurs in early August before full teaching faculties report back to school. Both BSD central office staff as well as WHS administration deliver this orientation. This orientation usually last for four days: new teachers and administrators from across the division spend two days together, while the other two days new teachers and administrators spend at their "home" school. BSD has a central officer staffer who oversees district-wide professional development, and BSD has an instructional coaching model with lead coaches who oversee specific disciplines, as well as more than 20 instructional coaches on staff. These school division officials can provide both a review of the DuFour and Eaker (1998) model of PLC as well as speak to the commitment of the school division to the model. Furthermore, using the pre-assessment data of the new teachers, the school division can provide differentiated workshops based on the core characteristics of the model, as well as bringing together diverse groups of teachers from various schools, essentially creating both discipline-specific and cross-school PLC teams.

Phase Three: Planning Week. In mid-August, all teaching faculty report to their schools to begin the new academic year. This back-to-school planning week for administrators and faculty usually lasts for six or seven school days and includes a division-wide professional development day. It is during this planning week that the WHS administration has the opportunity to set the tone, expectations, and supports for PLC. At the beginning of this planning week, administrators can deliver a brief review of as well as a statement of commitment to the DuFour and Eaker (1998) model of PLC. Administrators can then offer teacher breakout sessions based on the collected pre-assessment data to review or renew the varied aspects of PLC. Department chairs or veteran teachers experienced in PLC can assume leadership roles in developing and leading these sessions. Over the course of the planning week, the schedule should include time for PLCs to meet, orient new members, establish norms, review the mission, vision, and values of the school and school division, as well as begin the process of developing and revising common assessments. Administrators play an important role on PLC teams; they should participate in meetings and establish a clear connection of mutual support.

Phase Four: Recurring Professional Development Days. During the academic year, the BSD calendar includes two school-based and one all-district professional development days. There are a wide array of options for incorporating PLC professional development and work within these days without impeding other important work.

School-based days. First, the schedule for these days should include dedicated time for PLC teams to meet. School-based professional development days occur at the midpoint of the first and third marking periods, and offer an ideal time for PLC teams to report and analyze data from common assessments. Because BSD and WHS already schedule a mid-year review that falls in late January or early February, these other days offer the opportunity for a school-based quarterly review. It affords teachers and administrators an opportunity to discuss individual students, the collected and analyzed data, as well as upcoming common assessments. Additionally, in order to provide for sustained time for PLC work, the WHS administration can offer substitutes for teachers to engage in half-day or full-day retreats for PLC work, especially if teachers do not also have a common planning period.

District-wide days. BSD builds in one all-district professional development day in early November. During the 2016-2017 academic year, BSD reimagined its offerings for that day and offered a menu of workshops on different topics geographically spread across the school division. One of these workshops offered was an introductory workshop (PLC 101) on all-things PLC. BSD can continue to offer this introductory workshop, but it could also develop "advanced" versions, PLC 201, 301, etc., that covers in greater depth specific aspects of the DuFour and Eaker (1998) model. BSD has utilized this format of differentiated classes (101, 201, and 301) with technology initiatives professional development, such as Google classroom. Connecting these professional development classes with opportunities for PLC teams to meet on the same day

(either as within or across school teams) and take action on ideas elicited from the classes would show school division support for the growth and development of the DuFour and Eaker (1998) model of PLC, as well as the work in which PLC teams engage.

Challenges

The implementation of these recommendations presents challenges for both BSD and WHS. One significant challenge is achieving the consistency of implementation and adherence to the DuFour and Eaker (1998) model of PLC throughout the many levels of the school division's organization. It is difficult enough to achieve consistency in a singular school, such as WHS, that has over 75 teaching positions, let alone a school division that has 26 schools and well over 1000 teachers. A related challenge is securing commitment to the model of PLC. In addition to the vast levels of the organization and sheer numbers of employees impacted by PLC, it will be important for BSD and WHS to "sell" the effectiveness of PLC in order to secure buy-in from administrators and teaching faculty.

