

**The Impact of Data Analysis by Collaborative Teams and their Influences on
Student Achievement**

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Abstract

The purposes of this study were to investigate the relationships between the establishment of collaborative teams, collaborative teams who analyze and utilize student learning data, and student achievement. Thirteen research questions were developed to fulfill the purposes of the current study. One-hundred six third grade teachers in District X were given the option to participate in a survey that gathered information regarding the establishment of their collaborative teams, actions performed by their teams, and data analysis practices employed by their teams to improve student achievement. Fifty-four participants responded, and the Kansas Math Assessment scores from students in their classes were linked to the survey responses for analyses. One-factor ANOVAs were conducted for eight of the research questions, and correlations were conducted for the remaining five research questions. While literature suggests that PLCs provide an effective process for schools and teams to increase student achievement, the findings of the current study did not align with the literature. The results from the one-factor ANOVAs and correlations revealed that there were not significant differences in student achievement and weak to moderate negative relationships with student achievement, respectively, with the establishment of collaborative teams, actions performed by collaborative teams, and data analysis practices employed by collaborative teams. Although the results of this study were not favorable, schools and collaborative teams in District X will continue utilizing the PLC framework to improve student achievement.

Dedication

This work is dedicated to my past, current, and future students. Your well-being and educational careers have inspired me to pursue this degree in hopes to become a better educator for you. To my past students, I wish I would have known then what I know now. I think of you often and have thought of different ways I could have applied my new learning with you. To my current students, thank you for working with me to try new strategies and methods I have learned to gather a deep understanding of your knowledge. To my future students, I look forward to continuing to learn about and committing to the PLC framework to provide you with a purposeful and valuable education. I hold all of my students close to my heart. You deserve the best.

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Chapter One

Introduction

The need for education reform in American schools has been at the forefront of the United States Department of Education for years due to America's quest to maintain global competitiveness by increasing its students' academic achievement levels. Reform movements dating back to *A Nation at Risk*, *Goals 2000*, and *No Child Left Behind* (NCLB) were employed to address the learning needs of students ("Goals 2000," 1998; U.S. Department of Education, 2008). Professional learning communities (PLCs), an approach to school reform surfacing in the late 1990s, provide schools with a framework to increase student achievement with the implementation of three big ideas, four critical questions, and six essential characteristics (DuFour, DuFour, Eaker, & Many, 2006b; DuFour & Eaker, 1998). Schools have needed to adjust their cultures and practices as a result of reform movements, and the PLC framework encourages schools to provide a high level of learning for all students, collaborate, and focus on results (DuFour & Eaker, 1998).

"Clarity precedes competence" (DuFour & Fullan, 2013, p. 13). Schools must fully understand and embrace the collaborative framework in order for the reform efforts to increase student learning. "Clarifying the characteristics of a PLC, the underlying assumptions that drive the process, the challenges of implementation, and the need for individuals at all levels of the organization to contribute to the process" serve as a starting point for schools implementing PLCs (DuFour & Fullan, 2013, p. 13). The degree to which schools, collaborative teams, and teachers implement the components of the PLC

framework could affect the impact the process will have on student learning (Pfeffer & Sutton, 2000).

The current study was conducted at a time when the pressure for academic success was rising because of the economic recession and competition for employment (Kurtz, 2013). “At a time when the link between education and lifetime opportunity is stronger than ever before, the United States continues to score low on measures of education performance, and the gap between high and low performance is growing” (DuFour & Fullan, 2013, p. 4). The PLC framework offers schools, teams, and teachers opportunities and strategies to increase student learning, close the achievement gap, and hold teachers accountable for continued professional growth and working interdependently with their collaborative team to increase knowledge (DuFour & Eaker, 1998).

PLC is a commonly used term. A problem occurs when teams and schools claim they know and function as PLCs, but lack implementing what they know or not fully embedding the framework into their schools’ cultures. “We find that the terms travel easily - *professional learning communities, networks, capacity building*, and so on – but the meaning of the underlying concepts does not” (Fullan, 2005, p. 67). Effective implementation of the PLC process requires clarity of the framework to affect student achievement.

Background information for this study is provided to gain an understanding of the PLC framework and its demonstrated ability to impact student achievement. The statement of the problem, purpose statement, and significance of the study are provided to understand the importance of the study. Delimitations, assumptions, and research

questions are included, as well as definitions of terms for clarity. Lastly, an overview of the methodology and organization of the study are included for a preview of the remainder of the study.

Background

The PLC framework is based on three big ideas, six essential characteristics, and four critical questions (DuFour & Eaker, 1998). The three big ideas provide an umbrella that contains all components of the process. The three big ideas are a focus on learning, collaboration, and results-orientation.

1. The fundamental purpose of the school is to ensure all students learn at high levels.
2. School administrators and teachers must build a collaborative culture in which they work together interdependently and assume collective responsibility for the learning of all students.
3. Schools must systematically monitor student learning on an ongoing basis and use evidence of results to respond immediately to students who experience difficulty, to inform individual and collective practice, and to fuel continuous improvement. (DuFour, DuFour, & Eaker, 2008, p. 18)

There are six essential characteristics that support the three big ideas: “shared mission, vision, and values; collective inquiry; collaborative culture; action-orientation and experimentation; continuous improvement; and results-orientation” (DuFour & Eaker, 1998, p. 25). The implementation and learning environment of PLCs is critical, as schools and collaborative teams are only able to function at their highest level if all characteristics of the framework are implemented correctly. “For without a deep

implementation of all six characteristics, a school will not achieve learning for all” (Buffum et al., 2008, p. 14).

Teachers working interdependently in a collaborative team use four critical questions to guide their work to align with the three big ideas and six critical questions.

1. What is it we want our students to learn? What knowledge, skills, and dispositions do we expect them to acquire as a result of this course, grade level, or unit of instruction?
2. How will we know if each student is learning each of the essential skills, concepts, and dispositions we have deemed most essential?
3. How will we respond when some of our students do not learn? What process will we put in place to ensure students receive additional time and support for learning in a timely, directive, and systematic way?
4. How will we enrich and extend the learning for students who are already proficient? (DuFour, DuFour, & Eaker, 2008, p. 183)

Collaborative teams that follow the PLC framework utilize data as evidence of learning (DuFour, DuFour, Eaker, & Many, 2006b). Teams are able to turn data into meaningful information gathered from formative assessments given on a regular basis used to guide instruction and increase student achievement.

The collaborative framework provides guidance to ensure a high level of learning for all students through a collaborative culture and analyzing and utilizing student learning data to focus on results. When teams or individuals lack data analysis skills they are making decisions based upon opinion versus fact (Reed, 2006). The use of data

creates a results-oriented culture allowing teachers, teams, and schools to make decisions based upon student needs.

Venue. This study was conducted in a large, suburban school district (District X) in northeast Kansas, which included more than 28,500 students attending 34 elementary schools, nine middle schools, and four high schools in the 2012-2013 school year. District X also included six additional schools such as early childhood or alternative school settings. There were 2,416 certified employees and 2,007 classified employees in District X, for a total of 4,423 staff members. The average class size for elementary school was 20.3 students, and 21.8 and 24.6 students for middle school and high school, respectively. While the school district is large in a metropolitan area, it is expected to continue to grow for the next 30 years (District X, 2011; Executive Assistant to the Executive Director of Elementary Personnel in District X, personal communication, January 14, 2013). Teachers must be prepared with knowledge of best practice to meet the needs of the students in the growing community.

The diversity of District X's 2012-2013 student population represents seven ethnic and racial backgrounds and 77 languages. Seventy one point four percent of students were Caucasian, 13.3% Hispanic, 7% African American, 4.6% Asian, 0.4% Native American, 0.1% Pacific Island, and 3.3% multi-racial (District X, 2012a). The socioeconomic status of students is evident through the free and reduced lunch populations for the district. Twenty one point two percent of students in District X qualified for Free Lunch and 6.1% qualified for Reduced Lunch, while 29% of elementary students qualified for either Free or Reduced Lunch (District X, 2012a; District X, 2012b).

Schools that have 40% or more students from low-income families or with low socioeconomic status in the attendance boundaries were considered to be Title I schools by the state of Kansas (Kansas State Department of Education [KSDE], 2011). There are 10 Title I schools and 10 schools with English Language Learners (ELL) programs in District X to meet the needs of all students. Eight elementary schools are Title I schools that also have ELL programs. Thirteen point one percent of students in District X participated in an ELL program and 4.6% of students qualified for special education (District X, 2012a; Executive Assistant to the Executive Director of Elementary Personnel in District X, personal communication, January 22, 2013).

PLCs in District X began at the high school level with a reform movement in 2003 that implemented 21st Century programs, an innovative approach to high school education that focuses on career fields (District X, 2013b). PLCs expanded to the elementary and junior high school levels with intent to move both high school programs and the collaborative framework forward at all levels (Director of School Improvement and Assessment in District X, personal communication, January 28, 2013).

Implementation began on October 20, 2006, to ensure that all schools were embracing the three big ideas, six essential characteristics, and four critical questions in their schools' cultures. The intended outcome of the action plan, led by the Director of School Improvement and Assessment in District X, was to "enhance the implementation and effectiveness of Professional Learning Communities (PLCs) as a process for improved student learning for all licensed/certified staff" (District X, 2006, p. 1).

The Professional Learning Community Continuum Rubric (DuFour, DuFour, Eaker, & Many, 2006b) was used by schools to assess district implementation in

accordance with the prescribed district framework. The PLC Continuum Rubric encouraged self-assessment of progress on the three big ideas, six characteristics, and their overall PLC development. The four stages of the Professional Learning Community Continuum Rubric are as follows:

1. Pre-Initiation Stage: The school has not yet begun to address this principle or practice of a PLC.
2. Initiation Stage: An effort has been made to address this principle or practice, but the effort has not yet begun to impact a critical mass of staff members.
3. Developing Stage: A critical mass of staff has begun to engage in the practice. Members are being asked to modify their thinking as well as their traditional practices. Structural changes are being made to support the transition.
4. Sustaining Stage: The principle or practice is deeply embedded in the culture of the school. It is a driving force in the daily work of staff. It is deeply internalized and staff would resist attempts to abandon the principle or practice. (DuFour, DuFour, Eaker, & Many, 2006b, p. 32)

In 2006, 3% of schools reported they scored at the *Developing* or *Sustaining* stages (Director of School Improvement and Assessment in District X, personal communication, June 19, 2013).

Four professional development trainings were given to Building Leadership Teams (BLTs) in District X in the spring of 2006, fall of 2006, spring of 2007, and fall of 2007 by the Director of School Improvement and Assessment. Topics of the professional development included the PLC framework; importance of agendas; assessing progress as a PLC; District Negotiated Agreement; norms; Strategic, Measureable, Attainable,

Results oriented, and Time bound goals (SMART goals); common assessments; and analysis of student work. Two training series, a total of eight sessions, were also given in the fall of 2006 and spring of 2007 to one or two representatives in each school. The topics of the training series were *Collaborating for School Improvement* and *Results Now: Working Together as a PLC* (District X, 2006). Representatives from each school became the PLC expert and trained their staff on information learned. Additional training was also provided to administrators.

PLC Audits for the elementary schools, junior high schools, and high schools were conducted in the 2007-2008 school year to assess the current realities of PLC implementation. The audits were conducted to analyze schools' journeys while implementing the framework by using data collected by the PLC Continuum Rubric (DuFour, DuFour, Eaker, & Many, 2006b). The purpose of the PLC Audits was to determine the effectiveness, strengths, and needs of PLCs. Table 1 communicates the average level of implementation for all schools in District X and elementary schools in District X.

Table 1

PLC Audit Results: Fall 2007

	Pre-Initiation	Initiation	Developing	Sustaining
All Schools	0%	33%	13%	54%
Elementary Schools	0%	12%	13%	75%

Note. Adapted from "Elementary Professional Learning Communities Audit: Audit Report," by District X, 2008. Copy in possession of author.

The action plan goal was to have 85% of schools at the *Sustaining* or *Developing* stages by the end of the 2007-2008 school year, and the audit confirmed that an 18% increase in teams meeting the *Sustaining* or *Developing* stages was needed by the end of the school year.

The PLC Continuum Rubric results were analyzed with the Kansas Reading Assessment scores in two consecutive school years to assess the effectiveness of PLCs by comparing the schools that reported their development at the *Sustaining* stage to those who reported their development at the *Developing* stage. In the 2006-2007 school year, 95% of schools at the *Sustaining* stage had a higher percentage of students scoring at the *Proficient* level or higher on the Kansas Reading Assessment. In the 2007-2008 school year, 100% of schools at the *Sustaining* stage had a higher percentage of students scoring at the *Proficient* level or higher on the Kansas Reading Assessment (District X, 2008).

Audit analyses suggested that the implementation of PLCs resulted in an increase in student achievement based upon test scores from the state reading assessment. Both the *Developing* and *Sustaining* stages on the PLC Continuum Survey were acceptable to the standard set by District X, but the Audit results provided evidence that schools at the *Sustaining* stage had higher assessment scores than schools at the *Developing* stage. A positive correlation between the PLC Continuum Survey stages and assessment scores was confirmed by the PLC Audit. As more teams transitioned to the *Developing* or *Sustaining* stages, more students from schools in the *Sustaining* stage had a higher percentage of students scoring at the *Proficient* level or higher on the Kansas Reading Assessment in elementary school (District X, 2008).

The Audit provided data for all schools pertaining to the long-term goal set for PLC implementation. The goal of the action plan was for 85% of schools to score at the level of *Developing* or *Sustaining* on the PLC Continuum Rubric by the end of the 2008 school year (District X, 2008). Table 2 outlines the progress of all schools.

Table 2

Percent of Schools at the Developing or Sustaining Stages of the PLC Continuum Rubric

	Fall 2006	Spring 2007	Fall 2007	Spring 2008
Percent of All Schools	3%	38%	67%	81%

Note. Adapted from “Elementary Professional Learning Communities Audit: Audit Report,” by District X, 2008. Copy in possession of author.

The overall growth of schools scoring at the *Developing* or *Sustaining* levels grew 78% from the fall of 2006 to the spring of 2008. While tremendous growth was made, District X did not achieve its goal of 85%. However, PLCs were a contributing factor to an increased level of student achievement, according to district and state assessments.

While student achievement increased during the implementation of PLCs, other varying factors in education and in District X caused the degree to which the framework affected the increase in achievement to be unknown (Director of School Improvement and Assessment in District X, personal communication, June 19, 2013).

After the results of the PLC Audit were analyzed, training was provided to BLTs and administrators through their district meeting to provide professional development to teachers and principals on key concepts throughout the district. The Director of School Improvement and Assessment offered PLC information in forms of PowerPoints, handouts, and articles at the beginning of every school year for principals to use with

their staff as a way to review the expectations and purpose of the process and collaborative teams (Director of School Improvement and Assessment in District X, personal communication, January 7, 2013).

Statement of the Problem

PLCs provide the process to create cultural shifts that allow schools to improve student achievement through focusing on student learning, collaboration, and focusing on results (DuFour & Eaker, 1998). The three big ideas, six essential characteristics, and four critical questions provide focus and clarity for the collaborative framework. In order for schools to impact student learning, schools should seek to understand the meaning and applications of the ideas, characteristics, and questions.

A problem occurs when there is a lack of clarity towards the PLC process. A lack of clarity, or understanding, may create gaps between what schools should be doing and the current realities of schools as they seek to implement key practices to improve student learning. The current study specifically addresses the lack of clarity and implementation regarding the establishment of collaborative teams and their data analysis and utilization practices to improve student learning.

Collaborative teams that understand and embrace the process gather student learning data from common assessments to inform instruction and provide interventions to students who need more time and support. Teams that utilize common assessment results have more clarity in regards to if the essential learning is mastered by students (DuFour, DuFour, Eaker, & Many, 2006b). As previously stated, “clarity precedes competence” (DuFour & Fullan, 2013, p. 13) and clarity from student learning data will provide teachers, teams, and schools the information to improve student achievement.

Past reform efforts such as A Nation at Risk, Goals 2000, and NCLB aimed to improve student achievement, but the desired results were not produced at the intended level (“Goals 2000,” 1998; U.S. Department of Education, 2002, 2008). PLCs provide the process for teachers, teams, and schools to prioritize and focus on student learning to achieve desired results, regardless of the current government initiative (DuFour & Eaker, 1998). Time is of the essence in the educational careers of students. Students need their teachers and schools to find the clarity needed to improve student achievement.

Purpose Statement

The purpose of this quantitative study was to investigate the relationship between collaborative teams and student achievement as measured by the Kansas Math Assessment. A second purpose of this study was to investigate collaborative teams who analyze and utilize student learning data to increase achievement, as measured by the Kansas Math Assessment. The current study seeks to identify strengths in collaborative teams to examine the effects of student learning, based on results from a survey and the Kansas Math Assessment. Based on the results from a survey and the Kansas Math Assessment, the current study seeks to identify weaknesses in collaborative teams to examine the effects on student learning.

Significance of the Study

Teachers collaborating with other teachers, rather than working in isolation, is a cultural shift supported by research that aides to improve student achievement, among other variables in the education setting (DuFour, DuFour, Eaker, & Many, 2006b). Teachers and students attend school in a time where accountability and academic success are held to high standards (DuFour & Marzano, 2011). The PLC framework was

designed to ensure a high level of learning for all students, which requires teachers to collaborate and focus on results by analyzing and utilizing student learning data.

Creating effective practices is significant as teacher teams work to increase student achievement. Analyzed data from common formative assessments provide clarity for teams by separating the effective practices from the ineffective practices (DuFour, DuFour, Eaker, & Many, 2006b). The PLC framework provides the platform for teachers to share expertise and become more effective educators.

This study investigated the relationships between the establishment of collaborative teams, analysis and use of data, and student achievement. District X can benefit from this study by gaining information from the results, showing which collaborative team and data components had the strongest correlation with student achievement. The results of this study can provide valuable information for staff to use within their collaborative teams to improve student achievement. The results of this study will benefit schools beyond District X by contributing to the body of knowledge of the importance of analyzing and utilizing student learning data to provide intervention and enrichment for students, inform professional practice, and guide instruction to improve student achievement.

Delimitations

“Delimitations are self-imposed boundaries set by the researcher on the purpose and scope of the study” (Lunenburg & Irby, 2008, p. 134). The individuals in the sample, survey, and use of assessment data were controlled, as was the timeline of the study, limited to the 2012-2013 school year.

The first delimitation was the sample of the study. The individuals in the sample were limited to third grade teachers and their students in District X. Collaborative teams comprised of third grade teachers were the focus of this study and their students were also used to examine student achievement as a possible result of the practices of collaborative teams. All 34 elementary schools were represented by one to four teachers.

A second delimitation was the measurement of the variables. The researcher used the results of a collaborative team and data-literacy survey to examine the establishment of collaborative teams and the data analysis and utilization practices used by the teams to expectantly improve student achievement within PLCs. The survey used for this study was a compilation of items from two surveys, along with nine items included from the researcher. Four items on the survey derived from the Critical Issues for Team Consideration survey developed by DuFour, DuFour, Eaker, and Many (2006a) and 27 items stemmed from the Professional Learning Team Data-Literacy Survey authored by Graham and Ferriter (2010b). The surveys were developed to use as a resource to guide administrators and collaborative teams to follow the PLC framework. The researcher selected the items from the surveys that best fit the research questions and variables in this study.

A third delimitation of this study was the timeline and assessment data parameters. The survey was administered in March and April of 2013 and the 2013 Kansas Math Assessment scores were utilized from students of the participants to examine the relationship between the collaborative teams and their data analysis and utilization practices and student achievement.

Assumptions

Just as assumptions are made in everyday life, assumptions are made in research as well. “Assumptions are postulates, premises, and propositions that are accepted as operational for the purpose of the research” (Lunenburg & Irby, 2008, p. 135). The researcher made assumptions regarding demographics, collaborative team practices, the PLC framework, as well as student effort on the Kansas Math Assessment. It was assumed that the demographics of the 34 elementary schools that participated in the study were reflective of the demographics of District X.

It was assumed that the PLC training for principals and school representatives was from a highly qualified, well-trained, and knowledgeable individual from District X, so principals could guide teachers appropriately. The researcher assumed that all elementary school principals in District X had the same knowledge level of collaborative teams and PLCs and continue to establish the process, following through with related expectations in their buildings. The same resources are given to all principals from the Director of School Improvement and Assessment for support and guidance.

The researcher assumed that all third grade teachers actively participated in a collaborative team following the PLC framework for at least 30 minutes per 5-day rotation schedule, as required by District X (Professional Council, Board of Education, & District X NEA, 2012). While it is understood that teaching methods and practices were controlled by the teacher, the researcher assumed the third grade curriculum was utilized by all third grade teachers in District X. Long range plans were provided to all teachers in reading, math, and writing by the district. It was assumed that all participants followed the long range plans for mathematics in third grade.

The results of the Kansas Math Assessment reflect student learning, which is related to the district curriculum and feedback received from teachers. The researcher assumed that students performed to the best of their ability on the Kansas Math Assessment to represent their learning, teacher, family, school, district, and community. It was assumed that all students learned the importance of the Kansas State Assessments and that teachers administered the assessment using appropriate testing practices.

The Kansas Computerized Assessment (KCA) and Center for Educational Testing and Evaluation (CETE) created practice assessments that aligned with the Kansas Math Assessment. It was assumed that teachers in this study provided their students with the opportunity to utilize CETE and practice taking assessments that reflected question stems and modes of testing. The current study relied on students' exposure to CETE before the Kansas Math Assessment so the scores were reflective of academic knowledge, not program exposure.

Lastly, the researcher assumed the participants thought deeply about their practices and answered the survey questions honestly. Honest responses were needed to draw accurate conclusions.

Research Questions

The research questions addressed the establishment of collaborative teams that follow the PLC framework, as well as the actions and data analysis and utilization practices by collaborative teams to improve student achievement. Characteristics of effective collaborative teams were investigated to determine the impact of teams on student achievement. Actions performed by collaborative teams to improve student achievement were analyzed to find effective collaborative team practices. Methods of

data analysis and utilization practiced by collaborative teams were investigated to determine their relationships with student achievement. All research questions focused on activities that impact student achievement as measured by the Kansas Math Assessment.

1. To what extent is there a relationship between establishing collaborative teams and student achievement, as measured by the Kansas Math Assessment?
2. To what extent is there a relationship between collaborative teams establishing team norms and student achievement, as measured by the Kansas Math Assessment?
3. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the number of minutes per week devoted to collaborative team meetings?
4. To what extent is there a relationship between focusing on results as a part of collaborative teams and student achievement, as measured by the Kansas Math Assessment?
5. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams establishing learning targets based on standards?
6. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams analyzing student achievement data to establish and revise SMART goals?

7. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams developing assessments?
8. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering informal formative assessments?
9. To what extent is there a relationship between collaborative teams administering common formative assessments and student achievement, as measured by the Kansas Math Assessment?
10. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering summative assessments?
11. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams involving students in the assessment process?
12. To what extent is there a relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement, as measured by the Kansas Math Assessment?
13. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of use of assessment data to form interventions by collaborative teams?

Definition of Terms

This section provides definitions of terms used throughout the study. Terms should be defined when “individuals outside the field of study may not understand and that go beyond common language” (Creswell, 2009, p. 39). The terms are defined so they are applicable to education and this study.

