A MIXED STUDY OF PROFESSIONAL LEARNING COMMUNITIES AND
STUDENT ACHIEVEMENT

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ABSTRACT

The purpose of this study was to quantify the relationship between the professional learning community model and student achievement. The research design was a mixed study using both quantitative and qualitative data. An analysis of variance (ANOVA) was used to determine the differences in student achievement, as measured by state assessment scores for the years from 2005 through 2008. The data was broken down by grade to better analyze the data, and an ANOVA was run on each grade level individually. The data were entered into the Statistical Package for the Social Sciences (SPSS) statistical program. Interviews with the key informant staff were conducted to place the quantitative data in historical context and to determine if any patterns emerged to help further interpret the data. The ninety-five percent confidence level ($p < .05$) was used as the criterion level for determining statistical significance.

The major finding of the study was that there was no significant difference between the means in the Reading or Math scores in any grade after one year of implementing the PLC model. After two years of implementing the PLC model, grades four and six showed a significant difference between the mean scores in Reading. However in Math, sixth grade was the only grade that showed statistical significance. The results of this study showed statistical and anecdotal evidence to support the statement that when teachers perceive they are increasing their knowledge and skill at doing the work of a professional learning community, the more significant the student achievement gains. Both fourth grade and sixth grade teachers reported they began researching, learning, and implementing the new approach quickly and consistently. Both fourth grade and sixth grade teachers felt that they are far more effective now than they were four years ago, and

the data shows that those changes had statistically significant impacts on their students' achievement during those learning years. By contrast, the fifth grade teachers reported that they felt confused, disorganized, and inconsistent in their efforts with the model initially, and the data shows their efforts did not increase student achievement in statistically significant ways.

DEDICATION

This work is dedicated to my family - to my grandmother, who taught me to follow God and my heart; to my parents, who taught me to believe in myself and persevere; to my husband, who has always seen more in me than I have seen in myself; and to my sons, who are my inspiration. Without their unfailing love, support, and patience all along the way, I could not have seen this marathon through to the finish line. I hope I have made them proud.

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CHAPTER ONE

INTRODUCTION

Today's educators are finding themselves in an era of high-stakes testing and

increased accountability that is forcing even the most experienced, effective teachers and

school administrators to explore new ways to enhance student learning. Supporting this

idea, Darling-Hammond and McLaughlin (1995, p. 76) write, "The vision of practice that

underlies the nation's reform agenda requires most teachers to rethink their own practice,

to construct new classroom roles and expectations about student outcomes, and to teach

in ways they have never taught before."

In addition to the increased pressure from the federal government on schools and

teachers to prove their effectiveness - in the form of the No Child Left Behind legislation

(NCLB Act of 2001) – schools still have to find answers to the questions concerning how

to meet the needs of Special Education students, migrant students, students with behavior

challenges, and how to prevent school violence. Many strategies, from Differentiated

Instruction to Total Quality Management, have been implemented in schools across the

nation in the hope that one will be the magic bullet that solves all of the educational

community's challenging dilemmas. As expected, no one strategy has been found to

completely address the question of how to best increase student achievement, and once

accomplished, how to continually improve instruction to maintain high levels of learning

and teaching. One approach that has emerged to address this need is the model of

Professional Learning Communities (PLC).

Pioneered by Peter Senge, in his book *The Fifth Discipline* (1990), and refined by

Rick DuFour and Robert Eaker in their book *Professional Learning Communities at*

Work (1998), the PLC model provides a systematic framework for consistently evaluating

student work and teacher effectiveness, as well as establishing an environment where

adaptability and a willingness to learn and improve is the foundation for on-going

collegial interaction. The PLC model has quickly become the new way to "frame"

instructional practice, and educators are hopeful that this will be the unifying vision for

which education has been looking. Furthermore, educational researchers, like Darling-

Hammond and Richardson, feel job-embedded professional development will produce

more highly effective teachers than the traditional "sit and get" model of professional

development (2009). In addition, by continually collecting student data, in the form of

test scores, observations, and performance assessments, teachers will produce more data-

driven instruction, resulting in greater student achievement. Empirical evidence for this

link has already been found in the work of Susan Bigger on the relationship between

classroom literacy assessments and their ability to predict performance on a state test at

the elementary level. The results showed that there is a relationship between the

classroom assessments that educators use and student achievement on state tests;

however, these same teachers may not be using this data to drive their instruction because

they continue to work in isolation and are not given the opportunity to collaborate on

assessing student data (2006). This finding is further supported by the work of Darling-

Hammond and Richardson, who state, "Research points to the effectiveness of sustained,

job-embedded, collaborative teacher learning strategies," (2009, p. 52).

Clearly, as suggested by Banta, "The tests K-12 teachers value are not the high-

stakes state exams, but those that match their teaching objectives and tell them

immediately where learning is effective and which students need to improve which

skills," (2007). In the scientifically research-based climate of twenty-first century education, professional educators prefer evidence that shows the professional learning community model will produce the environment needed to bring about the desired student achievement outcomes. Research, such as the work conducted by Stefanie Capps, shows that when the model is implemented, student achievement improves. This research provides a strong rationale for principals to invest time and resources in this model (2005). Furthermore, additional research has shown that teachers and their respective principals who perceive themselves to be high-performing schools and perceive that they are operating at a higher level of implementation of the professional learning community model than other schools actually have greater student achievement than schools who perceive themselves to be low-performing schools operating with a lower implementation level of the professional learning community model (Dougherty, 2005).

Based on these intriguing research studies and a careful review of the literature, this study was a mixed study. This study used quantitative data analysis to observe if there was a statistical basis for a connection between the professional learning community model and increased student achievement. Qualitative data in the form of interviews with the staff was gathered to place the quantitative data within the historical context of the school. This will aid in interpreting the results of the clinical research study.

Problem Statement

An abundance of research has been conducted on the topic of professional learning communities. Most of the research focuses on how educators perceive the PLC model to be working in their respective schools, such as the work of Kathy Dodd who conducted a

case study of one school in Oklahoma to determine if establishing a professional learning community was a realistic strategy for addressing accountability concerns. Her research showed that student learning was strongly influenced by the development of the professional learning community model and served as a way to focus the teachers' conversations on student achievement through collaboration, common assessments, data analyses, and reflection (Dodd, 2006). In a different case study, conducted by Karrie Allen, the researcher sought to answer the question of whether participation in a professional learning community affected teachers' instructional practices. The results showed that when teachers participated in a professional learning community model, they came to value the process of examining student work and the dialogue that resulted as they sought to better meet individual student needs (Allen, 2005).

Other researchers focused their observations and reflections on topics such as how well the PLC model is implemented in their schools (Chan-Remka, 2007), the perceptions of teachers and administrators regarding the factors that promote teacher collaboration (Fisher, 2008), or whether there is a difference between the perceptions of elementary teachers versus middle and high school teachers with regards to their perceptions of being a professional learning community and their personal sense of efficacy (Grider, 2008).

Still other researchers have studied just what a PLC is and what it isn't, identifying characteristics, such as collective commitments and goals and cooperative investigation, that brought about the successful development of a professional learning community in two schools in Maryland (Spiegel-Stroud, 2007).

Researchers also began to study the PLC model from a more quantitative perspective. One such study, by Vanessa Bunker, utilized ANOVA analyses to determine correlations between teacher value, teacher skill, and increased student achievement in reading, math, and writing. Results showed that teacher value of the collaborative skill process had no relationship to academic achievement or student growth in reading or math. However, teacher skill in the collaborative process correlated significantly with student achievement in reading and math. In another study, Don Michael Furjes examined the relationship between the implementation of a comprehensive school portfolio – a compilation of student work that replaces traditional report cards - and the degree to which administrators and teachers perceived their school to be functioning as a professional learning community. The study utilized survey procedures and an ANOVA was used to analyze the survey data. The analysis of the responses showed evidence that the stage of the implementation process at which a school is currently involved has an influence on the level at which the staff perceives itself to be functioning as a professional learning community. The results also showed that the longer a staff works towards a common goal, the more profound their work becomes (Furjes, 2003).

Purpose of the Study

The purpose of this research study was to discover whether a statistically significant link between student achievement and the professional learning community model could be observed through a quantitative analysis of student state assessment data. This study was a mixed study, using both quantitative and qualitative data, conducted at one school, Bradley Elementary, in one district, USD 207, in Ft. Leavenworth, Kansas, where the

school has been using the professional learning community model since 2005. The idea

for this study emerged because the researcher has been a participant in this process as a

teacher at Bradley Elementary from the introduction of this model to the current day.

This study compared Bradley's student Kansas State Assessment test scores in

Reading and Math for each year from 2005 to 2008. The data were analyzed to

determine if there was a statistical link between the professional learning community

model and student achievement.

<div align="center">Significance of the Study</div>

The importance of the study lies in its emphasis on quantitative data analysis. The

results of this study will inform and direct the future teaching and learning at Bradley

Elementary School based on historical data generated by the district's students and staff

members during the years of 2005 through 2008.

In a review of the literature spanning from 1980 to the present day, the researcher

found that over 200 scholarly journal articles and research studies have been written on

either individual pieces of the Professional Learning Community model or on qualitative

factors, such as emphasizing how well the model was implemented, how well the

teachers and administrators thought they were doing implementing it, or how educators

felt about participating in a PLC in their own school. In a research study conducted by

Rebecca Good in 2006 and published by Texas A&M University, the researcher

conducted a quantitative, causal-comparative study to examine the relationship between

using the Data Collaborative Model (DCM) – similar to the PLC model in focus and

purpose - and student achievement through the Texas Essential Knowledge and Skills test

(TAKS) passing rates in math and reading. The rationale was that campuses that

attempted to create and implement a culture of data-driven decision making using this model over a three-year period of time would see an increase in teacher effectiveness which would lead to an increase in student achievement (Good, 2006). The results showed there was a statistically significant difference found to exist between the DCM approach and student achievement gains on the TAKS math assessment. However, the study found no statistically significant difference in the TAKS passing rates between the DCM approach and student achievement gains on the TAKS reading assessment. Furthermore, the study showed that high implementation campuses - campuses that implemented the DCM model with a higher degree of efficacy than other schools implementing the DCM model - had higher TAKS passing rates and mean gains than low implementation campuses, or campuses with a lower degree of implementation efficacy than other schools implementing the DCM model (Good, 2006).

Based on these intriguing results, this study contributes to the body of knowledge on this subject while establishing a quantitative database for further statistical analysis and research on the possible links between the PLC model and student achievement.

Background and Conceptual Framework

Population and Sample

The Fort Leavenworth school district, USD 207, is located on the military post of Fort Leavenworth in Leavenworth, Kansas. The student population is comprised of dependents of active-duty military personnel attending the Command and General Staff College (CGSC), the dependents of retired military personnel, the dependents of Department of Defense (DOD) civilians, and those families attached to the post through the Military Police battalion stationed on Fort Leavenworth or personnel attached to the

Disciplinary Barracks.   The staff sample was drawn from the currently employed, certified teachers who teach at Bradley Elementary and who have been teaching in one of the four grades this study focused on during the years of 2005 to 2008. All of these teachers are licensed teachers in the state of Kansas and all hold a professional level license. All of the teachers interviewed hold a Masters degree in Education, and all have participated in professional development opportunities regarding the professional learning community model through the school district.

Conceptual Framework

The student population is a highly mobile population, moving every one to two years due to military orders that assign parents to new duty stations. The district has an annual turnover rate of 70% each year. This means the student population that returns and stays for more than one year is only 30%. This situation creates a clean slate effect for the schools, resulting in very little cumulative effect of teaching strategies or interventions carried over from one year to the next. Each year teachers start school with less than 25% of their class having been at the school the year before. Although this makes a unique and interesting environment for conducting research, it is a constant challenge for the school to continue to produce high student achievement scores year after year with such a widely varying student population coming to them each August.

Although this study only makes statements about this specific population, and the results only make reference to this one district in Kansas, this study could have implications for school districts impacted by the military, Department of Defense Dependents Schools (DODDS), and school districts with high student turnover rates each year, and school districts who serve highly mobile populations. This study's results

might be extrapolated to shed light on how to counter such challenges as the stresses of war and deployments on military dependents and how military impacted schools address the unique challenges brought about by this particular population.

As displayed in Table 1, Caucasians are the largest ethnic group represented at Bradley Elementary and USD 207. However, the district and building percentages for this group are lower than the state of Kansas' percentages. Contrarily, the African-American population is slightly higher at Bradley Elementary and USD 207 than the state percentage numbers. Again, the Hispanic population is lower, both at the district and school level, than the state percentage, but the Other group, primarily made up of Pacific Islanders, Native Americans, and Asians, have more of a representation in USD 207, both at the district and building level, than is seen throughout the state of Kansas as a whole (KSDE, 2008).

When looking at the category of Economically Disadvantaged, the district and the building have only a third of the state's average representing this group. Furthermore, although the military community is highly mobile, it is not considered migrant, and both the school and the district do not report any students representing this group. The state of Kansas did not provide any statistics for the state as a whole in this category (KSDE, 2008).

Table 1

Demographic Percentages for 2007-2008 by Race / Ethnicity

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Race	State	District	Building
Caucasian	71.6	66.8	66.1
African-American	8.0	13.5	12.1
Hispanic	12.7	3.0	2.8
Other	7.7	16.8	19.1

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Kansas State Department of Education. (2008) Retrieved from
http://online.ksde.org/rcard/print_report.aspx

Both USD 207 and Bradley Elementary have about 3% of their total student

population considered to be English Language Learners or ELL (KSDE, 2008). Part of

this percentage comes from the regular immigration of people from other countries;

however, most of the school's and the district's numbers come from the students of

foreign officers who come to Ft. Leavenworth to attend Command and General Staff

College as a representative of their country's military.

The last demographic group represented is the students with disabilities category.

Although USD 207 as a district is very similar in percentages to that of the state of

Kansas as a whole, Bradley Elementary has about 2% higher than those averages (KSDE,

2008).