A second challenge for BSD and WHS with regard to the recommendations relates to maintenance of the PLC network and the openness to realize when the innovation may have run its course of effectiveness. A primary aspect of the recommendations was creating structure in which PLC networks could function. As administrative and teaching staff move into the school division, bringing them up to speed on the purpose, focus, actions, and expectations of the PLC network can result in sustainable continuation. Breakdowns in the understanding, structure, and process may result in a drift away from PLC's intended function

and purpose. There may come a time where the PLC network has lost its effectiveness and is susceptible to replacement by an innovation. Those who have the responsibility for that decision-making cannot sway toward nostalgia and be willing to undertake a new phase of change that best supports students.

Both of these challenges in response to this capstone study's recommendations are reflective of Fullan's (1982; 2007) changes processes model, which serves as the theoretical framework (see Figure 1 on page 9). For WHS, the two PLC teams that were explored, English 11 and Algebra 1, seem to be at the implementation stage. Collectively, WHS seeks to move to the institutionalization stage, whereby the PLC network serves as a prescription for positive school change, and greater depth that can targeted at problems that the school faces. At the macro-level, BSD has the problem of reframing PLC and seeking to apply consistently its processes.

Summary

I based these recommendations for BSD and WHS on the findings of this capstone study in response to the research questions, which derived from the intersection of the conceptual and theoretical frameworks. The recommendations encourage both BSD and WHS to clarify the purpose, focus, and operation of PLC networks and teams, as well as deliver sustained and differentiated professional development in the DuFour and Eaker (1998) model of PLC. Chapter 6 includes the action communication in which I present both the findings and recommendations to WHS.

Action Communication

To: Wheatland High School Principal
Buchanan School District

From: John C. Baran, Jr.
Doctoral Candidate
University of Virginia
1606 Grove Rd.
Charlottesville, VA 22901

Date: April 1, 2017

Dear Sir:

I am writing to report findings and recommendations based on a 13-week multiple-case study of the English 11 and Algebra 1 PLC teams. During the study, I observed the PLC teams, interviewed the teachers before and after my observations, and collected documents for review.

As you know, Buchanan School District began to explore the implementation of the DuFour and Eaker PLC model beginning with the 2003-2004 academic year. Buchanan School District turned to the DuFour and Eaker model of PLC in order to reduce student group variance in high-stakes standardized end-of-course tests. Wheatland High School modified its daily bell schedule beginning with the 2005-2006 academic year to incorporate dedicated time each day for teachers to meet in PLC teams or to work with students during a remediation period. The purpose of this study was to understand how teachers in the English 11 and Algebra 1 teams made sense of the purpose and focus of PLC. I specifically explored whether the focus of PLCs in the Buchanan School District and at Wheatland High School stayed consistent since implementation and if the Wheatland High School teachers adhered to the principles of the DuFour and Eaker model of PLC.

The findings and recommendations of this study can help make informed decisions about PLC practices at Wheatland High School. This case study is specific to the English 11 and Algebra 1 teams, and are not generalizable to all PLC teams within Wheatland High School or the Buchanan School District. The recommendations and findings are starting points for further exploration of best practices.

The findings of the study are as follows:

1. PLC team meetings at WHS did not reflect many of the core elements of the DuFour and Eaker (1998) model. Based on teacher actions during PLC team meetings and interview responses there was no evidence to suggest that teachers were familiar with the DuFour and Eaker (1998) model of PLC. As a result, teachers used the PLC time to discuss and act in four broad ways: school logistics, extra-curricular discussion, instructional, and assessment.

2. The focus of the PLC teams differed. The Algebra 1 PLC team largely focused on the state-mandated end-of-course standardized tests, while the English PLC team focused on developing team collegiality and a singular common assessment.

Based on the findings above, I recommend the following actions for the Buchanan School District and Wheatland High School in order to explore and strengthen their respective PLC networks:

Recommendation 1: Both BSD and WHS should clarify the purpose and focus of PLC teams as well as identify the optimal use of PLC time within the context of the goals of the school division.

