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# PLCs: Student Outcomes Evaluation in Midwest High School

Kelly E. Dickinson
*Lindenwood University*

# PLCs: Student Outcomes Evaluation in Midwest High School

by

Kelly E. Dickinson

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Sherrie Wisdom — 12/02/2011

Dr. Sherrie Wisdom, Dissertation Chair — Date

12/02/2011

Dr. Lynda Leavitt, Committee Member — Date

Jan Kellerman — 12/2/2011

Mrs. Jan Kellerman, Committee Member — Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

Full Legal Name: Kelly E. Dickinson

Signature: Kelly E Dickinson Date: 12-2-11

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This paper is dedicated to my husband, Craig. You truly are my very own Superman. I love you.

Abstract

This study was an evaluation of student outcomes following a five year implementation of PLCs at Midwest High School in the U.S. Three research questions were addressed: (1) Has student achievement increased during the course of implementing PLCs? If so, is there evidence that this is a result of a contribution from PLC implementation from 2006-2011? (2) Have teacher attitudes toward curriculum rigor, public image, quality of education, and post-high school preparedness changed during the implementation of PLCs from 2006-2011? (3) Is the staff, in April 2011, a mature PLC? For research question one, eight hypotheses resulted in the evaluation of quantitative data. Freshmen report cards were analyzed using a chi-square test for homogeneity of proportions. Algebra I, Biology, and English II Missouri EOC Exam data were analyzed using a *Z-test* for difference in proportions. Finally, Algebra I, American Government, English II, and Biology final exams were analyzed using a *Z-test* for difference in proportions. For research questions two and three, teacher survey data was analyzed using a Likert-like scale. Only the Algebra I and Biology Missouri EOC Exam data showed measurable increases in student outcomes at an alpha level of 0.05. Based on the study, the researcher identified strengths of Midwest High School that included its school-wide intervention program, shared-decision making by leadership, rigorous curriculum, post-high school preparedness, and the Algebra I and Biology PLC teams. The researcher made recommendations to Midwest High School that could help fill in the gaps identified in this study. Additionally, the researcher discussed the implications of this study for PLC high schools and high schools whose staff wishes to become a PLC.

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# Chapter 1: Introduction to the Study

This study was an evaluation of student outcomes following a five year implementation of Professional Learning Communities (PLCs) at Midwest High School. The researcher identified three research questions, collected student outcomes and staff perception data, and analyzed the data quantitatively to determine if Midwest High School was a mature PLC. This chapter discusses the background and rationale for the study, and lists the three research questions and eight hypotheses. Additionally, limitations and validity are addressed. Definitions of terms are also included.

## Background of the Study

In 2001, the No Child Left Behind Act (NCLB) was adopted, and United States public school districts became accountable for demonstrating Adequate Yearly Progress (AYP) based on state assessment scores and graduation and attendance rates (Missouri Department of Elementary and Secondary Education, 2010d). The federal government began requiring states and school districts to "provide annual report cards with information such as achievement data broken down by subgroup and information on whether school districts are making [AYP]" (Requirements of No Child Left Behind Act, 2002, p. T20). According to guidelines, schools not meeting AYP criteria in the same area for two consecutive years would be placed into School Improvement status and suffer additional consequences (Missouri Department of Elementary and Secondary Education, 2010d). According to the Missouri Department of Elementary and Secondary Education (2010d), schools that remained in School Improvement status risked public scrutiny, loss of students to better performing schools, loss and reorganization of staff, and state takeover. Ultimately, the goal of NCLB was that all students are proficient in

math and reading by 2014 (Requirements of No Child Left Behind, 2002). Despite increased accountability requirements for schools through NCLB, the United States Department of Education, National Center for Education Statistics (2011) reported that math and reading scores have not changed significantly over the past four decades.

Midwest High School is a public high school in Missouri, and in 2005 they were no exception to the national trend. Overall, they did not meet AYP in math or communication arts for three years in a row from 2003 through 2005 (Missouri Department of Elementary and Secondary Education, 2010a). Midwest High School was a high school serving just less than 2,000 students grades nine through 12 during the time of this study. During the course of this study, Midwest High School's student demographics averaged 87% white, 10% black, and 3% Asian and Hispanic. The percentage of students qualifying for free or reduced lunch (FRL) increased from 11.6% to 14.9% during the five years of this study (Missouri Department of Elementary and Secondary Education, 2010c).

Because Midwest High School did not meet AYP in math or communication arts for three years in a row (Missouri Department of Elementary and Secondary Education, 2010a), administrators and teachers began looking for a school improvement model. In spring 2006, they chose PLCs as their model for improvement, like hundreds of other PLC schools across the United States and Canada (Solution Tree, 2011). For Midwest High School staff, this decision was based largely on literature supporting PLCs (DuFour, R. P., DuFour, R. & Eaker, 2008).

R. P. DuFour and Eaker (1998) claimed that in order for schools to be successful they must adopt PLCs. "Virtually every leading educational researcher and almost all

professional organizations for educators have endorsed [PLCs]" (DuFour, R. P. & DuFour, R., 2010, p. 91). R. P. DuFour first developed PLCs at Adlai E. Stevenson High School in Lincolnshire, Illinois during his tenure as principal beginning in 1983 (Schmoker, 2001). PLCs are focused on three big ideas: learning, collaboration, and results (DuFour, R. P., 2007). Learning refers to "the fundamental purpose of the school, [which] is to ensure all students learn at high levels" (DuFour, R. P., et al., 2008, p. 18). Educators, too, need to learn continuously if they are to help students (DuFour, R. P., et al., 2008). Collaboration refers to the responsibility of educators to work with one another to help all students (DuFour, R. P., et al., 2008). Finally, achieving results refers to the continuous monitoring of learning through the collection of evidence. R. P. DuFour et al. (2008) stated "schools must systematically monitor students learning on an ongoing basis and use evidence of results to respond immediately to students who experience difficulty, to inform individual and collective practice, and to fuel continuous improvement" (pp. 18-19). Results are the key focus (DuFour, R. P., & DuFour, R., 2010).

Starting in March 2006 and continuing through May 2011, Midwest High School worked toward becoming a PLC with student outcomes focused on three areas. The first area of focus was assessments that were collaboratively developed by teachers called common assessments. The second student outcome evaluated was the Missouri State End of Course (EOC) Exams (see definitions, Chapter 1) that were given to all high school students in certain subject areas. According to R. P. DuFour and R. DuFour (2010), the purpose of evaluating common assessment data is, ultimately, to improve student achievement. Finally, the evaluation of student outcomes at Midwest High

School focused on first semester freshman report cards, since this semester of the students' high school career is most closely monitored at Midwest High School (PLC Leadership Team, 2011). Thus, the author of this study used quantitative data from EOC exams, common assessments, and freshmen report cards to evaluate the student outcomes.

The researcher also analyzed teacher survey data from two different staff surveys as an indicator of the effectiveness of the implementation of PLCs at Midwest High School. The first survey was written by Midwest High School's PLC Leadership Team (see Appendix A) and was given in October 2006 and April 2011. The second survey was written by and used with permission from Southwest Educational Development Laboratory (SEDL) and was given in April 2011. It was designed, in part to measure the "maturity of staffs as a learning community" (Hord, Meehan, Orletsky, & Sattes, 1999, p. 2).

**Importance of Study**

This study was an evaluation of student academic outcomes following the five year implementation of PLCs in Midwest High School. Fullan (2007) stated PLCs are difficult to implement because they involve changing a culture, not starting a program. However, since 21st century education will require teachers to work in PLCs (DuFour, R. P. & DuFour, R. 2010), successful creation of a learning community capable of effecting measureable change in student academic outcomes is imperative. Thus, this study may serve as a model for other school leaders wanting to evaluate their progress in PLC implementation.

Few other studies evaluate the relationship between PLC implementation and student achievement at the high school level. In one of the studies, Varano (2010) found no relationship between math or communication arts achievement in 115 Pennsylvania high schools whose principals reported implementing PLCs. In another study, Beres (2007) found no gains on a standardized English assessment and only slight gains on a standardized social studies assessment in 24 Alberta schools following a four-year PLC implementation.

**Rationale for the Study**

A large amount of resources were utilized by the administrators and staff in an attempt to correctly implement PLCs at Midwest High School. All building goals and professional development monies were linked to PLCs from March 2006 through May 2011. All building-wide professional development time was spent working on PLC initiatives; this time totaled a minimum of 34 hours per year for all staff and more than 36 additional hours per year for the members of the PLC Leadership Team. Professional development time was spent working on the development of functioning PLC groups and, in alignment with the PLC literature, on a comprehensive school-wide system of tiered interventions and incentives for students (DuFour, R. P. et al., 2008). Staff spent more than 110 school hours and over 90 after-school hours working with students on interventions and incentives. In addition, common course summative assessments were developed. Chapter 3 of this study detailed the implementation of PLCs in this high school.

**Research Questions**

The primary goal of Midwest High School from March 2006 through May 2011 was to effectively implement PLCs, thus becoming a mature PLC. The researcher measured outcomes by evaluating changes in student achievement in core subject areas and analyzing teacher survey data, as demonstrated by the following research questions.

1. Has student achievement increased during the course of implementing PLCs? If so, is there evidence that this is a result of a contribution from PLC implementation from 2006-2011?
2. Have teacher attitudes toward curriculum rigor, public image, quality of education, and post-high school preparedness changed during the implementation of PLCs from 2006-2011?
3. Is the staff, in April 2011, a mature PLC as measured by a diagnostic tool called School Professional Staff as Learning Community Questionnaire which was designed, written, and validated by SEDL (Hord et al., 1999)?

According to Hord et al. (1999), this survey was developed in 1996 at SEDL. SEDL is "a private, nonprofit education research, development, and dissemination (RD&D) corporation based in Austin, Texas [that is dedicated to] improving teaching and learning" (SEDL, 2011, para. 1). This survey contained 17 descriptors grouped into five areas. One potential use was as a diagnostic tool to determine if a staff has developed into "communities of professional learners" (Hord et al., 1999, p. 3).

**Alternate Hypotheses**

The dates and sample sizes chosen to test these hypotheses were based on population size. For hypothesis one, report card data was available from before the

beginning of the PLC process for all freshmen. According to Table 1, each freshman class included a population size of between 438 to 544 students, so the researcher used a random sample size of 50.

Table 1

*Midwest High School Freshmen Population Sizes in December*

| Category | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Freshman | 526 | 544 | 459 | 497 | 438 | 443 |

For hypotheses two, three, four, and five, common summative assessments were administered by faculty for the first time in 2010. A smaller, random convenience sample of 30 was used because population sizes ranged from 145 to 459, as shown in Table 2.

Table 2

*Midwest High School Course Population Sizes in December*

| Category | 2009 | 2010 |
|---|---|---|
| Algebra I | 145* | 327 |
| American Government | 334 | 280 |
| Biology | 323 | 437 |
| English II | 459 | 455 |

* District changed information systems, count may be unreliable

For hypotheses six, seven, and eight, Missouri State EOC Exams were administered by the state for the first time in 2009, which accounted for the dates chosen. Because the population size for each of the Missouri State EOC Exam data sets included between 383 to 478 scores, as shown in Table 3, a sample size of 40 was used.

Table 3

*Midwest High School State End Of Course Exam Population Sizes in April*

| Category | 2009 | 2011 |
|---|---|---|
| Algebra I | 400 | 430 |
| Biology | 383 | 478 |
| English II | 474 | 434 |

**Alternate hypothesis one.** There will be a measurable increase in average grade point average when comparing semester one freshmen report cards for each academic year from December 2005 to December 2010.

**Alternate hypothesis two.** There will be a measurable increase in average scores achieved for the course Algebra I on the semester one common final exam between December 2009 and December 2010.

**Alternate hypothesis three.** There will be a measurable increase in average scores achieved for the course American Government on the semester one common final exam between December 2009 and December 2010.

**Alternate hypothesis four.** There will be a measurable increase in average scores achieved for the course Biology on the semester one common final exam between December 2009 and December 2010.

**Alternate hypothesis five.** There will be a measurable increase in average scores achieved for the course English II on the semester one common final exam between December 2009 and December 2010.

**Alternate hypothesis six.** There will be a measurable increase in proportion of students who achieved Advanced and Proficient on the Algebra I Missouri State End of Course Exam between May 2009 and May 2011.

**Alternate hypothesis seven.** There will be a measurable increase in proportion of students who achieved Advanced and Proficient on the Biology Missouri State End of Course Exam between May 2009 and May 2011.

**Alternate hypothesis eight.** There will be a measurable increase in proportion of students who achieved Advanced and Proficient on the English II Missouri State End of Course Exam between May 2009 and May 2011.

**Null Hypotheses**

**Null hypothesis one.** There will be no measurable difference in average grade point average when comparing semester one freshmen report cards for each academic year from December 2005 to December 2010.

**Null hypothesis two.** There will be no measurable difference in average scores achieved for the course Algebra I on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis three.** There will be no measurable difference in average scores achieved for the course American Government on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis four.** There will be no measurable difference in average scores achieved for the course Biology on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis five.** There will be no measurable difference in average scores achieved for the course English II on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis six.** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the Algebra I Missouri State End of Course Exam between May 2009 and May 2011.

**Null hypothesis seven.** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the Biology Missouri State End of Course Exam between May 2009 and May 2011.

**Null hypothesis eight.** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the English II Missouri State End of Course Exam between May 2009 and May 2011.

**Limitations and Threats to Validity**

This study was limited in several ways. First, it was limited in its ability to evaluate the effectiveness of every component of the PLC process at Midwest High School. The information gathered and the analysis completed was intended to give a broad understanding of the academic status and collaborative status as a whole over a five year period. Additional analysis would have to be completed to determine the effectiveness of each component of the school as well as the academic progress of each course. Another limitation was that the information system at Midwest High School changed during the course of this study, so the population size for the Algebra I common final exams that was collected for hypothesis two may be unreliable. A third limitation was that the format of the Missouri State EOC Exams changed between 2010 and 2011 in that the constructed response sections were eliminated from Algebra I, Biology, and English II for the 2011 test due to budgeting cuts at the state level in Missouri.

There were four threats to internal validity. The first threat was that the population of students and teachers was different from year to year. This study did not follow the same group of students with the same teachers over a five year period. Rather, the researcher analyzed data from different groups of students in the same courses or grade levels. However, the student demographics did not change significantly during the period of time in which this study was conducted.

The second threat to internal validity was that the researcher was a member of the PLC Leadership Team that oversaw the PLC implementation. Therefore, bias was possible. To alleviate the effects of possible bias, this study was largely quantitative in nature, and quantitative data was selected using a random sampling tool (Social Psychology Network, 2008). Additionally, to address the extent to which the school is a learning community while addressing research question three, the researcher chose to evaluate data that had been collected with a nationally tested, valid instrument instead of one that was created within the building. This instrument, School Professional Staff as Learning Community Questionnaire, was developed by Hord (Hord et al., 1999). It was nationally field tested by Appalachia Educational laboratory and was found at the elementary, middle, and high school levels to be "useful as a screening, filtering, or measuring device to assess the maturity of a school's professional staff" (Meehan, Orletsky, & Sattes, 1997, Abstract).

The third threat to internal validity was the survey questions used to address research question two were written by the PLC Leadership Team at Midwest High School. Additionally, these survey questions were not tested for validity and bias is

possible. Attempts to eliminate bias were made through team discussions during the survey writing process.

The final threat to internal validity was the tools available to collect data. Because of this limitation, the common summative exam data obtained for hypotheses two through five was a convenience sample, randomly chosen from data that was available, not from the entire population. This was particularly true for 2009 Algebra I common summative assessment scores.

There was one threat to external validity in this study. Midwest High School was a suburban high school of nearly 2000 students. During the course of this study, Midwest High School's student demographics averaged 87% white, 10% black, and 3% Asian and Hispanic. The percentage of students qualifying for FRL increased from 11.6% to 14.9% during the time of this study (Missouri Department of Elementary and Secondary Education, 2010c). The study, therefore, cannot be generalized beyond the demographics of the school study site, Midwest High School.

**Definition of Terms**

*Academic Detention.* At Midwest High School, this was a one to two hour period of time after school where students were required to work with a content area teacher to make up missing work and focus on improving content skills (PLC Leadership Team, 2011).

*Academic Networking Period (ANP).* At Midwest High School, this was an 85 minute block of time every other day during which students met with other students in their grade under the supervision of an advisory teacher. During this time, students obtained academic help from teachers, tutors, and classmates. During Tiger Time

students were permitted to travel throughout the building to make use of the library and computer labs and to meet with teachers and peers for academic purposes (PLC Leadership Team, 2011).

*AYP.* AYP was a measure of the requirements of the No Child Left Behind Act. To meet AYP requirements, school districts must meet proficiency targets that were consistently increasing with the goal to have all students performing at proficient levels in math and reading by 2014 (Requirements of No Child Left Behind, 2002).

*Action Plan.* An action plan was a written document outlining how a person or team intended to reach a goal or complete a project. Written action plans increased communication by clarifying expectations and responsibilities (Carrison, 2010).

*Advanced report cards.* For the purpose of identifying students for interventions and incentives at Midwest High School, faculty identified students in need based on the number of Ds and Fs earned on their term and semester report cards. The term "Advanced", then, referred to students whose report card showed only As and Bs (PLC Leadership Team, 2011).

*Basic report cards.* For the purpose of identifying students for interventions and incentives at Midwest High School, faculty identified students in need based on the number of Ds and Fs earned on their term and semester report cards. The term "Basic", then, referred to students whose report card reflected one D or F (PLC Leadership Team, 2011).

*Below Basic report cards.* For the purpose of identifying students for interventions and incentives at Midwest High School, faculty identified students in need based on the number of Ds and Fs earned on their term and semester report cards. The

term “Below Basic”, then, referred to students whose report card reflected two or more Ds and/or Fs (PLC Leadership Team, 2011).

*EOCs.* EOCs have been defined as follows:

> The Missouri Assessment Program assesses students’ progress toward mastery of the Show-Me Standards which are the educational standards in Missouri. The Missouri Assessment Program includes required End-of-Course assessments in the subject areas of Algebra I, Biology, English II and Government. End-of-Course assessments are taken when a student has received instruction on the course-level expectations for an assessment, regardless of grade level. (Missouri Department of Elementary and Secondary Education, 2011, para. 7)

*Essential Course Outcomes (ECOs).* R. P. DuFour et al. (2008) defined these as the “critical skills, knowledge, and dispositions each student must acquire as a result of each course, grade level, and unit of instruction” (p. 466). At the school study site, each course developed their own list of ECOs and used them to drive their instruction.