Table 2

Demographic Percentages for 2007-2008 by Economically Disadvantaged

Category	State	District	Building
Economically Disadvantaged	38.7	9.9	10.6
Migrant	0.0	0.0	0.0
ELL	8.1	3.0	3.6
Students with Disabilities	13.2	13.7	15.3

Kansas State Department of Education. (2008) Retrieved from
http://online.ksde.org/rcard/print_report.aspx

Because the district's clientele is military, the student turnover rate at the school

averages 70% each year. Furthermore, the high mobility of these students creates a

situation where students' abilities upon entering the school are wide-ranging and their

needs are extremely varied. The school must take the students where they are

academically and advance them along the academic continuum for as long as they are

students at the school. This situation has been one of the driving forces behind the

district's adoption and implementation of the professional learning community model as

it continues to seek out efficient and effective ways to meet this on-going challenge,

utilizing research-based best practices and emerging educational research data.

Delimitations

The sample is limited only to those students in grades three through six from Bradley

Elementary school located within the Fort Leavenworth School District (USD 207) in

Fort Leavenworth, Kansas, during the years of 2005 through 2008, representing

approximately 1100 students.   This study makes observations and draws conclusions

based on the data analysis that was conducted on this specific sample of students. The

results apply to this one district in Kansas. However, the implications of the results

might have relevance to other school populations, such as other school districts impacted

by the military, other schools located on military installations, school districts with high

student turnover rates each year, and school districts who serve highly mobile

populations.

An additional delimitation is the source of the student achievement data for the years

2005 to 2008. The source used for this data analysis was the Kansas State Assessment in

Reading and Math, the annual state tests given to all students in grades three through

eight in Kansas. This test is particular to Kansas, although its content is based on the

suggested national standards in reading and math developed by the federal Department of

Education (KSDE, 2008).

Assumptions

The first assumption is that the professional educators and school administrators at

Bradley Elementary School have gone through professional development sponsored or

endorsed by Solution Tree, Association for Supervision and Curriculum Development

(ASCD), or other reputable professional development organizations offering professional

material on Professional Learning Communities (PLC) and how to implement and

practice this model consistently and effectively in the school. Another assumption is that

professional development over the last five years in this school has focused on

supporting, refining, and improving the knowledge base of both the professional

educators and the administrative leaders within this district on the topic of professional

learning communities. A final assumption is that all professionals involved in this model within this particular school are implementing and using this model consistently to the best of their abilities and with a high degree of efficacy.

<div align="center">Research Questions</div>

There were four research questions in this study:

1. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for one year?

2. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for two years?

3. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for three years?

4. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for four years?

<div align="center">Definition of Key Terms</div>

Student Achievement / Performance – Performance standards clearly define what student work should look like at different stages of academic progress and for diverse learners. They describe how good is good enough in reaching the content standard (Goals 2000: Reforming Education to Improve Student Achievement, 1998).

Experience – The observing, encountering, or undergoing of things generally as they occur in the course of time. The knowledge or practical wisdom gained from what one has observed, encountered, or undergone (www.dictionary.com).

Teacher effectiveness – Defined as a teacher's level of ability to teach the tested material in such a way as to improve student scores on standardized tests from the test's first administration to its last administration within a single year (Sanders & Rivers, 1996).

Certified teachers – Defined as teachers who hold a valid, current teaching license from the state in which they work and practice their profession (KSDE, 2008).

Uncertified teachers – Defined as those individuals who hold an emergency license or other temporary license that allows them to teach classes if they have credentials that meet specific state requirements. These documents are usually issued for a short duration of time with the intention being that the individual will seek further education to meet the missing requirements before the temporary license expires, thereby becoming a certified teacher (KSDE, 2008).

Professional Learning Community – Defined as a group of individuals working in collaborative teams to assess student learning and program effectiveness as a systematic, timely, data-driven, job-embedded form of professional development that is results based and focused on continuous improvement for both students and teachers. (DuFour, 2006).

Professional development – Defined as the continuing education of professionals in order to maintain high levels of performance and to insure that current practice incorporates and utilizes current research in the daily execution of the job. Professional Development prepares educators to understand and appreciate all students; create safe, orderly, and supportive learning environments; and hold high expectations for their academic

achievement while deepening educators' content knowledge and providing them with

research-based instructional strategies to assist students in meeting rigorous academic

standards (http://www.nsdc.org/standards/index.cfm).

Deployment – Defined as the placement of military troops and equipment in the field; the

movement of operational forces to a battle or engagement zone; the relocation of

personnel and equipment (Answers.com/Military dictionary, 2007).

High mobility – Defined as the frequent moving of students and their families from one

school to another. For this study, the definition will focus on children of military families

who move because of official orders to the military member to change location. This

applies to 35% of all active-duty military children who change schools at least one time

per year due to the active military member's transfer to another location (Smrekar,

Guthrie, Owens, & Sims, 2001).

Methods Overview

The research perspective for this study took a scientific approach. This study sought

to quantify the relationship between the professional learning community model and

student achievement. The research design of this study was a mixed study using both

quantitative and qualitative data. For the quantitative data, an analysis of variance

(ANOVA) was used to determine the differences in student achievement, as measured by

state assessment scores for the years from 2005 through 2008. For the qualitative data,

interviews with a sample of the staff were conducted to place the quantitative data in

historical context and to determine if any patterns emerged to help further interpret the

data.

The student sample came from those students in grades three through six from Bradley Elementary, one of the three elementary schools in the USD 207 School District. The staff sample of seven was drawn from the current twenty-four employed, certified teachers who teach at Bradley Elementary and who have been teaching in one of the four grades this study focused on during the years of 2005 through 2008.

There were four research questions in this study. The data collected were provided to the researcher by the Deputy Superintendent in charge of Instruction for the USD 207 School District. The data were entered into the Statistical Package for the Social Sciences (SPSS) statistical program with careful checking for accuracy. The staff interview data were collected and compiled in Summaries by grade level. Responses were coded and analyzed for patterns, themes, or constructs.

Summary

In conclusion, this research study, although small and focused in scope and research design, attempted to lay a statistical foundation for quantifying the relationship between the professional learning community model and student achievement. The study answers the fundamental question of whether or not there was an increase in student achievement in reading and math over a four year period of time due to the implementation of the professional learning community model. The scientific method was the guiding research perspective as the researcher explored these research questions.

Organization of the Clinical Research Study

Chapter One introduced the background to the study, the problem statement, the purpose of the study, and presented an overview of the methodology, describing the research questions, delimitations, assumptions, and terms used throughout the study.

Chapter Two contains the literature and research that has already been done in this field of study, telling the story of how this particular study came into being and why it can build on the body knowledge already established by the educational community. Chapter Three presents the Methodology used in this study, including the research design, the selection of the sample, the data collection procedures, and the bias or error that is anticipated in this research study. The results of this research are found in Chapter Four. The final chapter is Chapter Five, and that provides a discussion of the results as well as implications and recommendations for further research studies to be done on this topic.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

The conceptual framework for this literature review is based on the considerable

body of research conducted over the last twenty years pointing to teacher effectiveness as

being the one variable over time shown to have the greatest impact on student

achievement (Hanushek, Kain, & Rivkin, 1999; Goldhaber, 2002).   To act upon this

finding, the field of education has studied ideas from the field of business in an effort to

better understand what "effectiveness" means in terms of student achievement and

modern educational practices. Some of the models that have been explored and

translated into the educational world include Peter Senge's *The Fifth Discipline* (1990),

Total Quality Management (Deming, 1982), and ADDIE, which is the generic term for

the five-phase instructional design model consisting of Analysis, Design, Development,

Implementation, and Evaluation, where each step has an outcome that feeds into the next

step in the sequence. There are probably over 100 different variations of the generic

ADDIE model (Dick & Carey, 1996).

At the heart of this quest is the desire not to just improve student test scores, but to

base those academic gains on research-based practices and instructional models proven to

truly increase learning for students in the 21st century. Over the last decade, professional

learning communities have been the focus of a considerable amount of qualitative

research and scholarly articles. A considerable body of evidence regarding the success of

collaborative models comes from anecdotal reports or qualitative studies on teachers' and

administrators' perceptions about whether they are implementing the model correctly

(Ricketts, 2008; Montgomery, 2007; Haas, 2005) or whether they feel it is having a positive effect on student achievement or not (Garcia, 2004; Garcia, 2005). Ironically, while the professional learning community model emphasizes data collection and analysis, there is a smaller amount of quantitative data on the effectiveness of the professional learning community.

A smaller body of evidence has been collected with a quantitative approach. Empirical evidence for this link between professional learning communities and student achievement has been established in the work of Susan Bigger on the relationship between classroom literacy assessments and their ability to predict performance on a state test at the elementary level. The results showed that there is a relationship between the classroom assessments that educators use and student achievement on state tests; however, these same teachers may not be using this data to drive their instruction because they continue to work in isolation and are not given the opportunity to collaborate on assessing student data (2006). Other quantitative research, such as the research conducted by Stefanie Capps, shows that when the model is implemented, student achievement improves (Capps, 2005). Moreover, Vanessa Bunker conducted research utilizing ANOVA analyses to determine links between teacher value, teacher skill, and increased student achievement in reading, math, and writing. Results showed that teacher value of the collaborative skill process had no relationship to academic achievement or student growth in reading or math; however, teacher skill in the collaborative process correlated significantly with student achievement in reading and math (Bunker, 2008).

This review of the literature begins with a summary of the historical continuum that makes up the development of the current professional learning community model. The

review continues with a summary of the research conducted on the subject of teacher and school effectiveness, and then relates this research to the partnership that was forged between the world of education and the world of business. The review then briefly explains the work of Peter Senge entitled *The Fifth Discipline,* before it moves into an explanation of Total Quality Management, Collaborative Leadership, and finally, Professional Learning Communities. The chapter concludes with an overview of the research that has been conducted on the relationship between the professional learning community model and student achievement. Finally, the review summarizes the most recent statistical research conducted on the subject and how that has guided this clinical research study.

To understand how and why the field of education has embraced professional learning communities as the best way to enhance teacher effectiveness in the classroom and increase student achievement, it is necessary to go back to 1980 and the first evaluation that was done on the state of the modern American education system.

<div align="center">The Search for Greater Student Achievement – A History</div>

A Nation at Risk

In the 1980's, research suggested that the United States was slowly losing its ability to compete in world markets against such countries as Japan and Germany. The blame for this startling suggestion was placed squarely on the American public school system and presented in *A Nation at Risk*, a groundbreaking report sponsored by the U.S. Department of Education. The report presented research and data to show why the Department of Education felt that the poor academic quality of the American public schools was leading to lower productivity than that of our global competitors, and how

this poor quality was contributing to the decline of the United States' technological edge in the world (National Commission on Excellence in Education, 1983).

However, unlike previous reform proposals, *A Nation at Risk* did not advocate an increase in federal funding. Instead, the report's conclusions pointed to the need for states and local communities to increase academic standards, to improve the quality of teachers, and to reform the curriculum so that the curriculum better met the needs of the nation (Spring, 1990). This report was the start of a chain of events which have lead to the United States' current fixation on school improvement and increased student achievement.

Goals 2000

After *A Nation at Risk,* students did make improvement in academic achievement, but it was not significant enough for the federal government. Research conducted by the Department of Education found that a gap remained between Caucasians and Blacks, and the gains in math and science were not as great an improvement as those attained in reading (Goals 2000, 1994). The *Goals 2000: Educate America Act of 1994* was passed to "improve student learning through a long-term, broad-based effort to promote coherent and coordinated improvements in the system of education throughout the Nation at the State and local levels" (Title III, Sec. 302). Although this act helped to keep the media's eye on the education issue, there were no new plans or proverbial road maps provided on how the American public school system was going to accomplish this lofty goal. Some suggestions made by former President Clinton at the National Governor's Association meeting in February 1999 included ending social promotion, providing parents with

annual report cards on school performance, and establishing effective discipline policies (Clinton, 1999).

Picking up this challenge, educational researchers set out to learn more about how children learn. In so doing, they have added substantially to the body of knowledge on all aspects of learning. Armstrong conducted research on the physiology of the brain and on the multiple intelligences (Armstrong, 1994), and Erlauer conducted research on how brains learn (Erlauer, 2003). Additionally, Robert Marzano conducted research on the teaching practices that produce the best results for increased student learning. He has as also researched which areas of teaching and learning have the greatest positive impact on student achievement as measured by standardized tests (2003). However, this body of knowledge mentioned above took ten years to compile.

No Child Left Behind 2001

Meanwhile, the legislation and federal mandates continued. The *No Child Left Behind Act of 2001* purported its purpose to be "to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging state academic achievement standards and state academic assessments" (Sec. 1001). The comprehensive act included such areas of focus as increased accountability of schools for results, making the closing of the achievement gap a priority, and increasing professional development to instruct teachers on teaching methods that have been scientifically proven to work (Marzano, 2003). The way the government was going to guarantee that schools were implementing these mandates was the additional accountability measure of Adequate Yearly Progress (AYP) that would be measured at the end of each school year (NCLB, 2001).

No Child Left Behind 2002

The *No Child Left Behind Act of 2002* took accountability a step further and streamlined the legislation's intent to apply to all schools without modifications. The legislation's primary intent was still to ensure that all children were achieving at high levels and were able to demonstrate this achievement at a proficient or above level on challenging and comprehensive state tests. AYP was then measured by a school's performance on these state tests. Schools failing to meet AYP were to be subjected to state and local scrutiny and placed on a public list of poorly performing schools. The state would closely monitor schools needing improvement. Those failing to show improvement after two years would face the threat of closure or loss of federal funding (NCLB, 2002).

As the stakes for failing in the business of education became higher, the stress and pressure on the American public education system increased, trickling down to every school district, building, and classroom across the United States. The need to find the most effective and efficient way to educate students to a high level of achievement no longer was a fond academic wish but a necessity. However, as noted by educational researcher Michael Fullan, "Educational reform will never amount to anything until teachers become simultaneously and seamlessly inquiry oriented, skilled, reflective, and collaborative professionals" (Fullan and Stiegelbauer, 1991, p. 326). The search for how to transform schools, students, and teachers was on. Meanwhile, other educational researchers went about solving the nation's education problems from a different angle. Another group of researchers began looking at the factors that influenced student achievement, testing variables individually and in different combinations to determine the

formula for creating a high-achieving classroom and therefore high-achieving students. Among the topics researched were teacher effectiveness, Total Quality Management, and Collaborative Leadership.