Achievement. Achievement is the “level of attainment or proficiency in relation to a standard measure of performance, or, of success in bringing about a desired end” (“Achievement,” 2014, para. 1).

Adequate yearly progress (AYP). Adequate yearly progress (AYP) is an “individual state's measure of yearly progress toward achieving state academic standards. Adequate yearly progress is the minimum level of improvement that states, school districts, and schools must achieve each year, according to federal No Child Left Behind (NCLB) legislation” (“Adequate yearly progress,” 2008, para. 6).

Administrator. Also known as *Principal*, an administrator is a primary leader in a school with many roles including manager, principal, instructional leader, and curriculum leader (Phillips, n.d.).

Aggregated data. Aggregated data are student learning data “reported for whole populations” (“Aggregated data,” n.d., para. 1).

Assessment. Assessments are “teacher-made tests, standardized tests, or tests from textbook companies that are used to evaluate student performance” (“Assessment,” 2008, para. 15).

Collaboration. Collaboration is “a *systematic* process in which people work together, *interdependently*, to analyze and *impact* professional practice in order to

improve individual and collective results” (DuFour, DuFour, Eaker, & Many, 2006b, p. 214).

Common formative assessment. Also known as *common assessment*, a common formative assessment is “an assessment typically created collaboratively by a team of teachers responsible for the same grade level or course” (DuFour, DuFour, Eaker, & Many, 2006b, p. 214) and administered by a team to gather student learning data.

Curriculum. Curriculum is “specific content that is taught in specific courses and at specific grade levels” (DuFour & Marzano, 2011, p. 91).

Differentiated instruction. Differentiated instruction is instruction with “different avenues to acquiring content, to processing or making sense of ideas, and to developing products so that each student can learn effectively” (Tomlinson, 2001, p. 1).

Elementary school. The elementary schools in District X educate students from kindergarten through grade 5.

Enrichment. Enrichment enhances the curriculum by incorporating “problem solving, creative thinking, initiative and self-direction, discovery, higher order thinking skills, profound personal interests, self-acceptance, and the courage to be different” (Oxford Brookes University, 2006, para. 4).

Essential learning. Essential learning encompasses “the critical skills, knowledge, and dispositions each student must acquire as a result of each course, grade level, and unit of instruction” (DuFour, DuFour, Eaker, & Many, 2006b, p. 215).

Feedback. Feedback is “timely, specific, and ongoing” (O’Neill, Conzemius, Commodore, & Pulfus, 2006, p. 7) progress on student learning.

Formative assessment. Formative assessments are “formal and informal processes teachers and students use to gather evidence for the purpose of improving learning” (Chappuis, 2009, p. 5).

General assessment. The general assessment is a form of the Kansas Assessment and is taken by “students in general or regular education classes whose educational programs are not regulated by IEP’s [sic]” (Poggio, Yang, Irwin, Glasnapp, & Poggio, 2007, p. 1).

Goal. Otherwise known as *Learning Goal* or *Learning Target*, goals are “measurable milestones that can be used to assess progress in advancing toward a vision. Goals establish targets and timelines to answer the question, What results to we seek and how will we know we are making progress?” (DuFour, DuFour, Eaker, & Many, 2006b, p. 216).

Individual Education Program (IEP). An Individual Education Program (IEP) is created as an official document as a plan “for a student with learning disabilities by the student's teachers, parents or guardians, the school administrator, and other interested parties. The plan is tailored to the student's specific needs and abilities, and outlines goals for the student to reach” (“Individual education program,” 2008, para. 22).

Indicator. An indicator is a “statement of knowledge or skills that a student demonstrates in order to meet a benchmark” (KSDE, 2009, p. 6).

Intervention. An intervention is “timely, directive, precise, and systematic support to keep them (students) moving forward with their learning” (DuFour & Marzano, 2011, p. 191).

Kansas Computerized Assessment. Students are able to take the Kansas Reading and Math Assessment online using “the Kansas Computerized Assessment (KCA) system developed by the Center for Educational Testing and Evaluation [CETE] at The University of Kansas” (Poggio et al., 2007, p. 4).

Kansas Math Assessment. According to the Kansas Reading and Math General Assessment Examiner’s Manual for All Grade Levels (KSDE, 2007) “the Kansas Mathematics and Reading Assessment is a program of the Kansas State Board of Education and mandated by the Kansas State Legislature as well as federal No Child Left Behind legislation” (p. 1).

Leadership. Leadership is “a *process* whereby an individual *influences* a group of *individuals* to achieve a *common* goal” (Northouse, 2004, p. 3).

Mission. A mission is “the fundamental purpose of an organization. Mission answers the question, “Why do we exist?” (DuFour, DuFour, Eaker, & Many, 2006b, p. 217).

No Child Left Behind (NCLB). No Child Left Behind (NCLB) was implemented in 2002 with achievement standards for all schools. “It mandates annual student testing, includes guidelines for underperforming schools, and requires states to train all teachers and assistants to be “highly qualified” (“NCLB (No Child Left Behind),” 2008, para. 9).

Principal. Also known as *Administrator*, a principal is a primary leader in a school with many roles including manager, administrator, instructional leader, and curriculum leader (Phillips, n.d.).

Professional development. Professional development is “a lifelong, collaborative learning process that nourishes the growth of individuals, teams, and the school through a

daily job-embedded, learner-centered, focused approach” (DuFour, DuFour, Eaker, & Many, 2006b, p. 217; National Staff Development Council, 2000).

Professional learning community (PLC). A professional learning community is comprised of “educators committed to working collaboratively in ongoing processes of collective inquiry and action research to achieve better results for the students they serve” (DuFour, DuFour, Eaker, & Many, 2006b, p. 217).

Proficiency. Proficiency indicates that a student has “mastery or ability to do something at grade level” (“Proficiency,” 2008, para. 23).

Rubric. A rubric is a “scoring tool that lists the criteria to be met in a piece of work. A rubric also describes levels of quality for each of the criteria” (“Rubric,” 2008, para. 30).

SMART goal. A SMART goal is a goal that is “Strategic and Specific, Measureable, Attainable, Results-based, and Time-bound” (O’Neill et al., 2006, p. 13).

Socioeconomic status (SES). Socioeconomic status is a “measure of an individual’s or family’s economic and social position based on education, income, and occupation” (“Socioeconomic status,” 2011, para. 1). An individual’s or family’s income also determines if the child or children in a family qualify for free or reduced lunch prices. If the annual income in a family of three is less than \$24,817, the child or children qualify for Free lunch (add \$5,148 for each additional family member). If the annual income in a family of three is less than \$35,317, the child or children qualify for Reduced lunch price (add \$7,326 for each additional family member). The federal poverty guideline for a family of three is \$19,090, adding \$3,960 for each additional family member (Tribiano, 2012).

Standard. A standard is a “general statement of what a student should know and be able to do in academic subjects” (KSDE, 2009, p. 6).

Summative assessment. Summative assessments are “assessments that provide evidence of student achievement for the purpose of making a judgment about student competence or program effectiveness” (Chappuis, 2009, p. 5).

Team. A team is “a group of people working interdependently to achieve a common goal for which members are held mutually accountable. Collaborative teams are the fundamental building blocks of PLCs” (DuFour, DuFour, Eaker, & Many, 2006b, p. 219).

Title I. Title I is “a federal program that provides funds to improve the academic achievement for educationally disadvantaged students who score below the 50th percentile on standardized tests, including the children of migrant workers” (“Title I,” 2008, para. 4).

Vision. A vision is “a realistic, credible attractive future for an organization. Vision answers the question, “What do we hope to become at some point in the future?” (DuFour, DuFour, Eaker, & Many, 2006b, p. 219).

Overview of the Methodology

This study used a quantitative research design to examine the relationships between the establishment of collaborative teams, their data analysis and utilization practices, and student achievement. Fifty-four third grade teachers from 34 elementary schools in District X participated in this study in the 2012-2013 school year. The first variable in this study was the establishment of collaborative teams. The second variable was the priorities displayed in the actions of the collaborative teams, while the third

variable was the data analysis and utilization practices that collaborative teams employed to improve student achievement.

The information for the first, second, and third variables were collected by items from the Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) and Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b) assessing data analysis and utilization practices that teachers use within collaborative teams to increase student achievement. The survey was given in March and April of 2013 through SurveyMonkey to reflect on the 2012-2013 school year. The fourth variable used in this study was student achievement, as measured by the 2013 Kansas Math Assessment. Data analyses included the use of Pearson correlations and one-factor analyses of variance (ANOVA) to test the research hypotheses.

Organization of the Study

Chapter one introduced the overview of the study as well as related literature. Chapter two provides a review of the literature related to collaborative teams, PLCs, and data analysis and utilization. The methodology is discussed in chapter three. The quantitative research design used for this study is included. Chapter four includes the descriptive statistics and hypothesis testing results for the research questions. Chapter five includes findings related to the literature of PLCs and data analysis and utilization. It concludes with implications for action, recommendations for future research, and concluding remarks from the researcher.

Chapter Two

Review of the Literature

“The use of PLCs is the best, least expensive, most professionally rewarding way to improve schools” (Schmoker, 2005, p. 137). PLCs provide a process for schools to improve student achievement by embedding three big ideas, four critical questions, and six essential characteristics into their schools’ cultures (DuFour & Eaker, 1998). The essence of the work of schools and teams is discussed in this literature review, beginning with the history of school reform in the United States, including how past school reform efforts have led to PLCs as a means to school reform. The three big ideas are discussed in depth to provide a thorough background, justifying why analyzing and utilizing student learning data provide the clarity that is crucial to the effectiveness of collaborative teams that follow the PLC framework.

School Reform in the United States

A Nation at Risk was issued in 1983 by the National Commission on Excellence in Education as a result of an 18-month study on secondary education found that “the curricula no longer had a central purpose unifying all of the subjects” (Scherer, 1983, para. 1). The report recommended significant changes to education, as SAT scores were dropping, 13% of 17-year-olds were illiterate at the time of the study, and more students needed remedial courses in college (Scherer, 1983; U.S. Department of Education, 2008). Five areas were recommended for revision: “curriculum content, standards and expectations of students, time devoted to education, teacher quality, and educational leadership and the financial support of education” (U.S. Department of Education, 2008, p. 3).

The Excellence Movement began as a result of *A Nation at Risk*, and focused on adding more to requirements in hopes to achieve excellence (DuFour & Eaker, 1998). “Excellence characterizes a *school* or *college* that sets high expectations and goals for all learners, then tries in every way possible to help students reach them” (U.S. Department of Education, 1983, para. 22). *A Nation at Risk* was an awakening report as it insinuated that America’s schools were not up to par with the rest of the world (Newmann & Wehlage, 1995).

The report and associated realizations caused schools to change their traditions in terms of culture, policies, and procedures. Schools began restructuring in the late 1980s by addressing the following:

decentralization, shared decision making, school choice, schools within schools, flexible scheduling with longer classes, teacher teaming, common academic curriculum required for all students, reduction of tracking and ability grouping, external standards for school accountability, and new forms of assessments (portfolios). (Newmann & Wehlage, 1995, para. 1)

Not only were schools and students held accountable with specific expectations, teachers were also held accountable with the development of the National Board of Professional Teaching Standards in 1987. The standards required that teachers

are committed to students and their learning, know the subjects they teach and how to teach those subjects to students, are responsible for managing and monitoring student learning, think systematically about their practice and learn from experience, and are members of learning communities. (DuFour & Eaker, 1998, p. 212)

The Goals 2000 Education Program was developed in 1989 and included eight goals to accomplish by the year 2000. A summary of the goals include children starting school ready to learn, increased graduation rate, demonstrating academic competency in grades 4, 8, and 12, teachers having access to resources for continuous improvement and professional development, students in the United States being first in the world in science and math, literate adults, safe schools, and increased partnerships and parental involvement (DuFour & Eaker, 1998). The goals were developed based on three guiding principles: “Students learn best when they, their teachers, administrators, and the community share clear and common expectations for education...Student achievement improves in environments that support learning to high expectations...Student success stems from concentrating on results” (“Goals 2000,” 1998, p. 1). Teachers needed a system to determine what students must learn and produce results to assess progress towards achieving the goals.

Education reform needs to be results oriented through reliable and aligned means that answer the critical, bottom-line question; to what extent are students and schools meeting the standards? Continuous improvement requires carefully developed accountability systems for interpreting and responding to results and supporting improved student performance for *all* children. (“Goals 2000,” 1998, p. 1)

Goals 2000 began to increase the intensity of academic achievement and hold schools accountable for educating all students by requiring states to indicate specific standards for each grade level. Support was provided by Goals 2000 to states and districts to develop clear standards through the planning and implementation of school

improvement initiatives. School improvement efforts were tailored to improving student achievement to meet the developed standards. In addition to specifying standards, states were required to have assessments aligned with their standards in place by 2001, as student performance accountability systems were being developed (“Goals 2000,” 1998).

Only a “handful of states” had standards in the early 1990s (Reeves, 2005), but Goals 2000 was passed by Congress in 1994, along with another major act in education. The two acts passed by Congress in 1994 worked simultaneously to hold schools and teachers accountable for educating students. The Improving America’s Schools Act of 1994 (U.S. Department of Education, 1995), which reauthorized the Elementary and Secondary Education Act, required all 50 states to have academic standards and assessments, while the Goals 2000: Educate America Act (U.S. Department of Education, 1994) provided funds for states to write the academic standards (Rudalevige, 2003; U.S. Department of Education, 2008).

The reauthorization of the Elementary and Secondary Education Act required states to determine standards by the 1997-1998 school year, and determine assessments and adequate yearly progress (AYP) definitions by the 2000-2001 school year. However, only 17 states had clear standards by 1997 (Rudalevige, 2003). “The lesson that many policymakers and analysts took from the 1994 reauthorization was that federal dollars needed to be tied more explicitly to measureable gains in student performance” (Rudalevige, 2003, p. 64). Through the establishment of No Child Left Behind (NCLB), the federal government was able to distribute federal dollars based on student achievement.

NCLB is a “school reform measure that requires standardized testing of every pupil in the U.S. in mathematics and reading every year in grades 3 through 8” (Stiggins, 2002, para. 13). Students in grades 4 and 8 also had to participate in the National Assessment of Educational Progress (NAEP) to assess progress and compare student achievement between states (U.S. Department of Education, 2003; Rudalevige, 2003). Specific achievement requirements and proficiency levels were established as a part of NCLB by each state, including demographic subgroup requirements. The Act required all students to score at the proficient level or above on state assessments by the 2013-2014 school year (U.S. Department of Education, 2002). Title I funds are dependent upon specific demographic subgroups meeting state AYP. The subgroups included major ethnic/racial groups, economically disadvantaged students, limited English proficient (LEP) students, and students with disabilities (U.S. Department of Education, 2002). According to Reed (2006), many states did not require or need disaggregated data for school improvement before 2002, so major adjustments were needed on behalf of schools. However, there was room for flexibility as “the text of the law left the states to set their definition of proficiency and to use their own assessments to measure it” (Rudalevige, 2003, p. 68).

Educational accountability significantly changed when the No Child Left Behind Act of 2001 was passed by Congress. NCLB was “built on the foundation laid in the 1980s and 1990s by ensuring that states accepting the federal government’s targeted investment agree to *measure and report on results* in terms of standards and accountability” (U.S. Department of Education, 2008, p. 5). Previous school reform efforts such as A Nation at Risk, Goals 2000, and Improving America’s Schools Act of

1994 led to the development of NCLB as more accountability measures were included after acquiring knowledge with the implementation of each act.

PLCs offer schools a framework and process for school reform. Collaborative teams that follow the PLC framework ensure a high level of learning for all students, collaborate, and focus on results (DuFour & Eaker, 1998).

Teachers' groups, professional communities variously defined, offer the most effective unit of intervention and powerful opportunity for reform. It is within the context of a professional community – be it a department, a school, a network, or a professional organization – that teachers can consider the meaning of the nation's education goals in terms of their classrooms, their students, and their content area. (McLaughlin & Talbert, 1993, p. 18)

The development of PLCs began when the roles of teachers, administrators, and schools shifted their cultures.

Professional Learning Communities Movement

The role of a teacher has significantly changed in the history of education. (DuFour & Eaker, 1992). Teachers served as teachers of religion and values in the Colonial period when the purpose of schools was to “teach reading in order to give children access to the Bible” (DuFour & Eaker, 1992, p. 121). Teachers often worked with ministers to help with baptisms and funerals. Teachers of the late 19th century began to focus on the futures of their students. They were expected to determine the potential of each student and guide them to a future fitting their abilities such as “college preparatory, general, or vocational tracks in high schools or bluebirds, robins, and sparrows in elementary school” (DuFour & Eaker, 1992, p. 122). Teachers in the mid to

late 1900s developed into “diagnosticians” (DuFour & Eaker, 1992, p. 122). Teachers as diagnosticians determined the needs of each student through testing and developed interventions to best meet the needs of students (DuFour & Eaker, 1992).

As the focus of schools and responsibilities of teachers evolved, schools and teachers have taken different approaches to gaining new information to educate students. Teachers turned to research as an avenue to expand their expertise, but often found its use minimal because of the mode of information delivery and that work was commonly published by college professors, who may have been distant from the classroom (Eaker & Huffman, 1980). While research was worth reading, teachers needed opportunities for discussion and application to learn.

People learn through experience and the full use of their senses. Yet, teachers are often expected to change very personal and complex teaching behaviors through just reading research findings or hearing descriptions of the work that has been done by researchers. This “one-sense,” indirect exposure just isn’t powerful enough to have much impact. (Eaker & Huffman, 1980, p. 1)

Teachers could benefit from working with each other by sharing needed information or examples of how to apply the research in their classroom (Eaker & Huffman, 1980).

The Consumer-Validation process was developed to give teachers the opportunity to “interact with each other about teaching” (Eaker & Huffman, 1980, p. 8). Eaker and Huffman (1980) assisted the Murfreesboro City School System in Murfreesboro, Tennessee to develop a professional development program that allowed teachers to collaborate on specific topics. Sharing sessions were scheduled that allowed teachers to meet and share ideas and activities for the classroom. The sharing session topics aligned

with four seminar topics: planning and organization, time on task, classroom management, and affective teaching (Eaker & Huffman, 1980).

Teachers perceived the ideas of other teachers to be more credible than those of university professors. In other words, rather than relying on professors trying to sell ideas to teachers, these discussion sessions capitalized on teachers sharing experiences with each other. (Eaker & Huffman, 1980, p. 8)

Russian behaviorist Lev Vygotsky is well known for his theory of the Zone of Proximal Development (ZPD) and its impact on working with others. The first component of an individual's ZPD, is the actual developmental level, which is comprised of the current knowledge and experiences obtained by an individual. The ZPD is the difference between an individual's actual developmental level versus the level of potential development (Vygotsky, 1978). Preschool age children between the ages of three and five demonstrated that they could increase their actual developmental level to those of 5- to 7-years old by working collaboratively. Imitation was used to show that capabilities of children increase with the use of guidance and collaboration (Vygotsky, 1978). While Vygotsky's theory of ZPD focused on children, the power of learning from each other was evident.

Learning organizations surfaced in educational literature through Senge's (1990) work highlighting the importance of examining the big picture rather than smaller fragments of issues. Learning organizations are "organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (Senge, 1990, p. 3). Learning

organizations offer opportunities for teachers to learn from each other, as Eaker and Huffman (1980) found beneficial. Teachers should collaborate in their learning organizations, or PLCs, for four hours per month at the elementary level, and eight and ten hours per month at the middle level and high school levels, respectively (APQC, 2009). The literature suggested that collaboration was crucial to the success of teachers and their students. When teachers collaborate, they are able to share expertise surrounding instructional strategies that impact student achievement. Collaboration offers the opportunity for teachers and teams to focus on learning specific to their classrooms and students.

The Rand Corporation conducted a national study of four programs that focused on introducing and supporting innovative practices in schools at the local level from 1973 to 1978 (McLaughlin, 1990). Five different characteristics of projects were researched for their impact on innovations, and Rand found the scope of a project to be of important consideration.

Ambitious efforts were more likely to stimulate teacher change and involvement than were modest, narrow projects...Planned-change efforts, it seems, need to be sufficient in scope to challenge teachers and kindle interest, but not so ambitious that they required too much too soon from the implementing system.

(McLaughlin, 1990, p. 12)

The difference between and the effectiveness of local control versus policy was researched as well. It was found that local choices and control impact the policy more than the features of the policy (McLaughlin, 1990). Local choices allow schools and teachers to focus their efforts on issues that relate directly to their schools and students.

“Policymakers increasingly realize that regulations cannot transform schools; only teachers, in collaboration with parents and administrators, can do that” (Darling-Hammond, 1996, para. 5). The findings from Newmann and Wehlage (1995) supported that a school has the capacity to increase student learning, regardless of federal regulations.

As school reform in the United States was underway, research on effective schools was conducted. Ten key findings from research collected from effective schools, businesses, and leadership were consistent and could be applied to school improvement efforts. The findings included a commitment to people, clear vision, shared values, effective leaders, shaping the culture and climate, curriculum that aligns with school values, monitoring, teachers as leaders, celebration, and commitment to improvement (DuFour & Eaker, 1992). Seven additional factors were found prominent in effective schools including: “safe and orderly environment, climate of high expectations for success, instructional leadership, clear and focused mission, opportunity to learn and time on task, frequent monitoring of student progress, and home-school relations” (Lezotte, 1995, p. 13).

The process of obtaining the status of effective schools was complicated, but could be done at the school level, as opposed to the district level. In fact, guiding principles for effective school change suggested that single schools must be the focus for the change. The guiding principles also suggested that the entire school community must be involved as decision-makers in the process to becoming an effective school as alterations in practices, policies, and procedures may be needed to accommodate the change (Lezotte, 1995). Lastly, “school improvement, like any change, is best

approached as a process, not an event” (Lezotte, 1995, p. 6). Processes lead to continuous school improvement as events lead to concrete tasks accomplished.

Numerous contributions to the education profession provided examples of effective schools and led to the development of PLCs. Teachers began to focus on instruction and pedagogy specific to their setting and responsibilities, which enabled them to learn from one another (McLaughlin, 1990; McLaughlin & Talbert, 2006). Effective schools also promoted shared decision making of teachers and shared leadership between teachers and leaders (Darling-Hammond, 1995; Hord, 1998). Above all else, a purposeful commitment to student learning needed to be evident in order to impact student achievement (Hord, 1997b). Consequently, Newman and Wehlage (1995) found that restructuring schools at the local level has the ability to impact student achievement, regardless of federal regulations, dependent upon student learning, authentic pedagogy, school organizational capacity, and external support.

Once schools began to focus on student learning and involve teachers in the decision-making process, schools began to focus on results. Formative assessments were used to gather student learning data in both formal and informal manners to gauge students’ learning progress (Black & Wiliam, 1998). Assessments *of* learning and assessments *for* learning were established, with two different purposes of gathering student learning data (Stiggins, 2002). As the focus on results intensified, collaborative teams were reminded that results do not override the process of collaboration (Schmoker, 1999, 2002).

