Journal of Educational Leadership in Action

Volume 1 | Issue 1 Article 2

3-2013

PLCs: Student Outcomes Evaluation in a Midwest High School

Kelly E. Dickinson

PLCS: STUDENT OUTCOMES EVALUATION IN A MIDWEST HIGH SCHOOL

by Kelly E. Dickinson

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.

1. Introduction

Kelly Dickinson discusses the use of PLC's
in a secondary educational setting.

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, 2010c). 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, 2010c). According to the Missouri Department of Elementary and Secondary Education (2010c), 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 be 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's 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 in 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, 2010b).

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 that “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 that were given to all high school students in the areas of English II, American Government, Biology, and Algebra I. The purpose of evaluating common assessment data is to improve student achievement (DuFour, R. P., & DuFour, R., 2010). 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 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).

A. 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, literature states that 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 high school leaders wanting to evaluate their progress in PLC implementation. 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.

B. RATIONALE FOR THE STUDY

A large amount of resources were utilized by the administrators and staff in an attempt to 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 totalled 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, common course summative assessments, and, in alignment with the PLC literature, 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 per year working with students on interventions and incentives.

C. 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).

D. NULL HYPOTHESIS

H_0 1. 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.

H_0 2. 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.

H_0 3. 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.

H_0 4. 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.

H_0 5. 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.

H_0 6. 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.

H_0 7. 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.

H_0 8. 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.

E. 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 which 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 2,000 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, 2010b). The study, therefore, cannot be generalized beyond the demographics of the school study site, Midwest High School.

2. Background

The focus of this background 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 and educational examples of successful change. During this literature review, studies from businesses, healthcare organizations, and high schools were included while studies from elementary and middles schools were generally omitted.

A. 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 what they were currently doing (Emeagwali, 2010). 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 were 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 a change in a culture due to the need to shift the mindset of educators.

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, vision, values, and 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.

B. MISSION, VISION, VALUES, AND GOALS

In the general literature, 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 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.

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).

Similarly, 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).

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). The PLC literature defined values 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.

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. 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 they must involve all stakeholders (Kotter & Schlesinger, 2008; Spiro, 2011). 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).

C. 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 team building 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).

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 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 create stability within the teams by keeping largely the same groups together from year to year.

D. 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.

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, Tian, & Chen, 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. In fact, 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. 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). Therefore, team members value each other's ideas and allow the best ideas to win (Maxwell, 2009). 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, Kahai, & Yammarino, 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 favorable 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 offer appropriate professional development (Martin, 2006).

Another characteristic of effective teams is that they learn together systematically (Langley et al., 2009; Randolph & Blanchard, 2010). 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). R. P. DuFour 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 (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.

E. 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 its state testing and by nearly 40 points on the SAT composite because of the school’s work in PLCs. Lastly, Garcia (2009) reported Whittier Union High School District increased student achievement dramatically over the past five years due to its 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.

F. CHANGE ROADBLOCKS

It is this author’s conclusion that PLCs are a synthesis of the general literature with respect to best practices in any organization. Therefore, it makes sense that using these practices would promote positive change in any educational setting. So why, then, aren’t research successes consistent? Literature indicates several possibilities.

One such reason is that 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, Roychowdhury, & Verma, 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).

G. CONCLUSION

The author concluded that successful, sustainable change cannot occur without developing a mission and vision, identifying values and goals, implementing strong leadership, and focusing teamwork to transform culture. Since the author concluded the PLC concept is a synthesis of the general literature associated with instituting sustainable change in an organization, she was anxious to evaluate student outcomes following the implementation of PLCs in the Midwest School District.

3. Methods and Results

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.

A. 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 2005–2010. 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. 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. The critical value for this test was 24.996. The chi-square value was 20.928. Since 20.928 was less than the critical value of 24.996, there was not enough evidence to reject the null hypothesis.

A second set of student achievement data that was analyzed was 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. For hypotheses two through five, the researcher failed to reject the null hypotheses. There was not enough evidence to support a measurable increase in average scores for the courses Algebra I, American Government, Biology, or English II on the semester one common final exam between December 2009 and December 2010.

A third set of student achievement data was analyzed; 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, 2010c).