Researching Effectiveness

Educational researchers had long been researching the question of what constitutes quality teaching and learning. One finding the research confirmed repeatedly was that high-quality teachers positively affect student performance (Hanushek, Kain, & Rivkin, 1999, Goldhaber, 2002; Goldhaber & Anthony, 2003). Furthermore, research studies were finding a high correlation between teacher effectiveness and student achievement (Darling-Hammond, 1999; Goldhaber & Brewer, 1996; Greenwald, Hedges, & Laine, 1996). Therefore, professional educators and educational researchers found it logical to assume that if one could improve teacher effectiveness, then one would improve student achievement at the same time (Darling-Hammond, 1999). However, the belief that teacher effectiveness was the basis of student achievement, or lack thereof, was not without its skeptics.

Through a meta-analysis, Hanushek (1986) reviewed one hundred nine research studies on the effects of teacher experience, long believed to be the benchmark of effectiveness, and concluded that fewer than half of the research studies showed teacher experience as having any statistically significant effect on student achievement. Building on this line of research, Walsh (2001) conducted his own meta-analysis of one hundred fifty research studies going back over fifty years. In the end, he took Hanushek's conclusion a step further, concluding that the research did not even show certified teachers as being more effective than uncertified teachers. Walsh also concluded that a

license does not always equate to an effective, high quality teacher (2001). Although the original reports have since been widely criticized for their faulty methodology (Goldhaber, 2002), they nevertheless represent a large segment of the educational community that believes teacher effectiveness cannot be legislated or produced systematically like products on an assembly line.

Researchers agree that most of the current research data show a positive relationship between teacher quality and student achievement (Darling-Hammond & Youngs, 2002; Rowan, Correnti, & Miller, 2002). Researchers are cautious in their conclusions, and they are quick to point out that teacher effectiveness is not the sole predictor of student achievement. Other variables can influence student achievement, such as the demographic make-up of the school, family income level, teacher attitudes, professional development, and the level of commitment to continuous improvement by students and professionals alike. All have a role to play in student achievement (Goldhaber & Brewer, 1996). In addition to these variables, another stress emerged in the form of increased pressure from the federal government on schools and teachers to prove their effectiveness with the revised No Child Left Behind (NCLB) legislation of 2003, 2004, and 2006. This left schools continuing to struggle to find answers to questions concerning how to meet the needs of Special Education students, migrant students, students with behavior challenges, and students who perpetrate school violence while still meeting the academic requirements of all the NCLB revisions.

Armed with the knowledge that teacher effectiveness might be a key ingredient in student achievement, the field of education set out to do some research on how the business world addressed the subject of effectiveness in terms of production quality and

out-put. Strategies, from Total Quality Management, Collaborative Leadership theory, and Systems Theory, have all been explored, researched, and sometimes adapted for use in schools in an effort to think outside of the educational box and find a better approach to increasing student achievement. As expected, no one strategy was found to completely address the question of how to do this effectively. However, two topics - professional development and collaboration – continued to appear in the writings about these business models.

Researchers, like Arbogast, knew that previous research had linked student achievement to professional development, and the results of the research found that professional development needed to be more supportive of teacher learning to positively affect school culture and therefore increase student achievement (2004). In a related study, Ladwig's research results demonstrated a need for increased professional development as teachers try to address issues that arise as a result of increased collaboration. Based on this research, it appeared that professional development needed to be different than it had been in the past if collaboration was going to be increased (2007).

Continuing the search, educational leaders began asking the business world what it needed in the form of employable workers. The business world came back with recommendations for increased math and language skills with more of an emphasis on writing and effective communication, as well as being able to problem solve and think creatively (Borek, 2008). Although teachers had been teaching these very subjects for decades, somehow student achievement had not met the business world's current needs nor had it shown any signs of improvement (Spring, 1990). The academic achievement

of high school graduates was slowly drifting backwards. The question was why. The business world suggested that if education was doing what it had always done, and the educational community was no longer getting the results it wanted, then it was time to reconsider the manufacturing method – or in this case, the manner in which educational business was being conducted on a daily basis. Perhaps it is not the students who are becoming less intelligent, but rather the method of teaching and assessing the students that is out of step with society's new demands. Perhaps the way teachers and school districts do business needs to be reconsidered or redesigned (Seed, 2008). In other words, the proverbial manufacturing plant needs to be retooled in order to produce an improved, modern version of its original product by implementing new technology, innovative research, and customer demands. The business world suggested education look to systems theory for inspiration on how to start retooling the work of the public school system.

The Fifth Discipline

Named "Strategist of the Century" by the *Journal of Business Strategy,* Peter Senge in his book *The Fifth Discipline*, built upon the business world's work on systems theory. Peter Senge expanded this work into a vision of a learning organization that positively impacted the business world (Smith, 2001). From there, Senge went on to write another book, *Schools that Learn: A Fifth Discipline Fieldbook for Educators, Parents, and Everyone Who Cares About Education,* translating his ideas and his vision of a learning organization to the educational world. In this book, he outlines and defines five disciplines: personal mastery, mental models, shared vision, team learning, and systems thinking. In order for this transformation to take place, all the members in the

organization must voluntarily accept this new way of thinking. Once this shift has taken place, the organization can move forward on a process of continual improvement and lifelong learning (Smith, 2001).

The first discipline is personal mastery. In order for the organization to grow, improve, and learn, every member of the organization must be involved in a program of continuous learning. Without personal mastery at an individual level, the organization will not collectively grow and move forward (Kent, 2004). Although it is no guarantee that the organization will learn and grow just because its members do, it is a certainty that the organization will not grow if its members are not continuing to learn. Personal mastery also encompasses the belief that skills alone do not equate to mastery, but should reflect an individual's deepening understanding of his or her own personal vision, ethical commitments, professional expertise and knowledge, and desire to continuously improve (Smith, 2001).

The next discipline is mental models. Senge describes mental models as "deeply ingrained assumptions, generalizations, or even pictures and images that influence how we understand the world and how we take action" (Senge, 1990, p. 8). This reality can be seen every day and in every aspect of daily life. Two people can see the exact same situation and yet interpret it in two entirely different ways, based upon their learned notion of how things are or ought to be. Senge challenges educators to look at problems, situations, or data without a filter; let the facts point to a conclusion rather than looking at the facts and seeing what one wants to see (Senge, Cambron-McCabe, Lucas, Smith, Dutton, & Kleiner, 2000).

Another discipline involves the organization having a shared vision. Although it is important for an organization's leader to have a vision, that vision should originally come from the members of the organization itself, according to Senge, et al (2000). In order for this vision to be attainable and real, all stakeholders must have input into its creation. In education, this includes the administrators, the teachers, the classified staff, the parents, the community, and the students themselves. Once the vision is established, the members feel more of a commitment to the organization and to each other in order to fulfill their shared dream. They are more encouraged to think creatively and to experiment in order to find the best way to achieve their collective goal. Enthusiasm builds as success is attained and shared throughout the organization, creating a momentum of energy and excitement about the process and the work itself (Smith, 2001).

The fourth discipline is team learning. Senge (1990) states, "The discipline of team learning starts with 'dialogue', the capacity of members of a team to suspend assumptions and enter into a genuine 'thinking together' (10). Educational teams discuss and share their thoughts about student assessments, teaching methods, and student growth. The caution here is to not become involved in 'group think', the situation where a team feels compelled to agree to a course of action because they are a team and don't want to be disloyal, rather than because it is the right thing to do (Schultz, 1999). The courage and trust it takes to disagree with one another while still remaining respectful and supportive of each other is the hallmark of a healthy team learning environment (Schultz, 1999).

However, the fifth discipline – systems thinking – is the foundation of any learning organization because it provides the framework of thought for the other four disciplines (Senge, 1990). In a nutshell, if someone makes a change in one part of the system, it will

have a ripple effect somewhere else in the system. Understanding how changes affect the big picture of the entire grade level, building, and district helps educators to make thoughtful and effective changes to the system rather than acting alone and producing sometimes incoherent results. Senge suggests that instead of becoming good at 'putting out the fires', schools need to spend time learning how to prevent them from happening in the first place (2000). This purposeful and thoughtful approach is a real shift away from the day to day practice of most school systems, but in the long run, it will improve the school's ability to respond and support its clientele as well as its staff (Senge, 2000). Senge's work easily made the transfer from the business world to the educational world, and as it did so, the term 'learning organization' changed to 'learning communities' to encompass a broader audience (Smith, 2001).

Building on Senge, Sergiovanni's work on communities of learning and the importance of moral leadership within such a community, at all levels of its operation, made this concept a viable and exciting way of doing the business of educating students (1992). However, the question remained on how to make this way of thinking a workable and systematic process for educators to engage in on a daily basis. An idea came once again from the business world.

Total Quality Management

Total Quality Management (TQM) is the work of W. Edwards Deming, who is looked upon as the founder of the theory. His vision provided the road map for post-World War II Japan to reestablish its manufacturing industry with Statistical Process Control (SPC) and Total Quality Management (TQM). In 1982, Edwards Deming

published "*Out of the Crisis*" identifying 14 points for management which, if applied, would enable Japanese manufacturing efficiencies to be realized (Deming, 1982).

Even though Deming's theory was developed primarily for use in the business world, American educators adapted it to meet their own professional needs. Indeed, the five factors that define the actions of the effective leader for this theory share many similarities with the basic components that now make up a Professional Learning Community. The five factors found in Total Quality Management are: change agency, teamwork, continuous improvement, trust building, and eradication of short-term goals (Marzano, Waters, & McNulty 2005).

This leadership theory model is a powerful way of doing the "business" of educating. Change agency requires leaders, both administrative and staff, to stimulate change in their groups, eliminating routines and practices that get in the way of change and progress.   Teamwork and trust building require compassion and responsibility on everyone's part as teams become more dependent upon one another and collectively accountable for their results.   Continuous improvement requires drive and vision to sustain the teams. If continuous improvement is the common goal, the goal will not be reached without the drive of leaders to inspire each other when the going gets rough. In this model, the going will be rough; change and continuous improvement creates a certain amount of anxiety as people risk trying new things and dare to be innovative. This management model places considerable responsibility on the shoulders of the organization's leaders, and it requires them to be held accountable for their actions (Marzano, et al, 2005). As noted by Ogden and Germinario and summarized by Anthony Normore, a group needs a vision of what it wants to be and how it's going to get there. In

order for this collective vision to emerge, the leaders need to establish collaboration, help

build consensus, influence and synthesize a multitude of special interests into a single,

clear map for success that becomes more important than individual self-interests (p. 44).

By having a long-range vision for the future, short-term goals can be eliminated,

clearing the way for more meaningful growth and achievement. The Total Quality

Management model puts administrators back in the driver's seat, forcing them to become

instructional leaders and motivators for their staff (Deming, 1982). In turn, teachers are

asked to work together - not in isolation - and be held collectively responsible for their

students' progress. This new way of doing educational business is a paradigm shift from

the traditional method of teaching –emphasizing how teachers teach – to a modern

method of teaching – how well students learn - where student learning is emphasized and

student achievement is the most important result (DuFour, 1998).

In business terms, this method places more emphasis on the quality of the final

product rather than solely on the process itself. Vision, identified by Lussier and Achua

and summarized by Ray Kest, requires intelligence, creativity, risk-taking, and

unconventional thinking (p. 59) – all of which were the very ingredients the business

world said were needed and lacking in the modern workforce. Therefore, if the business

of education was to change, it needed to not only change how it approached student

learning, but it needed to change the way it developed its own workers and leaders so that

they in turn were capable of producing those improved results. The next question then

was how to train present and future administrators to move away from being an autocratic

manager to becoming a more democratic leader.

Collaborative Leadership

Collaboration leadership theory became the new frontier in the 1990's for solving problems in both business and educational arenas. "When nothing else works, people begin to collaborate," according to Chrislip and Larson in their book *Collaborative Leadership: How Citizens and Civic Leaders Can Make a Difference* (p. 5). The beauty of this type of leadership lies in its simplicity: everyone has a role to play and anyone can start the process towards a successful collaboration. The authors envision a leadership model that is a union of diverse people, views, and groups who learn to collaborate with each other in order to build a stronger community. The purpose of collaboration is to empower people to take collective responsibility for their success and failure, emphasizing the inclusion of as many stakeholders as possible right from the start. In his book, *Inclusive Leadership*, James Ryan states that, "When those involved in the learning process have some input into it, they will be more likely to feel that they belong and become engaged" (p. 80). Many times, people – whether they are in business or education – feel they have no input into the process and therefore little stake in the outcome. They are disconnected and disinterested. By contrast, in collaboration participants expect the outcome to be mutually beneficial because they have worked together towards achieving common goals, sharing responsibility, authority, and accountability along the way (Elder, 1996).

Interestingly, this collaborative model shares similar goals with the Interstate School Leaders' Licensure Consortium (ISLLC), which are the national guidelines to which all educational leaders are tested on for their licensure as administrators and to which all administrators adhere to in professional practice. The collaborative model especially

relates to Standard 3, which specifically addresses trusting people and their judgments, accepting and sharing responsibility, and involving stakeholders in a consensus building process. The model is also similar to Standard 4, which is to build partnerships with local businesses and community groups to encourage and support diversity, pool resources, and strengthen the relationships between all groups in order to actively support one another's goals within the greater community. As a theory primarily used in the business world, it shares many ideals and goals with the education world.

Unfortunately, groups that follow more traditional models of leadership exhibit the familiar signs of discontent from participants whose viewpoints are not heard or explored during the process. As noted by Chrislip and Larson, the school board "…locked in by traditional definitions of power and role, … is seen by many as the primary obstacle to enduring change…in public schools," (p. 29). Chrislip and Larson suggest that what is needed is a redefinition of leadership roles and practices, both for leaders and participants (p. 35).

Within the educational arena, the ISLLC standards have already stated in Standard 2 that administrative leaders need to ensure that all students and staff feel valued and important, and in Standard 5 that all are treated with dignity, fairness, and respect. Being heard and included in the conversation is at the heart of the collaborative leadership model.