The role and responsibilities for teachers were changing in schools that opted to restructure. “Practitioners must be willing to articulate a fundamentally new purpose of

schooling. They must be willing to redefine their basic responsibilities. They must be willing to re-examine the manner in which they conduct their day-to-day business” (DuFour & Eaker, 1992, p. 3). The changes included more leadership and decision making responsibilities for teachers, as well as a collaborative atmosphere for professional growth (Darling-Hammond, 1996; DuFour & Eaker, 1992; McLaughlin, 1990). The success of restructured schools depended upon teachers redefining their roles. In order for schools to make an impact on student learning, teachers must serve as leaders (DuFour & Eaker, 1992). Enabling teachers requires certain factors and practices such as “productive collegial relations, organizational structures that promote open communication and feedback, and leadership that “manages” opportunities for professional growth and nurtures norms of individual development” (McLaughlin, 1990, p. 15).

Restructuring schools as a result of setting standards should cause states to “invest in greater teacher knowledge” (Darling-Hammond, 1996, para. 1). The implementation of standards increased teacher accountability, a transition for which teachers needed to be prepared. The roles of teachers should be transformed through “redesigning initial teacher preparation, rethinking professional development; and involving teachers in research, collaborative inquiry, and standard-setting in the profession” (Darling-Hammond, 1996, para. 8). The value and potential of teachers was recognized and teachers were held to high expectations. The transformed role of teachers promoted schools to focus on the specific needs of their students.

While components of the PLC framework were developed and researched in the late 1900s, PLCs officially became a term used to describe a collective approach to

school reform in the late 1990s. PLCs utilize three big ideas to guide the work of teams: a focus on learning, collaboration, and results-orientation (DuFour & Eaker, 1998). Research conducted prior to 1998 suggested that collaboration and the following five characteristics define PLCs: “supportive and shared leadership, collective learning and application of learning, shared values and vision, supportive conditions, and shared personal practice” (Hord, 1998, p. 2). The five characteristics transformed into six essential characteristics that work simultaneously towards school improvement: “shared mission, vision, and values; collective inquiry; collaborative culture, action-orientation and experimentation; continuous improvement; and results-orientation” (DuFour & Eaker, 1998, p. 25).

Embracing PLCs as a school reform effort requires many cultural shifts between traditional schools and schools that follow the PLC framework (DuFour et al., 2006b). The process allows teams and schools to significantly change the way they work. “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” (McLaughlin & Talbert, 1993, p. 18). The evolution, change, and explanation of the three big ideas further describe the cultural shifts needed to becoming PLCs.

Professional Learning Communities’ Big Ideas

The PLC framework is based on three big ideas that encompass all aspects of the work of collaborative teams: ensure a high level of learning for all students, create a collaborative culture, and focus on results (DuFour & Eaker, 1998). In other words, “to create a professional learning community, focus on learning rather than teaching, work

collaboratively, and hold yourself accountable for results” (DuFour, 2004, p. 6). PLCs contribute to the effectiveness of schools and are a path to making the mission and vision of a school become a reality (DuFour, Eaker, & DuFour, 2005; Solution Tree, 2007).

It must be remembered that PLCs is not a program; it is a never-ending process that changes school culture. Programs are developed to enhance the process of changing the school culture to adhere to the PLC framework (Solution Tree, 2007). “Educators assume that a PLC is a meeting – an occasional event when they meet with colleagues to complete a task. It is not uncommon for us to hear, my PLC meets Wednesdays from 9:00 a.m. to 10:00 a.m.” (DuFour, DuFour, Eaker, & Many, 2010, p. 10). A PLC is the larger organization, such as the school or district that provides the environment and framework for collaborative teams of teachers and staff to efficiently function and provide a high level of learning for all students.

The foundation of PLCs is built upon the mission, vision, values, and goals of a school. “A group must be able to envision a better future before it can take steps to create that future” (DuFour & DuFour, 2007, p. 27). The mission answers the question “Why do we exist?” and provides schools and staff with a purpose, while the vision provides direction and answers the question “What must we become in order to accomplish our fundamental purpose?” (DuFour, DuFour, Eaker, & Many, 2006b, p. 24). A transparent mission and vision provide clarity for collaborative teams and schools as they educate students. A school’s vision is something to be honored as it sets the tone for a school’s environment and climate. The vision should be developed by the staff as it should guide the work of teams.

Staff should also develop shared values and goals to serve as stepping stones to achieving the mission and vision. “Engaging staff in a collaborative process to develop shared values, or “collective commitments,” is one of the most powerful tools for changing behaviors that can, ultimately, transform the culture of a school or district” (Eaker & Keating, 2008, p. 15). Values, or collective commitments, describe what staff will do to make progress towards the mission, vision, and purpose.

When members of an organization understand the purpose of their organization, know where it is headed, and then pledge to act in certain ways to move it in the right direction, they don’t need prescriptive rules and regulations to guide their daily work. (DuFour, DuFour, Eaker, & Many, 2006b, p. 25)

Goals are set to measure the progress towards the mission and vision and to know if the improvement efforts are effective. Effective goals “help close the gap between the current reality and where the staff hopes to take the school (the shared vision)” (DuFour, DuFour, Eaker, & Many, 2006b, p. 26). The mission, vision, values, and goals are executed through the three big ideas of PLCs.

Big idea #1: Focus on learning. Teaching is no longer the focus of schools following the PLC framework; learning is the primary focus. There is a difference between what is learned and what is taught; what is learned takes precedence over what is taught in the PLC process (DuFour, Eaker, & DuFour, 2005). Transferring the focus from teaching to learning takes many cultural shifts within a school including a shift in the fundamental purpose of schools, use of assessments, the response when students do not learn, the role and work of teachers, focus, school culture, and professional growth (DuFour, DuFour, Eaker, & Many, 2006b).

As previously stated, “clarity precedes competence” (DuFour & Fullan, 2013, p. 13). Schools that have a true focus on learning are transparent in what they want students to learn. They have answered the first critical question by determining the essential learning for each content area. Research has shown that “teachers are most effective in helping all students learn when they are clear regarding exactly what their students must know and be able to do as a result of the course, grade level, or unit of instruction” (DuFour, DuFour, Eaker, & Many, 2006b, p. 70).

The clear learning expectations set by collaborative teams of teachers as a part of PLCs in the Fort Leavenworth School District in Fort Leavenworth, Kansas were highlighted in the *Evaluating Professional Learning Communities* report by APQC Benchmarking Project. The district was included in the report because of their success with the framework, but a feature of the district’s PLCs that allowed for success was determining eight to 12 essential learning components for each grade level for the school year. Student learning data on the essential learning was gathered by common formative assessments, and student progress was monitored on a regular basis (APQC, 2009).

Each students’ learning is monitored skill by skill, and “the message is clear: some students will require a greater opportunity to learn- they will need more time and support than others- and the most effective schools ensure that they receive it” (DuFour, DuFour, Eaker, & Many, 2010, p. 102). A major difference between schools that focus on learning as a part of PLCs and traditional schools is the response to when students do not meet proficiency. Learning is the students’ responsibility or left to chance in traditional schools, whereas PLC schools ensure that all students learn (Solution Tree, 2007). Schools that follow the PLC framework have a systematic approach for students

who struggle learning the material and are in need of an intervention. “It eschews the randomness of traditional practice and guarantees all students will be the beneficiaries of a coordinated, methodical, multi-layered, fluid plan of intervention- regardless of the teacher to whom they are assigned” (DuFour, 2009, para. 8).

In addition to focusing on student learning, adults must be regular consumers of knowledge to remain informed of current research-based practices. “A corollary assumption is that if the organization is to become more effective in helping all students learn, the adults in the organization must also be continually learning” (DuFour, DuFour, Eaker, & Many, 2006b, p. 3). Job-embedded learning is an important piece to professional development in PLCs as collaborative teams are often involved in determining where they need to advance their knowledge to better meet the needs of their students. Members of PLCs are eager to apply their new learning and value learning through experience (DuFour, DuFour, Eaker, & Many, 2006b). “The learning is not trivial, nor is it unplanned. The question for professionals becomes: What should we intentionally learn in order to become more effective in our teaching so that students learn well?” (Hord, 2008, p. 12).

The major shift from focusing on teaching to focusing on learning requires a leader who fully understands the framework of PLCs, and how PLCs fit into a school’s culture. “Acting on this belief requires that leaders go far beyond simply endorsing the PLC concept; they must gain a deep, rich understanding of what professional learning communities are, how they differ from traditional schools, and how they work” (Eaker & Keating, 2012, p. 8). Principals serve as members of PLCs and need to be knowledgeable in order to support collaborative teams of teachers.

Principals serve as official leaders of a school and have the daunting task of fulfilling so many roles like

celebrate the success of their schools *and* to perpetuate discontent with the status quo; convey urgency regarding the need for school improvement *and* to demonstrate the patience that sustains improvement efforts over the long haul; encourage individual autonomy *and* to insist on adherence to the school's mission, vision, values, and goals; build widespread support for change *and* to push forward with improvement despite resisters; approach improvement incrementally *and* to promote the aggressive, comprehensive shakeup necessary to escape the bonds of traditional school cultures. (DuFour, 1999a, p. 62)

These tasks cannot be accomplished by a single administrator (DuFour, 1999a).

Principals of PLCs employ shared leadership and collaboration to allow teachers to become heavily involved in the school's journey to achieving their vision and increasing student achievement. "Supportive and shared leadership develops as a school's formal administrative leader – the principal – accepts a collegial relationship with teachers, shares power and decision making, and promotes and nurtures leadership development among staff" (Hord, 1998, p. 4).

Shared leadership is an important piece of the PLC culture, but leaders must communicate their tight and loose expectations for consistency (DuFour, 2007). Tight and loose leadership was explored by Peters and Waterman (1982) because a framework was needed for leaders to communicate expectations while promoting professional decision-making. Simultaneous tight and loose leadership is "the co-existence of firm central direction and maximum individual autonomy" (Peters & Waterman, 1982, p.

318). Tight and loose leadership provides clarity for teams and schools, in addition to the mission and vision, as they work to improve student achievement.

Leaders need to be cautious about “getting tight about the right things” (DuFour, 2007, para. 11) and setting a precedence that aligns with the school’s vision to ensure that actions and behaviors promote student learning. District leaders should be tight about the three big ideas, four critical questions, and six essential learning characteristics of PLCs, but “loose in allowing each school the autonomy to create its own strategies for creating these conditions” (DuFour, 2009, para. 11). Research from Sergiovanni (1984) confirmed that effective schools use a set of key principles to guide the work of staff, balanced with opportunities for teachers to operate as needed, while abiding by the key principles.

The leadership potential of teachers is recognized by principals that follow the PLC framework as they take a guidance role rather than a directive role (Hord, 2008). Blue Valley School District in Overland Park, Kansas is known for their shared leadership and systems for collaboration. They were another school district that participated and was evaluated for the success of their PLCs as a part of the APQC project.

Through the use of leadership teams (identified leaders within each PLC that in turn work with the principals and district leadership) they’ve been able to address a challenge with all PLCs, sticking to school improvement not school management or school operations. (APQC, 2009, p. 135)

Shared leadership and collaboration within a school allows numerous educational professionals to work interdependently to focus on learning and improve student achievement.

Focusing on learning is the reason why schools exist, which members of PLCs truly believe and take responsibility for fulfilling that purpose (DuFour, DuFour, Eaker, & Many, 2006b). However, the true meaning of focusing on learning can be easily confused with teaching; PLCs and collaborative teams are aware of the relationship between teaching and learning, but focus on learning as an effect of the teaching. “Whereas many schools operate as if their primary purpose is to ensure that children are taught, PLCs are dedicated to the idea that their organization exists to ensure that all students *learn* essential knowledge, skills, and dispositions” (DuFour, DuFour, Eaker, & Many, 2010, p. 11). The purpose of collaborative teams is to provide valuable opportunities for students to learn. Teams “never forget that the main reason they are together is about fulfilling their purpose” (Bellman & Ryan, 2009, p. 24).

Big idea #2: Collaborative culture. The three big ideas, six essential characteristics, and four critical questions were established to increase student learning through the use of teacher collaborative teams and PLCs (DuFour & Eaker, 1998). Following the PLC framework, collaborative teams of teachers work interdependently to share knowledge, gain expertise, and take action to increase student achievement. “The very reason any organization is established is to bring people together in an organized way to achieve a collective purpose that cannot be accomplished by working alone” (DuFour, DuFour, Eaker, & Many, 2010, p. 139). Collaborative teams are at the center of PLCs. The teams are the component that allows progress to be made and goals to be

accomplished. “The team is the engine that drives the PLC effort and the fundamental building block of the organization” (DuFour, DuFour, Eaker, & Many, 2006b, p. 3).

Isolation has a strong tradition in educational history (DuFour & Burnette, 2002). “Teaching has continued to be characterized by a single adult, standing alone before 25 children, and working in isolation” (DuFour, 1999b, p. 61). In an interview conducted by Sparks (2001), Senge stated that teaching is viewed as an individualistic profession because of the formal structure, but there are not rules or guidelines preventing teachers from collaborating, while structures can be changed, “changing the structures won’t amount to much if there isn’t a genuine desire on the part of teachers to do their work in a more collaborative way” (Sparks, 2001, p. 45). Teachers must understand the value of collaboration and learning from one another in order for PLCs to function properly.

Individual teachers working in isolation as they attempt to help all of their students achieve at high levels will eventually be overwhelmed by the tension between covering the content and responding to the diverse needs of their students in a fixed amount of time with virtually no external support. (DuFour, DuFour, Eaker, & Many, 2006b, p. 77)

Members of collaborative teams support one another to improve student achievement along with their own professional knowledge.

The Consumer-Validation study presented the need and a framework for teacher collaboration. The process addressed the use of research by teachers and found that teachers learn better from each other rather than reading about research published by college professors (Eaker & Huffman, 1980). “The term “consumer-validated research” reflects the idea that teachers should and can play an important part in developing and

testing ideas for instructional improvement...teachers might more readily try to incorporate in their classrooms because other teachers found them helpful” (Eaker & Huffman, 1980, p. 19).

There is value associated with teachers learning from one another how to become better teachers. “Teachers learn best from other teachers, in settings where they literally teach each other the art of teaching” (Schmoker, 2005, p. 141). Opportunities for teachers to learn from each other should be a component of a school’s culture.

What teachers need is a variety of living examples of implementation, as practiced by teachers with whom they can identify and from whom they can derive the confidence they can do better. They need to see examples of what doing better means in practice. (Black & Wiliam, 1998, para. 49)

PLCs provide the opportunities for teachers to learn from one another. In addition to improving student achievement, collaborative teams have the potential to improve the abilities of individual teachers. “The quality of the individual teacher remains paramount in student learning, and the PLC concept is our best strategy for creating the system that ensures more good teaching in more classrooms more of the time” (DuFour, 2009, para. 13). Sharing knowledge and expertise with collaborative teams brings out the best in each individual teacher. Improving teaching as a result of a collaborative effort to focus on student learning can impact student achievement. “Quality teaching is not an individual accomplishment, it is the result of a collaborative culture that empowers teachers to team up to improve student learning beyond what any one of them can achieve alone” (Carroll, 2009, p. 13).

Collaboration is important, but the focus of teams is crucial. “Collaborative teams of teachers, doing the right work, can achieve what individual teachers cannot achieve by working alone” (Eaker & Keating, 2012, p. 18). Collaboration does not automatically result in increased student achievement. Focusing on the right work requires teachers to focus on the four critical questions that guide PLCs developed by DuFour and Eaker (1998). The four critical questions provide structure and focus to ensure that teams spend their time on work that will impact student learning. “The pertinent question is not, “Are they collaborating?” but rather, “What are they collaborating about?” (DuFour, DuFour, Eaker, & Many, 2006b, p. 91).

As teams collaborate and focus on the right work, they develop collective autonomy (DuFour & DuFour, 2007). Members of collaborative teams within PLCs understand and accept that they cannot fulfill all of the responsibilities of teaching a group of students on their own. They understand they need their team and value their knowledge and expertise. “It is about trusting in the collective wisdom of the team to collaboratively bring about high levels of learning for all students” (Buffum et al., 2008, p. 209).

Adlai E. Stevenson High School in Lincolnshire, Illinois was a school of interest for the APQC project because of their work towards collective autonomy at both the district and school levels. Teachers are viewed as professionals and collaboration is a routine at Adlai E. Stevenson. “High quality learning happens when the teams identifies the issues, develops solutions, implements change, and evaluates their success” (APQC, 2009, p. 133).

Collaborative teams continuously perform tasks directly related to the shared purpose of ensuring a high level of learning for all students. “What collaborative team members do in a professional learning community goes far beyond casual collaborative conversations” (Eaker & Keating, 2012, p. 18). Effective teams begin examining the standard (district, state, or national) that students need to learn before determining the strategy to teach the identified essential learning. Teachers consistently ask questions about student learning to gather information and make necessary adjustments for improvement (Schmoker, 2002). In addition, collaborative teams communicate with other grade levels, particularly the grade level above and below, to seek information on mastery skills needed for that grade level (DuFour, 2004).

Once mastery levels are determined for essential learning, teams develop common formative assessments as a means to gather student learning data. During this process they also determine the criteria to grade or critique (DuFour, 2004). The assessment results are analyzed on a timely basis by teams that “highlight strengths in student learning, identify areas of concern, select interventions, evaluate the effectiveness of their assessments, learn from each other’s strengths, and monitor the learning of each student, skill by skill” (Eaker & Keating, 2012, p. 20).

Collaboration was crucial for Blue Valley School District in Overland Park, Kansas, and Kildeer Countryside Community Consolidated School District 96 in Buffalo Grove, Illinois, both participants of the APQC study, as they accomplished the following continuous tasks in the process of improving student achievement:

The teams developed common expectations and were responsible for identifying essential outcomes, developing common assessments, establishing targets and

benchmarks, analyzing assessment results, and planning for interventions. Each team was expected to identify and evaluate team norms continuously, to establish protocols to guide team work, to establish SMART goals, and to celebrate successes. (Many & King, 2008, p. 30)

Teams may vary in the way they work, but the priorities and over-arching, continuous tasks should be consistent. “One of the most effective ways to enhance and monitor the productivity of a team is to insist that it *produce*” (DuFour et al., 2010, p. 128).

Big idea #3: Results-orientation. Focusing on results allows teachers and students to use concrete evidence to measure progress. Without the results, assumptions measure progress and may be inaccurate. Collaborative teams that follow the PLC framework view data through a specific lens that allows learning data to be analyzed for each individual student, on each particular skill. The information gained from the analysis is utilized to make decisions about student learning and guide future instruction. The analysis and utilization of data performed by collaborative teams aides in fulfilling one of the purposes of PLCs, to ensure a high level of learning for all students (DuFour, DuFour, Eaker, & Many, 2006b). Teams are “hungry for evidence of student learning, and they use that evidence both to respond to students who need additional time and support as well as to inform and improve their professional practice” (Eaker & Keating, 2008, p. 15).

The effectiveness of PLCs is determined by the results produced by collaborative teams that show progress in student achievement. The effectiveness of teachers is also assessed by the progress made by students as a result of PLCs (DuFour, 2004). Focusing on results evaluates the effectiveness of the school and teams, critical to the school’s

continuous improvement, and can also serve as a motivator for students and staff (DuFour, DuFour, Eaker, & Many, 2006b). However, results do not override the process and importance of the work that collaborative teams do as a part of PLCs (Schmoker, 1999).

Kildeer Countryside Community Consolidated School District 96 in Buffalo Grove, Illinois, a featured school in the APQC project, had a “relentless state of restlessness” and focused on “changing practices based on what was learned (students and teachers)” (APQC, 2009, p. 139). Continuous improvement was a priority demonstrated by analyzing student learning data to clarify what students should be learning. Common assessments were given to analyze what students were learning, which led to specific intervention strategies (APQC, 2009). Continuous improvement required both teachers and students to learn. “Learning is not an activity that is undertaken solely by students, but is a continuous journey that all staff is part of as the district moves towards being the best in the country” (APQC, 2009, p. 139).

Leaders of Kildeer Countryside and Blue Valley School Districts guided their school districts on the journey to establish PLCs while focusing on continuous improvement “by becoming comfortable with being uncomfortable...The culture of both districts was characterized by a sense of continually moving towards better solutions” (Many & King, 2008, p. 29). When schools embrace continuous improvement, they are not satisfied with the current realities, therefore, always working towards the next step to achieving the shared vision. “In a school serious about pursuing continuous improvement for student learning, teachers and administrators are never at rest” (Kanold, 2006, p. 21).

Focusing on results means much more than administering assessments and obtaining student scores. It means that teachers work in collaborative teams to determine the specific skills students need to learn, and develop assessments that would accurately determine whether or not each student met the pre-determined proficiency level. The student learning data is used to make future decisions regarding the specific skill or topic of study, including the possibility of intervention or remediation (Buffum et al., 2008). Schools must have a system in place for teachers and collaborative teams to effectively focus on results.

Members of collaborative teams focus on results by sharing their expertise and knowledge to make meaning of data derived from assessments and provide intervention or enrichment based on student need.

Being a teacher in a professional learning community means being part of collaborative teams that recognizes students are more apt to perform well on high-stakes summative assessments if the quality of their learning is regularly monitored along the way – especially when the results of the assessments are used to provide students with additional time, support, or enrichment. (Eaker & Keating, 2012, p. 20)

Analyzing and utilizing student learning data provides information to brainstorm solutions to the areas in need of improvement in the current realities of students and schools. The actions and decisions of collaborative teams that follow the PLC framework rely on data analysis from common formative assessments to ensure their efforts are focused on the right work to improve student achievement.

Collaborative teams in PLCs set student learning goals to assess the progress of achieving the school's mission and vision. While the long term goal is to achieve the school's mission and vision, short term goals are set to assess the progress along the way and keep the school moving in the right direction (Schmoker, 1999). The goals are based on the essential learning determined by collaborative teams with a pre-determined proficiency level, aligning with the first big idea of PLCs: focus on learning (DuFour, 2004). "Without clear, common goals, teachers are not able to communicate meaningfully and precisely about how to improve- and about how to determine if they are improving" (Schmoker, 1999, p. 25).

Setting goals had a $d = 0.56$ effect size, which characterizes setting goals in the zone of desired effects (Hattie, 2009). Setting goals and providing updates on the progress towards achieving the goals allows students to take ownership of their learning and allows teachers to have concrete evidence on the progress of student learning and effectiveness of their teaching.

A basis of many claims about the value of self-assessment, self-evaluation, self-monitoring, and self-learning is that students have a reasonable understanding of where they are at, where they are going, what it will look like when they get there, and where they will go to next: that is, they have clear goals, learning intentions, and success criteria. (Hattie, 2009, p. 165)

Having goals with an assessed value results in higher student achievement than goals without any form of assessment, such as *do your best* (Hattie, 2009). "Teams are most effective when they are clear about the results they are to achieve" (DuFour & Eaker, 1998, p. 123) and setting goals defines a clear target for achievement.

In PLCs, collaborative teams develop SMART (Strategic and Specific, Measureable, Attainable, Results oriented, and Time bound) goals to assess student learning progress (DuFour, DuFour, Eaker, & Many, 2006b; O’Neill & Conzemius, 2005). The realistic goals are directly aligned with the school’s mission and vision, provide clarity on the purpose for learning, and can be accomplished in a specific time frame. “Not only do collaborative teams represent the optimum setting for the pursuit of meaningful SMART goals, but SMART goals also represent an essential tool in developing powerful collaborative teams” (DuFour, DuFour, Eaker, & Many, 2010, p. 172).

