2020

Instructional Coaching: Developing Efficacy for Project-Based Learning

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Digital Object Identifier: https://doi.org/10.13023/etd.2020.083

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INSTRUCTIONAL COACHING: DEVELOPING EFFICACY
FOR PROJECT-BASED LEARNING

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DISSERTATION
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A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Education in the
College of Education
at the University of Kentucky

By

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2020

ABSTRACT OF DISSERTATION

INSTRUCTIONAL COACHING: DEVELOPING EFFICACY
FOR PROJECT-BASED LEARNING

Project-based learning is a method of instruction utilizing techniques of brainstorming, research, and problem-solving. When learning in project-based environments, students work collaboratively and receive feedback from an authentic audience of knowledgeable and experienced professionals. Although these instructional methods are beneficial for student learning, they conflict with traditional instructional practices. Although teachers in a rural Missouri school district received professional development for incorporating project-based learning, they expressed feelings of confusion, uncertainty, and decreased competency when relinquishing traditional instructional methods. These feelings are indicative of low levels of self-efficacy that can negatively influence the degree to which new instructional methods are implemented in classrooms. Thus, an instructional coaching intervention to address teachers' efficacy for implementing project-based learning was developed.

This dissertation reports outcomes of a mixed-methods action research study that explores the influence instructional coaching had for teachers' self-efficacy to implement project-based learning. Quantitative and qualitative data gathered during the initial phases of the action research resulted in the design of a unique peer instructional coaching model to support teachers during their first year of project-based learning implementation. A sample of teachers participated in peer coaching professional development, and quantitative and qualitative data were collected over a period of six months to determine the effectiveness of the intervention. Analyses of data indicated instructional coaching positively influenced teachers' self-efficacy to implement project-based learning in high school classrooms. Further, elementary teachers demonstrated gains in their ability to implement elements of project-based learning when instructional coaching was used. Thus, results identified a need to continue the development of teacher efficacy and expand the peer instructional coaching model. Additional implications of teachers' participation in peer instructional coaching resulted in strengthened relationships, reduced feelings of isolation, and the development of teacher leaders.

Findings from this study were used to address the instructional practices of teachers in a rural Missouri school district and may be useful for schools when implementing new initiatives, curriculum, or instructional practices. Additionally, this study provides useful methods for schools aiming to incorporate practices of instructional coaching and roles of teacher leaders in professional learning.

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(Name of Student)

March 9, 2020

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DEDICATION

To all first-generation college students. May your determination never falter, and your ambition never cease.

ACKNOWLEDGMENTS

Multiple individuals deserve acknowledgement for the completion of this dissertation. First and foremost, to my husband Luke, who may have demonstrated more resilience than I have over the last five years. Thank you for your support, your patience, and even keeping the refrigerator stocked with pizza and cookie dough when you knew I needed it. To my children, who have certainly experienced neglect throughout this process. Kale and Leighton, your inquisitiveness was nothing short of entertaining. Brianna, your encouragement, support, and love kept me going.

To so many friends and colleagues who provided tips, advice, and feedback throughout this process. I would most certainly fail if I attempted to name you all. Thank you. To my parents, who provided me with encouragement and the space to work. Dad, thank you for providing me with the means to attend class when my rural Internet was insufficient. And Mom, I am forever grateful for the writing retreat you provided. Your support is especially appreciated.

Additionally, I have been fortunate to receive support and assistance from multiple committee members. Dr. Tricia Browne-Ferrigno, you are a fabulous teacher and I am thankful for the opportunities I've had to learn from you. Dr. Jayson Richardson, you pushed me to do my very best. I appreciate your comments and prompt feedback. Dr. Maria Cahill, I am thankful for your encouragement, positivity, and insight. Your inquiries have assisted me in broadening my perspective throughout this study. And finally, Dr. Daniela Di Giacomo, for your willingness to serve when assistance was most needed. I appreciate the time you each devoted to support me through this process.

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CHAPTER 1

CONTEXT AND SUPPORTING LITERATURE

Confidence and competence are often associated with one's ability to carry out a task successfully (Donahoo, Hattie, & Eells, 2018). If an individual has higher levels of self-confidence for an activity, those activities are often practiced more frequently (Patterson & Kellenher, 2005). Consequently, when actions are practiced regularly, competence increases. This process of attempting a new skill and developing competence for its use leads to the development of an individual's self-efficacy. Self-efficacy was defined by Bandura (1995) as a set of beliefs about one's perception to carry out an action.