The collaborative model has no formal power or authority figure; the leader works as a peer, but with a different role to play in the overall process. The group itself crosses boundaries. Participants do not all come from the same frame of reference, and all have different backgrounds, levels of training, and values. The goal is for the group to work

together on the content in a productive way to produce the results the group has decided upon (Chrislip & Larson, 1994). This model overlaps perfectly with the ISLLC Standard 1, which states that educational leaders facilitate the development, implementation, and stewardship of a shared vision of learning that is created by an inclusive school community. The implication for educational leaders, then, is clear: Collaboratively educators succeed and individually they all have a part in that success. By working together, educators can solve the challenges in education; however, by working in isolation, they will get more of what has already been proven not to work.

<div align="center">Professional Learning Communities</div>

Educators continued to find themselves in an era of high-stakes testing and increased accountability that was forcing even the most experienced, effective teachers and school administrators to explore new ways to enhance student learning. Supporting this idea, Darling-Hammond and McLaughlin (1995) write, "The vision of practice that underlies the nation's reform agenda requires most teachers to rethink their own practice, to construct new classroom roles and expectations about student outcomes, and to teach in ways they have never taught before". As the historical review has shown so far, the educational community immersed itself in this process of self-reflection and began to see itself and its future in completely new ways. Ironically, all the new theories pushed for collaboration, interconnectedness, and teamwork, while the theories themselves were still working in isolation from each other within school districts and buildings across the nation. Each new idea was added to the repertoire of teaching and learning strategies that educators drew upon for inspiration, but no one had yet seen how the ideas could all work together or recognized that there were many similarities between the ideas. The search

was on to find a way to bring all of these theories and practices together into one coherent way to doing educational business on a daily basis.

Professional learning communities concentrate attention on how students learn and put educator's professional expertise to work answering the four essential questions:

- What should students know?

- How will teachers know when they've learned it?

- What do teachers do if the student doesn't get it?

- What do teachers do if the students get it and need to move on? (Alberta Education, 2006).

Robert Marzano's research on best practices and what works in schools points to the need for authenticity when teachers collaboratively undertake to answer these essential questions. This kind of authenticity requires teachers to openly share failures and mistakes with their team in order for the group to analyze how to improve instruction and thereby improve student achievement (Marzano, 2003).

DuFour and Eaker more completely explain this idea in their book *Professional Learning Communities at Work* (1998). The PLC model creates a systematic framework for consistently evaluating student work and teacher effectiveness, as well as establishing an environment where adaptability and a willingness to learn is the foundation for on-going collegial interaction.

The PLC model quickly became the new way to "frame" instructional practice. Furthermore, many educational administrators felt that through this kind of job-embedded, on-going professional development, more highly effective teachers would emerge and produce greater student achievement (Carter, 2008; Capps, 2005).

The PLC model blends all of the previous models and theories into one roadmap for success. At the center of the model is teacher effectiveness. This effectiveness is developed and sustained through on-going, job-embedded professional development on a daily, weekly, and monthly basis. This can be in the form of additional training or classes, but mostly it comes in the form of professional educators working in teams to analyze their students' progress, the strengths and weaknesses of the students as well as the teachers' own teaching practices, and to share their knowledge with one another to bring about authentic success and achievement in each student.

Through this on-going process of analyzing student data and the effectiveness of teaching practices, the educators themselves continually grow by learning new methods as well as learning more about themselves as teachers, deepening and enriching their own professional knowledge and expertise (Good, 2006). Because the model demands collaborative teams working together, opportunities for collaborative leadership and input abound at all levels (Valli & Buese, 2007). Furthermore, by using a program evaluation model, such as ADDIE (described in Chapter 1), educators at all levels are involved in the work of continuous improvement, systematically assessing current levels of achievement, developing plans for addressing weaknesses, implementing those plans and collecting data on the process, and then analyzing it all again to see if it worked or it still needs refinement (Hord, 1997). This is the Total Quality Management approach in action, using a program evaluation model as a way to keep track of where the teams are in the process.

Finally, as an administrator in this environment, the role of instructional coach and facilitator can emerge as the administrator employs systems thinking to the data the staff

is compiling about the educational health of the students and areas of need they are

identifying that require administrative support in one way or another (Reeves, 2000).

Interventions at the building and district level can now be specific, timely, and effective

because the interventions are addressing data-driven needs rather than the more

traditional broad-spectrum approach which can be fiscally wasteful and academically

unnecessary (Lasley, Siedentop, & Yinger, 2006).

Qualitative Studies Summary

In reviewing over two hundred research studies on professional learning

communities, collaborative models, and their relationship to student achievement, this

researcher found seventy-six to be relevant to this study. These qualitative studies all

dealt with some aspect of the perception of teachers and administrators on the subject of

professional learning communities.

One such study examined how professional conversations within a PLC are

perceived by both administrators and teachers and how that perception impacts roles,

responsibilities, and relationships. The results showed that all participants attributed

improved school climate and morale to the application of the PLC model. Leadership

characteristics of the principal were cited the most in the development of the PLC and its

ensuing collaborative culture. Also cited were shared leadership opportunities, a

commitment to team building, trust, and greater responsibility for student performance

data. Both teachers and administrators attribute the increase in student achievement to

the application of the PLC model (Bergevin, 2006).

Other studies focused on the principals' perceptions (Ball, 2004) and actions (Perez,

2007) as they relate to professional learning communities. According to Ball's research,

the application of the PLC model created a new level of professional development for principals and helped alleviate their isolation within the school. However, sustaining the PLC produced challenges for the principals, and the principals found themselves emerging as their schools' lead staff developer (Ball, 2004). In reviewing the research conducted by Perez, the results showed that the principal's actions were instrumental in establishing shared norms and values, improvement, and collaboration. The data also suggested that principals are uniquely situated to assist in the development of the characteristics of a professional learning community (Perez, 2007).

Other research offered insights and anecdotal reflections on the PLC model, from the perceptions that are needed to foster a PLC (Gurley, 2000) to understanding teacher efficacy and beliefs in the PLC model (Looney, 2004). Results from Gurley's research showed that teachers shared a collective sense of responsibility for student growth. Furthermore, the principals were strong instructional leaders who deliberately engaged in behaviors that promoted professional learning amongst the teaching staff, such as facilitating teacher collaboration, shared practice, and professional development (Gurley, 2000).

Complimenting these findings is the research conducted by Looney as she sought to examine the relationship between teachers' perceptions of a departmental professional community and teachers' sense of efficacy. The results showed that the perception of a departmental professional community as well as their deprivatized practice were significant and positive predictors of teachers' overall efficacy for classroom management, instructional practices, and student engagement. Teachers' perceptions of

student performance emerged as the strongest predictor of teachers' efficacy beliefs (Looney, 2004).

In reviewing the research studies done on the implementation of a PLC within a school, there were 42 found to be relevant to this study. Many of these studies were mixed studies – both quantitative and qualitative analysis was conducted – and all focused on the challenges surrounding the set-up and maintenance of a professional learning community.

For example, one study focused on the development of a PLC in one elementary school using data to reveal how the professional learning community's characteristics were met and how the staff evolved into a professional learning community (Peraro, 2005). This study found over half of the staff voluntarily participated in two or more professional development opportunities provided by the school. The entire staff improved in team learning and working together as a team through these activities. Creating time, structure, vision, and values of a learning community were all necessary leadership functions in order for the PLC model to be successfully implemented. The use of collaboration and looking at student work were found to be effective tools for changing teaching instruction when implementing the PLC model (Peraro, 2005).

However, another study concentrated more on the role of organizational conditions on teacher team performance, the emergence and enactment of leadership within the teams, and the quality of team outcomes (Watson, 2005). The results showed that interactional routines exerted a powerful shaping force on team performance. Leadership in teams was revealed as a relational phenomenon that the researcher identified as emergent reciprocal influence. The study concluded that collaboration served as both a

disciplinary and an emancipatory role for individual teachers. The researcher related these findings on roles to broader trends in business management and educational reform (Watson, 2005).

Quantitative Studies Summary

Upon reviewing the quantitative research conducted on the subject of the relationship between the PLC model and student achievement, the researcher found 27 to be relevant to this clinical research study. Of the 27 research studies reviewed, seven studies' results were found to be particularly pertinent to this study.

In one such study, Don Michael Furjes examined the relationship between the implementation of a comprehensive school portfolio and the degree to which administrators and teachers perceived their school to be functioning as a professional learning community. The study utilized survey procedures and an ANOVA was used to analyze the survey data. The analysis of the responses showed evidence that the stage of the implementation process at which a school is currently involved has an influence on the level at which the staff perceives itself to be functioning as a professional learning community. The results also showed that the longer a staff works towards a common goal, the more profound their work becomes (Furjes, 2003).

In another study, the first-year impact of professional learning communities on low-achieving 7th and 8th grade students was explored (Shipman, 2006). In the analysis of the student survey results, findings related positive school climate and positive attitudes towards interventions during the implementation process of the PLC model. In the analysis of the staff survey results, findings related positive responses in the areas of personal teaching reflection, classroom management, and school climate during the same

period as the student survey responses. Student grade data was analyzed using a Welch t-test comparing the year with professional learning community interventions with the previous four years without these interventions. The results showed a statistically significant decline in the percentages of failing grades (F's) and no significant decrease in D's for both 7th and 8th grade students. Establishing a professional learning community was found to improve student learning for low achieving learners within the first semester of implementation (Shipman, 2006).

In reviewing the literature, five studies stood out as lighthouses to the researcher. These studies both summarized the existing research succinctly, and pointed the researcher towards the next logical question that needed to be explored in order to fully understand the topic. The following studies - Dougherty, 2005; Bigger, 2006; Good, 2006; Vescio, Ross, & Adams, 2006; and Bunker, 2008 - helped to guide this clinical research study, and they have helped to focus this study's questions and hypotheses. What follows is a brief summary of each of these studies.

Ellen Dougherty's research, entitled *The Relationship between Professional Learning Communities and Student Achievement in Elementary Schools* (2005), although a survey on principals' perceptions of how well their school matched Peter Senge's (1990) five disciplines, results showed that there was a difference between the high-performing schools and their perceptions of whether they were a highly functioning professional learning community or not.

Susan Bigger's research, entitled *Data-Driven Decision-Making Within a Professional Learning Community: Assessing the Predictive Qualities of Curriculum-Based Measurements to a High-Stakes, State Test of Reading Achievement at the*

Elementary Level (2006), helped the researcher better understand the history behind the federal mandates, the national push towards greater student achievement, and how that has coalesced into the NCLB directives all public schools adhere to today. In addition, Bigger's findings answered the researcher's question about just which components of a professional learning community seemed to best promote high performance from both students and teachers (Bigger, 2006). The study pointed to teacher collaboration, data-driven instruction, and the sense of belonging to a larger community that is equally committed to improving student learning and supporting teacher growth, as the overwhelming factors contributing to a single school's turn-around from being on academic warning to a blue ribbon school over the course of just a few years (p. 55).

The research done by Rebecca Good, entitled *Analyzing the Impact of a Data Analysis Process to Improve Instruction Using a Collaborative Model* (2006),used a process called the Data Collaborative Model which is very similar in its components to the professional learning community model. This study was a quantitative, causal-comparative study designed to examine the relationship between the Data Collaborative Model and student achievement through the TAKS (Texas Essential Knowledge and Skills) tests in reading and math (iv). The research found no significant link between the DCM model and increased reading scores, but it did find a significant link between the DCM model and math scores. This correlation was evident in both the low implementation schools and the high implementation schools (p. v).

In a paper presented to the NSRF Research Forum in January, 2006, authors Vescio, Ross, and Adams provided a review of the research available regarding the impact of professional learning communities on teaching practices and student learning (p. 2). Of

particular interest to this researcher was the question the authors posed about whether the literature supported the assumption that student learning increases when teachers participate in a professional learning community (p. 2). The review helped to focus the framework and direction of this study's research. The review pointed to compelling evidence from quantitative research already conducted that participation in a professional learning community did increase student achievement (p. 14).

Finally, Vanessa Bunker's research, entitled *Professional Learning Communities, Teacher Collaboration, and Student Achievement in an Era of Standards-Based Reform* (2008), used Pearson and ANOVA analyses to look at the correlations between teacher value, teacher skill, and increased student achievement in reading, math, and writing. This research determined that teacher value of the collaborative process had no relationship to academic achievement in these subject areas; however, teacher skill in the collaborative process did have a significant correlation to student achievement and growth. The study also examined qualitative factors that facilitate or hinder the collaborative process and therefore the level of student growth or achievement (Bunker, 2008).

<div align="center">Summary</div>

This chapter reviewed the historical development of the professional learning community model and the research related to the possible link between the professional learning community model and increased student achievement. A review of each of the ideas borrowed from the business world was presented, as well as the evolution of the current No Child Left Behind (NCLB) legislation that all schools in the United States of America operate under currently.

A review of the research done on this topic included over 200 studies, both quantitative and qualitative, found many indicators that point to this link between the professional learning community model and increased student achievement. However, there are few purely quantitative studies that attempt to establish this link without the use of additional qualitative research.

In the following chapter, the methodology of the clinical research study will be disclosed, as well as the hypothesis and statistical analyses that will be used to test the hypothesis garnered from this literature review.

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

The purpose of this research study was to discover whether a statistically significant link could be observed through a quantitative analysis of student data. This study was a mixed methods study conducted at one school, Bradley Elementary, in one district, USD 207, in Fort Leavenworth, Kansas, who has been using the professional learning community model in their school since 2005. This chapter describes the methodology used to conduct this study. The following sections describe the research perspective, research design, research questions and hypotheses, population, sample, data collection procedures, research questions, instrumentation, data collection and analysis with respect to student achievement, and limitations that were used in this study.

Research Perspective

This research study was guided by a scientific approach. This study sought to quantify the relationship between the professional learning community model and student achievement, and therefore the scientific approach seemed an ideal framework from which to form research questions and hypotheses. The scientific viewpoint requires the researcher to take nothing for granted, to look at all possibilities regarding variable interaction, and to support any conclusions with verifiable data. From the qualitative research already conducted on this topic, there is a sense that something is happening between these two variables. The focus of this study was to investigate the differences in achievement one, two, three, and four years after the implementation of the model.