Goals serve as small steps for teams working towards achieving the mission and vision of the school. “In the absence of a common goal, there can be no true team” (DuFour, DuFour, Eaker, & Many, 2006b, p. 26) as “goals give teamwork meaning” (Schmoker, 1999, p. 23). Goals translate a purpose for learning into something measureable and achievable as goals define what students should know and be able to do.

The status of goals is determined by assessment results. “Assessment promotes growth and then verifies it” (Stiggins, 2005, p. 77). Two categories of assessments, with two different purposes, are used to promote and verify growth: assessments *of* learning and assessments *for* learning (Stiggins, 2002). “The crucial distinction is between assessment to determine the status of learning and assessment to promote greater learning” (Stiggins, 2002, para. 22). Assessments *of* learning inform teachers “how much students have learned, whether standards are being met, and whether educators have done the job they were hired to do” (Stiggins, 2002, para. 11). These tests are known as summative assessments and are often used for accountability and report results to the

public. Examples of these assessments are college admissions tests, SAT, ACT, standardized testing programs, state and district assessments, grades, and unit exams or tests (Stiggins, 2002, 2005).

Assessments *for* learning are designed to provide information to students and teachers about the progress of learning (Stiggins, 2002).

Assessment *for* learning happens in the classroom and involves students in every aspect of their own assessment to build their confidence and maximize their achievement. It rests on the understanding that students, not just adults, are data-driven instructional decision makers. (Stiggins & Chappuis, 2006, p. 11)

Assessments *for* learning include formative assessments and may entail “both formal and informal methods, such as ungraded quizzes, oral questioning, teacher observations, draft work, think-alouds, student-constructed concept maps, learning logs, and portfolio reviews” (McTighe & O’Connor, 2006, para. 4).

Formative assessments are “at the heart of teaching” (Black & Wiliam, 1998, para. 5). Informal and formal formative assessments guide decision-making and instruction to improve student learning as formative assessments “help teachers know when to move on, when to ask more questions, when to give more examples, and what responses to student questions are most appropriate” (McMillan, 2000, para. 8). When the effects of frequency of formative assessments on student achievement were researched, it was found that as the number of formative assessments given in a 15-week period increased, student achievement increased (Bangert-Drowns, Kulik, & Kulik, 1991). It was reported that if one formative assessment was administered, an expected growth of 13.5% is reasonable, as is 24.5% for 15 formative assessments in the 15-week

period. If 30 formative assessments were given, a 29% gain in student achievement can be expected (Bangert-Drowns et al., 1991).

Three control groups were utilized for a study conducted by Bloom (1984) that investigated methods that produced similar achievement results as those engaging in tutoring: a conventional classroom, which resembled a traditional classroom, mastery learning that combined traditional teaching with formative assessments used to provide feedback and opportunities to correct to students, and tutoring, or small group instruction. The results were consistent with the findings of Bangert-Drowns et al. (1991) eight years later. Students in both studies increased their achievement through the use of formative assessments. “The average student under mastery learning was above one standard deviation above the average of the control class, or above 84 percent of the students in the control class” (Bloom, 1984, p. 5).

Effective collaborative teams that follow the PLC framework focus on formative assessments more than summative assessments because formative assessments allow students to understand their progress and provide information to guide instruction (DuFour, Eaker, & DuFour, 2005). Placing the emphasis on summative assessments rather than formative assessments is not productive as “student achievement suffers because these once-a-year tests are incapable of providing teachers with the moment-to-moment and day-to-day information about student achievement that they need to make crucial instructional decisions. Teachers must rely on classroom assessment to do this” (Stiggins, 2002, para. 6).

Collaborative teams develop and administer common assessments, which are referred to as a “self-managing mechanism” (Schmoker, 2005, p. 137). Collaborative

teams following the PLC framework value the use of common formative assessments, along with their results. They

use the results of every common assessment to identify individual students who need additional time and support for learning, to discover strengths and weaknesses in their teaching, and to inform and adjust their practice to increase the likelihood they will achieve their shared purpose: higher levels of learning for all students. (DuFour, DuFour, Eaker, & Many, 2006b, p. 155)

Common assessments are an essential component to collaborative teams and their efforts to improve student achievement.

Common assessments produce student learning data, which are required for three of the six characteristics: action-orientation and experimentation, continuous improvement, and results-orientation. Collaborating about student learning data provides information to teachers on where to take action, where improvements can be made, and determining essential knowledge that has yet to be mastered. Administering common formative assessments or other types of assessments, and focusing on the results is motivational and important to the effectiveness of a team's efforts towards continuous improvement of instructional practice and student learning (DuFour, DuFour, Eaker, & Many, 2006b). Effectively analyzing student learning data with collaborative teams leads to reflective teachers that implement their learning into classroom instruction to improve student achievement. Students benefit from their teacher's collaborative effort and use of assessments, while student achievement increases when teachers are members of effective collaborative teams that analyze student learning data to alter instruction to ensure a high level of learning for all students.

“In education, we assess for two reasons: (1) to gather evidence of student achievement to inform instructional decisions and (2) to motivate learning” (Stiggins, 2005, p. 65). Unfortunately, the assessment data is meaningless unless it is used to improve teaching and learning. Collecting the data is only the first step; the crucial step is what collaborative teams do with the data.

Digging deep into data is the process of collaboratively analyzing data and changing it into useful information to improve teaching and learning: to check current reality and measure progress. Numbers alone mean nothing. The right numbers, interpreted well, provide information to evaluate the effectiveness of our improvement efforts, guide our practice, and ultimately transform even our lowest performing schools into places with high levels of learning for both students and adults. (Buffum et al., 2008, p. 197)

Student learning data provides clarity to teams seeking to understand what their students know and are able to do.

PLCs that focus on results have a system in place that allows teachers to monitor all students' learning for each essential learning component. “The systematic collection and analysis of student achievement data should be a major component of any effort to create an excellent school” (DuFour & Eaker, 1992, p. 105). The four critical questions are an important piece of the PLC framework that allows teams to produce data to analyze. “The single best way to immerse a faculty in these questions, and ultimately to improve a school, is to focus teacher attention on developing local assessments, analyzing the results, and working together to improve upon those results” (DuFour, 2002, para. 12).

Formative assessments and assessments *for* learning are commonly misused as synonyms. The difference is that assessments *for* learning involve students in the assessment process, but both include frequent assessments to provide information to guide instruction and provide current updates on student learning (Stiggins, 2002). Involving students in the assessment process increases the probability of ensuring a high level of learning for all students. Students involved in assessments *for* learning “strive to understand what success looks like and to use each assessment to try to understand how to do better the next time” (Stiggins, 2005, p. 77). Three tools were found to use simultaneously to increase motivation, two of which involved students and teachers working together to define the assessment criteria for evaluation and student communicating their learning progress with others (Stiggins & Chappuis, 2005). Student-involved record keeping, the third tool, requires students to track their progress on learning targets. “As they chart progress, they gain a sense of control over their own learning” (Stiggins & Chappuis, 2005, para. 17).

Self-reported grades from students had the greatest effect size of all of the meta-analysis conducted of $d = 1.44$, which roughly translates to one and one-half year’s growth in just one year (Hattie, 2009). This involved students estimating their own performance based on predetermined criteria, and it was found that “students have reasonable accurate understandings of their levels of achievement” (Hattie, 2009, p. 43). Involving students in the assessment process allows students to take ownership of their learning, set personal goals, and serve as motivation to continue learning. “Educators who provide regular opportunities for learners to self-assess and set goals often report a change in the classroom culture” (McTighe & O’Connor, 2006, para. 39). In an

interview with Newcomb (2003), Senge reported that self-assessment is “one of the most important habits of thought you’d want to develop in any educational system” (para. 26). Self-assessment and involving students in the assessment process are methods to promoting the purpose of assessments and focus on improving learning.

“Both great teachers and great leaders possess clear vision and purpose, are effective communicators, and are willing to be judged based on results” (O’Neill et al., 2006, p. 142). Data and results tell the truth and serve as evidence to validate instructional decisions. Student learning data provides the clarity needed for teachers to inform their professional practice, motivate learning, and provide additional time or support (DuFour & Eaker, 1998; DuFour & Fullan, 2013). “How teams analyze and then use the results of the assessments is what really matters in terms of affecting student learning” (Eaker & Keating, 2012, p. 123). Focusing on results allows the three big ideas to work simultaneously and encourages teams to collaborate to focus on student learning.

Professional Learning Communities

PLCs embrace the three big ideas, six essential characteristics, and four critical questions into their school’s culture. A mission, vision, and goals are developed to lead schools in the direction of providing students a high level of learning. All aspects of the school, including interventions, common assessments, professional growth plans, essential learning, and common pacing, are aligned with the school’s mission, vision, and goals (APQC, 2009). “In the end a PLC is not a thing, it is something you are” (APQC, 2009, p. 139).

PLCs can benefit both staff and students in numerous ways. PLC efforts resulted in the following for schools: decrease in teacher isolation, shared responsibility for the

learning of all students, increased understanding of content and effective teaching, increased teacher morale, quick response to students who need more time and support, and an increased probability of a change in culture (Hord, 1997a). Students also benefit from PLC efforts in the following ways: decreased dropout rates, increased attendance, consistent learning opportunities, increased academic gains, decreased achievement gaps (Hord, 1997a).

PLCs have the potential to positively affect all stakeholders in a school.

“Professional learning communities set out to restore and increase the passion of teachers by not only reminding them of the moral purpose of their work, but also by creating the conditions that allow them to do that work successfully” (DuFour, DuFour, Eaker, & Many, 2006b, p. 203). Schools and school districts have general commonalities such as curriculum and grade levels, but they vary from school to school and from district to district. “There is recognition that variability may be a good thing- that it signals a healthy system, one that is shaping and integrating policy in the ways best suited to local resources, traditions, and clientele” (McLaughlin, 1990, p. 13). While PLCs are a structure of systematic school reform, the variability between schools that follow the PLC framework may fluctuate because of their local resources and clientele. “When this process becomes a part of a continuous improvement cycle, when it represents “the way we do things around here,” a school has taken a big step on its journey to become a professional learning community” (DuFour, 1998, para. 12).

Summary

School reform efforts such as A Nation at Risk, Goals 2000, and NCLB have changed the work of teachers, schools, and districts in hopes to increase student

achievement. PLCs provide a process for schools to reform their culture based on three big ideas: focus on learning, collaborative culture, and results-orientation (DuFour & Eaker, 1998). Six essential characteristics and four critical questions are embraced to guide the work of teams and shape the culture of the school (DuFour & Eaker, 1998). Student learning data and a results-orientation provide the needed information to work towards improvement and achieving the vision of a school.

While chapter one introduced the current study, chapter two provided literature to support the need and importance for teachers, teams, and schools to utilize and analyze student learning data to improve student achievement. Chapter three includes the quantitative methodology utilized for the current study.

Chapter Three

Methods

This study focused on the relationship between collaborative teams and student achievement. Specific information was gathered for this study pertaining to data analysis and utilization of student learning data as practices of collaborative teams to determine how the analysis and utilization of data affects student achievement. The research design includes a description of the variables of this quantitative study. The population and sample as well as the sampling procedures are described. The measurement, validity, and reliability of the Critical Issues for Team Consideration Survey (DuFour, DuFour, Eaker, & Many, 2006a), Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b), and the Kansas Math Assessment are included in the Instrumentation section. A description of the processes needed to collect the data, the data analysis and hypothesis testing, as well as limitations to the study are provided.

Research Design

A survey was used for this quantitative study to gather information regarding the establishment and practices of collaborative teams following the PLC framework, as well as the utilization of data and analysis practices from teachers within those teams. The purpose of a survey is to “generalize from a sample to a population so that inferences can be made about some characteristic, attitude, or behavior of this population” (Creswell, 2009, p. 146). Participants completed the survey in March and April of the 2012-2013 school year, reflecting on their collaborative teams and data analysis and utilization practices within their teams from the beginning of the school year. The survey results were used to examine the relationships between the establishment of collaborative teams,

their actions, and their data analysis and utilization practices, and their corresponding students' achievement.

The degree to which collaborative teams are established was the first variable used in this study. The second variable was the actions performed by collaborative teams to increase student achievement. The degree to which teachers analyzed and utilized student work and assessment scores to create meaningful information to improve student achievement was the third variable used in this study.

Information for the first, second, and third variables were collected using items from Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) and the Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b), both of which were published by Solution Tree. The researcher added nine items to gather more information pertaining to participants' demographic information. The survey required participants to reflect on their collaborative teams and the levels of data literacy, and data analysis and utilization practices within their teams.

The fourth variable was student achievement as measured by the Kansas Math Assessment. The 2013 Kansas Math Assessment scores from students of third grade teachers in District X were reported. The degree to which teachers analyzed and utilized student learning data within collaborative teams following the PLC environment was linked to student achievement using correlations and one-factor ANOVAs.

Population and Sample

The population of the study was all third grade teachers in Kansas who were members of a collaborative team that analyzed and utilized student learning data to increase student achievement while following the PLC framework. The sample of the

study focused on the 34 elementary schools in District X. Elementary schools in District X included kindergarten through grade 5. This study focused on third grade and included 106 third grade teachers in District X. Enrollment for District X in 2012-2013 was 28,872 students. The elementary population totaled 13,371, with 2,205 students in third grade (Executive Assistant to Executive Director of Elementary Personnel in District X, personal communication, July 15, 2013).

Sampling Procedures

The researcher used purposive sampling for this study. “Purposive sampling involves selecting a sample based on the researcher’s experience or knowledge of the group to be sampled” (Lunenburg & Irby, 2008, p. 175). All teachers ($n = 106$) who taught third grade in District X in the 2012-2013 school year were included in this study. Third grade teachers were included because it is the first grade level in which all students in Kansas take the Kansas State Assessment. Because of high-stakes testing pressures and the lack of assessment experience from third grade students, it is important for third grade teachers to analyze and utilize student learning data to understand strengths and areas in need of improvement to adequately prepare students to perform to the best of their ability. Fifty-four teachers responded to the survey and were therefore included in the sample.

Survey Instrumentation

Survey items from the Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) and the Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b), as well as student results from the Kansas Math Assessment, allowed the researcher to investigate the relationships between collaborative teams

analyzing and utilizing data and student achievement. This section includes a description about the instruments as well as information regarding their measurement, validity, and reliability.

Critical Issues for Team Consideration. The Critical Issues for Team Consideration was created to evaluate the effectiveness of collaborative teams (see Appendix A) (DuFour, DuFour, Eaker, & Many, 2006a). Four items of the 18-item survey were used in this study to gather information pertaining to the establishment and actions of teams. The four items address team norms, evaluating team norms, SMART goals, and essential learning for students. The four items from Critical Issues for Team Consideration represent items 1-4 on the survey for this study; two of which were modified for clarity. The remaining 14 items were not used because they were not applicable to this study.

Professional Learning Team Data-Literacy Survey. The Professional Learning Team Data-Literacy Survey was created by Graham and Ferriter (2010b) (see Appendix A). Twenty-seven items of the 28-item survey were used in this study to gather information regarding the analysis and utilization of data by collaborative teams to increase student achievement following the PLC framework. “A Professional Learning Community continually collects and analyzes data to answer the questions “Where are we now?” and “How do we close the gap (between where we want to be and where we are now)?” (Baldermann, Koenigsberger, Reiss, Ritchie, & Schwartz, 2007, p. 7). The Professional Learning Team Data-Literacy Survey is represented by items 5-31 on the survey for this study. Two of those items were modified for consistency between survey

items. Item 28 of the Professional Learning Team Data-Literacy Survey was not used as it is more appropriate for a school setting as opposed to research purposes.

Additional survey items. Nine items were added to the survey by the researcher to gather more information about the participants and their collaborative team practices. These items are included on the survey as items 32-40 (see Appendix B to view the complete survey used in this study). Item 32 gathers the approximate amount of time that collaborative teams devote to a variety of activities. The activities include establishing specific, results-oriented goals for learning; collaborating and developing common strategies to improve student learning; analyzing and monitoring student data; developing lists of common essential learning components as well as common assessments for that curricular area/grade level; examining student work; discussing strategies for differentiating instruction and student interventions; creating joint lesson plans; and sharing expertise in specific areas. This item was written for a previous district survey by the Director of School Improvement and Assessment in District X. One activity option was modified for clarity for this study.

Item 33 addressed the frequency in which teachers collect and display student data as a method to motivate students. Items 34, 35, and 36 gathered information about how often informal common assessments, formative assessments, and summative assessments, respectively, are administered. Strategies to involve students in the assessment process were gathered in item 37, and the number of minutes per week spent in collaborative team meetings was reported for item 38. Item 39 requested the number of years the participant had spent teaching third grade in District X, including the 2012-

2013 school year. Item 40 asked if the participant was currently teaching in a Title I school.

Measurement. The selected Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) and Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b) items combined with nine additional items were used to investigate the extent of the relationships between the establishment and actions of collaborative teams and student achievement results from the Kansas Math Assessment. The extent of the relationship between collaborative teams analyzing and utilizing student learning data and student achievement was also investigated.

Items 1-31 were on a 5-point Likert-type scale: 1 = *not true of our team*, 3 = *our team is working on this*, and 5 = *true of our team*. Modifications were made to the rating scales of Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) and the Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b) for clarity and consistency. Likert-type scales measure a single trait and participants report their level of agreement with a statement using the rating scale (Bertram, n.d.). Participants rated characteristics and actions of their collaborative teams. Strengths of a Likert-type scale are the simplicity, likeliness of reliability, and usability for participants. Weaknesses of a Likert-type scale are participants avoiding extreme choices, wanting to please the researcher, false portrayal of reality, and there is difficulty measuring validity (Bertram, n.d.). The validity of a Likert-type scale may be difficult to determine because the scale is a rating. However, the reliability of a Likert-type scale is high as each item is of equal importance. This ensures that participants are being scored rather than the items (Page-Bucci, 2003).

Item 32 required participants to estimate the percentage of time their collaborative team devoted to nine activities with response options of: *10% or less, 11-20%, 21-30%, 31-40%, 41-50%, 51-60%, 61-70%, 71-80%, and 81% or more*. Item 33 regarding collecting and displaying anonymous student data allowed participants to choose one of the following options: *Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, and Never*. Items 34, 35, and 36 addressed the use of different types of assessments, and required participants to choose one of the following options: *Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, and Never*. Item 37 asked participants to check all methods that applied to their practices of involving students in the assessment process. Participants were asked to choose one of the following options to report the number of minutes they meet with their collaborative team per week for item 38: *0-15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, and 61 minutes or more*. Item 39 was an open-ended response item in which participants were to provide a numeric response to indicate the number of years they had been teaching third grade in District X, including the 2012-2013 school year. Item 40 asked participants if they taught in a Title I school at the time of completion of the survey, with a response option of *Yes/No*. The survey responses of each participant were linked to the Kansas Math Assessment results of their students to examine the effectiveness of their collaborative team's data utilization and analysis practices within a PLC environment.

Validity and reliability. “Validity is the degree to which an instrument measures what it purports to measure” (Lunenburg & Irby, 2008, p. 181) and “reliability is the degree to which an instrument consistently measures whatever it is measuring”

(Lunenburg & Irby, 2008, p. 182). The validity and reliability were investigated by the researcher for this study.

The authors of the Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b) did not conduct validity or reliability measures.

Reliability and validity were not conducted as the survey was written and designed as a tool for school leaders to gather information about practices in a building and start conversations about the things that should be happening on learning teams. (W. Ferriter & P. Graham, personal communication, August 31, 2012)

The content validity of the Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) and Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b) was investigated by requesting the assistance of five subject matter experts (SMEs). The variables, research questions, and survey items were provided to the SMEs, who identified the survey items that measured each variable. The number of survey items for each variable was not disclosed to the SMEs. Table 3 presents the content validity results. The variable that measured each survey item was determined by the most common response from the SMEs. SME 1 was a junior high principal in a neighboring school district, and SME 2 was an instructional resource teacher in District X. SME 3 was a PLC consultant for schools around the country, while SME 4 was the Director of School Improvement and Assessment in District X. SME 5 was the deputy superintendent of a neighboring school district.

Table 3

Content Validity Results

Variable	Survey Items that Measure Each Variable
Establishment of Collaborative Teams (Variable 1)	1, 2, 21, 38
Actions performed by collaborative teams to improve student achievement (Variable 2)	4, 5, 6, 7, 8, 10, 12, 17, 18, 19, 20, 23, 30, 31, 32, 34, 35, 36, 37
Utilization of data by collaborative teams (Variable 3)	3, 7, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 24, 25, 26, 27, 28, 29, 30, 33
Student achievement (Variable 4)	Kansas Math Assessment

The validity of the survey was supported by the responses provided by the SMEs, as the SMEs confirmed that the survey items measure the four variables used in the study. The results of reliability analyses conducted using the data for this study is presented in the Data Analysis and Hypothesis Testing portion of this chapter.

Kansas Math Assessment

The Kansas Math Assessment, along with the Kansas Reading Assessment, was first administered in the spring of 2006. KSDE and The Center for Educational Testing and Evaluation (CETE) at the University of Kansas worked together to develop the assessments and programs. Students in grades 3-8 and 10 are required to take the Kansas Math Assessment (Poggio et al., 2007). The purposes of the Kansas Reading and Math Assessments are to:

- (1) provide aggregate state accountability and yearly progress information toward meeting the Kansas Curriculum Standards in the tested areas as required by the *No Child Left Behind* federal mandate;
- (2) provide building and district information to support school improvement evaluation needs as appropriate; and
- (3) report on the performance of students to support instructional planning for individuals and groups as judged appropriate by local educators. (Poggio et al., 2007, p. 2)

Five forms are available for the Kansas Math Assessment to assess 12 mathematics indicators for grade 3. All items on the Kansas Math Assessment derive from the standards, benchmarks, and indicators from the appropriate grade level. “The Curricular Standards serve as the basis for what is assessed by the tests and any interpretation and subsequent action based on student or group performance on these tests must focus on the assessed standards, benchmarks, and indicators” (Poggio et al., 2007, p. 2). The standards, benchmarks, and indicators are available to school districts through the KSDE website.

Students complete the Kansas Math Assessment over three days within a 2-week time frame. The assessment is divided into Part 1, Part 2, and Part 3 to make up the final score (KSDE, 2007). The majority of students complete the assessment electronically through the CETE program, but a paper and pencil option is available for students under certain circumstances (Poggio et al., 2007). Other accommodations are available under certain circumstances if necessary.

Seventy items are on the Kansas Math Assessment for grade 3. Numbers and computation skills make up 41.4% of the assessment, while algebra, geometry and measurement, and data analysis are 17.1%, 22.9%, and 18.6%, respectively (KSDE, 2005). Specific indicators on the third grade assessment are comparing numbers from zero to 10,000, equivalent representation, money using mixed bills and coins up to \$50, multiplication and division fact families, addition and subtraction number patterns, identify shapes, tell time to the nearest minute, possible outcomes of an event (probability), data analysis (median, mode, maximum, minimum, and range), one step real-world addition and subtraction problems, multiple representations of a pattern, and real-world problems using measurement (customary, metric, or time) (KSDE & Mathematics Specialists in the Private Sector from Kansas, 2005).