*FRL.* Part of the National School Lunch Program, this was a federally funded service to provide lunch for students whose family incomes are close to the poverty level. From July 1, 2010 through June 30, 2011, students qualified for free lunches if their family income was at or below $28,665 and they qualified for reduced price lunches if their family income was between $28,665 and $40,793 (United States Department of Agriculture, 2011).

*Individual Education Plan (IEP).* This is a legal document for a student with a disability. It contains information about a student’s present academic and functional

capabilities, goals, services provided, and accommodations (Office of Special Education Programs, 2006).

*Mature PLC.* School Professional Staff as Learning Community Questionnaire was an instrument used by the researcher for research question three. It was a survey that included 17 descriptors across five dimensions. It measured each descriptor on a five point Likert-like scale where three statements were printed along the continuum. Mature PLCs are organizations that display more desirable behaviors along each continuum (Hord et al., 1999).

*NCLB.* NCLB was federal legislation designed to increase student achievement. NCLB increased accountability for standards and testing, required the use of research-based practices for instruction, and allowed school transfers for those students whose schools were underperforming (Wong & Nicotera, 2007).

*Norms.* Norms were the rules a team agreed to abide by when working together. They were a list of expected behaviors (Chatman, 2010).

*PLC.* R. P. DuFour et al. (2008) defined PLCs as "educators committed to working collaboratively in ongoing processes of collective inquiry and action research to achieve better results for the students they serve" (p. 14).

*Proficient report cards.* For the purpose of identifying students for interventions and incentives at Midwest High School, faculty identified students in need based on the number of Ds and Fs earned on their term and semester report cards. The term "Proficient", then, referred to students whose report card showed only As, Bs, and Cs (PLC Leadership Team, 2011).

*SMART goals.* These were goals that were "Strategic AND Specific, Measurable, Attainable, Results-based, and Time-bound" (O'Neill & Conzemius, 2006, p. 13). SMART goals were broad and encompassed several years. As well, indicators were used along the way as "evidence… to see if the goal is being achieved" (O'Neill & Conzemius, 2006, p. 20).

*Tiger Fever.* This refers to a homegrown program at Midwest High School. Tiger Fever was a group of 11th and 12th grade students who acted as mentors and leaders for the ninth and 10th grade students. Tiger Fever students coordinated 8th grade orientation, tutored in tiered ANP classrooms, and developed relationships with 9th and 10th grade ANP classrooms through regular visits to disseminate school information and conduct team-building activities (PLC Leadership Team, 2011).

*Tiger Paws.* This referred to a tier two intervention for students at Midwest High School. Students in ninth and 10th grade who have at least one D or F on their report card and no attendance issues were, with team recommendation, placed into a Tiger Paws ANP classroom. Tiger Paws ANP classrooms had subject specific teachers to help the students with their academic problem areas. These ANP classrooms had a lower teacher to student ratio than Tiger Time classrooms as well as having Tiger Fever tutors assigned to them. Tiger Paws students had fewer travel privileges than Tiger Time students and were required to have their planners and homework completion checked every ANP. Tiger Paws students were transferred back to a Tiger Time ANP when they brought their grades up to a proficient level (PLC Leadership Team, 2011).

*Tiger Roar.* This referred to a tier three intervention for students at Midwest High School. Students in ninth and 10th grade who had at least two Ds and/or Fs on their

report card and no attendance issues were, with team recommendation, placed into a Tiger Roar ANP classroom. Tiger Roar ANP classrooms had subject specific teachers to help the students with their academic problem areas. These ANP classrooms had a lower teacher to student ratio than Tiger Paws classrooms as well as having Tiger Fever tutors assigned to them. Tiger Roar students had no travel privileges and were required to have their planners and homework completion checked every ANP. Tiger Roar students were transferred back to a Tiger Time or Tiger Paws ANP when they brought their grades up to an appropriate level (PLC Leadership Team, 2011).

*Tiger Study Table.* This referred to a homegrown intervention for athletes at Midwest High School. Tiger Study Table was a mandatory tutoring session during ANP for student athletes who had one or more Ds or Fs on their previously earned progress report. Students who met the criteria were required to report to Tiger Study Table during ANP until their grades were at a proficient level (PLC Leadership Team, 2011).

*Tiger Time.* This referred to a tier one intervention for students at Midwest High School. All students in grades nine through 12 were assigned to an ANP classroom that met for 85 minutes every other day. In Tiger Time, all students had the opportunity to meet with their teachers, receive additional assistance, and work with other students. Additionally, each ANP teacher tracked their students' academic progress and conducted grade consultation meetings with their students regularly (PLC Leadership Team, 2011).

*Watch List.* This referred to a homegrown intervention for ninth and 10th grade students at Midwest High School. Each grading period, students who were not in a tier two or three ANP but who had one D or F on their progress report were put on the Watch List. Each student was then assigned a teacher in addition to their ANP teacher who

would monitor their grades with them regularly and provide additional assistance by requiring regular check-up meetings, tutoring after school, and/or organizational help. This assistance continued until the student's grades were at a proficient level or until the student was placed in a Tiger Paws or Tiger Roar ANP (PLC Leadership Team, 2011).

**Conclusion**

PLCs became increasingly popular in public schools, but there was little research to support the connection between high school PLCs and increased student achievement. Therefore, the researcher chose to evaluate student outcomes following the five year implementation of PLCs at Midwest High School. In Chapter 2, the researcher examined necessities for affecting sustainable, positive change in an organization. Then, the researcher compared those necessities for change with what the literature stated regarding PLCs.

# Chapter 2: Review of Literature

The focus of this literature review was on the components necessary to affect change in any organization. For each component, the researcher discussed the literature as a whole and then in the context of PLCs, specifically. Finally, the researcher identified missteps that lead to change failure, educational examples of successful change, and literary comments about transforming culture. During this literature review, studies from businesses, healthcare organizations, and high schools were included while studies from elementary and middles schools were generally omitted. This approach was logical since the goal of Midwest High School when it began implementation of PLCs in 2006 was to affect positive change in student outcomes.

## Introduction

As a whole, schools across the United States were in need of positive change. The United States was not a leader when comparing science, technology, engineering, mathematics, and reading scores of its adolescent students to students in other countries (Baldi et al., 2007; Emeagwali, 2010; Fleischman, Hopstock, Pelczar, Shelley, & National Center for Education Statistics, 2010). Emeagwali (2010) reported the National Science Board found student scores in science, technology, engineering, and mathematics to be decreasing among adolescents. Fleischman et al. (2010) reported the Program for International Student Assessment (PISA) ranked 15-year old United States students seventh in reading literacy, 18th in mathematics, and 13th in science. In each case, their scores were at or below the average reported scores for all countries combined (Fleischman et al., 2010). Though the PISA math and science scores in 2009 showed improvements for United States students in both average score and international rank

over the corresponding 2006 scores, the United States was not a world leader (Baldi et al., 2007). Consequently, President Barack Obama cited the improvement of math, science, and literacy scores as educational priorities (Emeagwali, 2010).

To achieve academic improvement for United States students, schools needed to develop plans through which to change (Emeagwali, 2010). Fullan (2007) stressed the importance of defining change if it was to be successful. Therefore, the researcher examined what the literature said with respect to defining successful, sustainable change.

The first word in successful, sustainable change was the term successful. This term has two distinct meanings. First, the literature focused on success as an end product (Deis & Kheirandish, 2010; Whetten, 2010). In their study of work experience as a predictor of MBA program success, Dies and Kheirandish (2010) measured success by grade point average (GPA), which was a result of completing the program. Similarly, Whetten (2010) measured success with end results when he spoke about the purpose of integral business. Whetten (2010) stated integral business was dedicated "to creating both money and meaning" (p. 9).

A second meaning of success focused on process instead of product (Buono & Kerber, 2010; O'Doherty & Ovando, 2009; Spiro, 2011). Buono and Kerber (2010) associated success with flexibility. They stated success required "experimentation, improvisation, and the ability to cope with unanticipated occurrences and unintended repercussions" (p. 4). The message was that success was defined by the ability of an organization to change (Buono & Kerber, 2010). Other literature also associated success with continuous improvement cycles instead of a path that has an end (Spiro, 2011; O'Doherty & Ovando, 2009). They claimed that continuous improvement and success

were achieved when members of an organization consistently identified problems and solutions (O'Doherty & Ovando, 2009).

Sustainability referred to the ability to maintain a situation. For a change to be sustained, Benn and Martin (2010) reported the change must be related to the needs of the organization as a whole instead of the smaller fragments. Spiro (2011) cautioned that the idea of sustainability must be considered during the planning phases of the change, and it should not be assumed it will be a result of the change. Fullan (2007) stated that "materials…., teaching approaches…., [and] beliefs" (p. 30) were all considerations when working toward educational change, and it was the change in "conceptions and behaviors [that made sustainable change] so difficult to achieve" (p. 32).

According to the literature, change meant different things to different people (Fullan, 2001; Jørgensen, Owen, & Neus, 2008; Spiro, 2011). Spiro (2011) defined change as "the only constant, [or] any departure from the status quo" (p. 2). Similarly, Jørgensen et al. (2008) likened change to "the new normal" (p. 6); theirs were not the only perceptions found in the literature. When Fullan (2001) discussed change in relation to its impact on leadership, he reported that people associated change with a myriad of positive and negative emotions including "fear, anxiety, loss…, exhilaration, [and] excitement" (p. 1).

One commonality regarding the definition of change was that it was planned and continuous (Jørgensen et al., 2008; Kotter & Schlesinger, 2008; Spiro, 2011). The concept of change within an organization shifted from an intermittent occurrence to a constant occurrence (Jørgensen et al., 2008). Spiro (2011) stated "change is assumed to be an intentional process toward the goal of meaningful, positive reform" (p. 2). In fact,

many organization leaders felt they must make changes yearly (Kotter & Schlesinger, 2008). However, a two year study by IBM Corporation showed that although change became continuous, more than 20% of CEOs involved in the change process felt unable "to manage it" (Jørgensen et al., 2008, p. 1). Additionally, Jørgensen et al. (2008) found "on average, only 41% of projects [involving changes] were considered successful" (p. 2). Schools could not afford to have the same success rate, since, according to the NCLB Act of 2001, a goal of educating students was that "[ALL] children will be proficient in reading and math by 2014" (Missouri Department of Elementary and Secondary Education, 2004, para. 2). Therefore, educators looked for ways in which they could ensure change was both successful and sustainable.

PLCs were one possible way to reach that goal. R. P. DuFour and R. DuFour (2010) described PLCs as grounded in three main ideas: students learning at high levels, educators collaborating, and results being the key focus. R. P. DuFour and Eaker (1998) claimed that students could achieve results through targeted teacher collaboration and a shared mission, vision, values, and goals. Fullan (2007) stated that PLCs were not a program but were about a change in a culture.

The literature on PLCs claimed they were, for educators, the key to effecting successful, sustainable change in their organizations. R. P. DuFour and Eaker (1998) told readers that in order for schools to institute successful changes that increased student achievement, they must adopt PLCs. "Virtually every leading educational researcher and almost all professional organizations for educators… endorsed [PLCs]" (DuFour, R. P., & DuFour, R., 2010, p. 91). Among the organizations cited as endorsers of PLCs were the National Commission on Teaching and America's Future, the National Board for

Professional Teaching Standards, the National Education Association, the National Council of Teachers of Mathematics, and the National Council of Teachers of English (DuFour, R. P. et al., 2008).

The researcher investigated business, healthcare, and educational literature that gave organizations insight when working toward successful, sustainable change (Fullan, 2007; Spiro, 2011). The goal of the researcher in doing so was to communicate the relationship between general literature and what was known about PLCs. The general literature showed that successful, sustainable change occurred when there was a common mission, a common vision, common values, common goals, good leadership, and focused teamwork. Each of these components was addressed independently in the sections that follow. The literature on PLCs mirrored the general literature in these areas, and was discussed following each of the related sections.

**Mission**

The contents of organizations' mission statements varied, to some extent, in the literature. Cady, Wheeler, DeWolf, and Brodke (2011) communicated that mission statements explained why an organization exists, and reflected the culture of that organization. Spiro (2011) stated that mission statements identify the needs an organization fills in its specific area of business and then explain how the organization is going to reach their desired destination. Verma (2009) reported that mission statements provide "values and behavioral benchmarks" (p. 160). The most commonly shared definition of a mission statement was that it communicated a purpose for an organization, or an indication of what was to be achieved or accomplished (Cady et al., 2011; Spiro, 2011; Verma, 2009).

The mission statement served several purposes. Spiro (2011) stated that "before one can lead change, it must be clear what strategy is being pursued" (p. 13). To that end, a mission statement was necessary prior to planning change and should be developed collaboratively by the members of an organization (Spiro, 2011). Verma (2009) claimed mission statements should be used by leaders to "influence decision making across the system" (p. 171). In a study of 100 executives in Dehli, Verma (2009) found that the content of company mission statements was, in fact, being effectively communicated to executives at all levels.

The content of mission statements had common themes. In an analysis of 216 organizations' mission statements, Cady et al. (2011) found that "several unique and highly meaningful concepts [were] loaded into… very short [statements]" (p. 74). Additionally, he found that the content of these statements contained much repetition. Specifically, the following concepts were noted: "shareholder return/value…, quality…, customer needs/expectations met/exceeded…, financial performance/profitability…, integrity/ethics…, innovation/creativity…, [and] community focus/involvement" (p. 72). Similarly, Verma (2009) found that "companies' mission statements lay high emphasis on… leadership, honesty and ethics, customer satisfaction, loyalty, [and] commitment to quality" (p. 170).

The literature on PLCs reflected the business literature with respect to the mission statement (DuFour, R. P. & Eaker, 1998). Like Cady et al. (2011), R. P. DuFour and Eaker (1998) expressed that a mission statement explained why an organization existed. As such, it put everyone in an organization on the same path and gave them a reason for being there in the first place (DuFour, R. P. & Eaker, 1998). It answered questions about

the educators' responsibilities to the students and explained the existence of a school by clarifying the school's priorities and pointing it onto the correct path (DuFour, R. P. & Eaker, 1998). DuFour, R. P. et al. (2008) urged schools not to spend copious amounts of time writing mission statements, though, because they claimed the real quality work came with living the mission statement.

**Vision**

Like a mission statement, a vision statement is a statement with a purpose. A vision, though, is a statement of where a person or organization is going (Finley, 2010; Reason, 2010; Yokl, 2011). Finley (2010) reported a vision statement to be a clear picture of what the end product will look like. In a book about educational leadership, Reason (2010) compared a vision to a "destination" (p. 55). Yokl (2011) reported that a vision focuses direction and "separates our routine work from the big picture" (p. 52).

The literature cited several benefits to shared vision statements. In a study where Stoner questioned the employees of more than 500 leaders, leaders with a clear vision had the highest performing teams (Stoner, Blanchard, & Zirgarmi, 2010). Stoner et al. (2010) explained that a shared organizational vision allowed members "to act from a proactive stance, moving toward what [they] want rather than reactively moving away from what [they] don't want" (p. 18). Stoner et al. (2010) reported that having a clear vision saves time because it minimizes priorities by expressing the destination and acting as a tool for everyday decision-making. Organizations were only successful when they collaboratively developed their vision so the responsibility for realizing the vision was shared by all (Fullan, 2001; Stoner et al., 2010).

The PLC literature agreed with other literature with respect to the purpose of a vision statement (DuFour, R. P. & Eaker, 1998). R. P. DuFour and Eaker (1998) reported that a vision, which lasted five to seven years, was a comprehensive list of what a school aspired to be. Similar to Finley (2010), Reason (2010), and Yokl (2011), R. P. DuFour et al. (2008) described a vision as an attainable future.

R. P. DuFour and Eaker (1998) continued their description of a vision when they described how to create it. They reported the creation of a vision began by gathering pertinent research and background information (DuFour, R. P. & Eaker, 1998). Then, ideally, development of a vision was completed by stakeholders both in and out of the school (DuFour, R. P. & Eaker, 1998).

Like Fullan (2001) and Stoner et al. (2010), PLC literature cited several reasons why a vision statement was essential to the success of a PLC school (DuFour, R. P. et al., 2008; DuFour, R. P. & Eaker, 1998). R. P. DuFour et al. (2008) said "shared vision motivates and energizes people" (p. 143). It painted a picture of the school's future and allowed people to visualize a target so they could aim for it (DuFour, R. P. & Eaker, 1998). Further, a shared vision created commitment among people and showed initiative (DuFour, R. P. & Eaker, 1998).

**Values**

Meglino and Ravlin (1998) defined values as "end-states of existence that a person strives to achieve" (p. 353). They also stated that values are "modes of behavior" (Meglino & Ravlin, 1998, p. 353). When values are shared by employees, there are several positive impacts on an organization (Posner, 2010; Valentine, Godkin, Fleischman, & Kidwell, 2010; Wallace, de Chernatony, & Buil, 2011; Watrous,

Huffman, & Pritchard, 2006). First, when values are shared the job satisfaction of employees increases (Posner, 2010; Valentine et al., 2010). Valentine et al. (2010) found this to be true when they surveyed 781 employees in both health care and business (p. 362). Posner (2010) reached the same conclusion after surveying 711 U.S. managers (p. 536). Additionally, Posner (2010) reported increased job commitment, increased motivation, and increased feelings about ethical behavior when employee values aligned with those of their organization. Watrous et al. (2006) found that shared organizational values "were related to performance improvement" (p. 122). Wallace et al. (2011) reported that leadership influenced the values in a business organization. In Wallace et al.'s (2011) study of a chain of banks, they stressed that shared employee values were "critical to fostering brand-supporting behavior…., [and] the brand message is brought to life by those employees who have direct interaction with customers" (p. 409). This conclusion also applies to shared values in education in that educators act as the employees who are bringing the organizational values to the customers, or students.

The PLC literature also discussed the importance of shared values (DuFour, R. P. & Eaker, 1998). Values were defined as a code of conduct that was created by a learning organization in order to reach the vision (DuFour, R. P. & Eaker, 1998). Values, also called collective commitments, were no more than 10 statements with direct language that explained the personal behavior expected within a learning organization (DuFour, R. P. & Eaker, 1998); this association of values to personal expected behavior is much like the definition reported by Meglino and Ravlin (1998). R. P. DuFour et al. (2008) explained that values were essential to a learning organization because they provided

accountability for the people who had written them and they helped drive the cultural shift necessary to become a PLC.