Research Design

The research design of this study was a mixed study using both quantitative and qualitative data. An analysis of variance (ANOVA) was used to determine the differences in student achievement, as measured by state assessment scores for the years from 2005 through 2008. Beginning in 2005, Bradley Elementary implemented the PLC model and continued to use the model consistently throughout the years selected for this study. Staff interviews were conducted to place the quantitative data in historical context and to determine if there were any patterns that emerged that might help to further interpret the data.

There were two data sets in the quantitative analysis. The data sets were the student scores from the Kansas State Assessment for Reading and Math conducted in 2005, 2006, 2007, and 2008 for students in grades three through sixth grades from one elementary school, Bradley Elementary, in the USD 207 school district in Fort Leavenworth, Kansas. The 2005 data for Math represent the baseline for student achievement in fourth grade after the professional learning community model had been implemented throughout the school for one year. The 2005 data for Reading represent the baseline for student achievement in fifth grade after the professional learning community model had been implemented throughout the school for one year. The 2006 data for both Reading and Math established the baseline for the remaining years and grades. The years of 2006, 2007, and 2008 represent the evolution of the PLC model within the school over time. The data was broken down by grade to better analyze the data and draw conclusions from it.

The informal interview was used as the design for the staff interviews. Staff participation was voluntary and the sample was limited to those teachers who had taught in grades three through six during the years between 2005 and 2008. The data were collected and compiled in summaries by grade level. Responses were coded and analyzed for patterns, themes, or constructs.

<div align="center">Sample</div>

For the purpose of this study, the student sample came from those students in grades three through six from Bradley Elementary, one of the three elementary schools in the USD 207 School District. Each grade level represents approximately 60 students for each year, and collectively represents about 220 students each year for the combined grades.

The staff sample of seven was drawn from the current twenty-four employed, certified teachers who teach at Bradley Elementary and who have been teaching in one of the four grades this study focused on during the years of 2005 through 2008. All of these teachers are licensed teachers in the state of Kansas and all hold a professional level license. All of the teachers interviewed hold a Masters degree in Education, and all have participated in professional development opportunities regarding the professional learning community model through the school district.

This school district is located on the military post of historic Fort Leavenworth in Leavenworth, Kansas. The student population is made up of active-duty military personnel attending the Command and General Staff College (CGSC), retired military personnel, Department of Defense (DOD) civilians, and those families attached to the

post through the Military Police battalion stationed on Fort Leavenworth or personnel attached to the Disciplinary Barracks.

Instrumentation

For the qualitative data collection, the informal interview format was used. Three open-ended questions were asked of each of the four grade-level focus groups. The questions are as follows:

Question 1:

By your recollection, what was the reason for the school to choose to implement the professional learning community model?

Question 2:

What did the model look like in 2005 as compared to what it looked like in 2008?

Question 3:

In your opinion, what is the key element in the professional learning community model that produces increases in student achievement, such as teacher collaboration, examination of student work, data analysis of student performance on common assessments, common PLC time?

For the quantitative data collection, the dependent variable - student achievement - was measured using individual scores retrieved from the 2005, 2006, 2007, and 2008 Kansas Reading and Math Assessments. The Kansas Reading and Math Assessments are state-mandated assessments that fulfill the requirements of the federally-mandated No Child Left Behind Act of 2004 and are aligned to the Kansas Reading and Math Standards established by the Kansas State Board of Education (KSDE, 2008). These

tests are given annually to all students in third, fourth, fifth, sixth, eighth and tenth grades to measure student achievement and compare the achievement to the larger population.

For both the Reading and the Math Assessments, students are administered the test in three separate test sessions that have no time limitations imposed upon the students. For the Reading Assessment, one session is on vocabulary and figurative language, one is on text structure identification and use, and one is on basic reading comprehension. The assessment is comprised of multiple choice questions with twelve to fifteen indicators assessed per grade level. For Math, one is a non-calculator session and two sessions allow the use of a calculator. The Math Assessment tests students' abilities in Number Sense, Estimation, Algebra, Geometry, Statistics, and Probability. The assessment is composed of multiple choice questions with twelve to fifteen indicators assessed per grade level. Four to eight items are included per indicator for both the Reading and the Math Assessments.

<div align="center">Reliability</div>

Information on the reliability of test scores for each general assessment test form is provided in Tables 3 for Reading test form scores and Tables 4 for Math test form scores. The score reliability estimates reported in the tables are Cronbach alpha coefficients. The coefficient values range from a low of .88 to a high of .94 across all the Reading grade level forms and from .91 to .95 across all the Mathematics grade level forms (KSDE, 2006). According to Gall, Gall, and Borg in Applying Educational Research: A Practical Guide (2005), "a measure is considered reliable . . . if its reliability coefficient is .80 or higher. In the case of . . .Cronbach's alpha, a value of .7 or higher is usually sufficient," (pg. 140).

Table 3

Descriptive statistics for equating samples for Reading by test form

Grade	Form	#Items	N	Reliability (α)	Mean % Correct	SD Mean % Correct
3	386	58	15997	0.90	76.98	15.187
3	386	58	4479	0.88	77.91	13.613
3	522	58	4476	0.89	78.00	13.613
3	558	58	4475	0.91	77.95	13.647
3	559	58	4446	0.88	77.98	13.590
4	404	74	13504	0.92	76.97	14.764
4	404	74	5142	0.91	78.54	13.498
4	561	74	5169	0.92	78.46	13.653
4	562	74	5136	0.91	78.55	13.523
4	563	74	5117	0.92	78.53	13.598
5	389	74	13038	0.92	77.03	15.299
5	388	74	7129	0.91	78.12	14.267
5	565	74	3177	0.91	78.12	14.335
5	566	74	7098	0.88	78.01	14.483
5	5651	74	3952	0.89	78.22	14.232
6	401	79	11885	0.93	74.54	16.280
6	401	79	5708	0.92	76.30	15.233
6	569	80	5645	0.92	76.15	15.430
6	571	80	5683	0.92	76.24	15.320
6	572	80	5659	0.92	76.18	15.338

Kansas State Department of Education. (2006) Retrieved from
http://www.ksde.org/LinkClick.aspx?fileticket=rr3%2Bm%2F8Ax7M%3D&tabid=2371&mid=8
892

Table 4

Descriptive statistics for equating samples for Math by test form

Grade	Form	#Items	N	Reliability (α)	Mean % Correct	SD Mean % Correct
3	405	70	14657	0.93	79.89	16.194
3	405	70	3949	0.92	82.56	14.163
3	664	70	3912	0.92	82.73	13.946
3	665	69	3895	0.92	82.67	14.025
3	666	70	3913	0.91	82.67	14.006
3	669	70	3891	0.91	82.64	14.002
4	595	73	12005	0.92	74.50	15.840
4	595	73	4502	0.92	77.29	14.927
4	670	72	4479	0.91	77.49	14.667
4	671	73	4431	0.92	77.40	14.840
4	672	72	4459	0.92	77.47	14.742
4	673	73	4470	0.92	77.50	14.709
5	406	73	12449	0.92	73.12	16.149
5	406	73	4499	0.91	75.31	15.026
5	674	73	4446	0.91	75.64	14.701
5	675	73	4415	0.91	75.60	14.734
5	676	73	4379	0.91	75.59	14.865
5	678	73	4436	0.92	75.63	14.750
6	479	86	11615	0.95	72.42	17.743

Kansas State Department of Education. (2006) Retrieved from
http://www.ksde.org/LinkClick.aspx?fileticket=rr3%2Bm%2F8Ax7M%3D&tabid=2371
&mid=8892

Data Collection Procedures

To gain permission from Baker University an Institutional Review Board form was submitted and reviewed and approved by the University's IRB committee (Appendix A). To gain permission from the Fort Leavenworth School District to conduct the research in this school district, a research proposal was submitted to the Board of Education for the Fort Leavenworth School District outlining the purpose, design and use of the study (Appendix A). The Board granted permission to conduct the research during an open session of the September 2007 Board of Education meeting approving the use of existing and future student data (Appendix B). The following data was obtained:

1. Individual scores for the 2005, 2006, 2007, and 2008 Kansas Reading and Math Assessments for third, fourth, fifth and sixth grade students in the Fort Leavenworth School District.

2. Gender data for students participating in the 2005, 2006, 2007, and 2008 Kansas Reading and Math Assessments.

The data were provided to the researcher by the Deputy Superintendent in charge of Instruction. The data were entered into the Statistical Package for the Social Sciences (SPSS) statistical program with careful checking for accuracy. Students were identified by student identification number.

The interviews of seven professional staff members at Bradley Elementary were conducted in the spring of 2009 by the researcher at the school itself. The professionals who participated in these interviews did so voluntarily and without monetary compensation. These professionals represent different grade levels, and they have all been at Bradley Elementary from the beginning of this process to the current day. Each

grade level of two to three teachers was considered one focus group for the purpose of data collection in this study. The responses were coded and then analyzed for patterns, themes, or constructs that emerged from the data collected from each focus group.

<div align="center">Data Analysis</div>

Research Questions and Hypotheses

There were four research questions in this study:

1. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for one year?

2. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for two years?

3. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for three years?

4. To what degree is there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for four years?

Based on the research questions, the hypotheses for this study are as follows:

H1: There is a difference in student achievement, as measured by state math test scores for the years from 2005 through 2008, during which the professional learning community model was implemented at Bradley Elementary that is significant at the $p<.05$ level.

H2: There is a difference in student achievement, as measured by state reading test scores for the years from 2005 through 2008, during which the professional learning community model was implemented at Bradley Elementary that is significant at the p<.05 level.

The data sets collected using the procedures described in the previous section were analyzed using analysis of variance (ANOVA). The ninety-five percent confidence level (p < .05) was used as the criterion level for determining statistical significance.

Teachers participated in one of four focus groups. The interviews with staff members formed the structure for the data collection and analysis (Gall, Gall, & Borg, 2005). There was one focus group per grade level that consisted of two to three key informants per group. There was one interview session per focus group, and the questions were open-ended. Each focus group and interview was transcribed on the Contact Summary Form by grade level (Appendix D - H). Interpretational analysis was employed to identify commonalities, constructs, or themes in the data. In the analysis of fifth grade's responses, reflexivity was employed on Contact Summary of Fifth Grade #2 because one of the respondents was the researcher (Gall, Gall, & Borg, 2005).

<center>Bias and Limitations</center>

Bias may occur in the form of the few students who do stay within the district from year to year. Although this study has attempted to control this bias by using all the students from each grade level for each year examined, it is possible that these students will be in the sample and skew the results because of their repeated exposure to the professional learning community treatment model.

There are also many extraneous variables that may be at work within this district that could be influencing or having an impact on student achievement besides the professional learning community model. These include, but are not limited to, deployment, family background, SES, ethnicity, access to quality education, and high mobility. Again, the sample size has been a way to control for these variables and their influence on the study.

Summary

In conclusion, this research study, although small and focused in scope and research design, has attempted to lay the statistical foundation for quantifying the relationship between the professional learning community model and student achievement. The study answers the fundamental question of whether or not something is happening between the professional learning community model and student achievement, and to what extent it is occurring. Using the scientific method as the guiding research perspective, the question of a statistically significant link must be established before more subtle and complex research questions and hypotheses can be explored on this subject. This study and its design have laid that foundation.

The results of this research are found in Chapter 4. Chapter 4 presents the statistical data that was compiled and analyzed to answer this clinical research study's research questions and hypotheses. The explanations, analysis, and implications of the research and data analysis are found in Chapter 5, as well as recommendations for further research studies needing to be done on this topic.

CHAPTER FOUR

RESULTS

The purpose of this research study was to see if there was a statistical link between the implementation of a professional learning community model and student achievement. The researcher conduct a mixed study with one school, Bradley Elementary, in one district, USD 207, in Fort Leavenworth, Kansas, which has been using the professional learning community model in their school since 2005. This study compared Bradley's student state test scores in Reading and Math for each year from 2005 through 2008. The data were analyzed to determine if there was a statistical link between the professional learning community model and student achievement. The data were analyzed for statistical significance, and will be used to guide future professional practice in USD 207 School District.

This chapter presents the qualitative analyses of staff interviews and the quantitative analyses of the numerical data that were generated by the Fort Leavenworth School District. For the purpose of these analyses, student achievement and the years since the initial implementation were the dependent variables. The Kansas State Assessment for Reading and Math was the independent variable.

There were 615 total students represented in this clinical research study. In 2005, there were thirty-four females and twenty-two males whose scores were used in the study. In 2006, there were ninety-five females and ninety males; in 2007, there were ninety-four females and one hundred one males; and in 2008, there were eighty-seven females and ninety-four males whose scores were used in the study. An exception in

student representation occurred in 2005 due to there being only two grades required to take the Kansas State Assessments that year. The class required to take the Kansas State Assessment in Math was the fourth grade, representing 51 students at Bradley Elementary that year. The class required to take the Kansas State Assessment in Reading was the fifth grade, representing 56 students at Bradley Elementary that year.

Qualitative Results from Staff Interviews

The interviews of seven professional staff members at Bradley Elementary were conducted in the spring and autumn of 2009 by the researcher at the school itself. These professionals represent key informants at all four grade levels examined in the study, and the staff members have all been at Bradley Elementary from the beginning of this process to the current day. Each grade level was a focus group for the purpose of analysis.

There were three open-ended questions asked of each of the four focus groups interviewed for this study (see Appendixes D-H). The questions asked are as follows:

Question 1:

By your recollection, what was the reason for the school to choose to implement the professional learning community model?

Question 2:

What did the model look like in 2005 as compared to what it looked like in 2008?

Question 3:

In your opinion, what is the key element in the professional learning community model that produces increases in student achievement, such as teacher collaboration, examination of student work, data analysis of student performance on common assessments, common PLC time?

In September of 2009, two third grade staff members who were teaching third grade at Bradley Elementary during the years of 2005 through 2008 participated in this research study by volunteering to be interviewed.