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. For hypothesis eight, the researcher failed to reject the null hypothesis. There was 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. For hypotheses six and seven, the researcher rejected the null hypotheses. There was enough evidence to support a measurable increase in proportion of students who achieved Advanced and Proficient on the Biology and Algebra I Missouri State End of Course Exams between May 2009 and May 2011.

B. 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.

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. The first statement measured teacher perception of curriculum rigor, for which positive responses increased from 91.0% to 94.2%. The second statement measured teacher belief in the perception regarding a positive high school public image, for which positive responses increased from 67.6% to 77.0%. The third statement measured teacher perception regarding the quality of education provided by the high school, for which positive responses increased from 75.0% to 90.7%. The fourth statement measured teacher perception regarding the high school's ability to prepare students for post–high school experiences, for which positive responses increased from 67.7% to 94.0%. These results are shown graphically in Figure 1.

c. 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), 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, called School Professional Staff as Learning Community Questionnaire, 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. For each of the five areas, the positive Likert-like scale responses were averaged. In the area of principal shared leadership and decision-making, the average of the positive responses was 84.0%. In the area of shared vision of commitment to student learning, the average of the positive responses was 78.0%. In the area of collective learning to address student needs, the average of the positive responses was 69.4%. In the area of peer feedback of teacher classroom practices, the average of the positive responses was 25.0%. In the area of school conditions support PLCs, the average of the positive responses was 57.7%. These results are shown graphically in Figure 2. 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.

4. Discussion

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. 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.

A. RESEARCH QUESTION ONE

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.

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 could be attributed to the implementation of PLCs from 2006 to 2011. This researcher believed that increases in student achievement could 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 noted 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.

B. RESEARCH QUESTIONS TWO AND THREE

For research question two, 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.

For research question three, principal shared leadership and decision-making (84% positive responses) is the only area that met the researcher-chosen cutoff for classification as a mature PLC. The researcher concluded based on this information that, though Midwest High School had several strengths, it did not yet represent a mature PLC.

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 indicated 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 indicated 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 made 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 were 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.

C. 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, having some of the wrong people in place, or a combination of all three. One priority would be to evaluate the effectiveness of each team member and look at making tough staffing decisions. Another team priority 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. It is the researcher's belief that this is not nearly enough time for trust building and other PLC work that needs to be taking place. More time needs to be built into the schedule.

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 were critical in 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 have had 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).

Professional development should be a focus area of 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, provided 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).

D. IMPLICATIONS AND FUTURE STUDIES

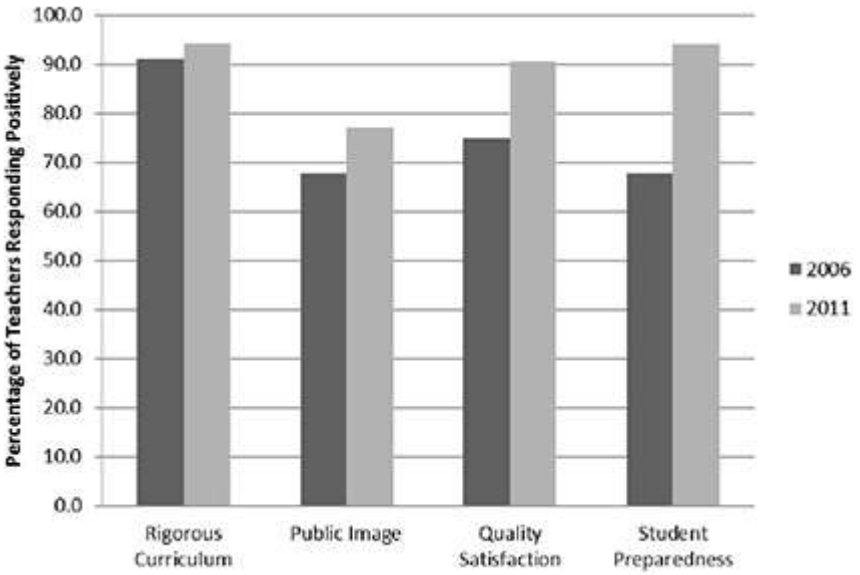
Since PLCs mirror research on best practices for successful, sustainable change in any organization, implementation of PLCs in a high school setting should, in theory, result in increased student achievement. However, this is not always the case. The researcher believes there could be several reasons for this. First, teachers and administrators could get caught up in process instead of product. For instance, they could create superfluous meeting notes and meaningless goals instead of pushing quickly past the logistics to the hard conversations that make a difference for the students. Maybe there is a best way to quickly and efficiently implement PLCs so that student benefits are immediate. A