Increased self-efficacy can positively influence teachers' abilities to implement new strategies such as project-based learning in their classrooms. For example, when teachers have high levels of self-efficacy, they are typically more willing to try new strategies and change practices following professional development (Guskey, 1988). Highly efficacious individuals believe they will be successful; hence, they are more persistent and more likely to embrace change (Tschannen-Moran & Hoy, 2001). Thus, efficacy is an important factor for successful implementation of project-based learning.

Instructional coaching is one opportunity for teachers to receive support to improve their self-efficacy. The principles of instructional coaching such as paraphrasing, questioning, and reflecting can build efficacy through the incorporation of social persuasion. Additionally, modeled instruction from coaches provides vicarious experiences for teachers that develop self-efficacy. Altogether, the dialogue, feedback,

and support gained from instructional coaching can positively develop mastery experiences for teachers, resulting in increased levels of self-efficacy.

This study, conducted in a rural Missouri school district, explores instructional coaching as a method to influence teachers' self-efficacy for implementing project-based learning. In this chapter, I discuss the context of the study and present the background on recent changes in the educational landscape. I describe the challenge of leadership practice and discuss my role as the researcher in this study. This chapter concludes with a review of supporting literature that informed the design of the study. In Chapter 2, I present guiding questions for the study and a detailed plan of data collection and analysis. The goal of this research was to explore the effectiveness of instructional coaching to influence teachers' self-efficacy for project-based learning instruction. Results of the instructional coaching intervention's effectiveness are presented in Chapter 3, and a plan for continued practice is shared.

Context

Lancaster Schools is a Pre-kindergarten through Grade 12 public school district located in a rural Missouri town. A total of 300 enrolled students are taught in the district's two buildings. The Adams campus is a Pre-kindergarten through Grade 8 building with an enrollment of 206 students, and the Taft campus is a Grade 9-12 high school with an enrollment of 94 students. The school district has little ethnic diversity with 62% of students receiving free or reduced-priced lunches and 93% of students identifying themselves as White (Missouri Department of Elementary and Secondary Education, 2017). The high free and reduced-priced lunch rate qualifies Adams as a Title I school.

Curricular and Instructional Alignment

In 2016, the Missouri Department of Elementary and Secondary Education (MoDESE) adopted new Missouri Learning Standards to define the content knowledge and skills students should learn at each grade level (i.e., pk-12). The adoption of new learning standards prompted Lancaster Schools to update curriculum in all subjects and grades. The redevelopment of curriculum at Lancaster Schools consisted of aligning the Missouri Learning Standards to grade-level courses and developing proficiency scales for each instructional standard to assess student competency. During the redevelopment period, teachers received long-term professional development that included (a) the use of data to make instructional and curricular decisions, (b) alignment of learning standards and content, and (c) purposes and practices of grading and assessment. Professional development occurred in whole-faculty and small department-based groups. The curriculum development process was complete in May 2018.

The newly adopted Missouri Learning Standards were written to require more rigor, critical thinking, and problem solving for all grade levels (MoDESE, 2016). Methods of inquiry were embedded within each standard and thus required educators to teach skills that had not been taught in previous years (e.g., research, problem-solving, and reiterative design). Regardless, instructional practices used in many classrooms at Lancaster Schools continued to include traditional guided practice, rote memorization, and direct instruction. For example, teachers of Grades 3 through 12 typically relied on lecturing content while students took notes or completed practice activities. Teachers of Kindergarten through Grade 2 regularly taught students using whole-group activities, such as skills worksheets. In previous years, these instructional methods were effective for ensuring required content was taught. Teachers were able to cover a large amount of

content very quickly; however, the recent curricular demands presented the need for new instructional methods. Thus, the Lancaster Schools superintendent arranged for professional development for teachers to incorporate project-based learning (PBL) in their classrooms. PBL professional development occurred from September 2018 to November 2018.

Project-based Learning

Using PBL instructional strategies has many advantages. For example, PBL includes questioning, inquiry, and collaborative teamwork. Students must develop plans for solving authentic problems by considering the resources available (Larmer, 2016; Pecore & Bohan, 2012). When students have choice with resources used for problem-solving, relevance is increased (Wijnia, Loyens, & Derous, 2011). Further, PBL can lead to increased critical thinking among students (Massa, 2008). Thus, the incorporation of PBL was identified as a promising practice to address the skills and content within the new Missouri Learning Standards.