**Goals**

Armenakis and Harris (2009) contended that a cultural shift could not take place without setting goals, and the analysis of a problem that comes prior to setting goals is a key component to successful, sustainable change. Additionally, Armenakis and Harris (2009) pointed out the importance of properly identifying needed changes and setting goals that align with those needs. They stated that, if the problem is not properly identified, then the goal reached will not be a solution to the problem (Armenakis & Harris, 2009). Kotter and Schlesinger (2008) and Spiro (2011) agreed that writing goals to solve problems and realize change comes after diagnosing the problems in an organization. They added that when goals are written they must include benchmarks with detailed timelines, and must involve all stakeholders (Kotter & Schlesinger, 2008; Spiro, 2011).

Fullan (2007) indicated that successfully implementing and monitoring a plan to reach a goal is difficult. Fullan (2007) stressed that implementation requires a delicate balance between leadership, stakeholders, internal factors, and external factors. Monitoring progress toward goals established to support the vision is essential, however (Kotter & Schlesinger, 2008; O'Doherty & Ovando, 2009; Spiro, 2011). While keeping focused on the target goals (Spiro, 2011), the short term situation, including the timeline and progress, should be evaluated and adjusted so the organization stays on track (Kotter & Schlesinger, 2008; Spiro, 2011). Spiro (2011) indicated about goals that "it's the destination-not the journey" (p. 9). The intent of this statement was to point out that the

plan will most certainly change as an organization moves toward a goal, but reaching the goal is the most important thing (Armenakis & Harris, 2009; Spiro, 2011). O'Doherty and Ovando (2009) pointed out that data should be utilized during this process to keep an organization on track.

Like other literature, Nelson, LeBard, and Waters (2010) and R. P. DuFour (2007) explained that implementing PLCs must involve a focus, or a goal. Additionally, all goals for a learning organization should be SMART (DuFour, R. P. & DuFour, R., 2010; O'Neill & Conzemius, 2006). SMART goals are "Strategic AND Specific, Measurable, Attainable, Results-based, and Time-bound" (O'Neill & Conzemius, 2006, p. 13). Goals are a requirement for success in any school because they prioritize the steps toward the vision in a systematic way (DuFour, R. P. & Eaker, 1998).

**Leadership**

Effective leadership is one of the most important components in any change process (O'Doherty & Ovando, 2009; Spiro, 2011). In their 2009 study of a successful school district, O'Doherty and Ovando (2009) found the number one factor affecting success to be leadership. Planning and shared accountability were secondary (O'Doherty & Ovando, 2009). Spiro (2011) agreed that excellent leadership is a mandatory component of the success of an organization.

Effective leaders share several characteristics. One of these characteristics is that good leaders understand the change process (Armenakis & Harris, 2009; Fullan, 2001; O'Doherty & Ovando, 2009; Parrett & Budge, 2009; Spiro, 2011). A good leader can focus on just a few priorities that support the vision and he or she has the ability and foresight to align the money and other resources with that vision (O'Doherty & Ovando,

2009). A leader knows how to implement changes (Armenakis & Harris, 2009) and can think several steps ahead of the current reality (Spiro, 2011). Additionally, Parrett and Budge (2009) found in their study of six high schools that a good leader can eliminate the noise associated with outside initiatives. This noise might include outside influences such as attempts by boards of education members to press personal agendas or central office employee initiatives that do not align with building goals.

Effective leaders provide needed training, or professional development (Armenakis & Harris, 2009; Fisher, 2007; Gajda & Koliba, 2008), and they put together professional development that will benefit teams (Chan & Chen, 2010; De Jong & Elfring, 2010; Ding & Ng, 2010; Locander & Luechauer, 2009). People will not support change if they fear they do not have the skills to contribute to it successfully (Armenakis & Harris, 2009; Kotter & Schlesinger, 2008; Zigarmi, P., Hoekstra, Blanchard, & Zigarmi, D., 2010). Armenakis and Harris (2009) found that effective leaders know how to involve people in the change process and offer professional development to increase their performance. Gajda and Koliba (2008) stated that professional development should include training and modeling on how to collaborate. Fisher (2007) agreed that collaboration will not happen on its own but must be taught through professional development. Also, Chan and Chen (2010) concluded leaders should promote problem-solving and critical thinking skills through professional development.

Locander and Luechauer (2009) told readers that teambuilding is an obligation associated with professional development because effective leaders do not forget the human element, and they need to be as concerned with their people as they are with their profits. Teams, especially long-term teams, should be purposefully built and actively

maintained so that relationships and trust are strong (De Jong & Elfring, 2010). This can be accomplished by purposefully increasing social interactions among team members (Ding & Ng, 2010). This might include prohibiting email communications one day of the week or participating in community service projects during work time (Locander & Luechauer, 2009). Gajda and Koliba (2008), through their development of a tool for leaders to evaluate teacher collaboration, identified the role of the effective principal to include evaluating and correcting weaknesses in teachers' collaboration.

Another characteristic of effective leaders is that they have credibility (Armenakis & Harris, 2009; O'Doherty & Ovando, 2009). In their 2006 study, Clark and Payne determined that good leaders are trustworthy and credible because they follow through on promises. Their expectations are clear and consistent (O'Doherty & Ovando, 2009), and they are strong communicators (Armenakis & Harris, 2009). "Employees want leaders they can trust" (Perrin & Blauth, 2010, p. 9), so having credibility as a leader is essential to good leadership.

Successful leaders can motivate their people; because they recognize that fear will not drive them into action (Fullan, 2007). One way leaders motivate their people is by improving emotions within their organization (Fullan, 2001) through being supportive (Kotter & Schlesinger, 2008). Leaders are also able to build self-esteem among people by choosing small tasks toward the goals initially so that successes can be celebrated (Armenakis & Harris, 2009).

Effective team leaders use the correct leadership style (Carew, Parisi-Carew, Good, & Blanchard, 2010; Chan & Chen, 2010; Hoegl & Parboteeah, 2006; Spiro, 2011). Good team leaders match their leadership style to the development level of the team

(Carew et al., 2010). For instance, when the team is new, leadership will have to be more directive; as the team progresses, the leader will need to take on more of a supporting role (Carew et al., 2010). Spiro (2011) agreed that when teams are ready, leadership structure should decrease. Chan and Chen (2010) cautioned team leaders not to be the dominant voice on the team. Hoegl and Parboteeah (2006) agreed, explaining that a facilitating style of leadership is best for teamwork quality.

To have good teams, leaders have the responsibility of pulling together the right people (Chan & Chen, 2010; Hoegl & Parboteeah, 2006; Maxwell, 2009). Maxwell (2009) stated "good leadership helps to put together the right people at the right time for the right purpose so that everybody wins" (p. 102). "Who we invite to the table makes all the difference" (Maxwell, 2009, p. 100). Teammates need to have similar values (Chan & Chen, 2010; Watrous et al., 2006). As well, they need to be from varied backgrounds and possess the ability to make decisions jointly (Hoegl & Parboteeah, 2006). Leaders are able to draw the right people into the organization, thus increasing the chances that necessary change efforts will be successful (Collins, 2001).

Besides gathering the right people and providing the right professional development, there are many other things managers can do to positively influence their teams (Carew et al., 2010; Hoegl & Parboteeah, 2006; Locander & Luechauer, 2009; Parrett & Budge, 2009; Sharma, Roychowdhury, & Verma, 2009; Sheng, Tian, & Chen, 2010; Spiro, 2011). Sheng et al. (2010) pointed out that managers should be showing team support by aligning job descriptions, promotions, and salaries to the team. Managers should be aware of team issues and help to resolve them (Carew et al., 2010; Sharma et al., 2009). They should assign the right roles within teams (Sharma et al.,

2009), and they should stay out of team decisions because external decisions decrease the quality of the teamwork (Hoegl & Parboteeah, 2006). Managers should avoid conducting meetings where they are the main focus (Spiro, 2011) and instead, increase the dialogue from their teams (Locander & Luechauer, 2009). Next, Locander and Luechauer (2009) stated that relations with people and teams will improve when talking and smiling with people increases and electronic communication decreases. Finally, teams are positively influenced when they have time to work, so leaders understand that teams must make efficient use of time (Parrett & Budge, 2009). In addition to utilizing their team time well, good leaders ensure that teams of teachers provide students time for needed interventions in their learning process (Parrett & Budge, 2009).

The PLC literature agreed with other literature with respect to the importance of effective leadership (DuFour, R. P. & Eaker, 1998; Nelson et al., 2010; Wood, 2007). Nelson et al. (2010) said PLCs are characterized by great leadership. The ability for principals to be able to develop PLCs is very important (DuFour, R. P. & DuFour, R., 2010) since "strong principals are crucial to the creation of learning communities" (DuFour, R. P. & Eaker, 1998, p. 183) and to the change process (Fullan, 2007). Principals must truly understand learning communities to be effective (Wood, 2007).

Like other literature, PLC literature stated that good leaders know how to focus on what is important (DuFour, R. P. & DuFour, R., 2010; DuFour, R. P. et al., 2008; DuFour, R. P. & Eaker, 1998; Wood, 2007). They work to protect the sanctity of the school's mission, vision, and values (DuFour, R. P. & Eaker, 1998). They proactively attend to progress (Wood, 2007) that is focused on changing undesirable teacher behaviors (DuFour, R. P. & DuFour, R., 2010) and achieving desirable student results

and continuous teacher learning (DuFour, R. P. & Eaker, 1998). Good principals can motivate teachers to make decisions collectively from the ground up (DuFour, R. P. & Eaker, 1998) by telling stories that speak to both the minds and the emotions of the teachers (DuFour, R. P. et al., 2008).

Another characteristic that good principal leaders have is a respect for time (DuFour, R. P. & DuFour, R., 2010; Nelson et al., 2010; Wood, 2007). Nelson et al. (2010) stressed the importance of time for teacher collaboration with respect to achieving goals that are focused on student work. Good principals provide teachers time to work and learn together multiple times per month (Wood, 2007). All of this is accomplished by working the needed time into the master schedule (DuFour, R. P. & DuFour, R., 2010).

Like other literature, PLC literature stated that effective principals help the teachers by supporting collaborative teams (DuFour, R. P. & Eaker, 1998; Wood, 2007). They foster collaboration by providing needed outside information to the teams (DuFour, R. P. & Eaker, 1998; Wood, 2007). Wood (2007) also pointed out good principals take part in team building exercises and then further creates stability within the teams by keeping largely the same groups together from year to year.

**Teamwork**

Carew et al. (2010) contended that “no one of us is as smart as all of us” (p. 188). Businesses and other workplaces, then, need teams of people working together collaboratively if they want to be successful (Carew et al., 2010). Fullan (2001) agreed that both businesses and schools need to develop teams that work together collaboratively or they will not be successful.

Reports on ideal team size are not universal. Spiro (2011) stated an ideal team is a group of individuals numbering no less than 12 and no more than 20. Palanski, Kahai, and Yammarino (2011) defined a team as "two or more interdependent individuals who work jointly to accomplish one or more tasks" (p. 201). Carew et al. (2010) agreed that a team must consist of two or more people working on the same goal.

Individuals benefit when they work in teams (Carew et al., 2010; Maxwell, 2009; Sheng et al., 2010; Spiro, 2011). Working in teams helps individuals to learn more than if they worked independently (Maxwell, 2009; Randolph & Blanchard, 2010; Spiro, 2011). In education, Vance (2010) stated that teachers of different subjects become connected to one another when they collaborate, so teaming becomes beneficial to them. Carew et al. (2010) reported that a study of 162 Swedish workers over a 14-year period showed individuals also benefit in terms of their health, because there is an increased risk of heart attack for people who work alone. Sheng et al. (2010) explained that teamwork is good for people because they are happier at work, so they stay in their positions longer, are more productive, and are absent less often.

When people work in teams, the company benefits (Carew et al., 2010; Maxwell, 2009; Spiro, 2011). Teams produce better ideas than individuals (Maxwell, 2009; Spiro, 2011). Teamwork allows the development of solutions that could not be conceived of by one person working independently (Spiro, 2011). Additionally, Maxwell (2009) explained that the sheer abundance of ideas produced in a team is greater and those ideas are more innovative than if individuals worked in isolation. Teams are also able to reach goals faster than if they were working separately (Carew et al., 2010; Maxwell, 2009).

Schmoker (1999) and Spiro (2011) reported there is a relationship between teamwork and improvement. Teams are stronger than individuals (Fisher, 2007).

The highest performing teams have commonalities in both their processes and their organization (Carew et al., 2010; Maxwell, 2009; O'Neill & Conzemius, 2006; Seibold & Kang, 2008; Sheng et al., 2010; Spiro, 2011). Carew et al. (2010) and Spiro (2011) explained that high performing teams have a mission, or purpose. As well, the members of successful teams share a common vision (Seibold & Kang, 2008), agree upon common values and norms (Carew et al., 2010), and work from goals that include tasks and timelines (O'Neill & Conzemius, 2006; Spiro, 2011). High performing teams also operate from carefully developed processes (Seibold & Kang, 2008). For example, Spiro (2011) explained that successful teams keep planning sheets and minutes from team meetings to keep track of their history that ultimately saves time that would otherwise be wasted because of memory loss or turnover (Spiro, 2011). The structure of the highest performing teams also includes team roles, or responsibilities (Seibold & Kang, 2008; Spiro, 2011). Finally, members of the highest performing teams possess the knowledge they need to find the resources necessary to get their jobs done (Carew et al., 2010).

The highest performing teams conduct themselves in many of the same ways (Carew et al., 2010; Gajda & Koliba, 2008; Seibold & Kang, 2008; Sheng et al., 2010). Carew et al. (2010) shared that on high performing teams everyone is a leader. Team members know how to manage conflict, develop ways to improve, and remain open and ready for changes as new situations arise (Carew et al., 2010). These individuals can build and maintain relationships with their teammates (Seibold & Kang, 2008) because they are more concerned with the greater good than with individual accomplishments

(Carew et al., 2010). High performing teams possess high morale and high productivity because they are empowered to do their jobs (Carew et al., 2010). Lastly, these teams celebrate their accomplishments as a team and as individuals (Carew et al., 2010; Gajda & Koliba, 2008; Sheng et al., 2010).

The highest performing teams have a strong sense of trust, so it is important to the team (Fisher, 2007; Martin, 2006; Palanski et al., 2011; Perrin & Blauth, 2010; Sheng et al., 2010, Spiro, 2011). In fact, Sheng et al. (2010) stated "trust is critical within a team" (p. 1299). Ding and Ng (2007) defined trust as follows:

> Trust [is] the willingness of one party, with a risk awareness that anticipates negative outcomes to be greater than favourable expectations, to be vulnerable to the actions of the other party in an environment of mutuality, which is situational and person specific. (p. 1106)

This vulnerability is essential to the success of any team, because teams require positive relationships if they are going to reach their goals (Fisher, 2007). A lack of trust within a team is anti-productive, leading to wasted time and money (Martin, 2006). Martin (2006) informed readers that organizations should actively foster trust-building. This process should include using teams to drive improvements and offering appropriate professional development (Martin, 2006).

There are benefits to increased trust on a team. Palanski et al. (2011) explained that when people trust their teammates, they are more likely to help one another and less likely to be concerned with themselves; as a result, the teams overachieve (Palanski et al., 2011). So, "trust is an important element in collaborative planning" (Spiro, 2011, p.

107). Perrin and Blauth (2010) added that consistent trusting within an organization leads to improved culture.

Because research concerning "trust in short-term teams… cannot necessarily be applied to [long-term] teams" (De Jong & Elfring, 2010, p. 535), it is important to distinguish between them. Ongoing, or long-term teams, last indefinitely in an organization (Palanski et al., 2011). They "are teams whose tasks involve longer work cycles and whose members expect to be working together on future tasks" (De Jong & Elfring, 2010, p. 535). In contrast, short-term or ad hoc teams are temporary (Palanski et al., 2011).

Several studies have examined the effect of trust on various factors within long-term teams (Ding & Ng, 2010; De Jong & Elfring, 2010; Palanski et al., 2011). Ding and Ng (2010) used a Chinese trust scale to question 211 architects from 17 design institutes in China. They found a positive relationship between architects' positive attitudes toward their work and their teams' trust in them (Ding & Ng, 2010). Additionally, Ding and Ng (2010) found a positive relationship between the architects' social interactions and their teams' trust in them. In another study, DeJong and Elfring (2010) questioned 565 members of 73 teams in the tax department of consulting firms and found there is a significant positive relationship between trust and team performance. In these long-term teams, De Jong and Elfring (2010) also found that trust impacts effort because of the norms that are established and the bonds that are formed. Additionally, these researchers explained that reflection is related to both trust and performance, and there is a positive relationship between trust and the monitoring of teammates (DeJong & Elfring, 2010). Palanski et al. (2011), like De Jong and Elfring (2010), found a strong positive

relationship between team trust and performance in the 16 long-term teams they studied. Additionally, Palanski et al. (2011) argued that teams have behavioral integrity because they make promises through their mission statements and goals and then either follow through with the promises or not. It was found that trust in long-term teams is positively tied to behavioral integrity (Palanski et al., 2011).

Studies have also analyzed the effect of trust on various factors within short-term teams (Palanski et al., 2011; Sheng et al., 2010). Sheng et al. (2010), through 548 questionnaires given to teams competing together for just over a three-month period, determined there is a direct relationship between positive individual behaviors and trust within the team. Palanski et al. (2011) also found that behavior of the short-term teams affects the level of trust. Additionally, the existence of trust increased team commitment (Sheng et al., 2010) and team performance (Palanski et al., 2011).

Not all of the factors studied regarding teams were found to influence trust (De Jong & Elfring, 2010; Ding & Ng, 2010). For instance, in long-term teams no evidence was found to support an individual's personality affecting the trust bestowed by fellow teammates (Ding & Ng, 2010). Likewise, Ding and Ng (2010) found no evidence to support an individual's ability level influencing the trust earned from teammates in long-term teams. Though long-term teams show a positive relationship between trust and monitoring of teammates, this was not the case in short-term teams (De Jong & Elfring, 2010). Monitoring, in this case, referred to teammates helping one another when they needed assistance (De Jong & Elfring, 2010).

Trust is established and maintained in several ways (Carew et al., 2010; Perrin & Blauth, 2010; Spiro, 2011). Trust is built when individuals focus on situations instead of

each other, are open and consistent, and give and receive constructive feedback well (Perrin & Blauth, 2010). Also, teammates can build trust through cooperation, sharing, and following through on commitments (Carew et al., 2010). Additionally, teams build trust when they plan together for the future and make team improvements (Perrin & Blauth, 2010). When trust among teammates waivers, it can be re-established through a focus on tasks and facts and a redirection toward the group's goals (Spiro, 2011). To get performance out of a team, trust has to be an ingredient that is nurtured and grown (De Jong & Elfring, 2010), and social time between teammates should be used to help with this nurturing (Sheng et al., 2010). Teams need trust so they will be able to smooth over internal conflicts or make changes among them (Perrin & Blauth, 2010). Perrin and Blauth (2010) concluded that "trust… is at the root of motivation" (p. 10). Without motivation, innovative ideas will be stifled (Perrin & Blauth, 2010).