The Kansas Math Assessment was implemented during the same time frame as NCLB. Test scores have improved since the implementation of the Kansas Math Assessment, as the number of students who scored at the *Proficient* level or above consistently continued to increase throughout administration. Table 3 reports the percentage of all students who scored at the *Proficient* level or higher on the Kansas Math Assessment for the state of Kansas, and District X specifically. The first line of the table communicates the AYP goal for all students in the state of Kansas, with the exception of the 2012-2013 school year. AYP was not utilized due to the change in accountability measures, beginning in the 2012-2013 school year (KSDE, 2012a). The second line represents all students in the state of Kansas, and the third line represents all students in District X. District X consistently had more students achieve *Proficient* or

higher than the state of Kansas by 7.6% to 17.4% and achieved the goal by a range from 11.4% to 44.7%. The number of students who scored at the *Proficient* level or higher has improved 11% in the nine years of participating in the Kansas Math Assessment based on the 2003 Kansas Curricular Standards for Mathematics.

Table 4

Percentage of All Students Who Scored Proficient and Above on the Kansas Math

Assessment

Location	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010	2010- 2011	2011- 2012	2012- 2013
AYP Goal	38.0	46.8	46.8	55.7	64.6	70.5	76.4	82.3	82.3	--
State of Kansas	65.3	68.6	74.7	78.3	82	83.5	83.6	85.4	86.1	79.5
District X	82.7	83.7	85.3	87.2	91.4	92.2	92.5	93.2	93.7	91.4

Note. The percentages in this table represent the student group *All Students*. Adapted from “Report Card: District X,” by KSDE, 2012b and “Report Card: State of Kansas,” by KSDE, 2012c.

Measurement. The Kansas Math Assessment was used in this study because it is a major assessment that all students in Kansas complete with consistent item stems, timelines, testing windows, and accommodations. All items are accompanied by four options that create a multiple choice format. Students choose one of the four response options, and assessment scores are reported as the percentage of items answered correctly (Poggio et al., 2007). Student scores are reported as a percentage of items answered correctly and the students are placed into one of five categories, based on assessment score. “The proportion of students classified in these categories becomes a primary

source of information in determining AYP for schools, districts and the state” (Poggio et al., 2007, p. 4). Zero to 57% correct qualifies as *Academic Warning*; 58 to 69% correct is *Approaches Standard*; 70 to 84% correct is *Meets Standard*; 85 to 92% is *Exceeds Standard*; and 93 to 100% is *Exemplary* (Poggio et al., 2007).

Validity and reliability. The criterion-related validity of the Kansas Math Assessment was explored using three analyses to document “the relationship of Kansas Assessment scores to relevant variables external to the test” (Poggio et al., 2007, p. 76). The first study investigated the relationship between the formative and general assessments. Student data was matched from formative and summative assessment results and “correlations between the formative aggregate and the General Assessment equated total scores were obtained for each grade level” (Poggio et al., 2007, p. 77). The correlations for the third grade general assessment form ranged from .67 to .75, and the correlations between the formative and summative assessments ranged from .71 to .87, all indicative of moderate to strong relationships.

The second study examined the relationship of test scores when assessments were administered electronically or using a paper and pencil mode of testing. The Kansas Computerized Assessment (KCA) is a part of the Kansas Assessment program. Sixty percent of students in Kansas who took the general form of the assessments in 2006 used a computer (Poggio et al., 2007). The correlation coefficients are consistent within and between modes of testing, ranging from .71 to .80. The relationships between the modes of testing being computer and paper and pencil are moderate to strong indicating that student achievement is tested, rather than the mode of testing.

The third validity study explored the relationship between teacher ratings and student test performance. In the 2005-2006 school year, “teachers were asked to place their students into one of the following categories: *Unsatisfactory*, *Basic*, *Proficient*, *Advanced*, and *Exemplary*” (Poggio et al., 2007, p. 80). The category names have since changed to *Academic Warning*, *Approaches Standard*, *Meets Standard*, *Exceeds Standard*, and *Exemplary*. The median correlation coefficient for grades 3-8 and 10 was .62, which indicates a moderate relationship. “The results of these analyses provide evidence to support the validity of 2006 Kansas Assessment scores” (Poggio et al., 2007, p. 81). The relationship between teacher ratings and student performance is strong and evidentiary of the validity of the Kansas Assessments.

The reliability analyses of the Kansas Math Assessment was performed using Cronbach alpha coefficients. The coefficients ranged from .91 to .95 for all forms of mathematics assessments. This indicates the Kansas Math Assessment is consistent in measuring mathematics ability. Classification consistency and classification accuracy were used to assess the reliability of the Kansas Assessments.

Classification consistency refers to the extent to which the classifications agree on the basis of two independent administrations of the test (or, two parallel forms of the test). Classification accuracy refers to the extent to which the actual classifications that are based on observed cut scores approximate those that are based on “true” cut scores. (Poggio et al., 2007, p. 59)

Classification consistency and classification accuracy were used to test the reliability of placing students into performance categories based on their scores on the Kansas Math Assessment. Classification consistency and classification accuracy were used to conduct

reliability analyses for the base form of the Kansas Math Assessment in 2006 with a sample size of 3,949 students. “Results showed that classification reliabilities were acceptable” (Poggio et al., 2007, p. 61). The third grade Kansas Math Assessment classification consistency was .68, while the classification accuracy was .76, which indicate moderately strong evidence of reliability.

Data Collection Procedures

The researcher sought permission from Solution Tree to utilize the Professional Learning Team Data-Literacy Survey for this study. Permission was given by Parry Graham and William Ferriter, authors of the Professional Learning Team Data-Literacy Survey (2010b), and Ashante Thomas, Editorial Assistant at Solution Tree, on August 30, 2012, to administer the survey to all third grade teachers in District X. (A copy of the letter written to the researcher that provides permission to use the survey is in Appendix C.) Permission was granted on August 30, 2012, to add five items to the survey. The Professional Learning Team Data-Literacy Survey was a reproducible in Graham and Ferriter’s (2010a) *Building a Professional Learning Community at Work: A Guide to the First Year*. Reproducibles are free education resources, so permission was not needed, but obtained for verification.

The researcher sought permission from the author of item 32 to add to the survey. Permission was also sought to alter one activity for clarification. Permission was given by the Director of School Improvement and Assessment in District X, on August 30, 2012, to add the item to the survey and alter an activity. (A copy of the letter written to the researcher that granted permission to add the item to the survey is in Appendix C.)

Permission was sought to use this item originally as item 28. It was later moved to item 32.

Nine additional items were added to the survey, four of which were from Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) from Solution Tree. The researcher sought permission from Solution Tree to utilize the four items, and additionally to alter two of those items. Permission was granted by Ashante Thomas, Editorial Assistant at Solution Tree on February 1, 2013, to utilize the items for the survey. (A copy of the letter written to the researcher that granted permission to use the items in the survey for this student is in Appendix C.) Critical Issues for Team Consideration was a reproducible in DuFour, DuFour, Eaker, & Many's (2006b) *Learning By Doing: A Handbook for Professional Learning Communities at Work*.

Permission was also sought to change the rating scales on both the Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b) and Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a) surveys for consistency purposes. Permission was not granted to change the reproducible itself, but a suggestion was made by Ashante Thomas, Editorial Assistant at Solution Tree on February 1, 2013, for the researcher to create her own survey, while citing the items from both surveys.

Prior to collecting data, a proposal was submitted to the Baker University Instructional Review Board (IRB) on February 22, 2013 (see Appendix D). On March 11, 2013, Baker University approved the research request. (A copy of the letter granting permission is in Appendix D.)

A Research Application Request was completed to obtain permission to administer the survey and collect assessment data in District X (see Appendix E).

Permission was given on March 26, 2013, and a copy of the letter given to the researcher that provided permission to use the survey is in Appendix E.

The electronic survey was administered to third grade teachers through SurveyMonkey on March 26, 2013. (A copy of the survey is included in Appendix B.) An incentive program was offered to participants who provided their name with their survey responses, in addition to the required Teacher Identification Number. Emails were sent to the sample to remind teachers to complete the survey on April 7, April 14, and April 22, 2013. The researcher conducted the drawing for a \$100 gift card to Target on April 26, 2013.

Once the survey results were collected, the names and Teacher Identification Numbers of participants were submitted to the Director of School Improvement and Assessment in District X to ensure the assessment results would remain anonymous. The assessment data was matched to the teacher participating in the study. The following information was provided for each teacher: mean score, standard deviation, range, high score, low score, number of students in each performance category, percentage of students in each performance category, total number of students, and number of students who received accommodations. The survey data was matched to the teacher data and entered into IBM® SPSS® Statistics Faculty Pack 21 for Windows for analyses.

Data Analysis and Hypothesis Testing

The research questions used for this study addressed the establishment of collaborative teams in a PLC environment as well as actions that collaborative teams perform to enhance student achievement. Research questions 1, 2, and 3 addressed the establishment of collaborative teams as a part of PLCs. Research questions 4-11

addressed the actions carried out by collaborative teams to improve student achievement. Research questions 12 and 13 addressed the analysis and utilization of data by collaborative teams. Pearson correlations and one-factor ANOVAs were conducted to address the research questions. The level of significance was set at .05.

RQ1: To what extent is there a relationship between establishing collaborative teams and student achievement, as measured by the Kansas Math Assessment?

H1: There is a positive relationship between establishing collaborative teams and student achievement.

Research question 1 examined the characteristics that pertain to the establishment of collaborative teams. A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between establishing collaborative teams and student achievement. A one-sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The response options on survey items 1, 2, and 21 were averaged for analysis. Reliability analysis of the items was tested using Cronbach's alpha, which resulted in moderate internal consistency, $\alpha = .595$. Item 1 addressed identifying team norms and item 2 addressed evaluating the team's dedication to the norms as well as the effectiveness of the team. Item 21 addressed feeling safe when discussing and sharing common assessment data with peers.

RQ2: To what extent is there a relationship between collaborative teams establishing team norms and student achievement, as measured by the Kansas Math Assessment?

H2: There is a positive relationship between collaborative teams establishing team norms and student achievement.

Research question 2 examined establishing team norms in a collaborative team. A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between collaborative teams establishing team norms and student achievement. A one-sample t test was conducted to test for the statistical significance of the correlation coefficient. The response options on survey items 1 and 2 were averaged for analysis. Reliability analysis of the items was tested using Cronbach's alpha, which resulted in moderate internal consistency, $\alpha = .692$. Items 1 and 2 addressed identifying team norms and evaluating the team's dedication to the norms as well as the effectiveness of the team.

RQ3: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the number of minutes per week devoted to collaborative team meetings?

H3: There is a difference in student achievement among the number of minutes per week devoted to collaborative team meetings.

Research question 3 examined the number of minutes per week that collaborative teams spend meeting to improve student achievement. A one-factor ANOVA was conducted to test H3. Item 38 was used for this analysis and asked participants to report the number of minutes per week spent meeting with their collaborative team. The number of minutes per week devoted to collaborative team meetings was used to group the student achievement scores on the Kansas Math Assessment: *0-15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, and 61 or more minutes.*

RQ4: To what extent is there a relationship between focusing on results as a part of collaborative teams and student achievement, as measured by the Kansas Math Assessment?

H4: There is a positive relationship between focusing on results as a part of collaborative teams and student achievement.

Research question 4 examined activities and characteristics of teams that focused on results. A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between collaborative teams focusing on results and student achievement. A one-sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The response options on survey items 5, 6, 10, 17, 18, 20, 23, and 30 were averaged for analysis. Reliability analysis of the items was tested using Cronbach's alpha, which resulted in strong internal consistency, $\alpha = .880$. Items 5 and 6 focused on the conversations and expectations for student mastery. Item 10 addressed teams developing common rubrics to ensure consistency when scoring performance-related tasks. Item 17 addressed using multiple sources of verification before making conclusions from assessment results. Item 18 required participants to report their team's practices regarding changing instructional methods based on assessment results. Item 20 addressed celebrating assessment achievements and item 23 examined the shared sense of responsibility for the learning of all students. Item 30 asked participants to rate their team's use of reliable research to confirm a prediction about student learning.

RQ5: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams establishing learning targets based on standards?

H5: There is a difference in student achievement among the levels of collaborative teams establishing learning targets based on standards.

Research question 5 addressed the establishment of learning targets based on standards. A one-factor ANOVA was conducted to test H5. Item 4 was used for the analysis and asked participants to rate their team's clarity of the essential learning that students will acquire. The clarity of essential learning by collaborative teams was used to group the student achievement scores on the Kansas Math Assessment was 1 = *not true of our team*, 3 = *our team is working on this*, and 5 = *true of our team*.

RQ6: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams analyzing student achievement data to establish and revise SMART goals?

H6: There is a difference in student achievement among the levels of analysis of student achievement data by collaborative teams to establish and revise SMART goals.

Research question 6 investigated analyzing student data to establish and revise SMART goals to improve student achievement. A one-factor ANOVA was conducted to test H6. Item 7 was used for the analysis and addressed having measurable instructional goals for common lessons. The measurable instructional goals were used to group the student achievement scores on the Kansas Math Assessment: 1 = *not true of our team*, 3 = *our team is working on this*, and 5 = *true of our team*.

RQ7: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams developing assessments?

H7: There is a difference in student achievement among the levels of collaborative teams developing assessments.

Research question 7 addressed collaborative teams developing assessments. A one-factor ANOVA was conducted to test H7. Item 8 was used for the analysis and focused on teams developing their own set of common assessments. The development of common assessments by collaborative teams was used to group the student achievement scores on the Kansas Math Assessment: 1 = *not true of our team*, 3 = *our team is working on this*, and 5 = *true of our team*.

RQ8: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering informal formative assessments?

H8: There is a difference in student achievement among the levels of collaborative teams administering informal formative assessments.

Research question 8 focused on utilizing informal formative assessments as a means to gather student learning information. A one-factor ANOVA was conducted to test H8. Item 34 was used for the analysis and asked participants to report the frequency they administer informal formative assessments. The administration of informal common assessments by collaborative teams was used to group the student achievement scores on the Kansas Math Assessment: *Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, or Never*.

RQ9: To what extent is there a relationship between collaborative teams administering common formative assessments and student achievement, as measured by the Kansas Math Assessment?

H9: There is a positive relationship between collaborative teams administering common formative assessments and student achievement.

Research question 9 addressed the use of common formative assessments to collect information regarding student learning. A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between collaborative teams administering common formative assessments and student achievement. A one-sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The response options on survey items 12, 17, and 19 were averaged for analysis. Reliability analysis of the items was tested using Cronbach's alpha, which resulted in moderately strong internal consistency, $\alpha = .770$. Items 12 and 17 addressed establishing an effective system for recording common assessment results and looking for multiple sources of verification before drawing conclusions from common assessment results, respectively. Item 19 asked participants to rate their team's utilization of common assessment results to provide remediation and enrichment to students.

RQ10: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering summative assessments?

H10: There is a difference in student achievement among the levels of collaborative teams administering summative assessments.

Research question 10 focused on using summative assessments as a means to gather student achievement data at the end of a unit or topic of study. A one-factor ANOVA was conducted to test H10. Item 36 was used for the analysis and asked participants to report the frequency they administer summative assessments. The administration of summative assessments by collaborative teams was used to group the student achievement scores on the Kansas Math Assessment: *Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, or Never.*

RQ11: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams involving students in the assessment process?

H11: There is a difference in student achievement among the levels of collaborative teams involving students in the assessment process.

Research question 11 addressed involving students in the assessment process. A one-factor ANOVA was conducted to test H11. Item 31 was used for the analysis and pertained to teams creating systems for engaging students in data collection for self-assessment. The systems for engaging students in data collection by collaborative teams was used to group the student achievement scores on the Kansas Math Assessment was 1 = *not true of our team*, 3 = *our team is working on this*, and 5 = *true of our team*.

RQ12: To what extent is there a relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement, as measured by the Kansas Math Assessment?

H12: There is a positive relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement.

Research question 12 addressed the knowledge and skill set regarding data obtained by collaborative teams. A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement. A one-sample t test was conducted to test for the statistical significance of the correlation coefficient. The response options on survey items 3, 7, 9, 11, 12, 13, 14, 15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, and 30 were averaged for analysis. Reliability analysis of the items was tested using Cronbach's alpha, which resulted in strong internal consistency, $\alpha = .908$.

Items 3 and 7 asked participants to rate their team's practices of analyzing student achievement data to establish and revise SMART goals and having measurable instructional goals for common lessons, respectively. Items 9 and 11 focused on the utilization of common assessments and rubrics that are tied to state standards. Items 12 and 13 focused on a system for recording assessment results and a process for looking at assessment results and item 14 addressed the ability for teams to productively discuss results. Item 15 pertained to teams using graphs and charts to view student achievement trends. Items 16, 17, and 18 asked participants to rate their team's ability to make predictions, draw conclusions, and change instructional practices based on common assessment results. Item 22 addressed using data as a tool for identifying effective practices rather than effective people. Item 24 asked participants to rate their team's skill set regarding effectively collecting and manipulating data. Items 25 and 26 asked participants to rate their personal understanding between the use of aggregated and disaggregated data and the use of formative and summative assessments, respectively.

Item 27 addressed respecting confidentiality of students and teachers when examining data. Items 28 and 29 addressed looking at standardized test results and the examination of the varied populations of students, respectively. Item 30 focused on utilizing research to test a predication.

RQ13: To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of use of assessment data to form interventions by collaborative teams?

H13: There is a difference in student achievement among the levels of collaborative teams using assessment data to form interventions.

Research question 13 focused on collaborative teams using assessment data to form interventions. A one-factor ANOVA was conducted to test H13. Item 19 was used for the analysis and pertained to teams providing remediation and enrichment to students based on assessment results. The remediation and enrichment implemented by collaborative teams based on common assessment results was used to group the student achievement scores on the Kansas Math Assessment was 1 = *not true of our team*, 3 = *our team is working on this*, and 5 = *true of our team*.

Limitations

Limitations are “factors that may have an effect on the interpretation of the findings or on the generalizability of the results” (Lunenburg & Irby, 2008, p. 133). A major uncontrollable factor that may impact the findings of this study is the understanding and difference between the terms *collaborative team* and *PLC*. A collaborative team is comprised of educators who work interdependently to increase student learning (DuFour, DuFour, Eaker, & Many, 2006b), but PLC is the culture of a

school, not something that teams do. A second limitation is what collaborative teams do within their team meetings and the overall focus of teams. Collaborative team meetings should be focused on the three big ideas, six essential characteristics, and four critical questions in order to positively impact student achievement (DuFour & Eaker, 1998). Collaborative team meetings are not the setting for discussion of lesson plans, field trips, and behavior.

The third and fourth limitations address clarity and consistency, respectively. Clarity of the PLC framework is crucial and may be an influential factor in the current study. Teachers, teams, and schools must understand the process in order to implement, execute, and embrace to improve student achievement. Lack of clarity of the process may not allow schools to produce similar results as schools that understand the PLC framework. Consistent implementation and training are also factors that may impact the results of the study. Representatives from each school, along with administrators, received four trainings from District X during the 2005-2006 and 2006-2007 school years. Once the trainings were completed, administrators were responsible for following through with the implementation at their schools. This presents a degree of variability between schools and their implementation, understanding, and execution of PLCs, which may have impacted results.

Class size is a limitation that could impact the Kansas Math Assessment results. The teacher to student ratio in each classroom may affect the Kansas Math Assessment results because of the ability or constraints to consistently work with students in need of assistance either individually or in small groups. The number of third grade students in a classroom ranged from 16 to 26 in District X's 34 elementary schools in the 2012-2013

school year (Executive Assistant to Executive Director of Elementary Personnel in District X, personal communication, July 15, 2013).

Title I and ELL schools are limitations as they also affect class size as well as available resources and instructional support. The demographics and socioeconomic status populations vary between schools. District X has 10 Title I elementary schools and 10 ELL elementary schools, eight of which have both programs (Executive Assistant to the Executive Director of Elementary Personnel in District X, personal communication, January 22, 2013). The percentage of students who qualify for free and reduced lunch in elementary school ranged from 2-88% across the district (District X, 2013a). Title I schools typically have more instructional support and resources available because of the varying degrees of challenges (KSDE, 2008). The researcher recognized that some third grade teachers had students who received additional academic services, and the additional support staff were variables not taken into consideration when evaluating results.

Limitations specific to the design of the current study include the quantitative design without the use of qualitative data to gather more information. The current study was limited to the 2012-2013 school year, focusing on third grade teachers. There was a response rate of 54 out of 106 teachers, for a total of 51%. Completion of the survey was optional, so participation was ultimately a choice. There was not time designated within contract hours to complete the survey, so participants may have had to complete the survey outside of the school day. Any of the factors described above could have impact the results of the current study.

Summary

This chapter provided a detailed explanation of the methodology and procedures used to address the research questions. The purposive sample of third grade teachers in District X was included as well as the process used for data analysis and utilization. Instrumentation of the Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a), Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b), and Kansas Math Assessment were discussed in detail. The method for data analysis and hypothesis testing were included. Chapter four provides the descriptive statistics and the results of the hypothesis testing.

Chapter Four

Results

This quantitative study was designed to investigate the relationship between collaborative teams and student achievement. An additional purpose was to explore the relationships between collaborative teams who analyze and utilize student learning data to increase achievement. Strengths and weaknesses were sought based on the results from a survey and the Kansas Math Assessment. Correlations were conducted to address research questions 1, 2, 4, 9, and 12, while one-factor ANOVAs were conducted to address research questions 3, 5, 6, 7, 8, 10, 11, and 13. This chapter includes descriptive statistics of the sample and the statistical analysis and results for each research question.

Descriptive Statistics

The population for the current study was limited to 106 third grade teachers in District X in the 2012-2013 school year. The sample consisted of 54 teachers who responded to the survey. Of the 54 teachers who completed the survey, 20 taught in a Title I school and 34 did not teach in a Title I school during the 2012-2013 school year. The number of years of teaching in District X from the sample ranged from one year to 22 years. See Table 5 for a breakdown of the number of years of teaching experience in District X (item 39).

Table 5

*Frequency Table of Number of Years**Teaching Third Grade in District X*

Number of Years	Frequency	Percent
1	10	18.5
2	6	11.1
3	2	3.7
4	5	9.3
5	4	7.4
6	6	11.1
8	4	7.4
9	6	11.1
10	3	5.6
11	1	1.9
12	2	3.7
13	1	1.9
16	1	1.9
18	2	3.7
22	1	1.9

The class size of teachers in the sample ranged from 16 to 26 students. Twenty-two students was the most common number of students in a classroom of the participants. See Table 6 for the frequencies of the number of students in a class from the sample.

Table 6

*Frequency Table of Number
of Students in a Classroom*

Number of Students	Frequency	Percent
16	1	1.9
17	8	14.8
18	4	7.4
19	7	13.0
20	1	1.9
21	8	14.8
22	13	24.1
23	4	7.4
24	5	9.3
25	1	1.9
26	2	3.7

Item 32 of the survey required participants to estimate how their time was utilized with their collaborative team based on nine team-related tasks. Response options were given in the form of percentages. Descriptive statistics from four of the possible responses from item 32 are shown in Tables 7 through 10. The remaining five items are included as descriptive statistics with their corresponding research question. Item 32b required participants to estimate the amount of time their team dedicated to collaborating and developing common strategies to improve student learning. Ten participants indicated they spent 81% or more of their time with their collaborative team on

developing common strategies to improve student learning. Results are shown in Table 7.