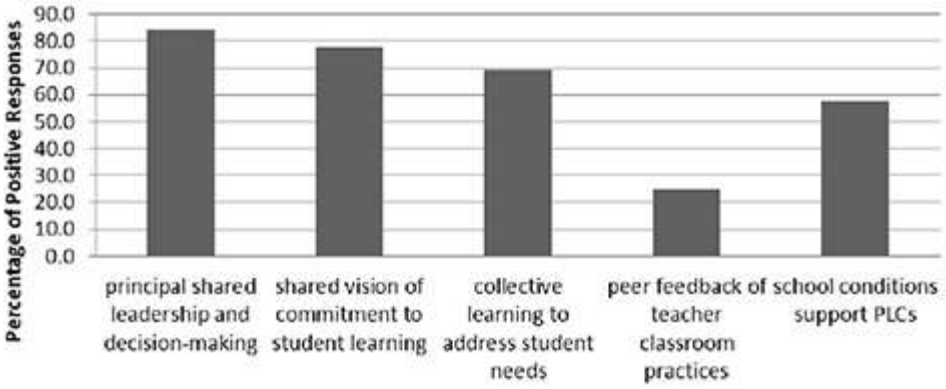
study that focused on the best way to implement PLCs would add to the current literature by providing high schools more direction and perhaps shortening the amount of time it takes high schools to see measurable results which would definitely benefit students.

Another possibility is that the structure of the United States' educational system as a whole is outdated. Perhaps there is something fundamentally flawed in the ways that grade levels are organized, staff is recruited, and time is distributed. It might be these flaws that inhibit the effects of good leadership and teamwork on the achievement of the students. While these ideas were not addressed in detail in this study, the author intends to explore them in future literature reviews and studies. Other countries are doing it better (Baldi et al., 2007; Emeagwali, 2010; Fleischman et al., 2010). International journals, then, would be a good place to start.

E. 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, provided the initial tools that educators would need to reach their destination: increased student achievement. However, they are not the only tools needed. It is up to educators to find the rest.


Percentage of Teachers Responding Positively
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Rigorous Curriculum
Public Image
Quality Satisfaction
Student Preparedness
2006
2011


Percentage of Positive Responses
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
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
school conditions support PLCs

References

Ainsworth, L. (2007). Common formative assessments: The centerpiece of an integrated standards-based assessment system. In Reeves, D. (Ed.), *Ahead of the curve: The power of assessment to transform teaching and learning* (pp. 78-101). Bloomington, IN: Solution Tree.

Armenakis, A. A., & Harris, S. G. (2009). Reflections: Our journey in organizational change research and practice. *Journal of Change Management*, *9*(2), 127-142. doi: 10.1080/14697010902879079

Baldi, S., Jin, Y., Skemer, M., Green, P., Herget, D., & National Center for Educational Statistics. (2007). Highlights from PISA 2006: Performance of U.S. 15-year-old students in science and mathematics literacy in an international context. *National Center for Education Statistics*. Retrieved from http://nces.ed.gov

Beres, C. J. (2007). *Learning communities, achievement and completion: Exploring relationships in Southern Alberta secondary schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3303767)

Bluman, A. G. (2010). *Elementary statistics: A step by step approach* (5th edition). New York, NY: McGraw-Hill.

Cady, S. H., Wheeler, J. V., DeWolf, J., & Brodke, M. (2011). Mission, vision, and values: What do they say? *Organizational Development Journal*, *29*(1), 63-78.

Carew, D., Parisi-Carew, E., Good, L., & Blanchard, K. (2010). Situational team leadership. In K. Blanchard (Ed.), Leading at a higher level (pp. 165-189). Upper Saddle River, NJ: FT Press.

Chan, L. H., & Chen, C.-H. (2010). Conflict from teamwork in project-based collaborative learning. *Performance Improvement*, *49*(2), 23-28.

De Jong, B. A., & Elfring, T. (2010). How does trust affect the performance of ongoing teams? The mediating role of reflexivity, monitoring, and effort. *Academy of Management Journal*, *53*(3), 535-549.

Ding, Z., & Ng, F. (2007). Reliability and validity of the Chinese version of McAllister's trust scale. *Construction Management and Economics*, *25*(11), 1105-1115.