Like trust, cooperation enhances teamwork within an organization (Hoegl & Parboteeah, 2006; Maxwell, 2009; Sheng et al., 2010). For instance, cooperation increases when team members value each other's ideas and allow the best idea to win (Maxwell, 2009). Sheng et al. (2010) explained that when people feel their part is valued by the team, their commitment to the team improves. Hoegl and Parboteeah (2006), in their study of 430 people on 145 teams, showed that the quality of decisions made by a team increases when team members have a more equal influence over the decisions that are made.

Another characteristic of effective teams is that they learn together systematically (Langley et al., 2009; Randolph & Blanchard, 2010; Schmoker, 1999). According to Schmoker (1999), this process starts with goals. Goals are essential because they "give

the teamwork meaning" (Schmoker, 1999, p. 23). Schmoker (1999) told readers that collaboration is ineffective without a limited number of clear goals. Randolph and Blanchard (2010) indicated that teams exist for the purpose of learning and using new information in the process of moving forward. Langley et al. (2009) agreed and described this cycle of learning and using new information to move forward as a "PDSA (Plan, Do, Study, Act) Cycle" (p. 24). According to Langley et al. (2009), successful implementation of new, proven ideas for the purpose of creating positive changes is cyclic and begins with a plan executed first on a small scale. In a PDSA cycle, the planning phase requires asking questions and making predictions. The doing phase requires attempting the plan and recording data during the process. The studying phase involves learning from the data and comparing the data to predictions. Finally, the acting phase requires moving forward based on what was learned. The cycle may need to repeat before the change is implemented (Langley et al., 2009).

PLC literature agreed with the general literature with respect to the need for effective teamwork (DuFour, R. P. & Eaker, 1998; Fullan, 2007; Wood, 2007). PLCs work because of teacher interactions (Fullan, 2007). Because the work of the teachers has the biggest impact on children, collaborative culture matters (Wood, 2007). Teachers cannot work alone and accomplish goals; they need to work together every day (DuFour, R. P. et al., 2008; Fullan, 2007). DuFour, R. P. and Eaker (1998) told readers that teachers must collaborate continuously, and they must always be learning.

There are several indications given in the PLC research regarding how teams of teachers should collaborate together (DuFour, R. P., 2007; DuFour, R. P. & DuFour, R., 2010; DuFour, R. P. et al., 2008; Nelson et al., 2010; Wood, 2007). First, teachers should

operate within a set of norms, or rules (Wood, 2007), because they help establish trust within the team (Nelson et al., 2010). Secondly, teachers should work to reach consensus on issues together by sharing and voting until the general opinion of the group is evident (DuFour, R. P. et al., 2008). Conversations within the team should always focus on student learning, not on teaching (Nelson et al., 2010), and interventions should be in place for each group to help students who are not learning (DuFour, R. P. 2007). These interventions can include "additional time [and]… additional support" (DuFour, R. P. & DuFour, R., 2010, p. 83).

According to the PLC literature, there are benefits to teacher collaboration (DuFour, R. P. & DuFour, R., 2010; Fullan, 2007). R. P. DuFour and R. DuFour (2010) told readers that teacher collaboration fosters shared responsibility for goals and breaks down isolation. Also, Fullan (2007) explained that collaboration improves teachers' situations, effectively decreasing burnout. Therefore, teachers, like members of other organizations, should collaborate together.

Like other teams in other organizations, PLC teams work together systematically. R. P. DuFour et al. (2008) explained that the work of a collaborative team of teachers should focus on what the students should know, how teachers will know when the students have learned, and what to do about students who either do not learn or learn at higher levels. Similarly to Langley et al.'s (2009) PDSA cycle, Nelson et al. (2010) advised teachers to use an inquiry cycle to do their important work. This inquiry cycle included focus, implementation, and analysis. The focus, or goals, of a professional team should be broad enough to reach all group members (Nelson et al., 2010), should be concerned with deeper learning (DuFour, R. P. & DuFour, R., 2010) and should draw on

outside research and resources (Nelson et al., 2010). Implementation involves carrying out the steps to reach the goals (Nelson et al., 2010). Nelson et al. (2010) explained that, after implementation, an analysis of the results following data collection is imperative because analysis of the data provides the opportunity for teams to determine their position relative to the goals and then redirect accordingly. The cycle then repeats.

The PLC literature and other education literature both supported the use and analysis of common formative assessments by teams of teachers to drive instruction (Ainsworth, 2007; DuFour, R. P., 2007). DuFour, R. P. et al. (2008) stated that common assessments are an excellent way to determine if students are actually acquiring the knowledge that teachers expect them to have. Ainsworth (2007) agreed that "educators need a dynamic, in-school assessment system that includes common formative assessments" (p. 82). Common formative assessments are assessments given by a team of teachers at the same grade level or in the same course several times during a time period to get a snapshot of student knowledge with respect to the most important objectives (Ainsworth, 2007; Nelson et al., 2010). Good common formative assessments are aligned to measure the same objectives (Ainsworth, 2007).

There are several benefits to the use of common formative assessments (Ainsworth, 2007). First, educators and students will "receive regular and timely feedback regarding student attainment of the most critical standards" (Ainsworth, 2007, p. 95). White (2007) agreed the learning data provided by common formative assessments creates a snapshot of student knowledge with respect to the big picture and most important standards. Ainsworth (2007) identified a second benefit in that common formative assessments promote consistency in expectations throughout a course or grade

level. Common formative assessments also act as a good indicator of summative results (Ainsworth, 2007). Lastly, White (2007) stated "our work will be most successful when we base it on evidence from our experience rather than another's research or reference" (p. 223). By this, White (2007) meant that when educators gather their own data through common formative assessments, they are more effective.

Common formative assessments provide learning data (Ainsworth, 2007; Schmoker, 1999; White, 2007). Schmoker (1999) stated "data makes goals meaningful" (p. 54). It allows educators to see what is really there with respect to the achievement of their students. With that data, educators can identify strengths and weaknesses in their instruction and make plans for improvement (Schmoker, 1999). Schmoker (1999) also pointed out that this process does not have to take long provided the right data is available prior to the educators' meeting to discuss it. PLC experts agree the purpose of evaluating common assessment data is to improve student achievement (DuFour, R. P. & DuFour, R., 2010).

**Transforming Culture**

Creating successful, sustainable change is about changing the culture of an organization (Fullan, 2001). Therefore, when it comes to achieving successful, sustainable change, Fullan (2001) concluded "reculturing is the name of the game" (p. 34). This involves breaking down barriers and developing trust that will foster the success of organizations, and schools specifically (O'Doherty & Ovando, 2009).

PLC literature and other education literature agree that an effective school culture contains several components that need to become embedded if the culture is to be sustainable (Parrett & Budge, 2009; DuFour, R. P. & Eaker, 1998). The culture of a

school needs to be one in which there are definite goals and increased learning for educators and students (DuFour, R. P. & DuFour, R., 2010). There should be shared values, reflective conversations, and shared celebrations of successes (DuFour, R. P. & Eaker, 1998). Parrett and Budge (2009) found the culture of a successful school should also include shared educator accountability. These requirements are many, which can create tension among teachers in a school.

Schools "cannot avoid the discomfort [during change], but [they] can determine how [they] will respond when the going gets tough" (DuFour, R. P., 2007, para. 11). Changing a culture involves communication throughout planning as well as targeted monitoring of progress. It involves continuous team collaboration with a shared purpose (DuFour, R. P. & Eaker, 1998). It requires the ability to resolve conflict, as conflict is part of the change process (DuFour, R. P. & DuFour, R., 2010). It is crucial that schools understand PLCs are not a program but are a shift in mindset to the continual monitoring of what is going on with respect to the goals (DuFour, R. P. et al.., 2008). Culture will change "when the new behaviors become normal" (DuFour, R. P. & DuFour, R., 2010, p. 80). Improvement and change will ultimately depend, though, on whether the educators commit and work hard to sustain the change (DuFour, R. P., 2007).

**Change Roadblocks**

Many of the mistakes that stifle the change process are due to inadequate leadership (Kotter & Schlesinger, 2008; Spiro, 2011; Zigarmi et al., 2010). Leaders fail in their planning efforts (Kotter & Schlesinger, 2008) when they do not dedicate all resources to only a limited number of focused goals (Zigarmi et al., 2010). Zigarmi et al. (2010) found organizations fail in their change process when leaders do not pilot efforts,

measure their progress by collecting data, or involve themselves fully in the implementation process. Kotter and Schlesinger (2008) found that change efforts fail when the time spent on the effort becomes too great. When morale suffers because leaders do not understand the culture, do not take time to alleviate concerns, fail to involve all stakeholders, or lose credibility, change processes are not likely to be successful (Kotter & Schlesinger, 2008; Zigarmi et al., 2010). Finally, inadequate leadership includes charging into an implementation without taking time to assess the needs thoroughly (Kotter & Schlesinger, 2008; Spiro, 2011; Zigarmi et al., 2010).

Sometimes successful change fails because the people in the organization do not support it (Armenakis & Harris, 2009; Kotter & Schlesinger, 2008; Zigarmi et al., 2010). One reason for lack of support is that the people are not convinced the leaders are committed to the change long term (Armenakis & Harris, 2009). Another reason people refuse to support a change effort is if they do not agree with the chosen method of change, or if they see a loss or no benefit to themselves for participating (Armenakis & Harris, 2009; Kotter & Schlesinger, 2008). A final reason for lack of support is a failure of people to believe they have the skills to make the change happen (Armenakis & Harris, 2009; Kotter & Schlesinger, 2008; Zigarmi et al., 2010).

There are several ways that teamwork can be negatively affected; leading to conflict that stifles change (Carew et al., 2010; Chan & Chen, 2010; Perrin & Blauth, 2010; Sharma et al., 2009). A study of 104 students in eight teams led Sharma et al. (2009) to conclude that teams dysfunction when there are too many different perspectives, when they are too big, and when there is no emotional attachment to the team. Conflict also results when there is ineffective communication (Chan & Chen,

2010) and negative reinforcement that leads to distrust (Perrin & Blauth, 2010). Poor leaders who treat their teammates unequally and self-centered teammates who put their needs above the team also induce conflict (Chan & Chen, 2010; Sharma et al., 2009). Finally, researchers agreed that a major source of team conflict and dysfunction is confusion about or lack of vision and goals (Carew et al., 2010; Chan & Chen, 2010; Sharma et al., 2009). These problems will persist if teams lack the ability to resolve conflict (Carew et al., 2010).

There are similar leadership and team challenges associated with becoming a PLC (DuFour, R. P. & Eaker, 1998; Fullan, 2007; Servage, 2009; Wells & Feun, 2007; Wood, 2007). One common mistake schools make is to take on too many goals at one time or to make their goals too general (DuFour, R. P. & Eaker, 1998). Another hurdle, according to Fullan (2007), is the difficult role of the leader in facilitating change. In a study of an urban school, Wood (2007) reported that most faculty members struggled with time availability and with a focus on student learning in their collaborative groups. A study of six high schools by Wells and Feun (2007) also revealed that teachers felt a collaborative focus on student learning was difficult. They preferred to spend their collaborative time sharing plans and ideas (Wells & Feun, 2007).

**PLC Case Studies**

Despite roadblocks, several schools showed marked improvements in academic achievement as a result of their focused participation in PLCs (DuFour, R. P. & DuFour, R., 2010; Garcia, 2009; Schmoker, 2001). Milwaukee Public Schools in Wisconsin showed increased achievement in math, reading, and science in 1998 as a result of their "clear standards, focused teaming, and goal-oriented, data-driven structures" (Schmoker,

2001, p. 31), all of which are components of PLCs. Schmoker (2001) also reports Adlai Stevenson High School District as a success story. Between 1985 and 1996, "they raised achievement in every measurable category" (Schmoker, 2001, p. 9). More recently, R. P. DuFour et al. (2008) wrote Granby Memorial High School in Granby, Connecticut increased achievement in all areas of their state testing and by nearly 40 points on the SAT composite because of their work in PLCs. Lastly, Garcia (2009) reported Whittier Union High School District increased student achievement dramatically over the past five years due to their work as a PLC.

Despite some case studies of success, PLC results noted in the literature and in relationship to academic achievement are mixed. Servage (2009) argued that PLCs removed the creativity from collaboration because "the learning content is largely pre-determined" (p. 166). Servage concluded "that PLC learning presently embraces technical and managerial dimensions of teachers' work at the expense of craft knowledge and critical perspectives" (p. 149), limiting teachers. In a study of 115 Pennsylvania high schools whose principals reported implementing PLCs, Varano (2010) found no relationship between PLCs and math or communication arts achievement as measured by state assessment data. In a similar study, Beres (2007) examined the relationship between PLC maturity level and student achievement in 24 secondary Alberta schools in a study that followed a four year implementation of PLCs at those schools. Beres (2007) found that, after four years, schools were still working toward becoming mature PLCs. Additionally, Beres (2007) found no gains in standardized English assessment scores and only slight gains in social studies scores.

## Conclusion

The author concluded that successful, sustainable change cannot occur without developing a mission and vision, identifying values and goals, implementing strong leadership, focusing teamwork, and transforming culture. Wood (2007) stated PLCs are promising for the future. The author concluded this is true because of the overwhelming parallels between the components of the PLC concept and the general literature associated with instituting sustainable change in an organization. The author was anxious to evaluate student outcomes following the implementation of PLCs in the Midwest School District. This study will add to the few existing quantitative student outcomes studies related to PLCs at the high school level in that it is also a quantitative study of student outcomes and it provides insight into the PLC implementation process.

# Chapter 3: Methodology

Studies reported mixed results regarding differences in student achievement following PLC implementation (Beres, 2007; DuFour, R. P. et al., 2008; DuFour, R. P. & DuFour, R., 2010; Garcia, 2009; Schmoker, 2001; Servage, 2009; Varano, 2010). This quantitative study will add to the current literature available regarding student outcomes following PLC implementation at the high school level. The researcher analyzed both quantitative, standardized student outcome measures such as state assessments as well as teacher-generated common assessments and grades. In addition, the researcher analyzed teacher perception survey data from two instruments. One of those instruments was validated.

## Rationale

This study was a partial evaluation of student outcomes following a five year implementation of PLCs in Midwest High School, which served nearly 2,000 students. Fullan (2007) stated PLCs are difficult to implement because they involve changing a culture, not starting a program. However, since 21st century education will require teachers to work in PLCs (DuFour, R. P. & DuFour, R., 2010), successful creation of a learning community culture is imperative. Thus, this study will add to the current literature on PLCs in that it examined their implementation at Midwest High School.

## Research Problem

Starting in March 2006 and continuing through May 2011, Midwest High School worked toward becoming a PLC. The research did not indicate an exact timeline for successful implementation, but the primary goal of this high school from March 2006

through May 2011 was to effectively implement PLCs. Therefore, the researcher partially evaluated progress toward that goal through use of student outcomes in the area of academic achievement and teacher perceptions through the use of two teacher surveys.

**Research Questions**

1. Has student achievement increased during the course of implementing PLCs? If so, is there evidence that this is a result of a contribution from PLC implementation from 2006-2011?
2. Have teacher attitudes toward curriculum rigor, public image, quality of education, and post-high school preparedness changed during the implementation of PLCs from 2006-2011?
3. Is the staff, in April 2011, a mature PLC as measured by a diagnostic tool called School Professional Staff as Learning Community Questionaire that was designed, written, and validated by SEDL (Hord et al., 1999)?

According to Hord et al. (1999), Hord developed this survey in 1996 at the SEDL. SEDL is "a private, nonprofit education research, development, and dissemination (RD&D) corporation based in Austin, Texas [that is dedicated to] improving teaching and learning" (SEDL, 2011, para. 1). This survey contains 17 descriptors grouped into five areas. One of its potential uses was as a diagnostic tool to determine if a staff has developed into "communities of professional learners" (Hord et al., 1999, p. 3).

**Null Hypotheses**

**Null hypothesis one.** There will be no measurable difference in average grade point average when comparing semester one freshmen report cards for each academic year from December 2005 to December 2010.

**Null hypothesis two.** There will be no measurable difference in average scores achieved for the course Algebra I on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis three.** There will be no measurable difference in average scores achieved for the course American Government on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis four.** There will be no measurable difference in average scores achieved for the course Biology on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis five.** There will be no measurable difference in average scores achieved for the course English II on the semester one common final exam between December 2009 and December 2010.

**Null hypothesis six.** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the Algebra I Missouri State End of Course Exam between May 2009 and May 2011.

**Null hypothesis seven.** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the Biology Missouri State End of Course Exam between May 2009 and May 2011.

**Null hypothesis eight.** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the English II Missouri State End of Course Exam between May 2009 and May 2011.

**Research Setting**

According to the Missouri Department of Elementary and Secondary Education (2010c), this high school served between 1886 and 2037 students enrolled in grades nine through 12 annually. As seen in Table 4, student enrollment was trending downward, with the lowest enrollment of 1886 being reported in 2010. Additionally, the Asian population was increasing while the black population showed decreases (Missouri Department of Elementary and Secondary Education, 2010c).

Table 4

*Midwest High School Enrollment Data*

| Enrollment | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Total | 2032 | 2037 | 1998 | 1980 | 1886 |
| Asian | 0.8% | 0.9% | 1.2% | 1.1% | 1.5% |
| Black | 11.0% | 10.8% | 11.3% | 10.7% | 9.5% |
| Hispanic | 0.4% | 0.4% | 0.7% | 0.7% | 0.8% |
| Indian | 0.0% | 0.0% | 0.0% | 0.0% | 0.1% |
| White | 87.7% | 87.8% | 86.8% | 87.5% | 88.1% |

*Note.* Adapted from "2009-10 School Accountability Report Card," by Missouri Department of Elementary and Secondary Education, 2010, para. 2. Retrieved from http://dese.mo.gov

The Missouri Department of Elementary and Secondary Education (2010c) reported between 2006 and 2011, the average dropout rate was 1.26% in Midwest High School. This number included 3.06% of black students and 1.02% of white students. These were the only subgroups in which dropout rates existed. In this school, there was

no noticeable change in this dropout trend in these groups during the time of the study (Missouri Department of Elementary and Secondary Education, 2010c).