The implementation of the DuFour and Eaker (1998) model of PLC occurred more than a decade ago in BSD. In that time, there has been turnover in the ranks of administrators and teaching faculty. It may be necessary for BSD to engage in a process to inform and engage all stakeholders as to how the work of PLC teams reflects the mission, vision, and values of the school division. At the same time, the WHS administration may also want to perform the same process to show how PLC work reflects the school's vision to embrace students, inspire learning, and innovate opportunities.

In addition to purpose, both BSD and WHS must grapple with the intended focus of PLC teams. The original focus of PLC teams was to reduce student subgroup variance on state end-of-course assessments. These state assessments continue to impact school accreditation and student graduation rates. In the time since PLC implementation, BSD has adopted a wide variety of curricular, instructional, and assessment-related initiatives. It is beneficial if BSD identifies a singular focus of PLC teams, or differentiates it based on level (elementary, middle, and high). High schools, for instance, still bear the burden of preparing students to pass state end-of-course assessments that impact accreditation and graduation rates. This is true despite members of the BSD school board and the central office publicly stating that they intended to petition the state for permission to use district developed performance assessments to replace the required state standardized tests in order to meet graduation requirements. There has recently been discussion in the state legislature and by the state superintendent for public education of moving away from the state end-of-course assessments in favor of locally developed ones, such as the BSD performance assessments, but until affirmed, high schools bear the weight of the impactful state assessments.

Finally, after addressing and clarifying the purpose and focus of PLC teams, both BSD and WHS should identify the optimal use of PLC time. This might include informational materials that highlight and describe actions that individual teachers and PLC teams should take. The school division and school may also want to highlight "model" PLC teams. Presentations, workshops, or consulting by these teams within and across schools could help disseminate effective functionality of PLC teams as well as creating dispersed leadership opportunities for teachers. Lastly, a clear list of expectations for PLC teams, at both the division and school level, would improve efficiency and effectiveness of operation. The genesis of all of these materials is also an opportunity for administrators and teachers to work collaboratively in dispersed leadership roles.

Recommendation 2: WHS should provide sustained and differentiated professional development to teachers in the DuFour and Eaker (1998) model of PLC.

Because the needs of students are contextual to each school setting, the professional development around PLCs should be developed and directed by specific schools. Both Sykes (1996) and Valli and Stout (2004) emphasize the need for professional development to be teacher- and student-centered as well as continuous in order to create a supportive framework that ultimately could result in positive school change. Although the DuFour and Eaker (1998) model of PLC is utilized division-wide, the professional development in the model at WHS should be devised and directed by school-specific administration and staff to reflect the needs of WHS students. What follows is a suggested plan for incorporating sustained and differentiated professional development to the faculty of WHS over the course of several phases during the academic year:

- **Phase One:** *Pre-Assessment*. Beginning with the existing faculty, administrators could pre-assess the experiences and understanding of WHS teachers in the DuFour and Eaker (1998) model of PLC in the late spring before the end of the academic year. The results of this pre-assessment can inform the planning for the professional development during the subsequent academic year, which occurs over the summer for WHS administrators.

- **Phase Two:** *New Teacher Orientation*. The orientation for new teachers occurs at both the district- and building-level. Central office personnel, instructional coaches, and building-level principals can provide both a review of the DuFour and Eaker (1998) model of PLC as well as speak to the commitment of the school division to the model. Furthermore, using the pre-assessment data of the new teachers, the school division can provide differentiated workshops based on the core characteristics of the model, as well as bringing together diverse groups of teachers from various schools, essentially creating both discipline-specific and cross-school PLC teams.