Ding, Z., & Ng, F. (2010). Personal construct-based factors affecting interpersonal trust in a project design team. *Journal of Construction Engineering Management*, *136*(2), 227-234.

DuFour, R. P. (2007). PLCs: A bandwagon, an idea worth considering, or our best hope for high levels of learning? *Middle School Journal 39*(1), 4-8. Retrieved from http://www.amle.org/Publications/MiddleSchoolJournal/Articles/September2007/Article1/tabid/1496/Default.aspx

DuFour, R. P., & DuFour, R. (2010). The role of PLCs in advancing 21st century skills. In J. Bellanca & R. Brandt (Eds.), *21st century skills: Rethinking how students learn* (pp. 77-95). Bloomington, IN: Solution Tree.

DuFour, R. P., DuFour, R., & Eaker, R. (2008). *Revisiting PLCs at work: New insights for improving schools*. Bloomington, IN: Solution Tree.

DuFour, R. P., & Eaker, R. (1998). *PLCs at work: Best practices for enhancing student achievement*. Bloomington, IN: Solution Tree.

Emeagwali, N. (2010). National Science Board says U.S. lead in STEM slipping. *Techniques: Connecting Education & Careers*, *85*(3), 10-11.

Finley, D. C. (2010). Build your business blueprint: 7 strategies to create and sustain the ultimate business. *Mar/Apr 2010 Practice Management Solutions*, 12-13.

Fisher, R. (2007). Putting the "team" in the fine arts team: An application of business management team concepts. *Arts Education Policy Review*, *108*(4), 25-30.

Fleischman, H. L., Hopstock, P. J., Pelczar, M. P., Shelley, B. E., & National Center for Education Statistics. (2010). Highlights from PISA 2009: Performance of U.S. 15-year-old students in reading, mathematics, and science literacy in an international context. *National Center for Education Statistics*. Retrieved from http://nces.ed.gov

Fullan, M. (2001). *Leading in a culture of change*. San Francisco, CA: Jossey-Bass.

Fullan, M. (2007). *The new meaning of educational change* (4th ed.). New York, NY: Teachers College Press.

Gajda, R., & Koliba, C. J. (2008). Evaluating and improving the quality of teacher collaboration: A field-tested framework for secondary school leaders. *NASSP Bulletin*, *92*(2), 133-153. Retrieved from http://www.principals.org

Garcia, T. (2009, December 25). Whittier Union emulated by school districts near and far. *Whittier Daily News*. Retrieved from http://www.allthingsplc.info

Hoegl, M., & Parboteeah, K. P. (2006). Autonomy and teamwork in innovative projects. *Human Resource Management*, *45*(1), 67-79.

Hord, S., Meehan, M., Orletsky, S., & Sattes, B. (1999). Issues…about change. Retrieved from http://www.sedl.org

Kotter, J. P., & Schlesinger, L. A. (2008). Choosing strategies for change. *Harvard Business Review*, *86*(7/8), 130-139.

Langley, G. J., Moen, R. D., Nolan, K. M., Nolan, T. W., Norman, C. L., & Provost, L. P. (2009). *The improvement guide: A practical approach to enhancing organizational performance*. San Francisco, CA: Jossey-Bass.

Locander, W. B., & Luechauer, D. L. (2009). The human element: Let Dow Chemical's "Hu" commercial teach you how to be a more humane leader. *Marketing Management*, *18*(2), 30-31.

Martin, K. (2006). The trust factor. *Industrial Engineer, 38*(3), 30-35.

Maxwell, J. C. (2009). *How successful people think: Change your thinking, change your life*. New York, NY: Center Street.

Meehan, M. L., Orletsky, S. R., & Sattes, B. (1997). Field test of an instrument measuring the concept of professional learning communities in schools. *Appalachia Educational Laboratory.* Retrieved from WilsonWeb database. (ED433358)

Meglino, B. M., & Ravlin, E. C. (1998). Individual values in organizations: Concepts, controversies, and research. *Journal of Management, 24*(3), 351-389.