Table 5

*Percentage of Students Seeking Post-Graduate Education*

| Destination | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Entering a 4yr. College/University | 45.5 | 44.4 | 47.2 | 47.8 | 42.0 |
| Entering a 2yr. College | 40.1 | 41.5 | 33.1 | 31.5 | 34.6 |
| Entering a Technical Institution | 4.8 | 3.1 | 2.8 | 5.2 | 1.9 |

*Note.* Adapted from "2009-10 School Accountability Report Card," by Missouri Department of Elementary and Secondary Education, 2010, para. 7. Retrieved from http://dese.mo.gov

For graduates of Midwest High School, more than 80% sought additional formal education during the five year study period. Table 5 summarizes the destination of graduates during the time of the study. All Midwest High School percentages were above the reported Missouri State percentages at that time, showing that Midwest High School had a higher than average percentage of graduates seeking post-graduate education.

At the time of this study, students were eligible for free lunch if their family earned less than $28,665 per year. They were eligible for reduced lunch prices if their family earned less than $40,793 per year (United States Department of Agriculture, 2011). At Midwest High School, the percentage of students who qualified for FRL increased from 11.6% to 14.9% between 2006 and 2010 (Missouri Department of Elementary and Secondary Education, 2010c).

From 2006 through 2010, Midwest High School reported a per pupil expenditure that was below the Missouri state average per pupil expenditure (Missouri Department of

Elementary and Secondary Education, 2010b). As seen in Table 6, this difference in spending was greater than $1,000 per student each of the five years of the study.

Table 6

*Average Per Pupil Spending ($) Comparison Between Midwest High School and State of Missouri*

| Year | School | State | Difference |
|---|---|---|---|
| 2006 | 7140 | 8221 | 1081 |
| 2007 | 7208 | 8682 | 1474 |
| 2008 | 7662 | 9338 | 1676 |
| 2009 | 7819 | 9667 | 1848 |
| 2010 | 8344 | 9751 | 1407 |

*Note.* Adapted from "Finance Report, 2006-2010," by Missouri Department of Elementary and Secondary Education, 2010, para. 1. Retrieved from http://dese.mo.gov

Under NCLB during this time, schools were required to track and report several data pieces for inclusion on a yearly report card. These data pieces were divided into three categories: communication arts test scores, math test scores, and additional indicators. The Missouri Department of Elementary and Secondary Education assigned Missouri schools goals for each category. School data was reviewed by employees of the state yearly and schools were graded as having *met* or *not met* their goals. This measure was called *AYP* (Wiener & Hall, 2004).

In Midwest High School, the communication arts category was measured by a Missouri State EOC Exam that students took in the spring during their English II course (Missouri Department of Elementary and Secondary Education, 2010a). The math category was measured by a Missouri State EOC Exam that students took in the spring

during their Algebra I course. Based on enrollment numbers, the state of Missouri determined that goals for each exam would be measured against five subcategories: all students, black, white, IEP, and FRL. The third category, additional indicators, included goals for subcategories of attendance and graduation rate (Missouri Department of Elementary and Secondary Education, 2010a). In order to meet AYP requirements in each category, the school must have met the goals in each subcategory. A summary of AYP status for this school from 2006 through 2010 appears in Table 7. As shown in Table 7, the school met all goals in 2009 and 2010.

Table 7

*AYP Status for Midwest High School*

| Category | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Communication Arts | Met | Not Met | Not Met | Met | Met |
| Mathematics | Not Met | Not Met | Met | Met | Met |
| Additional Indicator | Met | Met | Met | Met | Met |

*Note.* Adapted from "Final Adequate Yearly Progress," by Missouri Department of Elementary and Secondary Education, 2010. Retrieved from http://dese.mo.gov

Though not included in the AYP measures, students in the state of Missouri were also required to take a Missouri State EOC Exam in Biology. The required Biology EOC exams were required for the first time in 2009. At Midwest High School, students typically complete Biology during their 11th grade year. A summary of the students meeting state expectations in Biology is included in Table 8.

Table 8

*Percentage of Midwest High School Biology Students Who Met the Missouri Department of Elementary and Secondary Education's Minimum Score Requirements on the EOC Exam in Biology compared to Overall Missouri Percentages*

| Category | 2009 | 2010 | 2011 |
|---|---|---|---|
| Midwest High School | 61.5 | 74.3 | 80.1 |
| Missouri | 55.1 | 56.7 | 60.6 |

*Note.* EOC= End of Course. Adapted from "2009-10 School Accountability Report Card," by Missouri Department of Elementary and Secondary Education, 2010, para. 15. Retrieved from http://dese.mo.gov

Another student performance indicator was Advanced Placement (AP) testing. According to the College Board (2011b), Advanced Placement courses were courses taken in high school that have college level content standards set by the College Board. More than 30 AP courses existed in a variety of subject areas across all disciplines (CollegeBoard, 2011b). High schools chose whether or not to offer AP courses and then which AP courses to offer. Near the end of the course, students had the option to take a test written and scored by the College Board. Scores on the test ranged from one to five. Many colleges and universities accepted "qualifying AP Exam scores for credit and/or placement" (CollegeBoard, 2011b, para. 5). Most colleges and universities accepted a score of three or greater (CollegeBoard, 2011a).

As seen in Table 9, the number of AP tests given at Midwest High School increased from 2005 through 2010. Additionally, the number of tests scoring three, four, and five increased. This was due, in part, to a concerted effort on the part of administrators and several teachers to add AP courses to the course offering.

Table 9

*Midwest High School Advanced Placement Test Data*

| Category | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| AP tests given | 29 | 42 | 54 | 120 | 266 | 265 |
| AP tests earning 3-5 | 15 | 37 | 42 | 67 | 138 | 180 |

*Note*. AP = Advanced Placement

At Midwest High School, academic achievement appeared to have increased between 2006 and 2011 when considering Missouri AYP status and AP testing. However, several questions remained. For instance, it was not known whether improvements in state scores were statistically significant. Also, it was not known whether other academic measures within Midwest High School would show measurably significant increases.

**Methodology**

Prior to beginning this study, written permission was obtained by the researcher from the Assistant Superintendent of Curriculum at Midwest School District to use secondary data for this study. Then, documentation of processes used at Midwest High School were gathered; these included committee notes, faculty meeting minutes, reports to the principal, reports to the school board, and PowerPoint presentations.

**Research question one.** To address research question one, three student achievement measures were statistically evaluated. As the initial measure, first semester ninth grade report cards from the high school were analyzed for the fall of 2005, 2006, 2007, 2008, 2009, and 2010. From each population, a random sample of 50 student report cards was chosen using an online random sampling tool (Social Psychology Network, 2008). Each report card was classified as Advanced, Proficient, Basic, or

Below Basic (See Definition of Terms, Chapter 1). Advanced report cards were those containing only grades of A and B. Proficient report cards were those containing only grades of A, B, and C. Basic report cards were those containing one D or F. Below Basic report cards were those containing two or more Ds or Fs. For each population, the percentage of students with each type of report card was calculated and put into a table. Then, a chi-square test for homogeneity of proportions (Bluman, 2010) was conducted applying an alpha level of 0.05 to determine if the proportions for the years 2005-2010 were statistically different. If there was a statistical difference, the chi-square calculation would be higher than the critical value for this test and the evidence would be present to suggest rejection of the null hypothesis.

A second set of student achievement data that was analyzed is student scores on common semester one final exams for Algebra I, American Government, English I, and Biology. For each course, a convenience sample (Bluman, 2010) was gathered consisting of student scores earned by percentage during December 2010 and December 2011. From each of these samples, the researcher randomly chose 30 scores using an online random sampling tool (Social Psychology Network, 2008) and the average exam score for each of the eight groups was calculated. Then, a *z*-test comparing two means (Bluman, 2010) was conducted for each of the above courses using an alpha level of 0.05. If there was a statistically significant increase in average scores between 2010 and 2011, then evidence would be present to suggest rejection of the null hypothesis.

A third set of student achievement data that was analyzed is the Missouri State EOC Exam scores for English II, Algebra, and Biology, which were offered and administered for the first time in 2009. Teachers gave these exams yearly in April to

students completing the English II, Algebra, or Biology courses, respectively. Student scores were categorized as Advanced, Proficient, Basic, or Below Basic. School districts in Missouri were graded against achievement targets on the total percentage of students scoring in the Advanced and Proficient categories. Scores and progress toward achievement targets were typically available to schools and districts during October in the same year following the April exams (Missouri Department of Elementary and Secondary Education, 2010d).

To analyze EOC Exam scores, assessment data from 2009 and 2011 were compared. For each test in each year, the researcher randomly chose 40 scores using an online random sampling tool (Social Psychology Network, 2008). Then, a *z*-test comparing two proportions (Bluman, 2010) was conducted for the English II, Algebra, and Biology EOC Exams using an alpha level of 0.05. If there was a statistically significant increase in proportion of students who achieved Advanced and Proficient between 2009 and 2011, then evidence would be present to suggest rejection of the null hypothesis.

**Research question two.** In October 2006, a paper survey was given at a faculty meeting by the PLC Leadership Team to the teachers in this school. The goal was to gather baseline data prior to the changes that were going to take place. As a part of the survey, teachers were asked to report their opinions about current curriculum rigor, public image, quality of education, and post-high school preparedness on a four point scale. This same survey was given to the teaching staff again in April 2011. Surveys were collected and tallied by members of the PLC Leadership Team. Survey results were organized and recorded by the researcher and then compared using a Likert-like scale

analysis for trends to determine if there were any changes in teacher attitudes between 2006 and 2011.

**Research question three.** In April 2011, a paper survey was given at a faculty meeting by the PLC Leadership Team to the teaching staff in Midwest High School. According to Hord et al. (1999), Hord designed, wrote, and validated this survey in 1996 at SEDL. This survey, called School Professional Staff as Learning Community Questionaire, contained 17 descriptors grouped into five areas: principal shared leadership and decision making, shared vision of commitment to student learning, collective learning to address student needs, peer feedback of teacher classroom practices, and school conditions supporting PLCs. It was nationally field tested by Appalachia Educational Laboratory and was found at the elementary, middle, and high school levels to be "useful as a screening, filtering, or measuring device to assess the maturity of a school's professional staff" (Meehan, Orletsky, & Sattes, 1997, Abstract). Among its potential uses was a diagnostic tool to determine if a staff has developed into "communities of professional learners" (Hord et al., 1999, p. 3). The results of this survey were reported and then analyzed by the researcher on a Likert-like scale for trends to determine teacher attitudes toward progress in becoming a PLC.

## PLC Implementation at Midwest High School

**Role of the Researcher.** The researcher was a classroom teacher in the study site high school during the decision-making process and subsequent implementation of PLCs. The following timeline was described from personal experience.

**2005-2006 school year.** Due in part to Midwest High School educators' failure to meet overall AYP in math or communication arts for three years prior, in the fall of 2005

central office administrators required that Midwest High School adopt a school improvement model. Soon after that, the principal held a staff meeting where he suggested PLCs as the solution. He wanted to apply for a PLC training grant through the University of Missouri-St. Louis. One of the application criteria was a faculty vote where a minimum of 70% of faculty members voted in favor of becoming a PLC school. The vote failed to meet the 70% requirement.

The study site Midwest High School principal asked for teacher volunteers to form an ad hoc committee for the purpose of researching school improvement model options and making a recommendation to the faculty. Approximately 12 teachers from several different departments met several times during the fall to accomplish this task. The researcher was one of these teachers. Through their work, the teachers concluded that PLCs was the best school improvement model for Midwest High School.

In the spring of 2006, the principal again held a faculty meeting. This time, though, the ad hoc committee of teachers presented research and reasoning to explain why PLCs were the best school improvement model for their teachers and students. A second vote was taken, and over 80% of the teachers supported the recommendation. This high school staff then embarked on a journey to implement PLCs as its school improvement model beginning with the fall 2006 semester.

In the days following this meeting, the principal assembled a PLC Leadership Team consisting of eight people, including him and seven teachers. This team was chosen from the ad hoc committee by the principal. He chose teachers that represented as many departments in the building as were available. Additionally, he eliminated large amounts of duplication by excluding department chairs. The researcher was one of the

teachers on this PLC Leadership Team. Then, the principal applied for and was awarded the PLC training grant through a University of Missouri-St. Louis program. The training would be for the PLC Leadership Team and would include more than 12 days of training over a three year period. Following the grant award, the PLC Leadership Team attended their first training workshop during June. It was a four day workshop in which they built their team, learned the basic principles behind the PLC model, and made plans for the 2006-2007 school year.

**2006-2007 school year.** The implementation of PLCs began on August 10, 2006 when the faculty assembled for required work days prior to the start of school. Among other agenda items on the first work day, the faculty watched the barn-raising scene from the movie *Witness,* and then reflected in small groups on how the barn-raising represented a working system (PLC Leadership Team, 2006). The next work day, the PLC Leadership Team trained the faculty on the components of a mission and vision (DuFour, R. P. & Eaker, 2008). The faculty was led through a series of steps where they rewrote their mission statement by brainstorming first in pairs, then small groups, then larger groups. Finally, a representative from each of the large groups was asked to form an ad hoc committee to combine the mission statements into one. The process for revising the vision of the building followed the same procedure and began during professional development time in September. After meeting approximately three times each during the fall semester, the ad hoc teams completed the new mission and vision statements before December.

Also during the fall, PLC teams were formed within the content areas in the building. For smaller departments such as Fine Arts and Family and Consumer Sciences,

the entire departments formed one team. For larger departments, department members were divided into teams based on teaching core courses for graduation requirements. For instance, the English department divided into teams called English I, English II, English III and English IV, even though many more courses existed in that department. After forming teams, each team identified the roles of its members and developed Action Plans (see Definition of Terms, Chapter 1). Member roles included a facilitator in charge of the agenda, a timekeeper, a secretary in charge of minutes, and active participants. Each team functioned with a set of norms (see Definition of Terms, Chapter 1) which were created by each team when it was formed. Action Plans were written lists of the goals to be accomplished by the team, including what was planned, who was responsible, when it should be completed, how it was to get finished, and what the results would be (PLC Leadership Team, 2007). According to PLC Leadership Team conversations, the Action Plan was intended to be a simplified version of a SMART goal. It was chosen so teachers could initially begin work on writing goals in their teams.

On October 18, 2006, the teachers were surveyed by the PLC Leadership Team at a faculty meeting to obtain a snapshot look at their attitudes and beliefs with respect to the culture of the building. The intent was to use the information as a baseline for progress made during the development of the PLCs model in the building. This survey, repeated in April 2011, was the topic of research question two in this study and is included in Appendix A.

Another responsibility of the content area PLC teams was given in April 2007. It was to write ECOs for their courses by September 2007 (PLC Leadership Team, 2007). R. P. DuFour et al. (2008) defined ECOs as the “critical skills, knowledge, and

dispositions each student must acquire as a result of each course… of instruction" (p. 466). The requirement set forth by the administrative team through collaboration with the PLC Leadership Team was for between three and 10 ECOs to be written for each semester of each course that was taught during the 2006-2007 school year. If an instructor taught at least one section of the course, then the expectation was that he or she would assist the team in developing the ECOs.

In the spring of 2007, a committee of teachers began to meet in an effort to organize a building-wide intervention and incentive process for the school. The committee was the ANP (see Definition of Terms, Chapter 1) committee. The researcher was a member of this committee. Because the high school was on a block schedule, a 90 minute period of time during sixth block every other day was set aside for students to meet with teachers as needed. The purpose of the committee was to structure that time better so that the time was much more prescriptive for the students. The group was open to all teachers, and approximately 20 teachers were involved. Meetings continued into the summer, and in the fall of 2007 the ANP interventions and incentives diamond was implemented for grades nine and 10. Figure 1 shows this diamond. It had the following components:

Figure 1. Academic Networking Period Diamond of Interventions and Incentives

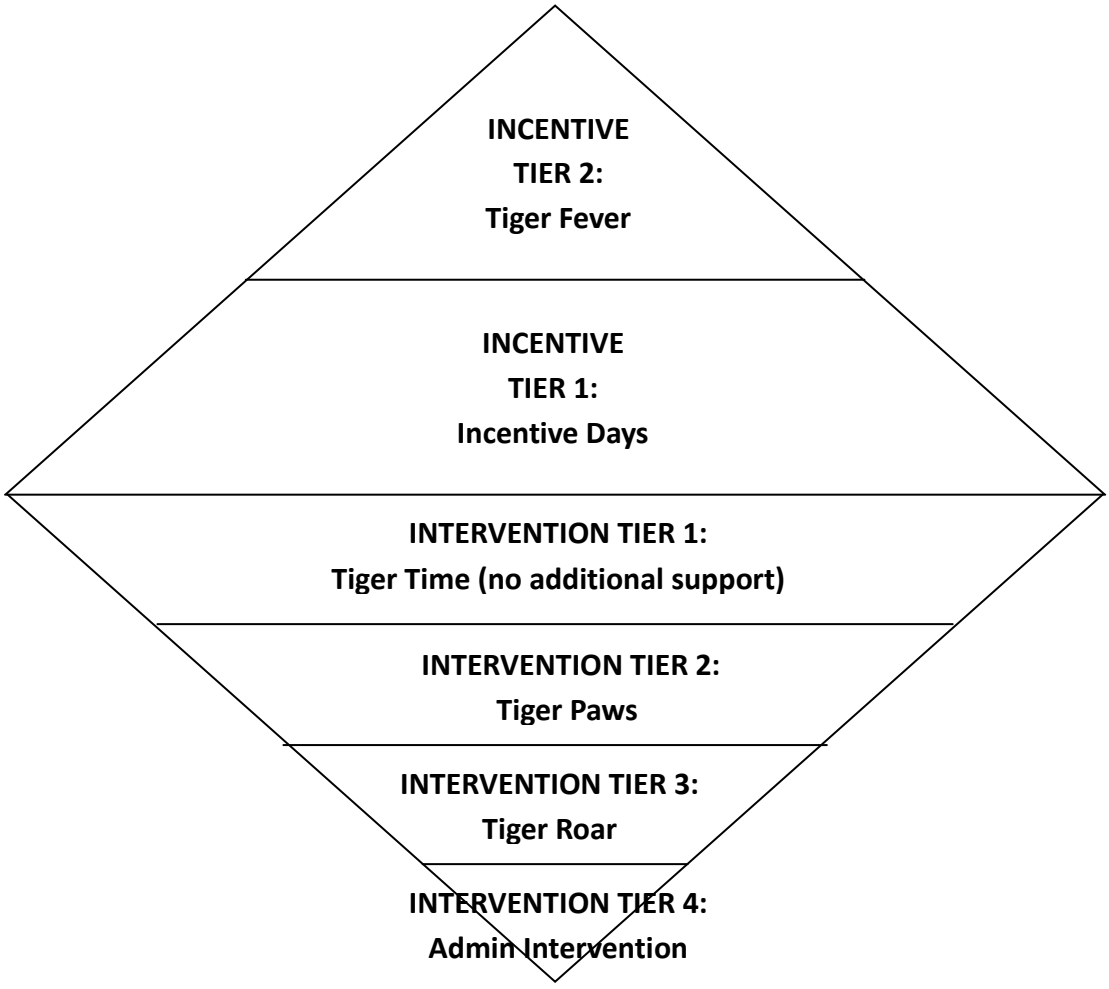


Figure 1. Model of the tiered system of interventions and incentives used during Academic Networking Period (ANP) at the study school site. Adapted from "Academic Networking Period: A main component of Midwest High School's pyramid of interventions and incentives," by the study school site PLC Leadership Team, 2011, unpublished manuscript.