- **Phase Three:** *Teacher Planning Week*. This back-to-school planning week for administrators and faculty usually lasts for six or seven school days and includes a division-wide professional development day. It is during this planning week that the WHS administration has the opportunity to set the tone, expectations, and supports for PLC. At the beginning of this planning week, administrators can deliver a brief review of as well as a statement of commitment to the DuFour and Eaker (1998) model of PLC. Administrators can then offer teacher breakout sessions based on the collected pre-assessment data to review or renew the varied aspects of PLC. Department chairs or veteran teachers experienced in PLC can assume leadership roles in developing and leading these sessions. Over the course of the planning week, the schedule should include time for PLCs to meet, orient new members, establish norms, review the mission, vision, and values of the school and school division, as well as begin the process of developing and revising common assessments. Administrators play an important role on PLC teams; they should participate in meetings and establish a clear connection of mutual support.

- **Phase Four**: *Recurring Professional Development Days*. The Buchanan School District includes both school-based and division-wide professional development days. First, the schedule for these days should include dedicated time for PLC teams to meet.
    - *School-based* professional development days occur at the midpoint of the first and third marking periods, and offer an ideal time for PLC teams to report and analyze data from common assessments. Because BSD and WHS already schedule a mid-year review that falls in late January or early February, these days offer the opportunity for a school-based quarterly review. It affords teachers and administrators an opportunity to discuss individual students, the collected and analyzed data, as well as upcoming common assessments. Additionally, in order to provide for sustained time for PLC work, the WHS administration can offer substitutes for teachers to engage in half-day or full-day retreats for PLC work, especially if teachers do not also have a common planning period.
    - *Division-wide* professional development day occurs in early November. During the 2016-2017 academic year, BSD reimagined its offerings for that day and offered a menu of workshops on different topics geographically spread across the school division. One of these workshops offered was an introductory workshop (PLC 101) on all-things PLC. BSD can continue to offer this introductory workshop, but it could also develop "advanced" versions, PLC 201, 301, etc., that covers in greater depth specific aspects of the DuFour and Eaker (1998) model. BSD has utilized this format of differentiated classes (101, 201, and 301) with technology initiatives professional development, such as Google classroom. Connecting these professional development classes with opportunities for PLC teams to meet on the same day (either as

within or across school teams) and take action on ideas elicited from the classes would show school division support of the growth and development of the DuFour and Eaker (1998) model of PLC as well as the work that PLC teams engage.

Several limitations affect the findings, recommendations, and usefulness of this capstone study. First, my presence at PLC team meetings may have altered the implementation and function of the Algebra 1 and English 11 PLC teams. Additionally, in the interviews that I conducted, my presence may have further caused participants to give the answer they thought was "correct." Second, I did not observe every PLC team at WHS, so the conclusions and recommendations may not apply to the non-observed PLC teams. Third, the findings and recommendations are possibly transferable to other similar research settings, but they are not generalizable to all PLC networks within BSD or in schools and school districts that utilize the DuFour and Eaker (1998) model of PLC. Fourth, and similar to the previous limitation, this capstone study focuses only on PLC teams in English and Math at WHS and not the other departments. Lastly, because I based my findings and recommendations my interpretation of events, it is possible that others who implement this capstone study would arrive at different conclusions and recommendations.

I hope that these findings and recommendations will be useful to Wheatland High School. I would be happy to provide an abbreviated list of references regarding the DuFour and Eaker model of PLC, as well as a list of references concerning PLC effectiveness and sustainability. Please do not hesitate to contact me if you have questions or concerns. You can reach me at my e-mail address, jcb5q@virginia.edu.

Sincerely,

John C. Baran, Jr.

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Appendix A

Administrator Interview Protocol

Introduction

Hello and thank you for agreeing to meet and speak with me today. I am conducting research on PLC at Wheatland High School. The purpose of this initial interview is to gather information about your professional background as well as your knowledge, experiences, and opinions with PLC. Is it OK if I audio record the interview today? I will transcribe the interview and replace with a pseudonym any personally identifying information about you and the research site. Would you like to pick your pseudonym? Do you have any questions for me before we begin?