Although many benefits for using PBL instruction exist, the practices contrasted instructional methods used by faculty at Lancaster Schools. For example, many teachers had relied on traditional practices such as lectures, worksheet packets, and quizzes when teaching. According to Quigley, Marshall, and Deaton (2011), balancing inquiry and problem solving with traditional practices for learning is a typical challenge for teachers who are beginning to incorporate PBL within their classrooms. Consequently, as teachers who are in the beginning stages of using PBL attempt to balance inquiry with traditional practices, they may experience a state of disequilibrium, which results in feelings of decreased competency. As teachers begin to make the transition to inquiry, they may feel less efficacious in their teaching.

Problem of Practice

Teachers' uncertainty to use PBL was identified following a six-week training conducted during the Fall 2018 semester. At the completion of training, many teachers appeared hesitant for using PBL in their classrooms. For example, some teachers described having a lack of confidence for addressing problems that might occur when using PBL while others questioned who would aid them when questions arose during implementation. Some teachers also expressed fear that the new methods would be ineffective with their students and asked for additional support during implementation. Thus, an instructional coaching intervention was suggested to influence teachers' self-efficacy for PBL.

Responses of teachers after participating in professional development for implementing PBL instruction were consistent with low efficacy. For example, an efficacious teacher is receptive to learning new skills and implementing new teaching practices (Guskey, 1988). However, apprehension expressed by teachers at Lancaster Schools contrasted these characteristics. Teachers' feelings were concerning because efficacy beliefs influence the persistence and resilience exhibited by an individual when attempting new practices (Bandura, 2000). As a result, low levels of teacher efficacy had potential to influence the degree to which PBL was implemented in classrooms at Lancaster Schools. Because PBL was a full-scale change, teachers must feel confident, competent, and capable to use these new methods of instruction in their classrooms effectively. Hence, successful PBL implementation at Lancaster Schools was dependent upon teachers' efficacy.

Multiple actions can be taken to influence teacher efficacy. Methods recommended by Knobloch and Whittington (2002) included additional support,

feedback, knowledge, experience, and collaboration. These recommendations align with components of instructional coaching. Thus, instructional coaching was identified as a promising method to increase support and influence teachers' self-efficacy to implement PBL at Lancaster Schools.

Benefits of Instructional Coaching for PBL

The use of instructional coaching to increase teachers' efficacy for PBL has multiple benefits. When teachers are coached, they are led to question and reflect on their experiences, resulting in learning and growth (Costa & Garmston, 2003). When implementing teaching methods such as PBL that contrast previously used practices, reflection and discussion can assist teachers to become more comfortable (DeChenne et al., 2014). This action is supported by Wahlstrom and Louis (2008) who reported that reflective dialogue and increased observations of classroom practices by peers led to improvements in instruction and teachers' self-efficacy. Further, due to natural tendencies to revert to what is familiar, the support of an instructional coach can have positive effects for PBL implementation (Ertmer & Glazewski, 2015; Ertmer & Simons, 2005).

The faculty at Lancaster Schools learned how to design an instructional unit using PBL during professional development. However, to improve their confidence for using PBL in their classrooms, teachers must have follow-up to practice, receive feedback, and reflect on their use of the new skills (Knobloch & Whittington, 2002). Research conducted by Joyce and Showers (2002) showed that when teachers receive professional development, the rate of implementing the new methods is 5-10%. However, one reason teachers may be reluctant to implement what was learned may be associated with lowered sense of self-efficacy. Lee and Blanchard (2018) explored this topic and found that one-third of teachers who did not implement PBL following professional development

reported lowered levels of efficacy. One method with positive outcomes for teachers'

self-efficacy following PBL professional development is instructional coaching

(DeChenne et al, 2014; Havice, Havice, Waugaman, & Walker, 2018).