***Intervention tier one.*** This tier, called Tiger Time (see Definition of Terms, Chapter 1), consisted of ANP classes of about 25 students organized by grade level. Approximately 85% of ninth and 10th grade students and 100% of full time 11th and 12th grade students were assigned to a Tiger Time ANP classroom. ANP students in

ninth and 10th grade who were assigned to a Tiger Time classroom earned proficient or advanced (see Definition of Terms, Chapter 1) report card during the previous term.

Students were allowed to use this time to work on homework and projects, gain additional help, and collaborate academically with peers. If students wanted to travel during their ANP time to see other teachers, use the library or work in the computer lab, they were required to obtain a pass before going to ANP. The students were responsible for bringing needed supplies and passes with them to ANP class. They were not allowed to visit their lockers during ANP (PLC Leadership Team, 2011).

The role of the subject area classroom teachers during their time with students was to issue the blue and green passes that students needed during ANP. A blue pass allowed a student to visit the teacher who issued it and could only be signed by that teacher. A green pass allowed students to visit the library or computer lab to complete work for the subject area teacher who issued it and could only be signed by that teacher. It was not permissible for ANP teachers to sign blue or green passes for students so they could travel during sixth block ANP (PLC Leadership Team, 2011). The expectation was that students would come to ANP prepared.

The role of the ANP teacher was to monitor the travel of their students during ANP. Students would sign out and in of their ANP classroom as they traveled and the ANP teachers would sign passes (PLC Leadership Team, 2011). Additionally, the job of the ANP teacher in an intervention capacity was to help students who did not have passes but had academic questions. Club and team meetings held by ANP teachers were prohibited during ANP time. The expectation was that ANP teachers would keep ANP and academic time and would remain available to their ANP students.

One additional role of the ANP teacher was to conduct grade consultations at the end of every term. This consisted of grade monitoring and goal setting. This was an opportunity for ANP teachers to build mentoring relationships with students and foster academic success. Each term, realistic and attainable academic goals were written by the students and reviewed with their ANP teacher. Then, every term, progress toward the goals was monitored.

***Intervention tier two.*** This tier, called Tiger Paws (see Definition of Terms, Chapter 1), consisted of students who had in the previous term earned a Basic report card (see Definition of Terms, Chapter 1). Tiger Paws classrooms held a maximum of 15 students each in either ninth or 10th grade. Additionally, these classrooms were organized by subject need. For instance, one classroom contained ninth grade students whose need was primarily math and/or science. One classroom contained ninth grade students whose need was primarily English and/or social studies. There were also two 10th grade classrooms organized in the same fashion. Each classroom was staffed by two content area teachers and one special education teacher (PLC Leadership Team, 2011).

Travel in Tiger Paws rooms was limited. Green and blue travel passes were not allowed. Instead, students who wished to travel did so only with ANP teacher permission and with a teacher or Tiger Fever (see Definition of Terms, Chapter 1) escort. Additionally, they were only permitted to travel to other Tiger Paws rooms (PLC Leadership Team, 2011). The primary reason for travel was to obtain answers to subject-specific questions that could not be answered by the teacher in a student's assigned Tiger Paws room.

In Tiger Paws, student progress was monitored every ANP by the ANP teachers. Once assigned to a Tiger Paws room, students remained for a minimum of six weeks (PLC Leadership Team, 2011). During this time, ANP teachers offered extra organizational assistance, daily grade monitoring, focused content area assistance, and increased structure.

Placement into or withdrawal from a Tiger Paws ANP was conducted at the end of every six-week term by a faculty team. This team consisted of one principal, one guidance counselor, and four teachers. The researcher was sometimes a member of this team. Movement between Tiger Time and Tiger Paws was based upon grades and attendance. Because of limited space in Tiger Paws classrooms, the perceived student issues needed to be as purely academic as possible for the team to place them. Students who did not attend school regularly or who had emotional issues that could not be met by the structure of the Tiger Paws classroom were not placed there (PLC Leadership Team, 2011).

***Intervention tier three.*** This tier, called Tiger Roar (see Definition of Terms, Chapter 1), consisted of students who had in the previous six-week term earned a Below Basic report card (see Definition of Terms, Chapter 1) and possessed behavioral and/or motivational issues. Tiger Roar classrooms held a maximum of 10 students each and were a mixture of ninth and 10th grade students. Each classroom was staffed by one content area teacher and one special education teacher. All travel during ANP for students in a Tiger Roar room was prohibited (PLC Leadership Team, 2011).

In Tiger Roar, student progress was monitored every ANP by the ANP teachers. Once assigned to a Tiger Roar room, students remained for a minimum of six weeks

(PLC Leadership Team, 2011). During this time, ANP teachers insisted on providing organizational assistance, focused content area assistance, and increased structure. These ANP classrooms were equipped with content textbooks and school supplies. Because ANP teachers monitored grades daily, they could obtain extra copies of the students' assignments from the content area teachers in an effort to help students earn better grades.

Placement into or withdrawal from a Tiger Roar ANP was conducted at the end of every six-week term by a faculty team. This team consisted of one principal, one guidance counselor, and four teachers. The researcher was sometimes a member of this team. Movement between Tiger Roar and Tiger Paws was based upon grades, attendance, and behavior. Because of limited space in Tiger Roar classrooms, the perceived student issues needed to be as purely academic and/or motivational as possible for the team to place them. Students who did not attend Midwest High School regularly because of attendance or who had emotional issues that could not be met by the structure of the Tiger Roar classroom were placed in other interventions such as the alternative school (PLC Leadership Team, 2011).

***Intervention tier four.*** Students in Tiger Time, Tiger Paws, and Tiger Roar whose behavior and/or academics consistently failed to meet the minimum expectations were referred to the their grade level principal's office (PLC Leadership Team, 2011). Behavioral and academic infractions were dealt with by use of the discipline guidelines that were in place. Among the possible consequences were detention, academic detention (see Definition of Terms, Chapter 1), in-school suspension, and out-of-school suspension.

***Incentive tier one.*** At the end of every six-week academic term, students earning a Proficient or Advanced (see Definition of Terms, Chapter 1) report card were rewarded with an Incentive Day. This incentive allowed students to spend half of one ANP class period either playing organized games in one of the two gymnasiums or relaxing in the cafeteria. During this time, students were also permitted to listen to their iPods, MP3 players, or other electronic devices. Electronic devices were otherwise against school policy.

***Incentive tier two.*** This tier, called Tiger Fever, was a mentor leadership program for 11th and 12th grade students. Students in Tiger Fever were placed in an ANP classroom where they were involved in mentoring ninth grade students who were in Tiger Time ANP classrooms. Additionally, they tutored students and ran errands for both the Tiger Paws and Tiger Roar Intervention ANP classrooms. During their time in their own ANP classroom, students were helped to develop leadership skills by two Tiger Fever teachers (PLC Leadership Team, 2011). Though discussed in this section, the Tiger Fever tier was not added to the ANP interventions and incentives diamond until the 2008-2009 school year.

**2007-2008 school year.** Throughout the 2007-2008 school year, teachers worked in their content area PLC teams to modify, complete, and write new Action Plans (see Definition of Terms, Chapter 1). The ANP intervention and incentive diamond continued without changes, and PLC teams met at least monthly to work toward achieving the goals laid out in their action plans.

The deadline for completing ECOs was extended from September 30, 2007 to May 8, 2008 (PLC Leadership Team, April 2008). This was largely due to feedback

received by the administrative team and the PLC Leadership Team from the teachers. Teachers were confused about the process and needed more time to both understand and complete the goal. All ECOs were completed according to the new timeline.

On April 25, 2008, the PLC Leadership Team held a celebration during a faculty meeting to highlight accomplishments within PLC Teams. Individual teachers were invited to add positive comments to a large piece of butcher paper. Ultimately, some of the comments were verbally shared and then the butcher paper was hung in the teacher work room. At the end of the celebration, faculty members were placed into groups of mixed departments to brainstorm goals for the 2008-2009 school year. During their summer planning session, the PLC Leadership Team used the results of this brainstorming session to write their building goals for the 2008-2009 school year (PLC Leadership Team, April 2008).

**2008-2009 school year.** During the 2008-2009 school year, the PLC Leadership team set three goals. The first goal was to decrease Ds and Fs among ninth and 10th grade students by 20% percent during the course of the school year. The second goal was to create and implement end of semester common assessment exams for each course being taught at Midwest High School by May 2009. The third goal was to re-integrate committees that were not subject-specific. Prior to the 2005-2006 school year, committees existed that would complete various jobs such as coordinating the building schedule for state test administration and planning social events. The decision was made to work to bring committees back that would increase interactions between members from different departments (PLC Leadership Team, August 2008).

On September 11, 2008, the PLC Leadership Team presented the faculty with a definition of common assessments so that teachers could begin to write common, summative semester final exams (PLC Leadership Team, September 2008). Within the context of this presentation were reminders regarding the importance of working efficiently in PLC teams through the use of norms during team meetings (see Definition of Terms, Chapter 1). Administrators expressed verbally and in written form the expectation that the common portion of each exam totaled at least two-thirds of the total points possible on that exam (PLC Leadership Team, September 2008). At this time, the SMART goals (see Definition of Terms, Chapter 1) were introduced by the PLC Leadership Team to the faculty in the hopes they would become familiar with the term.

Two additions were made to the ANP incentives and interventions diamond by the ANP committee and administrators. The first addition, as discussed previously, was the Tiger Fever tier two incentive program. The second addition was the use of grades for ANP classes. ANP class was not worth credit toward graduation. However, a grade of satisfactory or unsatisfactory was assigned to students in their ANP class each term where no grade was previously given. The guidelines required that, in order to earn a satisfactory grade, students needed to come prepared and remain on task at least 80% of the time. The addition of grades was made by the ANP committee and administrators so parents and students' teachers would have an indication from the report card of whether students were using their time in ANP effectively.

The faculty team members who met each term to place students into Tiger Paws and Tiger Roar made a change at the beginning of the 2008-2009 school year. Previously, the team placed ninth grade students into Tiger Paws or Tiger Roar for the

first time following their first six-week term as a high school student. However, the grades for these ninth grade students in greatest need of interventions were often nearly too low to recover by the time one-third of the semester had passed. Therefore, the faculty team began meeting with the feeder middle schools in the spring of 2008 to discuss the placement of students into Tiger Paws and Tiger Roar ANP classes for the start of their high school career rather than waiting six weeks.

By May 2009, all course instructors had developed and implemented common assessments according to administrative instructions. The PLC Leadership Team's second goal was met. As well, progress was made decreasing the percentage of Ds and Fs among freshmen and sophomores, which was goal number one. Though the trend in Ds and Fs continued to decrease, the PLC Leadership Team had difficulty calculating the exact percentage given the transient population and the type of data available to the team. No progress was made toward goal three, which was to re-integrate committees that were not subject-specific.

**2009-2010 school year.** When the students arrived for school in August 2009, the ANP *Watch List* was put into effect (see Definition of Terms, Chapter 1). The ANP developed the *Watch List* as an intervention for students who earned one D or F on their previous report card. Though Ds and Fs caused report cards to be classified as Basic or Below Basic, which was considered unacceptable at the school study site, one D or F was not sufficient for placement into a tier two Tiger Paws ANP class. Students on the Watch List were assigned to one of three teachers in charge of the program. Through these teachers' meetings with the students, students were required to show progress, keep a

planner, and attend regular after school academic detentions until their grades improved (PLC Leadership Team, 2011).

During the 2009-2010 school year, Tiger Study Table (see Definition of Terms, Chapter 1) also began. Urhahn (2010) documented the state high school athletic association for the school study site at the time of the study required students to earn at least 3.0 of the 3.5 possible credits per semester in order to be eligible to participate in athletics, band, choir, cheer, or dance the following semester. Tiger Study Table was a study group that met during ANP. Student athletes were assigned to a table in the cafeteria during ANP when their grades were such that they were in danger of becoming ineligible. This intervention was developed by several coaches to assist athletes whose progress reports were Basic but who were ineligible for Tiger Paws ANP placement (PLC Leadership Team, 2011).

On October 13, 2009, teachers were taught by the PLC Leadership Team how to develop and implement SMART goals within their PLC teams to replace the use of Action Plans. The rationale for the change, given by the PLC Leadership Team, was that SMART goals were a more effective way to increase student achievement. Like Action Plans, they included the use of goals, persons responsible, rationales, and timelines. In addition, though, SMART goals specifically focused on student results instead of allowing process goals, and SMART goals required the use of data as part of the rationale for the goal and as evidence of goal completion (PLC Leadership Team, 2009). All content area PLC teams were responsible for writing one SMART goal by the end of October, 2009. Additionally, they were required to monitor progress toward their goal

over the duration of the year. The development of SMART goals by PLC teams was accomplished on time.

During spring 2010, a small team of volunteer teachers under the direction of administration at the school study site developed training materials for the implementation of Build Your Own Assessment (BYOA) software with the goal to increase teacher and administrator effectiveness in using data to drive instruction. The researcher was one of these teachers. BYOA software allowed teachers to create their own assessments electronically, administer them to students on computer or scan form, and then print reports that showed analysis of the assessment data (School Software Group, 2011). This software had been purchased by the district.

**2010-2011 school year.** There were two main goals for the 2010-2011 school year. The first goal was to have SMART goals from 2009 completed and new or revised SMART goals made and monitored. This goal was completed on time. Any PLC teams struggling to meet the goal on time worked directly with administration.

A second goal was to have all teachers use the assessment analysis tool called BYOA that was described earlier to administer their common summative semester final exams for every course. In August, the BYOA goal for the 2010-2011 school year was communicated to faculty at the back-to-school professional development meeting. In September 2010, the researcher trained one teacher from each department in the school study site building on how to load completed assessments into BYOA (Dickinson & Spitznagel, 2010). The deadline for loading assessments was set at November 1, 2010.

After all exams were loaded, sessions were created in BYOA where students were aligned to the assessments they would take in December. At the November faculty

meeting, scan forms were distributed to each faculty member for each course they were teaching that was taking a BYOA assessment in December. These scan forms were clipped together with a list of students and student numbers as well as an index card that contained pertinent information for the test graders. The instruction to faculty members was to administer the assessment using the provided scan forms and students numbers and then to clip them back together with the included index card and turn them in to the office.

During finals week, a small team of three teachers and four building administrators spent more than 35 hours scanning completed assessments into BYOA and printing the reports that would be needed for the January professional development meeting the day following winter break. The researcher was a member of the scanning team.

A small committee of teachers, including the researcher, met over winter break to develop a professional development presentation that would help teachers to analyze their reports at the January 3, 2011 professional development meeting. One goal of this training piece was to tie the use of common assessments and BYOA into the school's professional development model, PLCs. Another goal was to give teachers a step-by-step method for conducting a data analysis meeting (BYOA Training Team, 2010).

Throughout the spring, teams worked to develop district-wide common summative assessments for second semester courses. The process for semester two was identical to the process for semester one with one exception; the number of teachers involved in the software process was increased. On April 21, 2011, the researcher held two half-day BYOA training sessions at the school study site where more than a dozen

teachers learned how to complete the entire BYOA process from beginning to end (Spitznagel & Dickinson, 2011).

During final exams in May 2011, more than 15 teachers and administrators spent no more than 15 hours scanning completed assessments into BYOA and printing the analysis reports. The shorter amount of time for this semester compared to December finals was that more faculty members had been trained to help and there were three scanning machines for grading instead of one. The BYOA goal for 2010-2011 was met.

**Conclusion**

The purpose of this study was to conduct an evaluation of student academic outcomes following the five year implementation of PLCs in Midwest High School. The researcher developed three research questions and eight hypotheses to determine if student achievement measurably increased and if Midwest High School was a mature PLC at the completion of the study duration. Student outcomes evaluated included semester one freshmen report cards, common final exam scores for Algebra I, English II, Biology, and American Government, and EOC exam scores for Algebra I, English II, and Biology. Also, the researcher analyzed the survey results for any changes in teacher attitudes from 2006-2011. Finally, survey results from a survey given to teachers in April 2011, School Professional Staff as Learning Community Questionaire (Hord et al., 1999), were synthesized to determine if Midwest High School was a mature PLC at the conclusion of this study. The data that was collected and analyzed during this study is reported in Chapter 4 and discussed in Chapter 5.

# Chapter 4: Results

The purpose of this study was to conduct an evaluation of student academic outcomes following the five year implementation of PLCs in Midwest High School. The researcher evaluated freshman report cards, EOC exam scores for Algebra I, English II, and Biology, and common final exams for Algebra I, English II, American Government, and Biology. Additionally, changes between 2006 and 2011 with respect to teacher perceptions about Midwest High School were analyzed. Finally, a nationally tested diagnostic tool, School Professional Staff as Learning Community Questionaire (Hord et al., 1999), was used to evaluate Midwest High School's maturity as a PLC.

## Research Question One

Has student achievement increased during the course of implementing PLCs? If so, is there evidence that this is a result of a contribution from PLC implementation from 2006-2011?

### Hypothesis One

***Alternate hypothesis one.*** There will be a measurable increase in average grade point average when comparing semester one freshmen report cards for each academic year from December 2005 to December 2011.

***Null hypothesis one.*** There will be no measurable difference in average grade point average when comparing semester one freshmen report cards for each academic year from December 2005 to December 2010.