Table 7

Frequency Table of Amount of Time Spent with Collaborative Team on Collaborating and Developing Common Strategies to Improve Student Learning

Time	Frequency	Percent
10% or less	4	7.4
11-20%	6	11.1
21-30%	8	14.8
31-40%	4	7.4
41-50%	4	7.4
51-60%	4	7.4
61-70%	5	9.3
71-80%	9	16.7
81% or more	10	18.5

Item 32f required participants to estimate the amount of time their collaborative team dedicated to examining student work. Twelve participants indicated they spent 21-30% of their time with their collaborative team examining student work. See Table 8 for descriptive statistics.

Table 8

*Frequency Table of Amount of Time Spent with
Collaborative Team on Examining Student Work*

Time	Frequency	Percent
10% or less	8	14.8
11-20%	7	13.0
21-30%	12	22.2
31-40%	7	13.0
41-50%	4	7.4
51-60%	3	5.6
61-70%	4	7.4
71-80%	6	11.1
81% or more	3	5.6

Item 32h required participants to estimate the amount of time their collaborative spent on creating joint lesson plans. Twenty-five participants indicated that they spent 20% or less of their time with their collaborative team creating joint lesson plans. See Table 9 for descriptive statistics.

Table 9

*Frequency Table of Amount of Time Spent with
Collaborative Team on Creating Joint Lesson Plans*

Time	Frequency	Percent
10% or less	15	27.8
11-20%	10	18.5
21-30%	3	5.6
31-40%	5	9.3
41-50%	4	7.4
51-60%	3	5.6
61-70%	4	7.4
71-80%	3	5.6
81% or more	7	13.0

Item 32i required participants to estimate the amount of time their collaborative team dedicated to sharing expertise in specific areas. Eleven participants indicated they spent 11-20% of their time with their collaborative team sharing expertise, while eight participants spent 81% or more of their time sharing expertise. Table 10 displays the descriptive statistics.

Table 10

Frequency Table of Amount of Time Spent with Collaborative Team on Sharing Expertise in Specific Areas

Time	Frequency	Percent
10% or less	7	13.0
11-20%	11	20.4
21-30%	6	11.1
31-40%	7	13.0
41-50%	4	7.4
51-60%	0	0.0
61-70%	7	13.0
71-80%	4	7.4
81% or more	8	14.8

The results from the survey were matched with the results from the Kansas Math Assessment. The average Kansas Math Assessment scores from the 54 classes was 86.43 ($SD = 3.81$) with the minimum and maximum averages scoring at 77.60 and 94.20, respectively.

Hypothesis Testing

The current study utilized correlations and one-factor ANOVAs to test the hypotheses investigating the establishment of collaborative teams, actions performed by collaborative teams, and data analysis and utilization practices employed by collaborative teams to improve student achievement.

RQ1. To what extent is there a relationship between establishing collaborative teams and student achievement, as measured by the Kansas Math Assessment?

H1. There is a positive relationship between establishing collaborative teams and student achievement.

The correlation coefficient ($r = -.099$) provided evidence for a weak negative relationship between the establishment of collaborative teams and student achievement. The results of the one-sample t test indicated a relationship that was not statistically significant between establishing collaborative teams and student achievement, $t = -.718$, $df = 1, 52$, $p = .476$. This does not support H1.

RQ2. To what extent is there a relationship between collaborative teams establishing team norms and student achievement, as measured by the Kansas Math Assessment?

H2. There is a positive relationship between collaborative teams establishing team norms and student achievement.

The correlation coefficient ($r = -.097$) provided evidence for a weak negative relationship between the establishment of team norms and student achievement. The results of the one-sample t test indicated a relationship that was not statistically significant between establishing team norms and student achievement, $t = -.701$, $df = 1, 52$, $p = .487$. This does not support H2.

RQ3. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the number of minutes per week devoted to collaborative team meetings?

H3. There is a difference in student achievement among the number of minutes per week devoted to collaborative team meetings.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = .613$, $df = 4, 49$, $p = .655$. See Table 11 for the means and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H3.

Table 11

H3 Descriptive Statistic Results of the Number of Minutes Per Week Devoted to Collaborative Team Meetings

Number of Minutes	<i>M</i>	<i>SD</i>	<i>N</i>
0-15 minutes	86.05	2.896	6
16-30 minutes	86.98	3.576	18
31-45 minutes	85.62	3.665	20
46-60 minutes	86.34	5.326	5
61 minutes or more	88.28	5.136	5
Total	86.43	3.812	54

RQ4. To what extent is there a relationship between focusing on results as a part of collaborative teams and student achievement, as measured by the Kansas Math Assessment?

H4. There is a positive relationship between focusing on results as a part of collaborative teams and student achievement.

The correlation coefficient ($r = -.252$) provided evidence for a weak negative relationship between focusing on results and student achievement. The results of the one-

sample t test indicated a marginally statistically significant relationship between focusing on results and student achievement, $t = -1.877$, $df = 1, 52$, $p = .066$. This does not support H4.

RQ5. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams establishing learning targets based on standards?

H5. There is a difference in student achievement among the levels of collaborative teams establishing learning targets based on standards.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = 1.005$, $df = 3, 50$, $p = .398$. See Table 12 for the means and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H5.

Table 12

*H5 Descriptive Statistic Results of Collaborative Teams**Establishing Learning Targets Based on Standards*

Response	<i>M</i>	<i>SD</i>	<i>N</i>
Not true of our team	--	--	0
Our team is working on this	89.90	--	1
Our team is working on this	86.90	6.894	3
Our team is working on this	85.08	3.621	14
True of our team	86.82	3.629	36
Total	86.43	3.812	54

Note. The first 'Our team is working on this' represents the response option of '2' on the survey. The second 'Our team is working on this' represents the response option of '3' on the survey. The third 'Our team is working on this' represents the response option of '4' on the survey.

Item 32d required participants to estimate the amount of time their collaborative team spent on developing lists of common essential learning components for their particular curricular area or grade level. Twelve participants indicated that they spent less than 10% of their time with their collaborative team developing lists of common essential

learning components. The descriptive statistics provided in Table 13 were not included in the analysis of H5.

Table 13

Frequency Table of Amount of Time Spent with Collaborative Team on Developing Lists of Common Essential Learning Components for Curricular Area or Grade Level

Time	Frequency	Percent
10% or less	12	22.2
11-20%	7	13.0
21-30%	9	16.7
31-40%	5	9.3
41-50%	2	3.7
51-60%	4	7.4
61-70%	3	5.6
71-80%	8	14.8
81% or more	4	7.4

RQ6. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams analyzing student achievement data to establish and revise SMART goals?

H6. There is a difference in student achievement among the levels of analysis of student achievement data by collaborative teams to establish and revise SMART goals.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = .154$, $df = 4, 49$, $p = .960$. See Table 14 for the means and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H6.

Table 14

H6 Descriptive Statistic Results of Analyzing Student Achievement

Data to Establish and Revise SMART Goals

Response	<i>M</i>	<i>SD</i>	<i>N</i>
Not true of our team	83.70	--	1
Our team is working on this	86.56	4.778	5
Our team is working on this	86.96	2.787	7
Our team is working on this	86.42	3.760	19
True of our team	86.37	4.187	22
Total	86.43	3.812	54

Note. The first 'Our team is working on this' represents the response option of '2' on the survey. The second 'Our team is working on this' represents the response option of '3' on the survey. The third 'Our team is working on this' represents the response option of '4' on the survey.

Item 32a required participants to estimate the amount of time their collaborative team spent on establishing specific, results-oriented goals for learning. Fifteen participants indicated that they spent 11-20% of their time with their collaborative team establishing

specific, results-oriented goals for learning. The descriptive statistics provided in Table 15 were not included in the analysis of H6.

Table 15

Frequency Table of Amount of Time Spent with Collaborative Team on Establishing Specific, Results-Oriented Goals for Learning

Time	Frequency	Percent
10% or less	5	9.3
11-20%	15	27.8
21-30%	8	14.8
31-40%	1	1.9
41-50%	5	9.3
51-60%	4	7.4
61-70%	5	9.3
71-80%	5	9.3
81% or more	6	11.1

RQ7. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams developing assessments?

H7. There is a difference in student achievement among the levels of collaborative teams developing assessments.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = .081$, $df = 4, 49$, $p = .988$. See Table 16 for the means

and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H7.

Table 16

H7 Descriptive Statistic Results of Collaborative Teams

Developing Assessments

Response	<i>M</i>	<i>SD</i>	<i>N</i>
Not true of our team	87.37	.833	3
Our team is working on this	86.90	2.666	3
Our team is working on this	86.02	4.372	10
Our team is working on this	86.49	3.378	16
True of our team	86.39	4.399	22
Total	86.43	3.812	54

Note. The first ‘Our team is working on this’ represents the response option of ‘2’ on the survey. The second ‘Our team is working on this’ represents the response option of ‘3’ on the survey. The third ‘Our team is working on this’ represents the response option of ‘4’ on the survey.

Item 32e required participants to estimate the amount of time their collaborative team spent on developing common assessments for their particular curricular area or grade level. Thirty-one participants indicated that they spent less than 30% with their collaborative team developing common assessments. The descriptive statistics provided in Table 17 were not included in the analysis of H7.

Table 17

Frequency Table of Amount of Time Spent with Collaborative Team on Developing Common Assessments for Curricular Area or Grade Level

Time	Frequency	Percent
10% or less	11	20.4
11-20%	10	18.5
21-30%	10	18.5
31-40%	7	13.0
41-50%	2	3.7
51-60%	4	7.4
61-70%	2	3.7
71-80%	5	9.3
81% or more	3	5.6

RQ8. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering informal formative assessments?

H8. There is a difference in student achievement among the levels of collaborative teams administering informal formative assessments.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = .397$, $df = 4, 49$, $p = .810$. See Table 18 for the means and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H8.

Table 18

H8 Descriptive Statistic Results of Administering Informal Assessments

Response	<i>M</i>	<i>SD</i>	<i>N</i>
Daily	85.23	2.939	6
Weekly	86.35	4.126	33
Monthly	86.79	3.773	12
Once per Quarter	89.05	1.202	2
Once per Semester	86.70	--	1
Once per Year	--	--	0
Never	--	--	0
Total	86.43	3.812	54

RQ9. To what extent is there a relationship between collaborative teams administering common formative assessments and student achievement, as measured by the Kansas Math Assessment?

H9. There is a positive relationship between collaborative teams administering common formative assessments and student achievement.

The correlation coefficient ($r = -.318$) provided evidence for a moderately weak negative relationship between administering common formative assessments and student achievement. The results of the one-sample t test indicated a statistically significant relationship between administering common formative assessments and student achievement, $t = -2.415$, $df = 1, 52$, $p < .05$. This does not support H9. Items 12, 17, and 19 were included in the analysis of H9. Table 19 includes descriptive data of the frequencies of administering common formative assessments (item 35).

Table 19

Frequency Table of Administering Common Formative Assessments

Response	Frequency	Percent
Daily	3	5.6
Weekly	19	35.2
Monthly	18	33.3
Once per Quarter	12	22.2
Once per Semester	1	1.9
Once per Year	1	1.9
Never	0	0.0

RQ10. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering summative assessments?

H10. There is a difference in student achievement among the levels of collaborative teams administering summative assessments.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = .714$, $df = 6, 47$, $p = .640$. See Table 20 for the means and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H10.

Table 20

H10 Descriptive Statistic Results of Administering Summative Assessments

Response	<i>M</i>	<i>SD</i>	<i>N</i>
Daily	86.10	--	1
Weekly	85.38	3.652	14
Monthly	87.39	3.678	16
Once per Quarter	85.78	4.071	18
Once per Semester	88.73	4.895	3
Once per Year	88.30	--	1
Never	89.10	--	1
Total	86.43	3.812	54

RQ11. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams involving students in the assessment process?

H11. There is a difference in student achievement among the levels of collaborative teams involving students in the assessment process.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = 1.102$, $df = 4, 49$, $p = .366$. See Table 21 for the means and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H11.

Table 21

*H11 Descriptive Statistic Results of Teachers of Collaborative Teams
Involving Students in the Assessment Process*

Response	<i>M</i>	<i>SD</i>	<i>N</i>
Not true of our team	88.03	5.713	3
Our team is working on this	89.10	.800	3
Our team is working on this	87.08	3.934	21
Our team is working on this	85.41	3.715	12
True of our team	85.49	3.573	15
Total	86.43	3.812	54

Note. The first ‘Our team is working on this’ represents the response option of ‘2’ on the survey. The second ‘Our team is working on this’ represents the response option of ‘3’ on the survey. The third ‘Our team is working on this’ represents the response option of ‘4’ on the survey.

Item 37 from the survey was not included in the analysis of H11, but provided descriptive data regarding the methods used by participants to involve students in the assessment process. Table 22 includes the frequency results.

Table 22

Frequency Table of Methods to Involve Students in the Assessment Process

Method	Frequency	Percent
Teachers and student collaborate to create learning goals.	32	59.3
Teachers and students collaborate to define the criteria for evaluation.	8	14.8
Teachers use strong and weak examples of student work to explain criteria.	40	74.1
Students create growth portfolios, learning logs, or data notebooks with evidence of student learning.	15	27.8
Students chart learning progress.	24	44.4
Students keep a record of learning data to monitor improvement.	14	25.9
Students evaluate their own work (in progress) and make adjustments to achieve the learning goal.	32	59.3
Students evaluate their own work by identifying strengths and weaknesses	21	38.9
Students evaluate their own work based on defined criteria.	19	35.2
Students estimate their own performance by assigning a grade (or symbol).	11	20.4
Students communicate learning progress with teacher.	30	55.6
Students communicate learning progress with parents.	24	44.4
Peer-assessment	14	25.9
Students choose assessment task.	11	20.4
Students set goals for future learning.	35	64.8
Other	0	0.0

RQ12. To what extent is there a relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement, as measured by the Kansas Math Assessment?

H12. There is a positive relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement.

The correlation coefficient ($r = -.240$) provided evidence for a weak negative relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement. The results of the one-sample t test indicated a marginally statistically significant relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement, $t = -1.783$, $df = 1, 52$, $p = .080$. This does not support H12.

Item 32c required participants to estimate the amount of time their collaborative team spent analyzing and monitoring student data. The descriptive statistics provided in Table 23 were not included in the analysis of H12.

Table 23

Frequency Table of Amount of Time Spent with Collaborative Team on Analyzing and Monitoring Student Data

Time	Frequency	Percent
10% or less	5	9.3
11-20%	4	7.4
21-30%	4	7.4
31-40%	11	20.4
41-50%	7	13.0
51-60%	7	13.0
61-70%	1	1.9
71-80%	7	13.0
81% or more	8	14.8

Item 33 asked participants how often they displayed student assessment data as a motivational method for students. Seventeen participants indicated that they never collected or displayed student assessment data. Table 24 includes the frequency results.

Table 24

*Frequency Table of Collecting and Displaying**Student Assessment Data*

Response	Frequency	Percent
Daily	3	5.6
Weekly	4	7.4
Monthly	14	25.9
Once per Quarter	10	18.5
Once per Semester	4	7.4
Once per Year	2	3.7
Never	17	31.5

RQ13. To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of use of assessment data to form interventions by collaborative teams?

H13. There is a difference in student achievement among the levels of collaborative teams using assessment data to form interventions.

The results of the analysis indicated there was not a statistically significant difference among the means, $F = 1.480$, $df = 3, 50$, $p = .231$. See Table 25 for the means and standard deviations for this analysis. No follow-up post hoc was warranted. This does not support H13.

Table 25

H13 Descriptive Statistic Results of Using Assessment Data to Form Interventions

Response	<i>M</i>	<i>SD</i>	<i>N</i>
Not true of our team	91.35	2.051	2
Our team is working on this	--	--	0
Our team is working on this	86.22	2.846	5
Our team is working on this	87.24	3.199	10
True of our team	85.98	4.009	37
Total	86.43	3.812	54

Note. The first ‘Our team is working on this’ represents the response option of ‘2’ on the survey. The second ‘Our team is working on this’ represents the response option of ‘3’ on the survey. The third ‘Our team is working on this’ represents the response option of ‘4’ on the survey.

Item 32g required participants to estimate the amount of time their collaborative team spent on discussing strategies for differentiating instruction and student interventions. Eleven participants indicated they spent 11-20% of their time with their collaborative team discussing strategies for differentiating instruction and student interventions, while 10 participants spent 81% or more of their time. The descriptive statistics provided in Table 26 were not included in the analysis of H13.

Table 26

Frequency Table of Amount of Time Spent with Collaborative Team on Discussing Strategies for Differentiating Instruction and Student Interventions

Time	Frequency	Percent
10% or less	1	1.9
11-20%	11	20.4
21-30%	7	13.0
31-40%	6	11.1
41-50%	5	9.3
51-60%	5	9.3
61-70%	4	7.4
71-80%	5	9.3
81% or more	10	18.5

Summary

This chapter included the results for each research question. Correlations and one-factor ANOVAs were used to test the hypotheses, and descriptive statistics in the form of frequencies were presented for further information. Chapter five includes an overview of the study as well as the major findings. Findings related to the literature and conclusions are also presented. Conclusions are presented in the forms of implications for action and recommendations for future research.

Chapter Five

Interpretation and Recommendations

The current study investigated the impact of data analysis by collaborative teams as a part of PLCs and their influences on student achievement. Chapter one provided an overview of the study and chapter two included information from literature related to PLCs, collaborative teams, and data analysis. Chapter three outlined the methodology, while results were provided in chapter four. Chapter five synthesizes the study by describing a summary of the study, an overview of the problem, purpose statement and research questions, a review of the methodology, and major findings. Findings related to the literature are explained and concluding remarks are presented in the form of implications for action and recommendations for future research.

Study Summary

The three big ideas of PLCs include a focus on student learning, a collaborative culture, and a focus on results (DuFour, DuFour, & Eaker, 2008). PLCs provide a framework for collaborative teams to focus on student learning through the analysis and utilization of student learning data to improve student achievement. To gather more information on the analysis of student learning data, the researcher investigated third grade teachers who were members of collaborative teams in District X. The following section includes an overview of the problem, purpose statement and research questions, review of methodology, and major findings.

Overview of the problem. PLCs are centered around three big ideas, six essential characteristics, and four critical questions (DuFour & Eaker, 1998). They provide focus

and clarity to guide the work of collaborative teams to impact student learning. A problem occurs when schools or teams claim they operate as a PLC but do not understand the true meaning and applications of the ideas, characteristics, or questions. As previously stated, “clarity precedes competence” (DuFour & Fullan, 2013, p. 13) and schools and teams need clarity and understanding of the framework in order to efficiently improve student achievement. The current study investigated the clarity and establishment of PLCs, collaborative teams, and data analysis and utilization practices used to improve student learning.

Purpose statement and research questions. The purpose of the current study was to investigate the relationship between collaborate teams and student achievement as well as the relationship between collaborative teams who analyze and utilize student learning data to increase achievement. The Kansas Math Assessment was used to measure student achievement. The study also sought strengths and weaknesses in collaborative teams to examine the effects on student learning based on results from survey responses linked to Kansas Math Assessment scores. Thirteen research questions were developed to gain a deep understanding of the purposes of the current study: (1) To what extent is there a relationship between establishing collaborative teams and student achievement, as measured by the Kansas Math Assessment?; (2) To what extent is there a relationship between collaborative teams establishing team norms and student achievement, as measured by the Kansas Math Assessment?; (3) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the number of minutes per week devoted to collaborative team meetings?; (4) To what extent is there a relationship between focusing on results as a part of collaborative teams

and student achievement, as measured by the Kansas Math Assessment?; (5) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams establishing learning targets based on standards?; (6) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams analyzing student achievement data to establish and revise SMART goals?; (7) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams developing assessments?; (8) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering informal formative assessments?; (9) To what extent is there a relationship between collaborative teams administering common formative assessments and student achievement, as measured by the Kansas Math Assessment?; (10) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams administering summative assessments?; (11) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of collaborative teams involving students in the assessment process?; (12) To what extent is there a relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement, as measured by the Kansas Math Assessment?; and (13) To what extent is there a difference in student achievement, as measured by the Kansas Math Assessment, among the levels of use of assessment data to form interventions by collaborative teams?

Review of the methodology. This quantitative study sought to gather information surrounding the establishment and practices of collaborative teams following the PLC framework, as well as the data analysis practices from teachers within the collaborative teams. An electronic survey was administered to 106 third grade teachers in District X in the 2012-2013 school year to gather data on the first three variables. Fifty-four teachers responded to the survey that included four items from the Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a), 27 items from the Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b), and nine items added by the researcher. The participants' survey responses were paired to the Kansas Math Assessment scores for data analyses. The degree to which teachers and collaborative teams following the PLC framework analyzed and utilized student learning data was linked to student achievement and analyzed using Pearson-product moment correlations for hypotheses 1, 2, 4, 9, and 12 and one-factor ANOVAs for hypotheses 3, 5, 6, 7, 8, 10, 11, and 13.

Major findings. Correlations and one-factor ANOVAs were conducted to configure results of hypothesis testing. The first three research questions addressed the establishment of collaborative teams. RQ1 examined the relationship between establishing collaborative teams and student achievement, while RQ2 examined the relationship between establishing team norms and student achievement. The data analyses revealed a weak negative relationship for both hypotheses 1 and 2. RQ3 examined the difference in student achievement among the number of minutes per week that collaborative teams devoted to team meetings. According to the data analysis, there was not a statistically significant difference among the number of minutes per week spent

in collaborative team meetings. The results for research questions 1, 2, and 3 suggest that establishing collaborative teams, establishing team norms, and the length of collaborative team meetings do not impact student achievement.

Research questions 4 through 11 addressed the second variable, actions performed by collaborative teams to improve student achievement. RQ4 investigated the relationship between collaborative teams that focus on results and student achievement. Results indicated that there was a weak negative relationship between teams focusing on results and student achievement. RQ5 and RQ6 involved the use of standards and goals. RQ5 examined the difference in student achievement among the levels of establishing learning targets based on standards, while RQ6 examined the difference among the levels of analyzing student achievement data to establish and revise SMART goals. Results indicated that there was not a statistically significant difference in student achievement for hypotheses 5 and 6.

Research questions 7, 8, 9, 10, and 11 were centered on assessments. A statistically significant difference was not found for H7, which examined the difference in student achievement among collaborative teams developing formative assessments. RQ8 and RQ10 examined the difference in student achievement among the levels of collaborative teams administering informal formative assessments and summative assessments, respectively. Results indicated there were not significant differences in student achievement for H8 and H10. RQ9 investigated the relationship between collaborative teams administering common formative assessments and student achievement. Results indicated that there was a moderately weak negative relationship between common formative assessments and student achievement. RQ11 investigated

the difference in student achievement among the levels of involving students in the assessment process. Results indicated there was not a statistically significance difference in student achievement. The actions performed by collaborative teams that were investigated by the second variable and research questions 4 through 11 suggest that the actions do not affect student achievement, while two of the actions may cause student achievement to decrease.