Benefit of the Study

This study was designed with multiple benefits for Lancaster Schools. The main

goal of this study was to implement a model of instructional coaching to increase

teachers' self-efficacy to implement PBL in their classrooms. When self-efficacy is

higher, teachers take more risks, are more willing to experiment, and persist longer when

learning new tasks (Tschannen-Moran & Hoy, 2001a). Although teachers at Lancaster

Schools participated in professional development, their hesitations for using PBL and

requests for further support suggested that not all teachers felt confident to use PBL in

their classrooms. Further, while instructional coaching was suggested by colleagues at

Learning Forward (2018) as a method to increase teacher self-efficacy, Lancaster Schools

did not employ an instructional coach at the time of this study. As a result, few

opportunities to exchange dialogue were available to improve teachers' beliefs for using

PBL. Although building principals could serve as instructional coaches, the discussion

between teachers and principals could be perceived as evaluative rather than an

opportunity for growth. In a successful coaching collaboration, feedback from a coach

should not be viewed as evaluative (Heineke & Polnick, 2013).

Additional benefits of an instructional coaching intervention included the

potential to influence the culture of professional learning at Lancaster Schools. Annually,

the leadership team of Lancaster Schools (consisting of the superintendent, two

principals, and one part-time curriculum director) identified needs for professional

development and arranged all learning experiences for faculty. However, due to the

multiple responsibilities the leaders must complete, little time was available for them to provide faculty with additional support and feedback of PBL implementation. Thus, teachers must consider what was learned from provided professional development and reflect on their practice to improve their skills for classroom instruction. However, individual reflection may not result in the confidence and competence needed to implement new practices at the desired level. In contrast, coached teachers gain confidence through reciprocal relationships with other colleagues (Jewett & MacPhee, 2012). Due to these relationships, when teachers are coached, learning is encouraged throughout the instructional setting. While instructional coaching can have positive influences for teachers' beliefs for using PBL, benefits also occur for the coach, and ultimately the school.

Researcher Experience and Role

My relationship with Lancaster Schools began as an external consultant. For the 2015-16 school year, I was contracted with Lancaster Schools to provide professional development for teachers of Grades 6-12. Assignments of this role included consultation and support for faculty in curriculum, instructional practices, assessment, and data analysis. When Missouri adopted the new Missouri Learning Standards in 2016, I was hired full-time by the district to oversee the development and transition in curriculum. From May 2016 to May 2018, I served the role of teacher and curriculum director. Upon completing the curriculum redevelopment project in May 2018, I transitioned out of the full-time role. However, I agreed to provide part-time support in professional development in the 2018-2019 school year. Thus, my role at Lancaster Schools while conducting this study was that of an external consultant. Detailed information regarding my role is provided in Chapter 2.

<div align="center">**Literature Review**</div>

The purpose of this literature review is to describe the research currently available for the following areas: (a) project-based learning, (b) teacher self-efficacy, (c) instructional coaching, and (d) effects of instructional coaching that may influence self-efficacy for PBL instruction. I begin this review of the literature with a broad view of recent reform efforts in education and their influence on instructional practices. PBL is presented as an instructional method to meet these new demands. The challenges teachers may experience when using PBL in their classrooms as well as factors that may lower teachers' current levels of self-efficacy are introduced. What is known about self-efficacy and how self-efficacy can influence teachers' actions when implementing new practices such as PBL are examined. Because the intervention used to influence teachers' efficacy in this study is instructional coaching, a description of instructional coaching is provided. The components of instructional coaching and their relationship with elements that positively influence self-efficacy are presented. The opportunities instructional coaching provides to address teachers' self-efficacy for implementing new practices such as PBL complete the literature review.

Impact of Education Reform

Due to concerns for the complexity of real-world problems, the traditional schooling model is experiencing change (Wagner & Compton, 2012). The economy, industry, and jobs available today demand more education and different skillsets than what were previously required (Partnership for 21st Century Skills, 2008). Societal changes that emphasize information processing, critical thinking, and problem solving have impacted education (Crockett, Jukes, & Churches, 2011). To address these changes, integration of content knowledge with skills such as collaboration, communication,

creativity, and critical thinking were reflected in the redevelopment of the Missouri Learning Standards in 2016. With the adoption of these standards, Missouri teachers must now provide rigorous learning experiences that include critical thinking, in-depth understanding, and problem-solving. These new standards emphasize skills necessary to solve authentic problems and reflect the knowledge and skills needed to achieve college and career readiness (MoDESE, 2016).

Changes in content standards impact what students should know and be able to do. However, now standards also impact how content is taught. Traditional methods of direct instruction conflict with the level of inquiry required in current content standards. Thus, teachers must learn new skills for instruction in their classrooms. One method that teachers can employ to incorporate the rigor, inquiry, and problem solving necessitated by new learning standards is PBL.