In answer to Question 1, the group said that the staff had been asked to begin reading professional journals and look at emerging research in the area of best-practice for teachers and administrators. The group added that they perceived the initiative to be a top-down directive and morale was initially low amongst the third grade teaching staff.

In response to Question 2, the group reported that collaboration initially focused on planning and common pacing. The group added that current practice is much improved over where it began in 2005 and teacher skill and knowledge has increased each year through implementation and application of the professional learning community model. Current collaboration focuses on standards and the alignment of teaching practices to those standards through on-going analysis of student data. More professional development on the correct implementation and application of the PLC model was provided over the years. The group reported that they feel the PLC model has been fully implemented at their grade level. They share a collective responsibility for their students' success.

In response to Question 3, the group agreed that collaboration and having a specific time set aside (as mandated by the USD 207 Board of Education) have been the critical factors involved in making the PLC model a success for them and their grade level.

In September of 2009, two fourth grade staff members who were teaching fourth grade at Bradley Elementary during the years of 2005 through 2008 participated in this research study by volunteering to be interviewed.

In answer to Question 1, the group said that the staff had been asked to begin reading professional journals and look at emerging research in the area of best-practice for teachers and administrators. The group added that they were asked to bring their discoveries to the principal and the principal then compiled this information to share with the staff.

In response to Question 2, the group reported that collaboration initially focused on aligning the state standards to the taught curriculum. The team then found the best match between best teaching practices the standards taught. The group added that through collaboration, they found gaps and redundancies in their teaching. The group reported that the first year of implementing the PLC model focused on learning to collaborate. The group reported that this action fundamentally changed their instructional practice, and it continues to do so the present day. More professional development on the correct way to analyze student data was needed and the principal arranged for these opportunities for the team. Current practice now focuses on analyzing student work and student data to direct their instructional practices. The group reported that they feel the PLC model has been fully implemented at their grade level. However, the group reported that they perceive increasing class sizes are lowering the impact of the PLC interventions. They share a collective responsibility for their students' success.

In response to Question 3, the group agreed that collaboration has been the critical factor involved in making the PLC model a success for them and their grade level.

In May of 2009, two staff members who were teaching fifth grade at Bradley Elementary during the years of 2005 through 2008 participated in this research study by volunteering to be interviewed.

In answer to Question 1, the group reported that the staff had been asked to look at emerging research in the area of best-practice for teachers and administrators. The group added that they perceived the initiative to be a top-down directive. One team member reported that the staff input was minimal. Both team members reported that morale was low initially amongst the fifth grade staff members.

In response to Question 2, the group reported that collaboration initially focused on planning and common pacing. The group reported that the first year of implementing the PLC model was disorganized. The group felt that the expectations for what they were to do were not made clear to them initially. More professional development was needed in the area of data analysis. However, the group reported that professional development opportunities did not always match up with all the members' schedules. Professional development was not consistent amongst the group members. Initial collaboration was not focused on student data. The group added that current practice is much improved over where it began in 2005 and teacher skill and knowledge has increased each year through implementation and application of the professional learning community model. Current collaboration focuses on standards and the alignment of teaching practices to those standards through on-going analysis of student data. The group reported that they feel the PLC model has been fully implemented at their grade level now.

In response to Question 3, the group agreed that having a specific time set aside (as mandated by the USD 207 Board of Education) has been a critical factor in making the PLC model a success for them and their grade level. Additionally, one member reported that data analysis was also a critical factor while the other member perceived collaboration to be equally important.

In August of 2009, one sixth grade staff member who was teaching sixth grade at Bradley Elementary during the years of 2005 through 2008 participated in this research study by volunteering to be interviewed.

In answer to Question 1, the staff member said that the staff had been asked to begin reading professional journals and look at emerging research in the area of best-practice for teachers and administrators. The staff member added that they were asked to bring their discoveries to the principal and the principal then compiled this information to share with the staff.

In response to Question 2, the staff member reported that collaboration initially focused on aligning the state standards to the taught curriculum. The team, as it was in 2005 through 2007, then found the best match between best teaching practices and the standards taught. The staff member added that through collaboration, the team found gaps and redundancies in their teaching. The staff member reported that the first year of implementing the PLC model focused on learning to collaborate, building common assessments, and aligning their work with the state standards. Early collaboration was not focused on student data but rather common planning and pacing. The staff member reported that more professional development was needed on analyzing student data, and the principal arranged for these opportunities for the team. Current practice, now consisting of two new sixth grade team members since 2007, focuses on analyzing student work and student data to direct their instructional practices. The staff member reported that the PLC model has been fully implemented at the sixth grade level. The current team of three staff members shares a collective responsibility for their students'

success, and they share a collective responsibility for the success of their team members as well.

In response to Question 3, the group agreed that having a specific time set aside (as mandated by the USD 207 Board of Education) has been a critical factor in making the PLC model a success for them and their grade level.

Common Themes

The common themes that emerged from the data were the importance of having a prescribed time set aside for the teams to conduct their PLC work. Another theme that emerged was the importance of collaboration to the successful implementation of the PLC model. Yet another theme was the need for more professional development as the teams began working together and identifying gaps in their own knowledge or skill base. A final theme that emerged was the feeling of collective responsibility for student success. This feeling developed over the four years of collaboratively working together as a professional learning community.

Construct

A construct that was identified was the change in instructional practice as a result of implementing the professional learning community model. All four grade levels reported some change in the way they instruct, analyze student work, or collaborate as a result of implementing and applying the PLC model to their grade level work.

Hypothesis Testing

Quantitative Results from data in Reading 2005-2008

Data for this study were compiled from individual scores for the 2005, 2006, 2007, and 2008 Kansas Reading and Math Assessments for third, fourth, fifth and sixth grade

students in the Fort Leavenworth School District. The next section presents the results of the quantitative analysis of the data collected for this study.

The 2006 data represent the baseline for student achievement after the professional learning communities model had been implemented throughout the school for one year. The remaining years represent the evolution of the PLC model within the school over time. Each grade was analyzed individually in order to draw better conclusions from it.

Using a One-Way Analysis of Variance (ANOVA), the researcher tested the differences in Reading scores across the years. A separate ANOVA was conducted individually for each grade represented in this study.

The following research hypothesis regarding the effects of the professional learning community model on student achievement in Reading was proposed:

1: There is a difference in student achievement, as measured by the Kansas State Assessment test for Reading scores for the years from 2005 through 2008, during which the professional learning community model was implemented at Bradley Elementary, that is significant at the $p<.05$ level

At Bradley Elementary School in 2005, the fifth grade consisted of 56 students across three different classrooms, in 2006 it consisted of 50 students in two classrooms, in 2007 it consisted of 48 students in two classrooms, and in 2008 it consisted of 41 students in two different classrooms. The mean test score for all four years was 83.6 with a standard deviation of 11.3 points.

Table 5

Means and Standard Deviations for Fifth Grade Reading for 2005-2008

Year	N - Students	Mean	Std. Deviation
2005	56	85.5	9.0
2006	50	80.8	12.7
2007	48	83.5	10.5
2008	41	84.7	12.8
Total	195	83.6	11.3

When the data were analyzed using a one-way ANOVA with the SPSS 16.0 data analysis software program to test for differences between the years, the results showed that there was no significant difference between any two of the means $(F (3, 191) = 1.694, p = .170)$.

In 2006, the third grade consisted of 55 students across three different classrooms; in 2007 it represented 53 students across three different classrooms; and in 2008 it represented 52 students across the same three different classrooms. As seen in Table 6, the mean test score for these three years was 86.7 with a standard deviation of 8.7 points.

When the data were analyzed using a one-way ANOVA with the SPSS 16.0 data analysis software program, the results showed that there was no significant difference between any two of the means $(F(2, 157) = 1.557, p = .214)$.

Table 6

Means and Standard Deviations for Third Grade Reading for 2006-2008

Year	N - Students	Mean	Std. Deviation
2006	55	85.3	9.7
2007	53	86.5	9.1
2008	52	88.3	7.0
Total	160	86.7	8.7

In 2006 the fourth grade consisted of 47 students across three different classrooms. In 2007 it consisted of 63 students across three different classrooms; and in 2008 it consisted of 51 students across the same three different classrooms. The mean test score for these three years was about 83.7 with a standard deviation of 10.6 points, as seen in Table 7.

Table 7 *Means and Standard Deviations for Fourth Grade Reading for 2006-2008*

Year	N - Students	Mean	Std. Deviation
2006	47	81.4	12.2
2007	63	82.2	11.4
2008	51	87.7	6.2
Total	161	83.7	10.6

A one-way ANOVA was performed on fourth grade's data and found to be statistically significant $(F$ $(2, 158) = 5.611, p = .004)$. When a follow-up Tukey HSD was

conducted, as shown in Table 8, the results showed that there was a significant difference between 2007 and 2008 and a significant difference between 2006 and 2008. There was no significant difference between 2006 and 2007. The mean test score for 2006 was 81.3 and the mean test score for 2007 was 82.2, as compared to the mean test score for 2008 which was 87.7. This means the largest difference between two means occurred between 2006 and 2008 for this grade level group.

Table 8

Results from Tukey test for Fourth Grade Reading for 2006-2008

Year	Mean Difference	Sig.
2006 – 2007	-.844	.906
2006 – 2008	- 6.30	.008
2007 – 2008	- 5.46	.016

In 2006 the sixth grade consisted of 30 students in two different classrooms. In 2007 it consisted of 31 students between two different classrooms; and in 2008 it consisted of 37 students between the same two different classrooms. The mean test score for these three years was 82.3 with a standard deviation of 11.2 points.

Table 9

Means and Standard Deviations for Sixth Grade Reading for 2006-2008

Year	N - Students	Mean	Std. Deviation
2006	30	80.1	12.5
2007	31	79.5	13.2
2008	37	86.5	5.8
Total	98	82.3	11.2

A one-way ANOVA was conducted on sixth grade's data and was found to be statistically significant ($F_{(2, 95)} = 4.536$, $p = .013$). When a follow-up Tukey HSD was conducted, as shown in Table 10, the results showed that there was there was no significant difference between 2006 and 2007, with the mean score dropping from 80.1 to 79.5, but there was a significant difference between 2006 and 2008, with the mean score moving from 80.1 to 86.5. Furthermore, there was a significant difference between 2007 and 2008, with the mean score moving from 79.5 to 86.5.

Table 10

Results from Post Hoc Tukey test for Sixth Grade Reading for 2006-2008

Year	Mean Difference	Sig.
2006 – 2007	.648	.970
2006 – 2008	-6.41	.045
2007 – 2008	-7.06	.023

Quantitative Results from data in Math for 2005-2008

The following research hypothesis regarding the effects of the professional learning community model on student achievement in Reading was proposed:

2: There is a difference in student achievement, as measured by the Kansas State Assessment test for Math scores for the years from 2005 through 2008, during which the professional learning community model was implemented at Bradley Elementary, that is significant at the p<.05 level.

In 2005 the fourth grade consisted of 51 students in three different classrooms; in 2006 it consisted of 47 students between the three different classrooms; in 2007 it consisted of 64 students across the same three different classrooms; and in 2008 it consisted of 52 students across the three classrooms. The mean test score for these four years was 79.9 with a standard deviation of 14.4 points.

Table 11

Means and Standard Deviations for Fourth Grade Math for 2005-2008

Year	N - Students	Mean	Std. Deviation
2005	51	69.8	16.9
2006	47	81.7	11.2
2007	64	81.1	14.1
2008	52	86.6	8.8
Total	214	79.9	14.4

A one-way ANOVA was performed on fourth grade's data and the tests found significant differences (F (3, 210) = 14.824, p = .000). When a follow-up Tukey HSD

was conducted, as shown in Table 12, the results showed there was a significant

difference between 2005 and 2006. The mean test score for 2005 was 69.8 while the

mean test score for 2006 was 81.7. In 2007, the mean test score was 81.1, but in 2008 the

mean test score rose to 86.6. There was no significant difference found between 2006

and 2007, or between 2006 and 2008, or between 2007 and 2008.

In 2006 the third grade consisted of 55 students in three different classrooms. In 2007

it consisted of 53 students across the three different classrooms; and in 2008 it consisted

of 52 students across the three different classrooms. The mean test score for these three

years was 90.3 with a standard deviation of 7.7 points.

Table 12

Results from Post Hoc Tukey test for Fourth Grade Math for 2005-2008

Year	Mean Difference	Sig.
2005 – 2006	-11.90	.000
2005 – 2007	-11.30	.000
2005 – 2008	-16.82	.000
2006 – 2007	.59	.996
2006 – 2008	- 4.92	.254
2007 – 2008	- 5.52	.118

Table 13 *Means and Standard Deviations for Third Grade Math for 2006-2008*

Year	N - Students	Mean	Std. Deviation
2006	55	90.7	6.73
2007	53	88.3	9.66
2008	52	91.8	5.99
Total	160	90.3	7.71

A one-way ANOVA was performed on third grade's math data and the tests found no significant differences between the scores (F (2, 157) = 2.746, p = .067). However, it is noteworthy because the p-value is close to .05. The mean test score for 2006 was 90.7 while the mean test score for 2007 was 88.3. However, the mean test score for 2008 rose to 91.8.

In 2006 the fifth grade consisted of 55 students in two different classrooms. In 2007 it consisted of 49 students between the two different classrooms; and in 2008 it consisted of 43 students across two different classrooms. The mean test score for these three years was 78.2 with a standard deviation of 15.05 points.

Table 14

Means and Standard Deviations for Fifth Grade Math for 2006-2008

Year	N - Students	Mean	Std. Deviation
2006	50	74.8	16.07
2007	49	77.6	14.47
2008	43	82.8	13.58
Total	142	78.2	15.05

A one-way ANOVA was performed on fifth grade's math data using a level of significance of .05. The test found significant differences between the scores (F (2, 139) = 3.443, p = .035). When a follow-up Tukey HSD was conducted, as shown in Table 15, the results showed a significant p-value of .03 between 2006 and 2008 but showed no significant difference between 2006 and 2007 with a value of .609. The mean test score for 2006 was 74.8 while the mean test score for 2007 was 77.6. However in 2008, the mean test score rose to 82.8. Additionally, there was no significant difference between 2007 and 2008 with a value of .219 even though the mean score rose from 77.6 in 2007 to 82.8 in 2008. This means the largest difference between two means occurred between 2006 and 2008 for this grade level group.