The third and final variable of the current study was data analysis and utilization practices that collaborative teams employ to improve student achievement, which was addressed by RQ12 and RQ13. RQ12 examined the relationship between collaborative teams obtaining knowledge and skills in the use of data and student achievement. Results indicated a weak negative relationship between teams obtaining data knowledge and skills and student achievement. RQ13 investigated the difference in student achievement among the levels of using assessment data to form interventions. Results indicated no statistically significant difference in student achievement. Results from hypothesis testing suggest that obtaining data knowledge and skills and using assessment data to form interventions does not affect student achievement, or may decrease student achievement.

Findings Related to the Literature

The findings from each research question are related to literature on the establishment of collaborative teams, actions performed by collaborative teams to improve student achievement, and data analysis and utilization practices employed by collaborative teams to improve student achievement and is further explained in comparison to the results of the current study in the following section. Overall, the

results presented in chapter four and explained in the major findings do not support the literature.

The establishment of collaborative teams. The first variable of the current study, the establishment of collaborative teams, was investigated by research questions 1 through 3, which addressed the establishment of collaborative teams, team norms, and the number of minutes per week devoted to collaborative team meetings, respectively. Literature relating to characteristics of established collaborative teams (RQ1), norms that guide the work of teams (RQ2), and the frequency and duration of team meetings (RQ3) is discussed in relation to the results of the current study. The described characteristics are the foundation for the PLC process.

Established collaborative teams embed the three big ideas and six essential characteristics, and utilize the four critical questions of PLCs in their daily routine (DuFour & Eaker, 1998). Established collaborative teams focus on student learning through the discussion of the four critical questions of teams. They gather specific learning data to guide their instruction and decision making via common assessments (DuFour, Eaker, & DuFour, 2005). Implementing the ideas, characteristics, and questions of PLCs ensure that teams focus on learning as opposed to teaching. Results of the current study do not align with the literature, as results for RQ1 indicated a weak negative relationship between establishing collaborative teams and student achievement.

A specific characteristic of collaborative teams is establishing and adhering to team norms. Establishing team norms affects a team's ability to effectively collaborate.

When individuals work through a process to create explicitly stated norms, and then commit to honor those norms, they increase the likelihood they will begin to

function as a collaborative team rather than as a loose collection of people working together. (DuFour, DuFour, Eaker, & Many, 2006b, p. 103)

Norms serve as commitments to the collaborative team. Time, listening, confidentiality, decision making, participation and expectations are topics to consider when developing team norms (DuFour, DuFour, Eaker, & Many, 2010). Results of the current study do not align with the literature, as results for RQ2 indicated a weak negative relationship between establishing team norms and student achievement.

Finding time for collaboration is difficult due to scheduling challenges, but it is crucial to the success of the collaborative team and student achievement. The APQC (2009) study reported that best practice at the elementary level includes collaborative teams that meet on average for 4 hours per month, or 1 hour per week. Some methods that schools in North America have used to create time for collaboration is common preparation time for teachers, parallel scheduling, adjusting start and end times of the school day, sharing classes, scheduling group activities or events, banking time, and meeting during in-services or faculty meetings (DuFour, DuFour, Eaker, & Many, 2006b). Results of the current study do not align with the literature, as the results for RQ3 revealed that there was not a significant difference in student achievement among the number of minutes devoted to collaborative team meetings.

Actions performed by collaborative teams. The second variable of the current study, actions performed by collaborative teams to improve student achievement, was investigated by research questions 4 through 11. Eight actions of collaborative teams were examined and the relating literature is discussed in comparison with the results. The literature supports the use of collaborative teams focusing on results (RQ4),

unpacking standards to create learning targets (RQ5), developing SMART goals (RQ6), developing assessments (RQ7), administering informal assessments (RQ8), administering common formative assessments (RQ9), administering summative assessments (RQ10), and involving students in the assessment process (RQ11).

Research question 4 addressed the degree to which collaborative teams focus on results. Focusing on results and gathering evidence of student learning validates if learning targets and SMART goals have been met and if students have acquired the essential learning. It confirms the effectiveness of instructional practices utilized or suggests that other options should be considered. “Schools must systematically monitor student learning on an ongoing basis and use evidence of results to respond immediately to students who experience difficulty, to inform individual and collective practice, and to fuel continuous improvement” (DuFour, DuFour, & Eaker, 2008, p. 18). Results of the current study do not align with the literature, as the results for RQ4 indicated a weak negative relationship between collaborative teams focusing on results and student achievement.

Research questions 5 and 6 examined the establishment of learning targets based on standards and analyzing student learning data to establish and revise SMART goals, respectively. Schools following the PLC framework have an established mission and vision. Learning targets and goals serve as small steps that collaborative teams use to guide their work towards achieving the mission and vision. Learning targets are developed by examining the standards with precision and prioritizing skills or concepts, known as essential learning, which students should learn. The learning targets define what students should learn, and answer question one of the four critical questions

(DuFour, DuFour, Eaker, & Many, 2006b). SMART goals are developed by collaborative teams to determine if students have met the desired proficiency level. Setting goals is an effective practice for teachers to employ with their students with an effect size of $d = 0.56$, which is in the zone of desired effects (Hattie, 2009). Setting goals allows students to be knowledgeable of their current levels of learning and the expected level of achievement. Results of the current study do not align with the literature: for RQ5 and RQ6, results indicated there were no significant differences in student achievement by implementing learning targets and SMART goals, respectively.

Research question 7 investigated the difference in student achievement among collaborative teams developing assessments. Assessments *of* learning and assessments *for* learning have two different purposes. “The crucial distinction is between assessment to determine the status of learning and assessment to promote greater learning” (Stiggins, 2002, para. 22). Common assessments, a form of assessments *for* learning, can be used to evaluate the progress of learning on the essential learning components. Essential learning components should be developed by collaborative teams. In order for the common assessment to align with the essential learning, teams may choose to develop their own assessments to ensure they gather productive information. Results of the current study do not align with the literature, as the results for RQ7 did not indicate a significant difference in student achievement among the levels of teams developing assessments.

Research questions 8, 9, and 10 examined the administration balanced assessment, including assessments *of* learning and assessments *for* learning. Formative assessments have proven to produce significant gains in student achievement (Bangert-

Drowns et al., 1991). Informal formative assessments provide quick checks for understanding during a lesson, common assessments provide progress updates on essential learning, and summative assessments evaluate learning at the end of a unit or topic of study for effective student feedback. Collaborative teams that follow the PLC framework place more emphasis on formative assessments as opposed to summative assessments to gather more immediate information regarding the progress of learning (DuFour, Eaker, & DuFour, 2005). Results of the current study do not align with the literature as the results for research questions 8 and 10 did not indicate a significant difference in student achievement among the levels of administering informal formative assessments and summative assessments. Results for RQ9 do not align with the literature as results revealed a moderately weak negative relationship between administering common formative assessments and student achievement.

Research question 11 investigated the involvement of students in the assessment process. Involving students in the assessment process allows teachers and students to work together to promote learning. In addition to students being accountable for their learning, they are also knowledgeable about the specific requirements to achieve proficiency, their current status of learning, and how to improve their learning (Stiggins & Chappuis, 2006). Students can be held accountable for their learning through the use of growth portfolios, learning logs, charting learning progress, and data notebooks with evidence of student learning. They can also evaluate their own work with self-reported grades, which has been found to produce one and one-half year's growth in one year's time (Hattie, 2009). Teacher and student collaboration is important when involving students in the assessment process. They can work together to create learning goals,

define the criteria for evaluation, and discuss learning progress. Student choice of assessment task and setting goals for future learning are additional methods to involve students in the assessment process. Results of the current study do not align with the literature as the results for RQ11 do not indicate a significant difference in student achievement among the levels of involving students in the assessment process.

Data analysis practices employed by collaborative teams. The third variable of the current study, data analysis practices employed by collaborative teams to improve student achievement, was investigated by research questions 12 and 13. The establishment of collaborative teams investigated in research questions 1 through 3 and actions of collaborative teams investigated in research questions 4 through 11 lay the foundation and gather the information to analyze student learning data. Literature supports the knowledge and skills of data (RQ12) and using assessment data to form interventions (RQ13) and is discussed in relation to the results.

Research question 12 examined the relationship between collaborative teams obtaining data knowledge and skills and student achievement. Teachers and schools typically have an abundance of available data through standardized assessments, common assessments, demographics, among other sources of information (DuFour, DuFour, Eaker, & Many, 2006b). The data are meaningless unless teachers and schools know how to effectively and efficiently analyze the data to transform it into meaningful information. Data is needed for the third big idea (focus on results), three essential characteristics (action-orientation and experimentation, continuous improvement, and results-orientation), and one critical question (how will we know if students have learned the essential learning?); data is crucial in following the PLC framework. Student learning

data is used as evidence of learning, a comparison between classes, and to provide enrichment and intervention as soon as the need arises (DuFour, DuFour, Eaker, & Many, 2006b). Results of the current study do not align with the literature as the results for RQ12 revealed a weak negative relationship between teams obtaining data knowledge and skills and student achievement.

Research question 13 investigated the difference in student achievement among the use of assessment data to form interventions. Question one of the four critical questions defines what students should know, question two determines if students have acquired the material, and question three requires teams to develop a plan if students have not learned the essential learning. A major difference between traditional schools and schools that utilize the PLC process is the response time to form interventions. Collaborative teams following the PLC framework use common assessments to determine if students have acquired the essential learning, and provide additional time and support if needed as soon as the need arises (DuFour, DuFour, Eaker, & Many, 2006b). Results of the current study do not align with the literature as the results for RQ13 do not indicate a significant difference in student achievement among the levels of using assessment data to form interventions.

Results of the current study were not favorable despite that literature communicates that PLCs are a highly effective process to improve student achievement. The achievement scores of District X should be considered when examining the results as students in District X produced higher achievement results than the state of Kansas and surpassed AYP expectations (see Table 4). District X consistently had over 90% of its students score *Proficient* or above on the Kansas Math Assessment since the 2007-2008

school year. The collaborative teams, assessments, student learning data, or knowledge of students could be contributing factors to the success of District X, but a single contributing factor responsible for the high achievement scores from District X was unknown.

Conclusions

Conclusions are drawn from the current study in this section. Implications for action, recommendations for future research, and concluding remarks are provided.

Implications for action. Results of the current study revealed that the topics investigated in the research questions had weak to moderate negative relationships with student achievement and no significance differences in student achievement among the levels of implementation. District X was in its seventh year of all schools following the PLC framework when the current study was conducted. Considering the results were not favorable and did not align with PLC literature, the following implications should be considered by District X and other districts who use the PLC framework.

Administrative training, support, and expectations play a tremendous role in schools and influence how teachers approach educating their students. “The quality of teaching, learning, and relationships in professional learning communities depends on the quality of leadership provided by principals and teachers” (Sparks, 2005, p. 156). Belief and support of collaborative teams and the PLC framework as well as encouragement for teachers to serve as leaders may have varied between principals of teachers who participated in the study. District X relied on their administrators to educate all staff, including new staff, on a consistent basis to ensure their teams were operating according to the PLC framework. Administrative training and support impacts the accountability of

teachers to follow through with their obligation to contribute to their collaborative teams and PLCs.

The three big ideas, six essential characteristics, and four critical questions encompass the PLC process. PLCs do not function without these components. Members of PLCs should be consistently embracing the big ideas, characteristics, and questions into their daily practice. Additionally, members must have a deep understanding of the meaning and applications of each of the components. In order for schools, teams, and teachers to do something well, they must first understand what they are to do.

Mission and vision statements are common within schools, as many states have required schools to establish them (DuFour & Eaker, 1998). However, the intent and application of mission and vision statements are critical to PLCs. Schools and teams develop the mission, vision, values, and goals to guide the work of teams to improve student achievement (DuFour, DuFour, Eaker, & Many, 2006b). The involvement of staff in development increases the meaning, ownership, and purpose of the statements. The actions of schools and teams work to bring the mission and vision to life. An implication of the current study is for staff at each school to evaluate their mission and vision statements to determine if they align with the PLC framework as well as District X's mission and vision statements. Schools and teams may want to assess if their actions align with the mission and vision statements as well.

Time is valuable. The study was conducted in a time period when new initiatives were being introduced by District X, which diluted the focus of the PLC process. While schools and teams needed to be educated on the new initiative, they also needed time for collaboration and implementation of PLCs in order to improve student achievement. An

implication of the current study is for district and building level administrators to ensure they are maintaining PLCs by providing time for teams to collaborate and remain dedicated to PLCs.

Recommendations for future research. The current study could be extended to gather more information relating to data analysis by collaborative teams and its impact on student achievement. While the current study utilized quantitative methods, a mixed-method approach could extend the study. Interviews could be conducted upon completion of the survey. Further research could also be conducted to analyze the team norms and attend a collaborative team meeting from each participant. Interviews and observations may provide more insight to the functionality and practices of teams.

An additional qualitative method to gather more information on data analysis by collaborative teams is to examine the assessments (informal formative, common formative, and summative) used to collect student learning data. Further research could be conducted to examine the extent to which the assessments are linked to SMART goals or the mission and vision of the school. Additionally, further research could investigate the specific practices that collaborative teams employ to analyze the data gathered from assessments.

The current study was limited to third grade teachers in the 2012-2013 school year and their students' Kansas Math Assessment scores, which could be expanded to numerous approaches. Kansas Reading Assessment scores could be linked to the survey responses to discover if the same results are produced as when the Kansas Math Assessment scores were analyzed. A second expansion is that all grade levels that require students to take state assessments could also be included in the study. If all grade

levels participate, the results could then be analyzed by school to determine if certain schools function more effectively as PLCs than others. Schools could be given valuable opportunities to learn from one another, given the results.

As previously stated, the current study only focused on third grade teachers, but could be extended to include administrators. Leadership is a factor in PLCs that can positively or negatively affect the work of collaborative teams. Gathering information from administrators regarding what they do to promote, support, and enhance collaborative teams and PLCs may allow for conclusions to be drawn about the establishment of collaborative teams, actions performed by collaborative teams to improve student achievement, and data analysis practices employed by collaborative teams.

Finally, comparing District X to similar districts in demographics that may or may not utilize the PLC framework could lead to more information about the effectiveness of PLCs in District X. Including other districts in the study would allow the researcher to draw more conclusions about effective practices within the PLC model that produce higher student achievement.

Concluding remarks. The current study examined data analysis practices utilized by collaborative teams that follow the PLC framework. More specifically, the current study sought to investigate the extent of the relationships of the establishment of collaborative teams, actions performed by collaborative teams, and data analysis practices employed by collaborative teams with student achievement. The results indicated that the establishment of collaborative teams, actions performed by collaborative teams, and the data analysis practices employed by collaborative teams did not have a significant

difference in student achievement or had a weak to moderate negative relationship with student achievement. While the findings of the current study were not favorable, the literature surrounding PLCs suggests that collaborative teams and schools that embrace the PLC framework have the potential to dramatically increase student achievement. Students attend school to learn, and PLCs provide the process for teachers, teams, and schools to ensure that teams collaborate to focus on learning and results in order for students to learn and to increase student achievement.

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Appendices

Appendix A: PLC Surveys

Critical Issues for Team Consideration

Team Name:

Team Members:

Use the following rating scale to indicate the extent to which each statement is true of your team.

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

1. _____ We have identified team norms and protocols to guide us in working together.
2. _____ We have analyzed student achievement data and established SMART goals to improve upon this level of achievement we are working interdependently to attain. (SMART Goals are Strategic, Measurable, Attainable, Results oriented, and Time bound. SMART Goals are discussed at length in chapter 6.)
3. _____ Each member of our team is clear on the knowledge, skills, and dispositions (that is, the essential learning) that students will acquire as a result of (1) our course or grade level and (2) each unit within the course or grade level.
4. _____ We have aligned the essential learning with state and district standards and the high-stakes assessments required of our students.
5. _____ We have identified course content and topics we can eliminate to devote more time to the essential curriculum.
6. _____ We have agreed on how to best sequence the content of the course and have established pacing guides to help students achieve the intended essential learning.
7. _____ We have identified the prerequisite knowledge and skills students need in order to master the essential learning of each unit of instruction.
8. _____ We have identified strategies and created instruments to assess whether students have the prerequisite knowledge and skills.
9. _____ We have developed strategies and systems to assist students in acquiring prerequisite knowledge and skills when they are lacking in those areas.
10. _____ We have developed frequent common formative assessments that help us determine each student's mastery of essential learning.

11. ____ We have established the proficiency standard we want each student to achieve on each skill and concept examined with our common assessments.
12. ____ We use the results of our common assessments to assist each other in building on strengths and addressing weaknesses as part of an ongoing process of continuous improvement designed to help students achieve at higher levels.
13. ____ We use the results of our common assessments to identify students who need additional time and support to master essential learning, and we work within the systems and processes of the school to ensure they receive that support.
14. ____ We have agreed on the criteria we will use in judging the quality of student work related to the essential learning of our course, and we continually practice applying those criteria to ensure we are consistent.
15. ____ We have taught students the criteria we will use in judging the quality of their work and provided them with examples.
16. ____ We have developed or utilized common summative assessments that help us assess the strengths and weaknesses of our program.
17. ____ We have established the proficiency standard we want each student to achieve on each skill and concept examined with our summative assessments.
18. ____ We formally evaluate our adherence to team norms and the effectiveness of our team at least twice each year.

Professional Learning Team Data-Literacy Survey

Because professional learning communities focus on results and make every effort to ensure that all students are successful, effective manipulation of data is essential. This survey is intended to help us, as a school, learn more about our levels of data literacy. The results of this survey will help us target our professional development in the next year, and we thank you in advance for answering in an honest and thoughtful manner.

Your Team: _____

Please indicate the extent to which each of the statements below is true by circling one of the four numbers using the following scale:

1 = Very true

2 = True

3 = Somewhat true

4 = Not true

Data-Literacy Statement	Rating			
	1	2	3	4
Our team has regular conversations about what student mastery looks like.	1	2	3	4
Our team has agreed-upon expectations for mastery on most assignments.	1	2	3	4
Our team has measurable instructional goals for all common lessons.	1	2	3	4
Our team has developed our own set of common assessments that we use regularly (at least monthly).	1	2	3	4
I believe that our common assessments are tied to state standards and are reliable measures of what students should know and be able to do.	1	2	3	4
Our team has developed our own set of common rubrics we can use to score performance-related tasks.	1	2	3	4
I believe that our common rubrics are tied to state standards and are reliable measures of what students should know and be able to do.	1	2	3	4
Our team has established an effective system for recording results from our common assessments.	1	2	3	4
Our team has an effective process for looking at the results of common assessments together.	1	2	3	4
Our team is able to discuss common assessment results in a positive and constructive way.	1	2	3	4
Our team uses graphs and charts to make student achievement trends visible in our conversations about results.	1	2	3	4

Our team makes predictions about student learning based on common assessment results.	1	2	3	4
Our team considers multiple hypotheses and looks for multiple sources of verification before drawing conclusions from common assessment results.	1	2	3	4
Our team changes our instructional practices based on common assessment results.	1	2	3	4
Our team provides remediation and enrichment to students based on common assessment results.	1	2	3	4
Our team celebrates achievements that are highlighted in the results of our common assessments.	1	2	3	4
I feel safe when revealing my common assessment data in front of my peers.	1	2	3	4
Our team uses data as a tool for identifying effective practices rather than as a tool for identifying effective people.	1	2	3	4
Our team has a sense of shared responsibility for the success of all our students.	1	2	3	4
Our team has the skills necessary to collect and manipulate data effectively.	1	2	3	4
I know the difference between and understand when to use aggregated and disaggregated data.	1	2	3	4
I know the difference between and understand when to use formative and summative assessments.	1	2	3	4
Our team respects the confidentiality of students and teachers when looking at data.	1	2	3	4
Our team has looked at our students' standardized exam results.	1	2	3	4
Our team is aware of all of the varied populations we serve and looks at results for each of these populations individually.	1	2	3	4
Our team refers to reliable research when we are testing a prediction we have made about student learning.	1	2	3	4
Our team has created systems for engaging students in data collection for self-assessment.	1	2	3	4

Please take a few moments to share any final thoughts about the use of data on your learning team. What are you most proud of? What are you the most concerned about? What kinds of support would you like from administration to continue your work next year? What are the most significant barriers preventing your team from using data more effectively? What kinds of resolutions can you imagine for those barriers?

Appendix B: Survey

For items 1-31, participants rate each statement using the following scale: 1= *not true of our team*; 3 = *our team is working on this*; 5 = *true of our team*

Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2006a)

1. We have identified team norms and protocols to guide us in working together.
2. We formally evaluate our adherence to team norms and the effectiveness of our team at least twice each year.
3. We have analyzed student achievement data to establish and revise SMART goals to improve upon this level of achievement we are working interdependently to attain. (SMART goals are Strategic, Measureable, Attainable, Results oriented, and Time bound)
4. Each member of our team is clear on the essential learning (knowledge, skills, and dispositions) that students will acquire as a result of our grade level and each topic within the grade level.

Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010b)

5. Our team has regular conversations about what student mastery looks like.
6. Our team has agreed-upon expectations for mastery on most assignments.
7. Our team has measurable instructional goals for all common lessons.
8. Our team has developed our own set of common assessments that we use regularly (at least monthly).
9. Our common assessments are tied to state standards and are reliable measures of what students should know and be able to do.
10. Our team has developed our own set of common rubrics we can use to score performance-related tasks.

11. Our common rubrics are tied to state standards and are reliable measures of what students should know and be able to do.
12. Our team has established an effective system for recording results from our common assessments.
13. Our team has an effective process for looking at the results of common assessments together.
14. Our team is able to discuss common assessment results in a positive and constructive way.
15. Our team uses graphs and charts to make student achievement trends visible in our conversations about results.
16. Our team makes predictions about student learning based on common assessment results.
17. Our team considers multiple hypotheses and looks for multiple sources of verification before drawing conclusions from common assessment results.
18. Our team changes our instructional practices based on common assessment results.
19. Our team provides remediation and enrichment to students based on common assessment results.
20. Our team celebrates achievements that are highlighted in the results of our common assessments.
21. I feel safe when revealing my common assessment data in front of my peers.
22. Our team uses data as a tool for identifying effective practices rather than as a tool for identifying effective people.

23. Our team has a sense of shared responsibility for the success of all our students.
24. Our team has the skills necessary to collect and manipulate data effectively.
25. I know the difference between and understand when to use aggregated and disaggregated data.
26. I know the difference between and understand when to use formative and summative assessments.
27. Our team respects the confidentiality of students and teachers when looking at data.
28. Our team has looked at our students' standardized exam results.
29. Our team is aware of all the varied populations we serve and looks at results for each of these populations individually.
30. Our team refers to reliable research when we are testing a prediction we have made about student learning.
31. Our team has created systems for engaging students in data collection for self-assessment.