Professional Experience/Background Questions

1) Please tell me about your educational background
    a. Where did you attend college?
    b. What degrees have you earned or are currently pursuing?
    c. How did you earn teaching licensure/certification? How did you earn administrative certification?
2) Please tell me about your professional experience.
    a. How long have you been an administrator? How long have you been an administrator at Wheatland High School?
    b. What administrative duties are your responsibility

PLC Knowledge Questions

1) How do you define Professional Learning Community (PLC)?
2) Buchanan School District and Wheatland High School implement a model of PLC based on the theories of DuFour and Eaker (1998). What are the essential characteristics of that model?

PLC Experience Questions

1) What role does PLC play at Wheatland High School? In Buchanan School District?
2) Do administrators participate as members of PLC teams?
    a. If so, what memberships on PLC teams do you have?
3) Please describe a typical PLC team meeting of which you are or have been a member.
4) Based on your understanding of PLC, what should teachers be doing during PLC time?

PLC Opinion Questions

1) Overall, how would you describe and rate the effectiveness PLC teams at Wheatland High School?

Appendix B

Teacher Pre-Observation Interview Protocol

Introduction

Hello and thank you for agreeing to meet and speak with me today. I am conducting research on PLC at Wheatland High School. The purpose of this initial interview is to gather information about your professional background as well as your knowledge, experiences, and opinions with PLC. Is it OK if I audio record the interview today? I will transcribe the interview and replace with a pseudonym any personally identifying information about you and the research site. Would you like to pick your pseudonym? Do you have any questions for me before we begin?

Professional Experience/Background Questions

1) Please tell me about your educational background
    a. Where did you attend college?
    b. What degrees have you earned or are currently pursuing?
    c. How did you earn teaching licensure/certification?
2) Please tell me about your professional experience.
    c. How long have you been teaching? How long have you been teaching at Wheatland High School?
    d. What subject do you teach? What grades and/or classes do you currently teach? What grades and/or classes have you previously taught?

PLC Knowledge Questions

1) How do you define Professional Learning Community (PLC)?
2) Buchanan School District and Wheatland High School implement a model of PLC based on the theories of DuFour and Eaker (1998). What are the essential characteristics of that model?

PLC Experience Questions

1) What role does PLC play in your department? At Wheatland High School? In Buchanan School District?
2) What PLC teams have you been a member of?
3) Please describe a typical PLC team meeting of which you are or have been a member.
4) Based on your understanding of PLC, what should teachers be doing during PLC time?

PLC Opinion Questions

1) Overall, how would you describe and rate the effectiveness of your PLC teams?
    a. What positive aspects have you experienced? What negative aspects have you experienced?

Appendix C

Teacher Post-Observation Interview Protocol

Introduction

Hello and thank you for agreeing to meet and speak with me again. The purpose of this summary interview is to gather information about your PLC experiences that just concluded with the unit of study. Is it OK if I audio record the interview today? I will transcribe the interview and a pseudonym will replace any personally identifying information about you and the research site. Do you have any questions for me before we begin?

1) Please describe the unit of study that was just completed.
    a. How long did it take?
    b. What content did you teach?
    c. What instructional practices did you use?
    d. How did you assess students?
2) How many times did your PLC team meet during this unit?
3) How did you use PLC time during this unit?
4) How did PLC time influence you during this unit of study?
    a. Instruction
    b. Assessment (formative and summative)
    c. Data collection and analysis
5) What will you do differently, if any, for the next unit of study, during PLC team meeting time?

Appendix D

PLC Team Observation Protocol

Date:		Start Time:	End Time:
PLC Team:	English Math Science Social Studies	Team Members:	

Observation	**Observer Comment/Reflection**

Appendix E

Informed Consent Agreement

Please read this consent agreement carefully before you decide to participate in the study.

Purpose of the research study: The purposes of this study is understand the current focus of PLCs at Wheatland High School, how teachers use PLC time, and if teachers adhere to the principles of the DuFour and Eaker (1998) model of PLC.