Table 15

Results from Post Hoc Tukey test for Fifth Grade Math for 2006-2008

Year	Mean Difference	Sig.
2006 – 2007	- 2.83	.609
2006 – 2008	- 8.01	.028
2007 – 2008	- 5.18	.219

In 2006 the sixth grade consisted of 30 students in two different classrooms. In 2007 it consisted of 31 students between the two different classrooms; and in 2008 it consisted of 38 students across two different classrooms. The mean test score for these three years was 83.0 with a standard deviation of 13.54 points.

Table 16

Means and Standard Deviations for Sixth Grade Math for 2006-2008

Year	N - Students	Mean	Std. Deviation
2006	30	79.0	13.16
2007	31	80.2	16.61
2008	38	88.5	8.71
Total	99	83.0	13.54

A one-way ANOVA was performed on sixth grade's math data and was found to be statistically significant (F (2, 96) = 5.553, p = .005).   When a follow-up Tukey HSD was conducted, as shown in Table 17, the results showed there was a significant difference between 2006 and 2008, but there was no difference between 2006 and 2007 with a p-

value of .93. However, there was a significant difference between 2007 and 2008 with a p-value of .026. The mean test score for 2006 was 79.0 while the mean test score rose to 80.2 in 2007. The mean test score rose again in 2008 to 88.5.

Table 17

Results from Post Hoc Tukey test for Sixth Grade Math for 2006-2008

Year	Mean Difference	Sig.
2006 – 2007	- 1.22	.928
2006 – 2008	- 9.49	.010
2007 – 2008	- 8.26	.026

Summary

In summation, the results from the individual one-way ANOVA's by grade level showed an overall positive trend with some grades showing differences that were statistically significant. Follow-up tests using the Tukey HSD test confirmed these results and provided further statistical support for the findings. However, the data had to be looked at by individual grade and year to accept or reject the null hypothesis specifically. The staff interviews provided additional insight into the historical context from which these scores were generated and add another layer of meaning to interpreting and understanding the results of the quantitative data.

Chapter 5 presents a study summary that includes the overview of the problem, purpose statement and research questions, review of the methodology, and major findings. Findings related to the review of literature are also presented, as well as implications for action and recommendations for future research.

CHAPTER FIVE

INTERPRETATION AND RECOMMENDATIONS

Introduction

This study examined whether there was a statistical link between the professional

learning community model and student achievement using the Kansas State Assessment

scores in Reading and Math as the data to be analyzed. Additional qualitative data were

collected in the form of interviews of seven of the original staff members who were

teaching in grades three through six during the years of 2005 through 2008. This study

was a mixed study using analysis of variance (ANOVA) to determine the differences in

student achievement, as measured by state assessment scores for the years from 2005

through 2008. Beginning in 2005, Bradley Elementary implemented the PLC model and

continued to use the model consistently throughout the years selected for this study.

Chapter 4 presented the results of the study. This chapter presents a study summary that

gives the overview of the problem, purpose statement and research questions, review of

the methodology, and major findings. In addition, findings related to the literature are

explored as well as implications for action, recommendations for future research and

concluding remarks.

Study Summary

Overview of the Problem

Researchers have begun to study the PLC model from a more quantitative

perspective. From the qualitative research already conducted on this topic, there is a

sense that something is happening between the two variables of the professional learning

community and student achievement. The focus of this study was to investigate the

differences in achievement one, two, three, and four years after the implementation of the

model. Additionally, beginning in 2006, the state of Kansas required all students in grades three through ten to take the state math and reading tests in compliance with the No Child Left Behind Act of 2001. Bradley Elementary began collaborating in 2004 and began implementing the PLC model in 2005. The question emerged as to whether the PLC model had anything to do with the academic success of this particular school. That question became the inspiration for this clinical research study.

Purpose of the Study

This study sought to quantify the relationship between the professional learning community model and student achievement. The research design of this study was a mixed study using both quantitative and qualitative data. For the quantitative data, an analysis of variance (ANOVA) was used to determine the differences in student achievement, as measured by state assessment scores for the years from 2005 through 2008. For the qualitative data, interviews with a sample of the staff were conducted to place the quantitative data in historical context and to determine if any patterns emerged to help further interpret the data.

Review of Methodology

The research design of this study was a mixed study using a one-way analysis of variance (ANOVA) to determine the differences in student achievement, as measured by state test scores for the years from 2005 through 2008, during which the professional learning community model was implemented at Bradley Elementary. The ninety-five percent confidence level (p < .05) was used as the criterion level for determining statistical significance.

The two data sets were the student scores from the Kansas State Achievement Tests for Reading and Math given in 2005, 2006, 2007, and 2008 for students in grades three through six from one elementary school, Bradley Elementary, in the USD 207 School District in Fort Leavenworth, Kansas. The data were broken down by year and grade to better analyze the data and draw conclusions from it.

An ANOVA was run on each grade level, grades three through six, individually. The data were entered into the Statistical Package for the Social Sciences (SPSS) statistical program with careful checking for accuracy. Students were identified by student identification number.

The interviews of seven professional staff members at Bradley Elementary were conducted in the spring and autumn of 2009 by the researcher at the school itself. These professionals represent key informants at all four grade levels examined in the study, and the staff members have all been at Bradley Elementary from the beginning of this process to the current day. Each grade level was a focus group for the purpose of analysis.

The sample came from those students in grades three through six from Bradley Elementary in the USD 207 School District. The sample collectively represents about 220 students each year for the combined grades.

This school district is located on the military post of historic Fort Leavenworth in Leavenworth, Kansas. The student population is made up of active-duty military personnel attending the Command and General Staff College (CGSC), retired military personnel, Department of Defense (DOD) civilians, and those families attached to the post through the Military Police battalion stationed on Fort Leavenworth or personnel attached to the Disciplinary Barracks.

Major Findings

The results are presented in the order of the research questions covering each of the hypotheses tested. The findings are presented below.

The first research question asked to what degree was there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for one year. This study found that there was no significant difference between the means in Reading scores in any grade after one year of implementing and applying the PLC model. The study found that this was also true for Math, with the exception of fourth grade. Fourth grade only showed a significant difference after the first year of implementation. The fourth grade's data did not show a statistically significant difference for any of the other years examined.

Quantitative data are consistent with the responses given by the grade level staff members in their interviews. Grades four and six perceived that they were actively learning how to properly implement the PLC model, and grades three and five felt they had low morale and were initially confused or disorganized, but all grade levels reported that they were not looking at student data and changing instructional practice based on that collaborative process. The quantitative data support those reflections.

The second research question asked to what degree was there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for two years. This study found that after two years of implementation of the PLC model, both grades four and six showed a significant difference between the mean scores in Reading. However in Math, sixth grade was the only grade that showed

statistical significance in their scores. Neither grade three nor grade five showed a significant difference in either Reading or Math scores.

Again, these quantitative data are consistent with the qualitative data collected in the interviews. Both fourth and sixth grade reported that they had sought out additional professional development in either data analysis or in implementation of the PLC model. Both reported how the process of collaborating on analyzing student data became better each year as their skill and knowledge increased. Both third and fifth grade reported that the initial years were lacking in vision and purpose; the team members perceived that they either did not know what to do or that they were not implementing or applying the PLC model well.

The third research question asked to what degree was there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for three years. Again, the quantitative data showed that both fourth grade and sixth grade showed significant differences in Reading, and fifth grade and sixth grade showed significant differences in Math. Third grade did not show a significant difference in either Reading or Math for the same time period.

Finally, the last research question asked to what degree was there a difference in student achievement in Reading and Math after the implementation of a professional learning community model for four years. Only fifth grade in Reading and fourth grade in Math have been implementing the PLC model and taking state achievement tests for four years. When looking at fifth grade in Reading from 2005 to 2008, there was no significant difference that was found over those years. When looking at fourth grade in Math from 2005 to 2008, the only significant difference found was after the initial year of

implementation; no other years since were found to be significant. The null hypothesis cannot be rejected for these two grades from these two data sets for this research question.

<div align="center">Summary of the Major Findings</div>

The results of this study showed statistical and anecdotal evidence to support the statement that the better teachers are doing the work of a professional learning community, the more significant the student achievement gains. Both fourth grade and sixth grade teachers reported they began researching, learning, and implementing the new approach quickly and consistently. Both grade levels felt that they are far more effective now than they were even four years ago, but the data show that those adjustments had statistically significant impacts on their students' achievement anyway during those learning years. By contrast, the fifth grade reported that they felt confused, disorganized, and inconsistent in their efforts with the model and the data shows that their efforts did not increase student achievement in statistically significant ways. Based on the results of the data, the results were mixed. The results suggest that when teachers begin to implement the PLC model consistently and with efficacy - even if done in incremental stages - student achievement will improve. Furthermore, the results also suggest that for staff members, perception is reality. If they perceive that they are implementing the model well and working as a true PLC within their grade level team, then they are and the student achievement will increase. If the teachers feel they are not, then they are not and the student achievement gains will not increase significantly.

This study found that there was a significant link between the PLC model (Professional Learning Community) and reading scores for the fourth and sixth grade in

the years 2006-2008, as well as a significant link between the PLC model and math scores for fourth grade for 2005-2006 and for fifth and sixth grades from 2006-2008. With the exception of fifth grade, the results for fourth and sixth grade are consistent with their statements about how effectively they felt they were implementing and utilizing the PLC model consistently. As for fifth grade, these results also support fifth grade teachers' statements regarding their increase in learning about the PLC model and their increasing understanding of how to better implement the model consistently to become more effective teachers for their students. The fifth grade's math scores show how their students' achievement began to increase as the staff's own knowledge and understanding increased.

<p style="text-align:center">Findings Related to the Literature</p>

When reviewing the literature, one finding past research confirmed repeatedly was that high-quality teachers positively affect student performance (Hanushek, Kain, & Rivkin, 1999, Goldhaber, 2002; Goldhaber & Anthony, 2003). Furthermore, previous research studies found a high correlation between teacher effectiveness and student achievement (Darling-Hammond, 1999; Goldhaber & Brewer, 1996; Greenwald, Hedges, & Laine, 1996). Therefore, it is logical to assume that if one could improve teacher effectiveness, then one would improve student achievement at the same time (Darling-Hammond, 1999).

In recent qualitative studies on the PLC model and student achievement, evidence was found that teacher effectiveness improved as their understanding of the PLC model improved, such as their increased understanding of teacher efficacy and beliefs in the PLC model (Looney, 2004) and their increased understanding of how the necessary

components of a PLC work together to improve teacher effectiveness and, ultimately, student achievement (Reisig, 2003; Spiegel-Stroud, 2007). These studies have provided much needed support and evidence that as teachers become more effective, and truly feel that they are becoming more effective in their practice, their students' academic gains increase.

This supports Ellen Dougherty's research, entitled *The Relationship between Professional Learning Communities and Student Achievement in Elementary Schools* (2005), in which her results showed that there was a correlation between the high-performing schools and their perceptions of whether they were a highly functioning professional learning community or not. This also supported Susan Bigger's research (2006), which pointed to teacher collaboration, data-driven instruction, and the sense of belonging to a larger community committed to improving student learning and supporting teacher growth, as the overwhelming factors contributing to a single school's turn-around.

 Bigger's findings are consistent with this study's qualitative findings. This study found that the teachers perceived teacher collaboration and teachers assessing student data frequently and purposefully were the keys to their students' making remarkable progress each year and helping their grade level team to work more productively together.

A contradiction was found to previous research which found no significant correlation between the DCM model (Data Collaborative Model) – a model very similar to the Professional Learning Community model - and increased reading scores, but did find a significant difference between the DCM model and math scores (Bigger, 2006).

However, this study's findings are consistent with the findings of Vanessa Bunker's research (2008), which used ANOVA analyses to look at the links between teacher value, teacher skill, and increased student achievement in reading, math, and writing. This research determined that teacher value of the collaborative process had no relationship to academic achievement in these subject areas; however, teacher skill in the collaborative process did have a significant correlation to student achievement and growth (Bunker, 2008). This study is consistent with Bunker's findings because it also found that when teachers perceived that they gained more skill at implementing and applying the PLC model – through professional development opportunities – student achievement increased.

<div align="center">Conclusions</div>

Implications for Action

The results of this study were mixed, but it suggests that if the PLC model is applied consistently to evaluate student progress and teacher effectiveness, regardless of the staff's personal feelings about the model, student achievement will increase.

Findings from this study will be shared with teachers, administrators and district leaders. A copy of the full study will be given to the Professional Development Director and the Board of Education for the Fort Leavenworth School District. The results of this study may be shared with parents concerned with district policy changes regarding professional learning community endeavors, early release days, and flexible grouping for Reading and Math in grades three through six.

As a result of this study, one implication for action in this school is to provide more on-going professional development opportunities for staff members to participate in to

increase their skill in implementing and applying the PLC model with efficacy. This is not only important for current staff members who want to increase their skill level and knowledge base, but for those new staff members who are new to the school, either because they are new to the profession or because they are coming from other districts, and do not have the same familiarity with the PLC model as the rest of the staff.

Another implication for action in this school is for either the Professional Development Director for the school district or the principal of the school to provide instructional leadership to those grade levels who appear to still be in need of more specific mentoring on how to effectively implement the PLC model in an effort to produce the same results as the fourth and sixth grade teams.

Recommendations for Future Research

This study enabled the researcher to explore the impact and significance of the professional learning community model on student achievement for students in grades three through six. While all data were found to be reliable and valid, further research is recommended. The following recommendations are provided for the researcher interested in following up on the findings of this study:

1. Replicate this study using similar methodology but an assessment tool other than the Kansas Reading and Math Assessment. A different assessment might present different findings.

2. Replicate this study with a larger sample size. Evaluation using a larger sample size would either support or contradict the findings of this study as well as similar studies.