Additional Questions

32. What percentage would most closely approximate the amount of Professional Learning Community (PLC) time you spend on the following activities?
(Response options: 10% or less, 11-20%, 21-30%, 31-40%, 41-50%, 51- 60%, 61-70%, 71-80%, 81% or more)
 - a. Establishing specific, results-oriented goals for learning
 - b. Collaborating and developing common strategies to improve student learning

- c. Analyzing and monitoring student data
 - d. Developing lists of common essential learning components for your curricular area or grade level
 - e. Developing common assessments for your curricular area or grade level
 - f. Examining student work
 - g. Discussing strategies for differentiating instruction and student interventions
 - h. Creating joint lesson plans
 - i. Sharing expertise in specific areas
33. How often do you collect and display student data (anonymous data) as a motivational method for students? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)
34. How often do you administer informal common assessments? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)
35. How often do you administer common formative assessments? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)
36. How often do you administer summative assessments? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)
37. What strategies do you use to involve students in the assessment process? (Check all that apply)
- Teachers and students collaborate to create learning goals.
 - Teachers and students collaborate to define the criteria for evaluation.
 - Teachers use strong and weak examples of student work to explain criteria.
 - Students create growth portfolios, learning logs, or data notebooks with evidence of student learning.
 - Students chart learning progress.

- Students keep a record of learning data to monitor improvement.
- Students evaluate their own work (in progress) and make adjustments to achieve the learning goal.
- Students evaluate their own work by identifying strengths and weaknesses.
- Students evaluate their own work based on defined criteria.
- Students estimate their own performance by assigning a grade (or symbol).
- Students communicate learning progress with teacher.
- Students communicate learning progress with parents.
- Peer-assessment
- Students choose assessment task.
- Students set goals for future learning.
- Other (Please list: _____)

(Brown, Rust, & Gibbs, 1994; Hattie, 2009; Hawaii Department of Education, n.d.; Sadler, 1989; Stiggins, 2002; Stiggins & Chappuis, 2005; Woytek, n.d.)

38. How many minutes per week do you meet with your collaborative team to discuss student achievement? (0-15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, 61 minutes or more)
39. How many years have you been teaching third grade in the Olathe School District? (Include the current school year in your response)
40. Do you currently teach in a Title I school? (Yes or No)

Appendix C: Permission Letters to the Researcher



RE: 8/30/2012 Permission Request

October 8, 2012

Dear Ms. Kray,

We have reviewed your request to adapt and use Professional Learning Team Data-Literacy Survey from *Building a Professional Learning Community at Work™: A Guide to the First Year* by Parry Graham and William M. Ferriter in your Baker University dissertation in January 2013. The material you are requesting is reproducible, so permission is not needed.

Reproducibles are free education resources designed by the authors to be used, shared, and so on. However, the Solution Tree watermark must remain at the bottom of each page, and please cite Solution Tree and *Building a Professional Learning Community at Work™: A Guide to the First Year* by Parry Graham and William M. Ferriter in your dissertation.

For future requests, please continue to use our "Permission Request Form" accessible via www.solution-tree.com. You may access the form by clicking on "Contact Us" and then "Permission Request Form" located under "Solution Tree Press." Thank you.

Best,



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Letter from District X

August 30, 2012

Kim,

I am pleased to provide you with permission to use "Item 28" on your survey of staff regarding Professional Learning Communities. I am sure the data gathered will be helpful to you as you complete your degree and move forward in your career!



A handwritten signature in black ink, which appears to read "Mary Matthews". The signature is written over a solid black rectangular redaction box.

Mary Matthews
Director of Assessment, School Improvement, Extended Learning



February 1, 2013

Hi Ms. Kray,

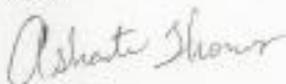
Thank you for choosing Solution Tree material. The material you're requesting to use for your Olathe School District surveys, Critical Issues for Team Consideration from *Learning by Doing (2nd edition): A Handbook for Professional Learning Communities at Work™* by Richard DuFour, Rebecca DuFour, Robert Eaker and Thomas W. Many, is free to share, use, and copy, so you do not need permission to use it. However, we cannot grant permission to change the reproducible by adding new rate scales and points, because that would compromise the authors' work. Also, we cannot put you touch with anyone with information about validity testing.

Instead, you are encouraged to create your own survey, but please cite *Learning by Doing (2nd ed.)* if you use questions from it in your survey. Complete APA citation information for *Learning by Doing (2nd ed.)* is below, but please follow whatever citation form you prefer.

DuFour, R., DuFour, R., Eaker, R., Many, T. W. (2010). *Learning by doing (2nd edition): A handbook for professional learning communities at work™*. Bloomington, IN: Solution Tree Press.

Thank you again for choosing Solution Tree! Please continue to use the Permission Request Form located on our website, solution-tree.com, if you have future requests.

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Appendix D: Instructional Review Board Application and Approval



SCHOOL OF EDUCATION
GRADUATE DEPARTMENT

Date: February 21, 2013
IRB PROTOCOL NUMBER _____
(IRB USE ONLY)

IRB REQUEST
Proposal for Research
Submitted to the Baker University Institutional Review Board

I. Research Investigator(s) (Students must list faculty sponsor first)

Department(s) School of Education Graduate Department

Name	Signature	
1. Dr. Phyllis Chase		Major Advisor
2. Katie Hole		Research Analyst
3. Dr. Dennis King		University Committee Member
4.		External Committee Member

Principal Investigator: Kimberly Kray
Phone: 319.270.7796
Email: kimberlyskray@stu.bakeru.edu
Mailing address: 18766 W 161st Street, Olathe, KS 66062



Faculty sponsor: Dr. Phyllis Chase
Phone: 816.808.1500
Email: PhyllisChase@fbc.bakeru.edu

Expected Category of Review: ___ Exempt ___ Expedited ___ Full

II: Protocol: (Type the title of your study)

The Effects of Collaborative Teams and Data Analysis and Utilization on Student Achievement

Summary

In a sentence or two, please describe the background and purpose of the research.

The purpose of this quantitative study is to investigate the relationship between effective collaborative teams, as defined by Professional Learning Communities, and student achievement as measured by the Kansas Math Assessment. A second purpose of this study is to investigate the relationship between teachers who analyze and utilize student learning data as part of their collaborative team and student achievement as measured by the Kansas Math Assessment. Effective collaborative teams within PLCs simultaneously implement six characteristics to provide a high level of learning for all students and improve student achievement. The analysis that teachers and collaborative teams perform with student learning data is what impacts student achievement. Teachers in District X's elementary PLCs and collaborative teams will be analyzed to examine the relationships between effective collaborative teams, data analysis and utilization, and student achievement.

Briefly describe each condition or manipulation to be included within the study.

There is no manipulation or condition included in this study.

What measures or observations will be taken in the study? If any questionnaire or other instruments are used, provide a brief description and attach a copy.

Will the subjects encounter the risk of psychological, social, physical or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that risk.

Participants will respond to four items from the Critical Issues for Team Consideration survey, and 27 items from Professional Learning Team Data-Literacy Survey, both published by Solution Tree. The researcher added nine items to gather specific demographic information from participants. The survey consists of 40 items and will be administered through SurveyMonkey, an online survey tool. A copy of the survey is attached. Students of the participants will take the Kansas Math Assessment in March or April, which consists of 70 items. Students will complete the assessment on the computer within a two-week time frame. Items from the survey will be paired with assessment results to examine the relationships between collaborative teams, actions performed by collaborative teams to improve student achievement, data analysis and utilization practices, and student achievement.

Subjects will not encounter the risk of psychological, social, physical, or legal risk.

Will any stress to subjects be involved? If so, please describe.

Participants will not be subjected to any stress in the study.

Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.

Subjects will not be deceived or misled in any way.

Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.

There will not be a request for any personal or sensitive information. Student test scores will be in aggregate form.

Will the subjects be presented with materials which might be considered to be offensive, threatening, or degrading? If so, please describe.

Subjects will not be presented with materials that could be considered offensive, threatening, or degrading.

Approximately how much time will be demanded of each subject?

The survey will take approximately 20 minutes for participants to complete.

Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

The population of the study is all third grade teachers in Kansas who are members of a collaborative team that analyzes and utilizes student learning data to increase student achievement within a PLC environment. The sample for the study will focus on elementary schools in District X. Elementary schools in District X include kindergarten through grade 5. The sample will focus on third grade and will include 103 third grade teachers in District X.

The following message will be sent in an email to teachers along with the SurveyMonkey link to complete the survey:

Dear Third Grade Teachers,
 My name is Kimberly Kray and I teach third grade at ~~Redwood~~. I am currently pursuing a doctoral degree in educational leadership through Baker University. I am in the process of writing my dissertation and am in need of your help. My study focuses on the relationships between collaborative teams, actions performed by collaborative teams to improve student achievement, data analysis and utilization practices, and student achievement. Below is a link to a 40-item survey through SurveyMonkey. The survey should take you about 20 minutes to complete and will be available from DATE to DATE.

The purpose of the survey is to gather information about collaborative teams and their actions as well as data analysis and utilization practices to determine what strategies and characteristics are most effective in terms of student achievement. Student achievement will be measured by the 2013 Kansas Math Assessment scores. Your identity will be kept confidential and will not be made part of any permanent records. At the conclusion of the survey, you will have one of two options: provide your name and be eligible for a \$100 gift card to Target as a token of appreciation OR provide your teacher identification number and remain anonymous to the researcher. Your name or teacher identification number will be assigned a number by the Director of School Improvement and Assessment to keep survey results anonymous to the researcher. By completing the survey, you are implying consent for information from your survey to be utilized for my study. Participation is voluntary and you may stop anytime you desire.

Thank you so much for taking the time to help with my study. Your participation is greatly appreciated. If you have any questions please contact me at kkayrw@gladeschools.org or 319.270.7796.

Sincerely,
Kimberly Kray

**What steps will be taken to insure that each subject's participation is voluntary?
What if any inducements will be offered to the subjects for their participation?**

The selected items from the Critical Issues for Team Consideration survey and Professional Learning Team Data-Literacy Survey will be administered through SurveyMonkey and emailed to teachers to complete on their own time. The following statement will be included in an email to participants: *Participation is voluntary and you may stop anytime you desire.*

Participants have the option of including their name at the end of the survey to enter into a drawing for a gift card as a token of appreciation for participating. No inducements will be offered for completion of the Kansas Math Assessment.

How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.

By completing the survey, participants are implying consent to the researcher to use information from the survey. Written consent will not be used as the survey is completed electronically.

Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.

No aspect of the data will be made part of a permanent record that can be identified with the subject in this study.

Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher or employer? If so, explain.

Participation will not be made part of any permanent record available to a supervisor, teacher, or employer.

What steps will be taken to insure the confidentiality of the data? Where will it be stored? How long will it be stored? What will be done with it after the study is completed?

The results of the Critical Issues for Team Consideration survey and Professional Learning Team Data-Literacy Survey from SurveyMonkey will be immediately given to the Director of Assessment and School Improvement in District X. She will assign each teacher a number for the study. The teachers will also be grouped by school, and the schools will be assigned a letter. Once the official Kansas Math Assessment scores are reported, she will also pair the survey results and the assessment results with the teacher's number. She will provide an Excel spreadsheet with the results with numbers to represent participants and letters to represent schools to protect the anonymity of the participants and schools in the district.

The survey results and Kansas Math Assessment data will be kept in the researcher's file cabinet in a folder labeled "confidential." There will not be any names on any data piece held by the researcher to protect the confidentiality of participants. The data will be stored in the file cabinet throughout the duration of the study. Once the study is complete, the data will be kept in a file cabinet with other important documents to the study for five years. After five years, the data will be destroyed.

If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?

There are not any risks involved in the study.

Will any data from files or archival data be used? If so, please describe.

The results from all third grade students on the 2013 Kansas Math Assessment will be used in this study. The results from students of each teacher will be paired with information collected by the items from the Critical Issues for Team Consideration survey and Professional Learning Team Data-Literacy Survey to examine the correlation between collaborative teams, actions performed by collaborative teams to improve student achievement, data analysis and utilization practices, and student achievement.

Survey

For items 1-31, participants rate each statement using the following scale: 1= *not true of our team*; 3 = *our team is working on this*; 5 = *true of our team*

Critical Issues for Team Consideration (DuFour, DuFour, Eaker, & Many, 2010)

1. We have identified team norms and protocols to guide us in working together.
2. We formally evaluate our adherence to team norms and the effectiveness of our team at least twice each year.
3. We have analyzed student achievement data to establish and revise SMART goals to improve upon this level of achievement we are working interdependently to attain. (SMART goals are Strategic, Measureable, Attainable, Results oriented, and Time bound)
4. Each member of our team is clear on the essential learning (knowledge, skills, and dispositions) that students will acquire as a result of our grade level and each topic within the grade level.

Professional Learning Team Data-Literacy Survey (Graham & Ferriter, 2010)

5. Our team has regular conversations about what student mastery looks like.
6. Our team has agreed-upon expectations for mastery on most assignments.
7. Our team has measurable instructional goals for all common lessons.
8. Our team has developed our own set of common assessments that we use regularly (at least monthly).
9. Our common assessments are tied to state standards and are reliable measures of what students should know and be able to do.
10. Our team has developed our own set of common rubrics we can use to score performance-related tasks.
11. Our common rubrics are tied to state standards and are reliable measures of what students should know and be able to do.
12. Our team has established an effective system for recording results from our common assessments.
13. Our team has an effective process for looking at the results of common assessments together.
14. Our team is able to discuss common assessment results in a positive and constructive way.
15. Our team uses graphs and charts to make student achievement trends visible in our conversations about results.
16. Our team makes predictions about student learning based on common assessment results.
17. Our team considers multiple hypotheses and looks for multiple sources of verification before drawing conclusions from common assessment results.
18. Our team changes our instructional practices based on common assessment results.
19. Our team provides remediation and enrichment to students based on common assessment results.

20. Our team celebrates achievements that are highlighted in the results of our common assessments.
21. I feel safe when revealing my common assessment data in front of my peers.
22. Our team uses data as a tool for identifying effective practices rather than as a tool for identifying effective people.
23. Our team has a sense of shared responsibility for the success of all our students.
24. Our team has the skills necessary to collect and manipulate data effectively.
25. I know the difference between and understand when to use aggregated and disaggregated data.
26. I know the difference between and understand when to use formative and summative assessments.
27. Our team respects the confidentiality of students and teachers when looking at data.
28. Our team has looked at our students' standardized exam results.
29. Our team is aware of all the varied populations we serve and looks at results for each of these populations individually.
30. Our team refers to reliable research when we are testing a prediction we have made about student learning.
31. Our team has created systems for engaging students in data collection for self-assessment.

Additional Questions

32. What percentage would most closely approximate the amount of Professional Learning Community (PLC) time you spend on the following activities?
(Response options: 10% or less, 11-20%, 21-30%, 31-40%, 41-50%, 51- 60%, 61-70%, 71-80%, 81% or more)
 - a. Establishing specific, results-oriented goals for learning
 - b. Collaborating and developing common strategies to improve student learning
 - c. Analyzing and monitoring student data
 - d. Developing lists of common essential learning components for your curricular area or grade level
 - e. Developing common assessments for your curricular area or grade level
 - f. Examining student work
 - g. Discussing strategies for differentiating instruction and student interventions
 - h. Creating joint lesson plans
 - i. Sharing expertise in specific areas
33. How often do you collect and display student data (anonymous data) as a motivational method for students? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)
34. How often do you administer informal common assessments? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)
35. How often do you administer common formative assessments? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)

36. How often do you administer summative assessments? (Daily, Weekly, Monthly, Once per Quarter, Once per Semester, Once per Year, Never)
37. What strategies do you use to involve students in the assessment process? (Check all that apply)
- Teachers and students collaborate to create learning goals.
 - Teachers and students collaborate to define the criteria for evaluation.
 - Teachers use strong and weak examples of student work to explain criteria.
 - Students create growth portfolios, learning logs, or data notebooks with evidence of student learning.
 - Students chart learning progress.
 - Students keep a record of learning data to monitor improvement.
 - Students evaluate their own work (in progress) and make adjustments to achieve the learning goal.
 - Students evaluate their own work by identifying strengths and weaknesses.
 - Students evaluate their own work based on defined criteria.
 - Students estimate their own performance by assigning a grade (or symbol).
 - Students communicate learning progress with teacher.
 - Students communicate learning progress with parents.
 - Peer-assessment
 - Students choose assessment task.
 - Students set goals for future learning.
 - Other (Please list: _____)
- (Brown, Rust, & Gibbs, 1994; Deliberations, n.d.; Hattie, 2009; Hawaii Department of Education, n.d.; Sadler, 1989; Stiggins, n.d.; Stiggins & Chappuis, n.d.; Woytek, n.d.)
38. How many minutes per week do you meet with your collaborative team to discuss student achievement? (0-15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, 61 minutes or more)
39. How many years have you been teaching third grade in the Olathe School District? (Include the current school year in your response)
40. Do you currently teach in a Title I school? (Yes or No)



March 11, 2013

Ms. Kimberly Kray
18766 W. 161st Street
Olathe, KS 66062

Dear Ms. Kray:

The Baker University IRB has reviewed your research project application (E-0162-0222-0311-G) and approved this project under Expedited Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

The Baker University IRB requires that your consent form must include the date of approval and expiration date (one year from today). Please be aware of the following:

1. At designated intervals (usually annually) until the project is completed, a Project Status Report must be returned to the IRB.
2. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
3. Notify the OIR about any new investigators not named in original application.
4. Any injury to a subject because of the research procedure must be reported to the IRB Chair or representative immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform Office of Institutional Research (OIR) or myself when this project is terminated. As noted above, you must also provide OIR with an annual status report and receive approval for maintaining your status. If your project receives funding which requests an annual update approval, you must request this from the IRB one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Carolyn Doolittle, EdD
Chair, Baker University IRB

Appendix E: Research Application Request and Approval from District X

Research Application Request-Internal

INSTRUCTIONS:

Please provide the following information so that your project can be considered in relation to district criteria. Allow a minimum of two (2) weeks for completion of the review process.

PLEASE NOTE: Your final application should include submission of the following requirements:

- (1) the on-line application,
- (2) a copy of your Human Experimentation Committee project review and approval (if applicable), and
- (3) a letter from your academic advisor/committee indicating that your research project has been reviewed and approved.

Requirements #2 and #3 can be scanned and sent through email to [REDACTED], inserted into the on-line application in word format, or sent in hard copy format to [REDACTED] at the Instructional Resource Center, [REDACTED].

1. Applicant(s) Name:	<input type="text" value="Kimberly Kray"/>
2. Position:	<input type="text" value="3rd Grade Teacher"/>
3. School/Location:	<input type="text" value="[REDACTED]"/>
Other Location (please specify):	<input type="text"/>
4. Telephone:	<input type="text" value="319.270.7796"/>
5. Email address:	<input type="text" value="kkrayrw@[REDACTED]; kimberlyskray@stu.bakeru.edu"/>
6. Project Title:	<input type="text" value="The Effects of Collaborative Teams and Data Analysis and Utilization on Student Achievement"/>
7. The proposed research is for:	<input type="text" value="Doctoral dissertation through Baker University in Overland Park, Kansas"/>
Other (please describe):	<input type="text"/>
8. Anticipated Dates:	
Beginning Date:	<input type="text" value="March 2013"/>
Ending Date:	<input type="text" value="July 2013"/>
Date Final Report Available:	<input type="text" value="December 2013"/>
9. Participant Description:	
Number of schools involved in the study:	<input type="text" value="34"/>
Number of teachers involved in the study:	<input type="text" value="103 (all third grade teachers)"/>
Number of students involved in the study:	<input type="text" value="0"/>

10. Has the project been submitted to a Human Experimentation Committee?

No

Yes

11. If no, please explain why your project has not been submitted to a committee on human experimentation.

12. Either paste a copy of the letter from the Human Experimentation Committee regarding your study (Word format) below, email a scanned copy to XXXXXXXXXXXXXXXXXXXX@XXXXXXXXXXXX, or send a hard copy to [XXXXXXXXXXXX](#) at the Instructional Resource Center.

Please see attached. Attached is the approval letter from Baker's IRB Committee as well as the cover page with approval signatures from my advisor and research analyst.

13. Brief review of the literature:

PLCs have proved to provide great opportunities to improve student achievement through focusing on student learning, collaborating with teachers, and focusing on results (DuFour & Eaker, 1998). The six critical characteristics of PLCs are: "common mission, vision, values, and goals; collaborative culture; collective inquiry; action orientation; continuous improvement; focus on results" (Mattos, 2008, p. 14). Each characteristic is dependent upon the other, and works simultaneously to improve student achievement. PLCs and collaborative teams will not function at their highest potential if one or more of the characteristics are weak or missing (Mattos, 2008).

The four essential questions developed by DuFour and Eaker (1998) provide focus for collaborative teams within a PLC environment: "What do we want students to learn? How will we know if they've learned it? What will we do if they haven't learned it? What will we do if they've demonstrated proficiency?" (Eaker & Keating, 2012, p. 51). The answer to each question is dependent upon the answer to the previous question. The third and fourth questions are impossible to answer without

14. Major research questions:

1. To what extent is there a relationship between establishing collaborative teams in a PLC environment and student achievement as measured by the Kansas Math Assessment?
2. To what extent is there a relationship between establishing team norms and student achievement as measured by the Kansas Math Assessment?
3. To what extent is there a relationship between the number of minutes per week devoted to collaborative team meetings and student achievement as measured by the Kansas Math Assessment?
4. To what extent is there a relationship between focusing on results as a part of collaborative teams and student achievement as measured by the Kansas Math Assessment?
5. To what extent is there a relationship between collaborative teams establishing learning targets based on standards and student achievement as measured by the Kansas Math Assessment?
6. To what extent is there a relationship between analyzing student achievement data to establish and revise SMART goals and

19. Project Dissemination Plan:

Upon completion of the study and dissertation, I will present my study to a committee through a dissertation at Baker University. The committee is comprised of my advisor, research analyst, a university committee member, and an external committee member. After the defense, I will provide a copy of the study to the Olathe School District.

20. Briefly describe how this research project supports Olathe District curriculum, a district goal, and/or individual school's improvement plan.

This study investigates the relationships between the establishment of collaborative teams, data analysis and utilization, and student achievement, and can benefit the Olathe School District by gaining information from the results, showing which collaborative team and data components have the strongest correlation with student achievement. The results of this study can provide valuable information to staff to use within their collaborative teams to improve student achievement.

21. Please provide a letter from your faculty advisor/committee indicating that the research project has been reviewed and the researcher has met all requirements necessary to conduct the proposed research. You can either paste an electronic copy of the letter (Word format) into this section, email a scanned copy to rlawrence@olateschool.org, or send a hard copy to [rlawrence](#) at the Instructional Resource Center.

Please see attached letter of approval from Dr. Phyllis Chase of Baker University.

22. Any other comments regarding your application?

Thank you for considering this request and assisting in the completion of my doctoral program.

Letter from District X

Dear Ms. Kray,

The research *The Effects of Collaborative Teams and Data Analysis and Utilization on Student Achievement* has been approved from the ~~Chicago Public Schools~~ with the following criteria:

- ~~Mary Mathew~~, Director of School Improvement/Assessment, will serve as the district contact for the project.
- A summary report should be submitted following the completion of your project. Please submit the report to me at the address below or at the email address ~~mmathew@cps.k12.il.us~~.

~~Chicago~~ staff members look forward to working with you throughout the project. If you should have any questions or require any assistance, please contact me at ~~312.755.2222~~.

Sincerely,

~~Mary Mathew~~


~~Mary Mathew~~

Directory of Assessment and School Improvement