As the initial measure, the researcher analyzed first semester ninth grade report cards from the high school for the fall of 2005, 2006, 2007, 2008, 2009, and 2010. From each population, the researcher chose a random sample of 50 student report cards using

an online random sampling tool (Social Psychology Network, 2008). Each report card was classified as Advanced, Proficient, Basic, or Below Basic (See Definition of Terms, Chapter 1). For each population, the percentage of students with each type of report card was calculated and is shown in Table 10. Then, a chi-square test for homogeneity of proportions (Bluman, 2010) was conducted by the researcher applying an alpha level of 0.05 to determine if the proportions for the years 2005-2010 are statistically different from each other. The critical value for this test was 24.996. The chi-square value was 20.928. Since 20.028 was less than the critical value of 24.996, there was not enough evidence to reject the null hypothesis. There was no difference in the proportions of freshmen students earning each type of report card for the years 2005 through 2010.

Table 10

*Percentage of Freshman Earning Each Report Card Type Their First Semester*

| Report Card Type | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Advanced | 30 | 46 | 36 | 40 | 24 | 40 |
| Proficient | 26 | 28 | 30 | 20 | 40 | 34 |
| Basic | 8 | 4 | 10 | 12 | 20 | 8 |
| Below Basic | 36 | 22 | 24 | 28 | 16 | 18 |

*Note.* Data is recorded as percent of sample.

**Hypothesis Two**

***Alternate hypothesis two.*** There will be a measurable increase in average scores achieved for the course Algebra I on the semester one common final exam between December 2009 and December 2010.

***Null hypothesis two.*** There will be no measurable difference in average scores achieved for the course Algebra I on the semester one common final exam between December 2009 and December 2010.

A random sample of Algebra I semester one final exam scores was taken by the researcher for each of two data sets. For December 2009 Algebra I final semester exams, 145 scores were available to the researcher and a sample of 30 was randomly chosen by the researcher using an online sampling tool (Social Psychology Network, 2008). For December 2010 Algebra I final semester exams, 327 scores were available to the researcher and a sample of 30 was randomly chosen by the researcher using the same online sampling tool. Table 11 summarizes the mean for each data set.

Table 11

*Means of Algebra I Semester One Common Final Exams*

| Category | Mean |
|---|---|
| December 2009 | 72.56 |
| December 2010 | 73.13 |

*Note.* Means are recorded as percentages earned.

A *z*-test for difference in means was conducted at an alpha level of 0.05. With a critical value of +1.65 for this right-tailed test, the *z*-test value was calculated to be +0.19. The researcher, therefore, failed to reject the null hypothesis. There is not enough evidence to support a measurable increase in average scores for the course Algebra I on the semester one common final exam between December 2009 and December 2010.

**Hypothesis Three**

***Alternate hypothesis three.*** There will be a measurable increase in average scores achieved for the course American Government on the semester one common final exam between December 2009 and December 2010.

***Null hypothesis three.*** There will be no measurable difference in average scores achieved for the course American Government on the semester one common final exam between December 2009 and December 2010.

A random sample of American Government semester one final exam scores was taken by the researcher for each of two data sets. For December 2009 American Government final semester exams, 334 scores were available to the researcher who chose a sample of 30 using an online sampling tool (Social Psychology Network, 2008). For December 2010 American Government final semester exams, 280 scores were available to the researcher who chose a sample of 30 using the same online sampling tool. Table 12 summarizes the mean for each data set.

Table 12

*Means of American Government Semester One Common Final Exams*

| Category | Mean |
|---|---|
| December 2009 | 74.36 |
| December 2010 | 79.93 |

*Note.* Means are recorded as percentages earned.

A *z*-test for difference in means was conducted at an alpha level of 0.05. With a critical value of +1.65 for this right-tailed test, the *z*-test value was calculated to be +1.45. The researcher, therefore, failed to reject the null hypothesis. There is not enough evidence to support a measurable increase in average scores for the course American

Government on the semester one common final exam between December 2009 and December 2010.

**Hypothesis Four**

***Alternate hypothesis four.*** There will be a measurable increase in average scores achieved for the course Biology on the semester one common final exam between December 2009 and December 2010.

***Null hypothesis four.*** There will be no measurable difference in average scores achieved for the course Biology on the semester one common final exam between December 2009 and December 2010.

A random sample of Biology semester one final exam scores was taken by the researcher for each of two data sets. For December 2009 Biology final semester exams, 323 scores were available to the researcher who chose a sample of 30 using an online sampling tool (Social Psychology Network, 2008). For December 2010 Biology final semester exams, 437 scores were available to the researcher who chose a sample of 30 using the same online sampling tool. Table 13 summarizes the mean for each data set.

Table 13

*Means of Biology Semester One Common Final Exams*

| Category | Mean |
|---|---|
| December 2009 | 73.89 |
| December 2010 | 76.73 |

*Note.* Means are recorded as percentages earned.

A *z*-test for difference in means was conducted at an alpha level of 0.05. With a critical value of +1.65 for this right-tailed test, the *z*-test value was calculated to be +0.73. The researcher, therefore, failed to reject the null hypothesis. There is not

enough evidence to support a measurable increase in average scores for the course Biology on the semester one common final exam between December 2009 and December 2010.

**Hypothesis Five**

***Alternate hypothesis five.*** There will be a measurable increase in average scores achieved for the course English II on the semester one common final exam between December 2009 and December 2010.

***Null hypothesis five.*** There will be no measurable difference in average scores achieved for the course English II on the semester one common final exam between December 2009 and December 2010.

A random sample of English II semester one final exam scores was taken by the researcher for each of two data sets. For December 2009 English II final semester exams, 459 scores were available to the researcher who chose a sample of 30 using an online sampling tool (Social Psychology Network, 2008). For December 2010 English II final semester exams, 455 scores were available to the researcher who chose a sample of 30 using the same online sampling tool. Table 14 summarizes the mean for each data set.

Table 14

*Means of English II Semester One Common Final Exams*

| Category | Mean |
|---|---|
| December 2009 | 66.05 |
| December 2010 | 72.43 |

*Note.* Means are recorded as percentages earned.

A *z*-test for difference in means was conducted at an alpha level of 0.05. With a critical value of +1.65 for this right-tailed test, the *z*-test value was calculated to be +1.46.

The researcher, therefore, failed to reject the null hypothesis. There is not enough evidence to support a measurable increase in average scores for the course English II on the semester one common final exam between December 2009 and December 2010.

**Hypothesis Six**

***Alternate hypothesis six.*** There will be a measurable increase in proportion of students who achieved Advanced and Proficient on the Algebra I Missouri State End of Course Exam between May 2009 and May 2011.

***Null hypothesis six.*** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the Algebra I Missouri State End of Course Exam between May 2009 and May 2011.

A random sample of Algebra I End of Course Exam scores was taken by the researcher for each of two data sets. For May 2009 Algebra I End of Course Exams, 400 scores were available to the researcher who chose a sample of 40 using an online sampling tool (Social Psychology Network, 2008). For May 2011 Algebra I End of Course Exams, 429 scores were available to the researcher who chose a sample of 40 using the same online sampling tool. Table 15 summarizes the percentage of students earning a score or proficient or advanced.

Table 15

*Percentage of Students Scoring Proficient or Advanced on Algebra I End Of Course Exams*

| Category | 2009 | 2011 |
|---|---|---|
| Advanced and Proficient | 75 | 90 |

*Note.* Scores are recorded as percentages earned.

A *z*-test for difference in proportions was conducted at an alpha level of 0.05. With a critical value of +1.65 for this right-tailed test, the *z*-test value was calculated to be +1.77. The researcher, therefore, rejected the null hypothesis. There is enough evidence to support a measurable increase in proportion of students who achieved Advanced and Proficient on the Algebra I Missouri State End of Course Exam between May 2009 and May 2011.

**Hypothesis Seven**

***Alternate hypothesis seven.*** There will be a measurable increase in proportion of students who achieved Advanced and Proficient on the Biology Missouri State End of Course Exam between May 2009 and May 2011.

***Null hypothesis seven.*** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the Biology Missouri State End of Course Exam between May 2009 and May 2011.

A random sample of Biology End of Course Exam scores was taken by the researcher for each of two data sets. For May 2009 Biology End of Course Exams, 383 scores were available to the researcher who chose a sample of 40 using an online sampling tool (Social Psychology Network, 2008). For May 2011 Biology End of Course Exams, 478 scores were available to the researcher who chose a sample of 40 using the same online sampling tool. Table 16 summarizes the percentage of students earning a score or proficient or advanced.

Table 16

*Percentage of Students Scoring Proficient or Advanced on Biology End Of Course Exams*

| Category | 2009 | 2011 |
|---|---|---|
| Advanced and Proficient | 47.5 | 72.5 |

*Note.* Scores are recorded as percentages earned.

A *z*-test for difference in proportions was conducted at an alpha level of 0.05. With a critical value of +1.65 for this right-tailed test, the *z*-test value was calculated to be +2.28. The researcher, therefore, rejects the null hypothesis. There is enough evidence to support a measurable increase in proportion of students who achieved Advanced and Proficient on the Biology Missouri State End of Course Exam between May 2009 and May 2011.

**Hypothesis Eight**

***Alternate hypothesis eight.*** There will be a measurable increase in proportion of students who achieved Advanced and Proficient on the English II Missouri State End of Course Exam between May 2009 and May 2011.

***Null hypothesis eight.*** There will be no measurable difference in proportion of students who achieved Advanced and Proficient on the English II Missouri State End of Course Exam between May 2009 and May 2011.

A random sample of English II End of Course Exam scores was taken by the researcher for each of two data sets. For May 2009 English II End of Course Exams, 474 scores were available to the researcher who chose a sample of 40 using an online sampling tool (Social Psychology Network, 2008). For May 2011 English II End of Course Exams, 434 scores were available to the researcher who chose a sample of 40

using the same online sampling tool. Table 17 summarizes the percentage of students earning a score or proficient or advanced.

Table 17

*Percentage of Students Scoring Proficient or Advanced on English II End Of Course Exams*

| Category | 2009 | 2011 |
|---|---|---|
| Advanced and Proficient | 77.5 | 90 |

*Note.* Scores are recorded as percentages earned.

A *z*-test for difference in proportions was conducted at an alpha level of 0.05. With a critical value of +1.65 for this right-tailed test, the *z*-test value was calculated to be +1.52. The researcher, therefore, failed to reject the null hypothesis. There is not enough evidence to support a measurable increase in proportion of students who achieved Advanced and Proficient on the English II Missouri State End of Course Exam between May 2009 and May 2011.

**Research Question Two.**

Have teacher attitudes toward curriculum rigor, public image, quality of education, and post-high school preparedness changed during the implementation of PLCs from 2006-2011?

In October 2006 and April 2011, the faculty at the school study site was asked to respond to survey questions on four topics using a Likert-like scale. This survey can be found in Appendix A. The first statement measured teacher perception of curriculum rigor. The second statement measured teacher belief in the perception regarding a positive high school public image. The third statement measured teacher perception regarding the quality of education provided by the high school. The fourth statement

measured teacher perception regarding the high school's ability to prepare students for post-high school experiences. Table 18 summarizes the percentage of teachers who responded positively to the statements, and it shows an increase in teacher perception for all statements.

Table 18

*Percentage of Teachers Responding Positively to Survey Statements Measuring Their Perceptions about Midwest High School*

| Category | 2006 | 2011 | Difference |
|---|---|---|---|
| Rigorous Curriculum | 91.0 | 94.2 | 3.2 |
| Public Image | 67.6 | 77.0 | 9.4 |
| Quality Satisfaction | 75.0 | 90.7 | 15.7 |
| Student Preparedness | 67.7 | 94.0 | 26.3 |

**Research Question Three**

Is the staff, in April 2011, a mature PLC as measured by a diagnostic tool designed, written, and validated by the SEDL (Hord et al., 1999)?

This survey contained 17 descriptors grouped into five areas (Hord et al., 1999). The first area was "the collegial and facilitative participation of the principal, who shares leadership… and decision making with the staff" (Hord et al., 1999, p. 3). This area had two descriptors. The second area was "a shared vision that is developed from the staff's unswerving commitment to students' learning and that is consistently articulated and referenced for the staff's work" (Hord et al., 1999, p. 3). This area had three descriptors. The third area was "learning that is done collectively to create solutions that address students' needs" (Hord et al., 1999, p. 3). This area had five descriptors. The fourth area was "the visitation and review of each teacher's classroom practices by peers as a feedback and assistance activity to support individual and community improvement"

(Hord et al., 1999, p. 3). This area had two descriptors. The fifth and final area was the "physical conditions and human capacities that support such an operation" (Hord et al., 1999, p. 3). This area had five descriptors. For each area, the positive Likert-like scale responses were averaged. Table 19 summarizes the percentage of teachers who responded positively to each area by reporting these averages. Area one, principal shared leadership, showed the highest percentage, while area four, peer feedback of teacher classroom practices, showed the lowest percentage.

Table 19

*Percentage of Teachers Responding Positively to Each Area of the PLC Diagnostic Tool*

| Category | % Positive Responses |
|---|---|
| principal shared leadership and decision-making | 84.0 |
| shared vision of commitment to student learning | 78.0 |
| collective learning to address student needs | 69.4 |
| peer feedback of teacher classroom practices | 25.0 |
| school conditions support PLCs | 57.7 |

*Note.* % = percent; PLC = PLC. Adapted from "Issues… about Change," by S. Hord, M. Meehan, S. Orletsky, and B. Sattes, 1999. Retrieved from www.sedl.org

**Conclusion**

An analysis of student outcomes and teacher perception indicates that Midwest High School is not yet a mature PLC. This is based on the evidence that only two of eight evaluated areas of student outcomes showed statistically significant gains during the time of this study. While positive teacher perceptions of Midwest High School increased during the time of this study, three of the five measures of a mature PLC scored below

80%. Since the current research did not identify a percentage that would classify schools as mature PLCs, the researcher chose 80% as a cutoff for discussion purposes.

Chapter 5 includes a detailed discussion of the data. Additionally, implications for Midwest High School, specifically, and for PLC high schools, generally, are given. Finally, recommendations for further studies are included.

# Chapter 5: Conclusions

The purpose of this study was to conduct an evaluation of student academic outcomes following the five year implementation of PLCs in Midwest High School. The aim of this chapter was to summarize this study by discussing each of the three research questions independently and then triangulating the data to draw conclusions about whether Midwest High School is a mature PLC. Though the researcher ultimately concluded that Midwest High School is not yet a mature PLC, several insights were made into strengths and weaknesses in the faculty's implementation process. Based on the study, recommendations were made to move Midwest High School toward becoming a mature PLC and the implications of this study on other high schools was addressed. Finally, the researcher described two other studies that would add to the available literature on PLCs in high schools.

## Discussion of Research Question One

Has student achievement increased during the course of implementing PLCs? If so, is there evidence that this is a result of a contribution from PLC implementation from 2006-2011?

For hypothesis one, chi-square test for homogeneity of proportions showed no measurable difference in the proportion of students earning Advanced, Proficient, Basic, and Below Basic report cards in the first semester of their freshman year from 2005 through 2010. This was discouraging for Midwest High School faculty members since all interventions and incentives were available to freshman during this time: tiered ANP class, Tiger Study Table, Watch List, academic detention, Tiger Fever representatives, grade consultation, and incentive day. However, closer inspection of the data did show a

downward trend in the percentage of Below Basic report cards since the original measure in 2005, as shown in Figure 2. This trend could indicate that interventions and incentives impacted those students whose report cards typically fell into this category.

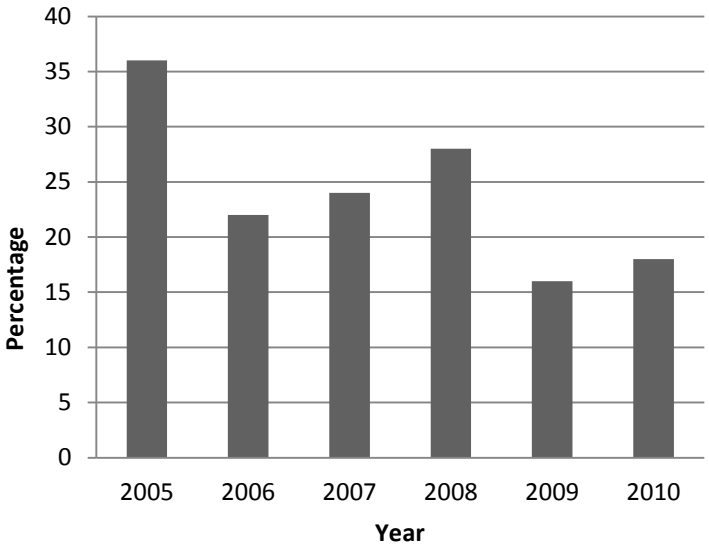


*Figure 2*. Percentage of Freshmen Earning Below Basic Report Cards Semester One

Hypotheses two through five evaluated common final exam scores between December 2009 and December 2010. *Z*-tests for difference in proportions were conducted at an alpha level of 0.05. There was no measurable difference between scores earned on common final exams in Biology, Algebra I, English II, and American Government courses during these times. However, in all four cases there was an observable increase in the average scores earned by students, as shown in Table 20.

Table 20

*Means of Semester One Common Final Exams*

| Subject | December 2009 | December 2010 |
|---|---|---|
| Algebra I | 72.56 | 73.13 |
| American Government | 74.36 | 79.93 |
| Biology | 73.89 | 76.73 |
| English II | 66.05 | 72.43 |

Hypotheses six through eight evaluated Missouri End of Course Exam scores between May 2009 and May 2011 for Algebra I, English II, and Biology. A measurable increase was found in movement of the proportions of students earning Advanced or Proficient rating in both Algebra I and Biology using *z*-tests for difference in proportions at an alpha level of 0.05. Though there was not a measurable increase in English II, the percentage of students scoring Proficient or Advanced did indicate an observable increase over the two year period. Figure 3 summarizes the percentage of students scoring Proficient or Advanced in May 2009 and May 2011 for all three subjects.