What you will do in the study: This study will take place from October through November 2016. It will follow PLC teams in 11th grade English and Algebra 1 over the course of a unit of study and consist of an administrator interview (approximately 30 minutes), a pre-observations interview with teachers (approximately 30 minutes), observations (weekly; 30 minutes each) and document collection of PLC teams, and a post-observations interview with teachers (approximately 30 minutes). Interviews and PLC team meetings will be audio recorded in order to assist the researcher in his note-taking. During the interview, you may can skip any question that makes you uncomfortable and you can stop the interview at any time.

Time required: The study will require about 1 hour of your time. You will be asked to participate in a pre and post interview, with each taking approximately 30 minutes.

Risks: There are no anticipated risks in this study.

Benefits: There are no direct benefits to participating in this study. The recommendations of the researcher, however, intend to help the administrators and teachers to become more knowledgeable about PLC and hopefully to improve function, effectiveness, and sustainability.

Confidentiality: To ensure the confidentiality of the participants, all personally identifiable information will be removed and pseudonyms will be used for persons and the research site. All data related to the study will be store in password-protected files on a password-protected computer. At the conclusion of the study, the data will be store on a password-protected file on an external hard drive that will be housed in a safety deposit box.

Voluntary participation: Your participation in the study is completely voluntary.

Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty. If you choose to withdraw, all study materials related to you will be destroyed immediately.

How to withdraw from the study:

If you want to withdraw from the study, during the interview portion of the study, tell the researcher to stop the interview. If during the observation portion of the study, tell the researcher and leave the room. There is no penalty for withdrawing.

Payment: You will receive no payment for participating in the study.

If you have questions about the study, contact:
John C. Baran, Jr.
1606 Grove Rd.
Charlottesville, VA 22901
Telephone: (434) 806-0529
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Stephanie van Hover
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If you have questions about your rights in the study, contact:
Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Dr Suite 500
University of Virginia, P.O. Box 800392
Charlottesville, VA 22908-0392
Telephone: (434) 924-5999
Email: irbsbshelp@virginia.edu
Website: www.virginia.edu/vpr/irb/sbs

Agreement:
I agree to participate in the research study described above.

Signature: _____ Date: _____

You will receive a copy of this form for your records.

Appendix F

Capstone Study Codebook

Code	Definition	Description
DE – M, V, V	DuFour & Eaker – Mission, Vision, Values	Reference or connection made to the mission, vision, or values of BSD or WHS.
DE – I	DuFour & Eaker – Collective Inquiry	Seeking, testing, or reflecting on new methods
DE – C	DuFour & Eaker – Collaborative Teams	Team learning
DE – A	DuFour & Eaker – Action or Experimental Orientation	Developing and testing hypotheses
DE – CI	DuFour & Eaker – Continuous Improvement	Focus on purpose and achievement
DE – R	DuFour & Eaker – Results Orientation	Engaged with tangible results
SL	School logistics	Topics that related to the operation of the school and their effects on the classroom *Emergent Code Examples*: Altered Schedule (AS), Mentorship (M), Fire Drill (FD), PSAT (PSAT), and Assembly (A).
EX	Extra-Curricular Discussion	Topics were those that had nothing to do with students, curriculum, instruction, or assessment of 11th grade English or Algebra 1.

		Emergent Code Examples: Election - Presidential (E-P), Election – Local (E-L), Weekend – Past (W-P), Weekend – Upcoming (W-U), Gossip – Colleague (G-C), and Gossip – Student (G-S).
INS	Instruction	A topic discussed in the form of sharing current practices. *Emergent Code Examples*: Methods (M), Units (U), Lessons (L), Activities (ACT), Curriculum (C), Maker Ed (ME), Projects (P-I), and Passion-Based (PBL).
AMT	Assessment	Most of the assessment discussion in the English 11 PLC focused on the common midterm examination. With regard to the Algebra 1 PLC team, the assessment discussion that primarily occurred was in creating and revising the unit test on solving equations and inequalities. Emergent Code Examples: Warm-Ups (WU), Quizzes (QU), Formative (F), Summative (S), Common (CA), Projects (P-C), Alternative (AA), and Makeup (A-M).