3. Replicate and extend this study analyzing the impact of the PLC model on student achievement in regards to ethnicity and gender.

4. Replicate this study but include a more comprehensive qualitative assessment tool to look more deeply at the feelings and perceptions of the staff in order to gain more insight into its effect on student achievement and the implementation of the PLC model.

Concluding Remarks

In conclusion, it is the belief of this researcher that student achievement should be the highest priority for educators, both the teachers and administrators. Research is showing that when teachers learn to look critically at their own role in their students' success, they become more effective teachers who have an even greater positive impact on their students. By applying the professional learning community model, teachers can learn how to work collaboratively with one another and learn how to better assess the needs of their students. In doing so, the teachers themselves learn how to become even better teachers and the students make meaningful, and sometimes significant, progress on their educational journey. All educators should continue to examine their practices to ensure that they are consistently delivering the highest quality of instruction possible to their students.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL OF STUDY

28 October 2009

Melissa Hunter-Boyce
4107 Grand Ave.
Leavenworth, KS 66048

Dear Ms. Hunter-Boyce:
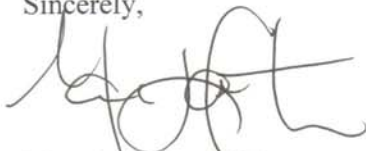
The Baker University IRB has reviewed your research project application (M-0075-1009-1028-G) and approved this project under Exempt Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, 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,

Marc L Carter, PhD
Chair, Baker University IRB

CC: Harold Frye

P.O. Box 65, Baldwin City
Kansas 66006-0065

APPENDIX B: RESEARCH PROPOSAL LETTER TO THE BOARD

August 27, 2007

Board of Education
USD 207
1 Education Way
Ft. Leavenworth, KS 66027
RE: Request to use data in Doctoral Dissertation

Dear Members of the Board of Education for USD 207,

My name is Melissa Hunter-Boyce and I am currently a sixth grade teacher at Bradley Elementary School. I am also a doctoral candidate at Baker University in their Educational Doctorate program in Educational Administration.

As a requirement of the doctoral program, I must conduct a research study and present my findings in the form of a dissertation. My study will be a quantitative study which will establish a statistical basis for any correlation between the professional learning community model and student achievement.

There are two data sets that I am proposing to analyze in this study. The first set is the spring standardized test scores from the Iowa Test of Basic Skills (ITBS) given five years ago in 2002, converted to z-scores, for all students in grades 4-6 from the three elementary schools in the district, before the professional learning communities model was implemented within the district. The second data set is the spring standardized test scores from the ITBS given in 2007, converted to z-scores, for all students in grades 4-6 from the same three elementary schools in the district, now with the PLC model having been implemented and practiced for five years. Finally, an ANOVA (Analysis of Variance) test will be done on the data to determine if there is a correlation between the professional learning community model and student achievement across the three grade levels in the study.

Enclosed with this letter is a copy of my Institutional Review Board (IRB) proposal that will be submitted to the review committee at Baker University. This proposal provides further information concerning my study and the assurances that no harm will come to any participating subjects as a result of this study. No names or other identifying data will be used in this research study.

I respectfully request that I may be allowed to use the data proposed from USD 207 in my research. By using this data, I hope to not only earn my doctorate, but provide useful data to the district about its mission to continually improve student learning and teaching practice. Thank you for your time and consideration on this request.

Sincerely,

Melissa Hunter-Boyce
Teacher, Bradley Elementary

APPENDIX C: BOARD APPROVAL OF CLINICAL RESEARCH STUDY

Board of Education Minutes
Fort Leavenworth, U.S.D. 207
20 September 2007 - 1600 Hours

1. Pursuant to authority of K.S.A. 72-8205, the Board of Education, U.S.D. 207, Fort Leavenworth, Kansas held a regular board meeting at 1600 hours, 20 September 2007 in the Patton Jr. High Library Media Center.

    Members Present: COL (Ret) Stephen J. Kempf - President
    LTC Carl W. Prioleau - Vice President
    Mrs. Teresa K. White - Member

    In addition to the members present, the meeting was attended by Ms. Deborah A. Baeuchle, Superintendent; Mr. Keith A. Mispagel, Deputy Superintendent; COL (Ret) William J. Heinen, Clerk of the Board; Mrs. Geri Parscale, Professional Development Director; Ms. Katherine Focht, Recording Secretary; Dr. Martin Gill, Dr. Jeanne Berg, Mrs. Marlene Black, USD 207 Principals; Mr. Bryan Brown, Technology Director; Mrs. Suzie Heinen, Mrs. Heather Ruiz, Mrs. Ada Shea, Ms. Penny Paradies, USD 207 Teachers; Miss Jessica Coogle, Patton Jr. High Gr. 7 Student; Mr. Jeff Crawley, LAMP Reporter; LTC and Mrs. R. Ponder, MAJ (Ret) Katherine Wilhelm, MAJ and Mrs. Mark Childress, Ms. Karen L. Hayes, Mr. Dennis Fetter, Visitors.

2. A motion was made, seconded and carried to approve the agenda. (Encl 1)

3. The minutes of the meeting held on 16 August 2007 were reviewed and a motion was made, seconded and carried to approve as written. (Encl 2)

4. The financial reports for August 2007 were reviewed and a motion was made, seconded and carried to approve as written. (Encl 3)

5. The warrant report starting with check number 36113 thru 36292 was reviewed and a motion was made, seconded and carried to approve as written. (Encl 4)

6. COL (Ret) William J. Heinen, Clerk of the Board, provided the following administrative notation for record: "Fort Leavenworth USD 207 received correspondence from MAJ (Ret) Katherine J. Wilhelm requesting her husband's title and her title be changed to reflect their military status. As an administrative note I recommend their titles be changed from Mrs. Katherine J. Wilhelm to MAJ (Ret) Katherine J. Wilhelm and from Dr. Gary B. Wilhelm to COL Gary B. Wilhelm. Additionally, she provided an outline of her presentation that she made during the July 26th, 2007 board meeting and requested that this be included in the July meeting minutes. I recommend we file her request to include their military titles and presentation outline as a record on file for this meeting." The July 26th, 2007 board meeting minutes will not be amended. As memorandum for record, USD 207 recorded their names identical to how they signed into the July 26th board meeting visitor log. (Encl 5)

Board of Education Minutes
Fort Leavenworth, U.S.D. 207
20 September 2007 - 1600 Hours

20. Ms. Baeuchle provided an overview of submitted requests for board support on the following special activities:
- MacArthur Elementary – "Kansas Music Educators Association All-State Children's Treble Honor Choir" / Grades 5 & 6 Students – Qualifying audition scheduled for October 12, '07 within the school building; KMEA *(Kansas Music Educators Association)* competition scheduled for February 28, 29, 2008 in Wichita, KS.
- Patton Jr. High – "Kansas Music Educators Association All-State Middle Level Choir" / Grades 8 & 9 Students – KMEA competition scheduled for February 28, 29, 2008 in Wichita, KS.

After a review by the board and administration,
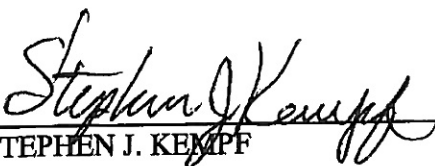
A motion was made, seconded and carried to approve the special activities support requested. (Encl 18)

21. A motion was made, seconded and carried approving the research project for doctoral studies as submitted. (Encl 19)

22. The Superintendent, Ms. Deborah A. Baeuchle, has been directed to contact all families on their determination of exception to policy, as approved by the Board of Education. (Encl 20)

23. There being no further business, the meeting adjourned at 1708 hours.

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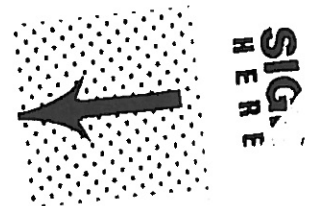
STEPHEN J. KEMPF
COL, USA (RET)
PRESIDENT

WILLIAM J. HEINEN
CLERK

6

APPENDIX D: CONTACT SUMMARY FOR THIRD GRADE

Contact Summary Form
3th grade

Type of contact: **Mtg:**   **Place**:   **Date:**

                Phone: **Place**:   **Date**:

                Inf. Int: 3th grade teachers **Place**:   Classroom   **Date**: Sept., 2009

Pick out the most salient points in the contact. Number in order on this sheet and note page number on which point appears. Number point in text of write-up. Attach theme or aspect to each point. Invent themes where no existing ones apply and asterisk those. Comment may also be included in double parentheses.

Page	Salient Points	Themes / Aspects
1	1. Professional journals showed emerging research.	Research
1	2. Top-down initiative; low morale initially	Leadership School Climate
1	3. Collaboration focused on planning & pacing	Implementation Collaboration
1	4. Collaboration has improved over the years	Collaboration Implementation
1	5. Current collaboration focuses on standards & Student data analysis	Collaboration Implementation *Data Analysis
1	6. More PD provided on PLC implementation	Implementation Leadership
2	7. Implementation is now complete	Implementation
2	8. Collective responsibility for student success	School Climate Collaboration
2	9. Collaboration and time set aside are critical for PLC success	Collaboration Leadership *Time

APPENDIX E: CONTACT SUMMARY FOR FOURTH GRADE

Contact Summary Form
4th grade

Type of contact: **Mtg:**   **Place**:   **Date:**

               Phone: **Place**:   **Date**:

               Inf. Int: 4th grade teachers **Place**:   Classroom   **Date**:   Sept., 2009

Pick out the most salient points in the contact. Number in order on this sheet and note page number on which point appears. Number point in text of write-up. Attach theme or aspect to each point. Invent themes where no existing ones apply and asterisk those. Comment may also be included in double parentheses.

Page	Salient Points	Themes / Aspects
1	1. Professional journals showed emerging research.	Research
1	2. Principal brought research to staff.	Leadership Research
1	3. Collaboration focused on aligning teaching to standards	Implementation Collaboration
1	4. Collaboration showed gaps and redundancies.	Collaboration
1	5. First year of PLC focused on collaboration; Changed instructional practice	Collaboration Implementation
1	6. More PD gained on data analysis.	Professional Dev.
1	7. Current practice focuses on student data analysis And instructional practice	Professional Dev. Implementation *Data Analysis
2	8. Increase in class size lowering impact of PLC	*Class size Implementation
2	9. Collective responsibility for student success	School Climate Collaboration
2	10. Collaboration is critical for PLC success	Implementation Collaboration

APPENDIX F: CONTACT SUMMARY FOR FIFTH GRADE, 1

Contact Summary Form
5th grade 1

Type of contact: **Mtg:**   **Place**:   **Date:**

                  Phone: **Place**:   **Date**:

                  Inf. Int: 5th grade teacher **Place**:   Classroom **Date**: May, 2009

Pick out the most salient points in the contact. Number in order on this sheet and note page number on which point appears. Number point in text of write-up. Attach theme or aspect to each point. Invent themes where no existing ones apply and asterisk those. Comment may also be included in double parentheses.

Page	Salient Points	Themes / Aspects
1	1. We began PLC's because it was new research.	Research
1	2. Perceived to be top-down initiative.	Leadership
1	3. Minimal staff input; low morale going in.	School Climate Morale
1	4. First year of PLC was disorganized.	Implementation
1	5. Expectations not clear.	Leadership
1	6. More PD needed on data analysis.	Professional Dev.
1	7. Collaboration was not focused on data.	Collaboration Implementation Leadership
1	8. Professional development during the summer.	Professional Dev. Implementation Leadership
2	9. Collaboration is the key to successful PLC	Collaboration Implementation
2	10. Time set aside to do PLC work is critical	Implementation Leadership *Time

APPENDIX G: CONTACT SUMMARY FOR FIFTH GRADE, 2

Contact Summary Form
5th grade 2

Type of contact: **Mtg:**   **Place**:   **Date:**

                 Phone: **Place**:   **Date**:

                 Inf. Int: 5th grade teacher **Place**:   Classroom **Date**: May, 2009

Pick out the most salient points in the contact. Number in order on this sheet and note page number on which point appears. Number point in text of write-up. Attach theme or aspect to each point. Invent themes where no existing ones apply and asterisk those. Comment may also be included in double parentheses.

Page	Salient Points	Themes / Aspects
1	1. We began PLC's because it was new best practice.	Research
1	2. Principal brought research to staff.	Leadership Research
1	3. Staff did action research to learn about collaboration.	School Climate Morale Collaboration Research
1	4. First year of PLC was disorganized.	Implementation
1	5. Expectations not clear.	Leadership
1	6. More PD needed on data analysis.	Professional Dev.
1	7. Collaboration was not focused on data.	Collaboration Implementation Leadership
1	8. Professional development during the summer.	Professional Dev. Implementation Leadership
2	9. Data-analysis is the key to successful PLC	*Data Analysis
2	10. Time set aside to do PLC work is critical *Time	Implementation Leadership

APPENDIX H: CONTACT SUMMARY FOR SIXTH GRADE

Contact Summary Form
6th grade

Type of contact: **Mtg:**   **Place**:   **Date:**

Phone: **Place**:   **Date**:

Inf. Int: 6th grade teacher **Place**:   Classroom   **Date**: Aug., 2009

Pick out the most salient points in the contact. Number in order on this sheet and note page number on which point appears. Number point in text of write-up. Attach theme or aspect to each point. Invent themes where no existing ones apply and asterisk those. Comment may also be included in double parentheses.

Page	Salient Points	Themes / Aspects
1	1. Professional journals showed emerging research.	Research
1	2. Principal brought research to staff.	Leadership Research
1	3. Collaboration focused on aligning teaching to standards	Implementation Collaboration
1	4. Collaboration showed gaps and redundancies.	Collaboration
1	5. First year of PLC focused on collaboration, Common assessments, and align with standards	Collaboration Implementation
1	6. More PD needed on data analysis.	Professional Dev.
1	7. Collaboration was not focused on data.	Collaboration Implementation Leadership
1	8. Current practice focuses on student data analysis. And instructional practice	Professional Dev. Implementation *Data Analysis
2	9. Collective responsibility for student success	School Climate Collaboration
2	10. Time set aside to do PLC work is critical *Time	Implementation Leadership