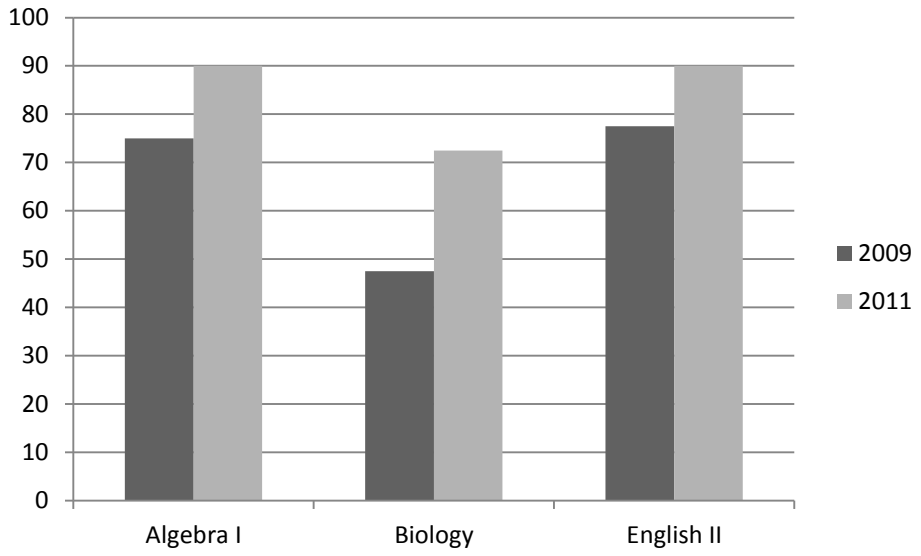


*Figure 3*. Percentage of Students at Midwest High School Scoring Proficient or Advanced on the Missouri End of Course Exam

The differences in the scores earned by students could be indicative of the functioning level of the PLC team associated with each course. For instance, the researcher observed that both Algebra I and Biology PLCs utilized common plan times to some extent to plan lessons, write common unit objectives and work on common formative assessments. Each PLC team varied in the amount of plan time spent working together. Further research would have to be done to give validity to this claim.

The first part of research question one asked if student achievement increased during the course of PLC implementation from 2006-2011. Six of the eight hypotheses showed no statistically measurable increases in student outcomes. However, trends in student outcomes were promising. For instance, hypotheses two through eight all showed increases in student outcomes. Additionally, data utilized in hypothesis one showed a downward trend in the percentage of students earning Below Basic Report Cards (see

Definitions, Chapter 1). These trends could indicate a positive shift in student achievement that will continue following the conclusion of this study.

The second part of research question one asked if increases in student achievement can be attributed to the implementation of PLCs from 2006 to 2011. This researcher believes that increases in student achievement can be tied to PLC implementation. PLC implementation encompassed nearly all building-based and external professional development between 2006 and 2011. As a part of this professional development, teams were formed and given time and direction for collaborating together. Common tests and EOC exams were utilized and discussions regarding student achievement at the item-level followed. Time, collaboration, and the utilization of common assessments, are all components of PLCs (DuFour, R. P. et al., 2008). Since the research states that the right professional development is essential to a successful change process (Chan & Chen, 2010; De Jong & Elfring, 2010; Ding & Ng, 2010; Locander & Luechauer, 2009), positive changes in student outcomes are in part a result of the PLC professional development that was provided to the faculty.

**Discussion of Research Questions Two and Three**

Have teacher attitudes toward curriculum rigor, public image, quality of education, and post-high school preparedness changed during the implementation of PLCs from 2006-2011?

As shown in Figure 4, the percentages of teachers responding positively increased in all categories from 2006 to 2011. The highest increase in teacher attitude, 26.3%, was in student preparedness for post-high school experiences. Satisfaction with the quality of education offered was second. The smallest increases in teacher perception included

public image and curriculum rigor, with curriculum rigor increasing only 3.2%. However, curriculum rigor may have had the smallest increase because it was the highest score in 2006. In fact, in 2011 it was also the highest score, with 94.2% of teachers responding positively.

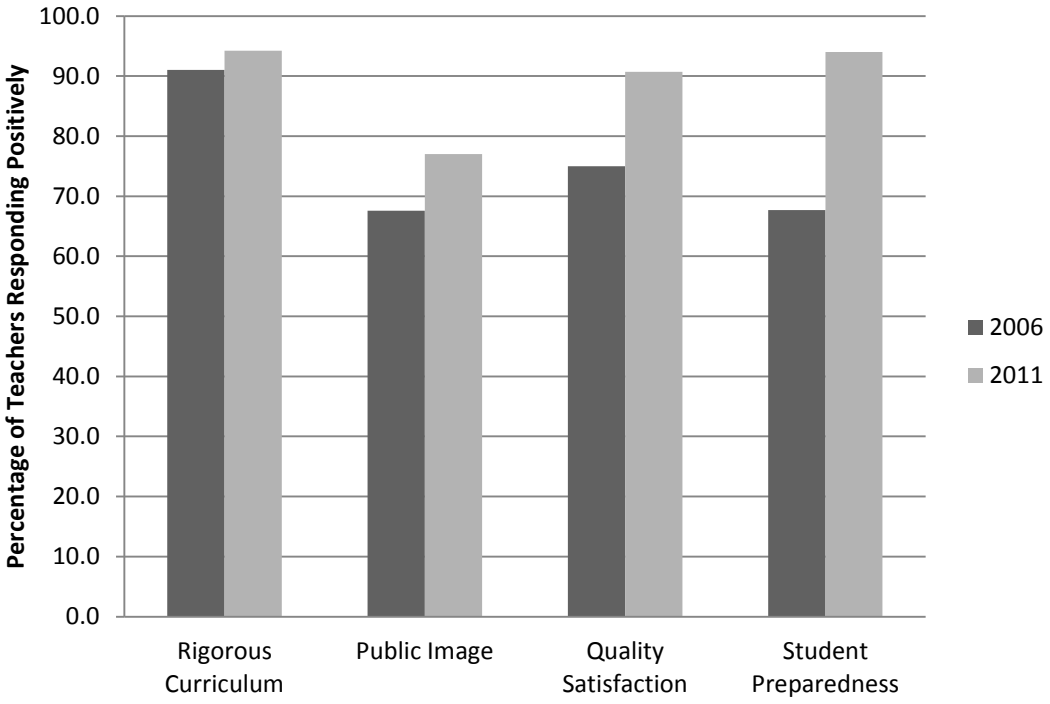


*Figure 4*. Teachers' Self-Reported Positive Attitudes from 2006 to 2011

Is the staff, in April 2011, a mature PLC as measured by a diagnostic tool designed, written, and validated by the SEDL (Hord et al., 1999)?

Midwest High School had strengths and weaknesses, as measured by the diagnostic tool (Hord et al., 1999) and summarized in Figure 5. Principal shared leadership and decision-making (84% positive responses) and shared vision of commitment to student learning (78% positive responses) were strengths of Midwest High School. This is a compliment to the administrative team at Midwest High School,

who was practicing good leadership skills when they shared decision-making responsibilities as much as possible (Chan & Chen, 2010; Hoegl & Parboteeah, 2006; Spiro, 2011). However, the other three areas were weaknesses with the percentage of teachers responding positively being below 70%. The researcher concluded based on this information that, though Midwest High School had several strengths, it did not yet represent a mature PLC.

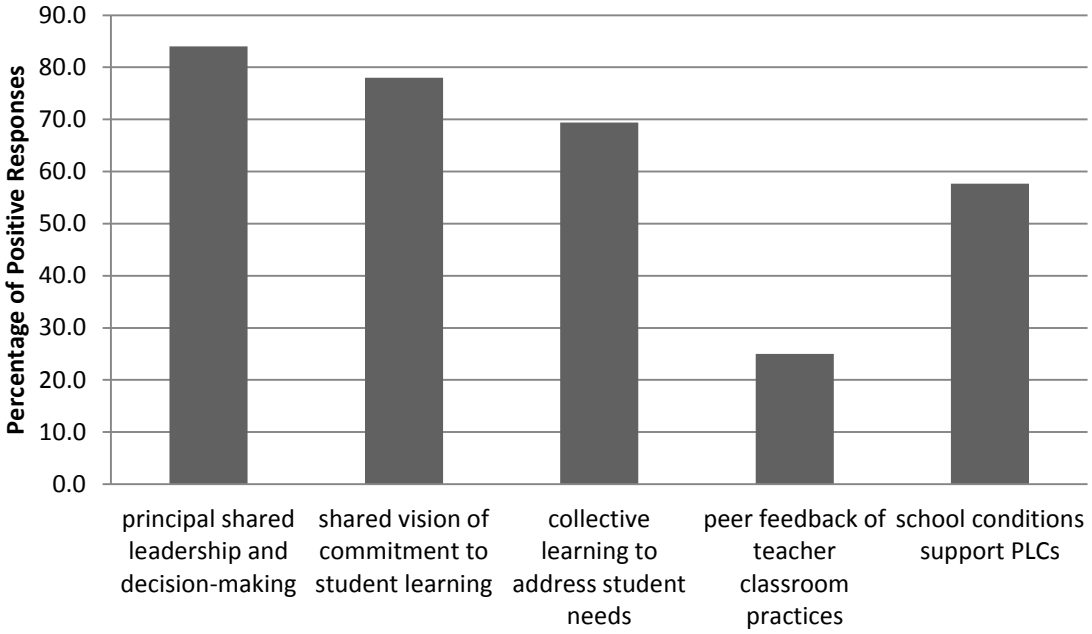


*Figure 5.* Percentage of Teachers Responding Positively to Each Area of the PLC Diagnostic Tool. Adapted from "Issues… about Change," by S. Hord, M. Meehan, S. Orletsky, and B. Sattes, 1999. Retrieved from www.sedl.org

In triangulating the three research questions, several trends became clear. Two of the lowest percentages, peer feedback of teacher classroom practices (25% positive responses) and collective learning to address student needs (69.4% positive responses), may give insight to the reason why, in research question one, the researcher failed to reject six of eight null hypotheses. If PLC teams, according to teacher perception, were

not focusing the majority of their time and efforts or were not focusing those efforts correctly on student needs and the instructional strategies to support them, then it makes sense that student outcomes did not increase as hoped.

The low percentage of positive responses to peer feedback of teacher classroom practices could indicate the collective focus of PLC teams did not adequately address instructional strategies. When considering this with the high curriculum rigor reported in research question two, it became clear that PLC teams were ready for this step, because a focus on curriculum should precede the development of planned lessons in order to reach a pre-determined destination (Wiggins & McTighe, 2005). In the case of Midwest High School, teacher perceptions indicate that a focus on increasing curriculum rigor took place but not a focus on subsequent instructional strategies. This is consistent with the lack of measurable increases in final exam scores seen in research question one. Even though average exam scores increased in all four areas studied, these increases were not statistically significant; this indicates the need for additional work on instructional strategies.

The neglect of peer review of instructional strategies could explain the failure to see a measurable increase in common assessment scores as found in hypotheses two through five in research question one. Teachers were not given release time to observe one another teaching in their classrooms. If the teachers' focus was on the curriculum but not on the resulting instructional strategies, it makes sense that summative assessment scores did not measurably increase. After all, how could the end result be expected to change if the steps leading up to that end result are never modified?

Only 57.7% of teachers responded positively that school conditions at Midwest High School support PLCs. This could be because of limited PLC meeting times as only two hours per month were worked into the schedule for most PLC teams to meet, with only a few PLC teams sharing a common plan time. Perceptions about school conditions could also have resulted from the level of trust and positive relationships among staff members. Similar reasons for teacher perceptions of public image at Midwest High School as described in research question two could exist, but further information would have to be gathered to determine if a correlation exists. However, based on these responses and on the failure to reject six of eight null hypotheses in research question one, the researcher concluded that the culture was still transforming at Midwest High School even though there was cause to celebrate some success. More researched-based work needs to be done in the areas of teamwork and professional development in order to truly create the successful, sustainable change desired by Midwest High School.

**Recommendations for Midwest High School**

This study revealed that strengths of Midwest High School following the implementation of PLCs included several components. The measurable improvement of Algebra I and Biology Missouri EOC scores were a highlight for research question one. Also, positive trends in final exam scores for the courses investigated were promising. Additionally, the decrease in the percentage of Below Basic freshmen report cards provided hope for a continuation in this trend and subsequent measurably significant results in the future. The results of research question two indicated that a rigorous curriculum and post-high school preparedness were strengths. Finally, shared-decision making by leadership was reported as a great strength in research question three.

Though several strengths were revealed, the researcher concluded that Midwest High School was not yet a mature PLC and that more work needed to be done before successful, sustainable change was accomplished. Based on the results of this study, the researcher concluded that additional work needs to be done in teams and with professional development before the goal of becoming a mature PLC can be realized.

One focus area of Midwest High School should be the development of the PLC teams. Based on research question three, school conditions were not supporting PLCs fully. The researcher speculated that this could have been due to time available to PLCs, trust and relationships among and between PLCs, or a combination of both. One team priority, then, is the building of trust. The highest performing teams build and maintain trust so it cannot be neglected (Fisher, 2007; Martin, 2006; Palanski et al., 2011; Perrin & Blauth, 2010; Sheng et al., 2010; Spiro, 2011). The researcher concluded that time is another priority. Teams had, during the time of this study, two hours of scheduled time per month to work together. This is not nearly enough time for the trust building and other PLC work that needs to be taking place. More time needs to be built into the schedule to complete the hard job the PLCs need to be doing.

By triangulating findings for the three research questions in the previous section, the researcher was able to identify a number of areas in which teams should be focusing their work. One of these areas is in the development of a curriculum that clearly identifies "the specific understandings [the PLC team is] after and what such understandings look like in practice" (Wiggins & McTighe, 2005, p. 15). Even though teacher perception was that curriculum rigor was high, discussions involving the curriculum are critical to helping students achieve the goals teachers set for them.

Another area in which teams should be focusing their work is the development of common formative assessments for each course (Ainsworth, 2007; DuFour, R. P., 2007). According to Aisworth (2007), common formative assessments will arm PLC teams with data necessary to predict how students are likely to perform on the common summative exams. Therefore, the creation of common formative assessments and the subsequent use of those assessments to give evidence for changes in instruction are essential to the ultimate learning levels of the students. A third area on which teams should be focusing their work is the development of course level interventions. R. P. DuFour et al. (2008) reported that teams should know what to do when a student does not learn. Though building-wide Midwest High School has an answer to this question, PLC teams for each course should also have a detailed plan to insure that all students learn. A final area in which teams should focus is on the assignment of roles (Seibold & Kang, 2008; Spiro, 2011), and one of those roles should be a facilitator capable of leading the team through curriculum revisions, assessment writing, and intervention development. Midwest High School needs to provide professional development in this area, then, so that these facilitators have the tools and the confidence to perform this important role.

The art of facilitation is not the only professional development that needs to be provided for PLC teams at Midwest High School. According to Fisher (2007) and Gajda and Koliba (2008), teams need professional development on how to collaborate with each other. Additionally, PLC teams should have training on how to use their common formative assessments to inform their instruction. Finally, subject-specific professional development should be provided so that teachers continue to be confident in the ever-changing content in their fields of instruction. Carew et al. (2010) reported that high

performing teams have the knowledge they need to get their jobs done. This is the only way to get teachers to support the changes necessary to become a mature PLC, because teachers cannot support changes unless they are confident they have the skills to make them successful (Armenakis & Harris, 2009; Kotter & Schlesinger, 2008; Zigarmi et al., 2010).

Additional work with teams and professional development will be futile without a way to monitor progress; there are several ways to accomplish this. Interviews conducted by an outside party or a series of anonymous, open-ended survey questions would be a good way to gather information from teachers. Initially, questions could focus on answering the following:

- What did the Algebra I and Biology PLCs do to achieve measurable differences in the results of their Missouri EOC Exams?
- Were math and science staff survey scores better than the rest of the staff survey scores? Are these or other departments functioning as mature PLCs?
- What are the strengths and weaknesses of courses and departments that were not a part of this study?
- What additional information is there regarding the strengths and weaknesses of the courses and departments that were a part of this study?
- Why was there a teacher perception of gaps in collective learning to address student needs, peer feedback of teacher classroom practices, school conditions supporting PLCs, and public image? What do teachers think should be done to close the gaps?

The answers to these questions, along with the team and professional development recommendations described above, will provide a plan for Midwest High School to move forward. When they are ready, the staff of Midwest High School should again evaluate their status as a mature PLC by repeating the School Professional Staff as Learning Community Questionnaire that was used in research question three (Hord et al., 1999).

**Implications**

This study has several implications for PLC high schools and for high schools that want to become PLCs. According to the review of literature in Chapter 2, PLCs mirror research on best practices for successful, sustainable change in an organization. However, the researcher believes there is no easy way to implement them; the process is messy. High schools who embark on a journey to become a mature PLC should remember that the implementation of PLCs should be a means to the end goal, which is the improvement of student achievement. Teachers and administrators should not get caught up in going through the motions by creating superfluous meeting notes and meaningless goals. Building leaders should recognize that maturity as a PLC is an ongoing goal that staff members are constantly striving toward. Maintain a focus on student achievement by pushing quickly past the logistics to the hard conversations that make a difference for the students. By developing a clear mission and vision, identifying meaningful values and goals, providing professional development, sharing leadership, and building collaborative teams, successful, sustainable change is possible.

**Recommendations for Future Studies**

There are three areas that warrant further study with respect to PLCs at the high school level. One such study would be to consider the most efficient way to implement

PLCs. As described above, the implementation of PLCs is not a simple one. It is easy to lose focus and momentum when attempting to transform the culture of a building. A study that focused on the best way to implement PLCs would add to the current literature in that it would provide high schools more direction and perhaps shorten the amount of time it takes high schools to see measurable results and would definitely benefit students.

Another area that warrants further study is student outcomes following the implementation of PLCs at the high school level. The researcher found few areas where quantitative student outcomes were referenced with respect to PLC work (DuFour, R. P. & DuFour, R., 2010; Garcia, 2009; Schmoker, 2001), and, at the time of this study, only one study was found between 2006 and 2011 that attempted to show statistically significant increases in student outcomes as a result of PLC work (Varano, 2010); this being one such study. A collection of studies attempting to evaluate student outcomes following the implementation of PLCs at the high school level would add to the current literature by giving incite to best practices.

A final area that warrants additional study is the length of time it takes to become a mature PLC. Additional resources should be invested to complete a decade-long study to determine if maturity as a PLC could be reached in high schools with additional time.

**Conclusions**

The purpose of education is to provide assistance to students so they may achieve results, and results come when a faculty is able to undergo successful, sustainable change in their school. R. P. DuFour et al. (2008) provided a description of PLCs that not only mirrored the current literature on organizations' best practices for creating successful, sustainable change but put it into an educational context. Though the road to increased

student achievement through successful, sustainable change is not straight or smooth, the researcher believes that educators have an obligation to find a way. PLCs, though not a specific set of directions, provide the initial tools that educators will need to reach their destination: increased student achievement.

## Appendix A

**Teacher Perceptions Survey**

Please circle your response to the following statements:

1. Midwest High School has a rigorous curriculum.

Strongly Agree  Generally Agree  Generally Disagree  Strongly Disagree

2. Midwest High School has a good public image.

Strongly Agree  Generally Agree  Generally Disagree  Strongly Disagree

3. I am satisfied with the quality of education at Midwest High School.

Strongly Agree  Generally Agree  Generally Disagree  Strongly Disagree

4. Midwest High School is adequately preparing students for their post high school experience.

YES  NO

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