Missouri Department of Elementary and Secondary Education. (2010a). Final Adequate Yearly Progress. Retrieved from http://dese.mo.gov

Missouri Department of Elementary and Secondary Education. (2010b). 2009-2010 School Accountability Report Card. Retrieved from http://dese.mo.gov

Missouri Department of Elementary and Secondary Education. (2010c). Understanding your adequate yearly progress (AYP) report 2010-2011. Retrieved from http://www.dese.mo.gov

Nelson, T. H., LeBard, L., & Waters, C. (2010). How to create a PLC. *Science and Children, 47*(9), 36-40.

O'Doherty, A., & Ovando, M. N. (2009). Drivers of success: One district's process for closing achievement gaps in a post–No Child Left Behind context. *Journal of School Leadership, 19*(1), 6-32.

O'Neill, J., & Conzemius, A. (2006). *The power of SMART goals: Using goals to improve student learning.* Bloomington, IN: Solution Tree.

Palanski, M. E., Kahai, S. S., & Yammarino, F. J. (2011). Team virtues and performance: An examination of transparency, behavioral integrity, and trust. *Journal of Business Ethics, 99*, 201-216. doi: 10.1007/s10551-010-0650-7

Parrett, W., & Budge, K. (2009). Tough questions for tough times. *Educational Leadership, 67*(2), 22-27.

Perrin, C., & Blauth, C. (2010). The basic principles: Building blocks of trust. *The Catalyst, 39*(2), 9-12.

PLC Leadership Team. (2011). *Academic Networking Period: A main component of Midwest High School's pyramid of interventions and incentives*. Unpublished manuscript.

Randolph, A., & Blanchard, K. (2010). *Empowerment is the key.* In *Leading at a higher level* (pp. 57-74). Upper Saddle River, NJ: FT Press.

Reason, C. (2010). *Leading a learning organization*. Bloomington, IN: Solution Tree.

Requirements of No Child Left Behind Act. (2002, August 22). *The Washington Post*, p. T20.

Schmoker, M. (2001). *The results fieldbook: Practical strategies from dramatically improved schools*. Alexandria, VA: Association for Supervision and Curriculum Development.

SEDL. (2011). *About SEDL: Overview*. Retrieved from http://www.sedl.org

Seibold, D. R., & Kang, P. (2008). Using critical praxis to understand and teach teamwork. *Business Communication Quarterly*, *71*(4), 421-438.

Servage, L. (2009). Who is the "professional" in a PLC? An exploration of teacher professionalism in collaborative professional development settings. *Canadian Journal of Education*, *32*(1), 149-171.

Sharma, V., Roychowdhury, I., & Verma, M. (2009). Why do willfully designed teams fail? Factors leading to team dysfunction. *Icfai Journal of Soft Skills*, *3*(1), 45-55.

Sheng, C.-W., Tian, Y.-F., & Chen, M.-C. (2010). Relationships among teamwork behavior, trust, perceived team support, and team commitment. *Social Behavior and Personality*, *38*(10), 1297-1306.

Social Psychology Network. (2008). *Research randomizer*. Retrieved from http://www.randomizer.org/form.html

Solution Tree. (2011). *PLC Locator*. Retrieved from www.allthingsplc.org

Spiro, J. (2011). *Leading change step-by-step: Tactics, tools, and tales.* San Francisco, CA: Jossey-Bass.

United States Department of Education, National Center for Education Statistics. (2011). *Fast facts: What are the long-term trends in student achievement in reading and mathematics?* Retrieved from http://nces.ed.gov

Varano, S. A., Jr. (2010). *Professional Learning Communities and Student Achievement in Pennsylvania High Schools* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 3439761)

Verma, H. V. (2009). Mission statements: A study of intent and influence. *Journal of Services Research*, *9*(2), 153-171.

Wells, C., & Feun, L. (2007). Implementation of learning community principles: A study of six high schools. *NASSP Bulletin*, *91*(2), 141-160.

Wiggins, G., & McTighe, J. (2005). *Understanding by design*. Alexandria, VA: Association for Supervision and Curriculum Development.

Wood, D. (2007). Teachers' learning communities: Catalyst for change or a new infrastructure for the status quo? *Teachers College Record*, *109*(3), 699-739.

Yokl, R. T. (2011). Crafting a vision to optimize supply chain success. *Healthcare Purchasing News*, *35*(2), 52.

Zigarmi, P., Hoekstra, J., Blanchard, K., & Zigarmi, D. (2010). *Organizational leadership.* In *Leading at a higher level* (pp. 191-214). Upper Saddle River, NJ: FT Press.