Project-based Learning

PBL is a student-centered instructional method that requires students to conduct inquiry in order to solve an authentic problem (Larmer, 2016; Larmer & Mergendoller, 2015; Massa, 2008; Wijnia et al., 2011). PBL instruction differs from traditional, teacher-directed instruction in several ways. For example, when traditional instruction is used, teachers present content and assess students' comprehension using knowledge checks, quizzes, and end-of-unit tests. However, when using PBL, teachers present students with an authentic and challenging problem. The problem is based on concepts that are used as a central focus point for student learning. Students then use available resources and real-world tools to learn more about the concept and present possible solutions. Teachers scaffold the activities students participate in and use questioning strategies to lead students toward potential solutions. Students differentiate their learning by using their

strengths to choose resources and finished products. Assessment occurs through collected evidence of student progress toward potential solutions of the problem. Finally, students present their solution to an audience of stakeholders (e.g., entrepreneurs, community members) who have expertise to provide feedback on the final product (Bell, 2010; Larmer, 2016).

Multiple benefits exist when PBL is employed effectively. Often, since a problem used in PBL is typically a real-world issue, content from multiple disciplines is integrated in instruction. Using interdisciplinary approaches allows teachers to cover more material at a deeper level (Ertmer, 2009). Further, teachers who use PBL in their classrooms have reported feeling that students are more engaged in learning and use higher levels of critical thinking strategies (Massa, 2008). This assertion was supported by the research of Duran, Ballone-Duran, Haney, and Beltyukova (2009), who reported that 80% of elementary teachers surveyed perceived PBL as beneficial for students. Data from a similar study conducted by Massa, Dischino, Donnelly, Hanes, and DeLaura (2012) revealed increased student motivation when PBL was used effectively. Students expressed excitement when PBL was employed, and thus, they were more motivated to learn.

Implementation Challenges

Although beneficial for student learning, shifting instructional methods to incorporate PBL requires new approaches for teachers in planning and instruction. For example, in traditional learning environments, teachers typically plan and organize content linearly by pacing content learning standards, presentation, delivery, and assessment (Hartman, Renguette, & Seig, 2018). Further, teachers in traditional learning environments typically provide students with pre-determined resources and plan how and

when the resources are used. However, when designing units for PBL, teachers must think more broadly to encompass authentic problem-solving. PBL instruction is designed from concepts or themes, which broadens planning to include content and skills from other disciplines. Rather than planning linearly, when PBL is used teachers start with a problem that does not have a clear answer (Hartman et al., 2018). Students use authentic skills of self-regulation and problem-solving to find possible solutions. Students then critique and revise based on reflections of their progress (Larmer, 2016). Thus, teachers must anticipate potential learning resources for problem-solving and be comfortable allowing students to find and use their own resources. Additionally, students' solutions to the problem may differ, which requires teachers to assess application of knowledge rather than one correct answer. This may be challenging for teachers because finding the right balance for the learning content, skills, and authentic application when using PBL takes time to develop. Thus, teachers may feel uncomfortable and attempt to direct project-based lessons in a more predictable fashion.

Teachers may also have different levels of comfort for incorporating inquiry. For example, Quigley, Marshall, and Deaton (2011) found that when first implementing PBL instruction, teachers reported feeling a loss of control. In traditional teacher-directed instruction, the teacher determines what is taught and how much time is spent on each topic. When using PBL, teachers must learn to facilitate learning and scaffold content using mini-lessons, guiding questions, and reflection. Thus, balancing the role of facilitator and instructor can be challenging for some teachers in the initial stages of implementation. Although teachers experienced in using PBL have described covering twice as much content, novice teachers may fear that using these new methods will be

ineffective (DeChenne et al., 2014). Hence, Hartman and colleagues (2018) suggested that a network of teachers be developed to provide support when teachers are beginning to use PBL.

Regardless of practice, learning new instructional strategies to use in the classroom can sometimes make teachers feel uncomfortable (Joyce, Weil, & Calhoun, 2004). According to Marshall and Smart, (2013), teachers are reluctant to use instructional strategies that they feel are unclear when they are faced with external pressures for student learning, such as high-stakes testing. Thus, teachers who are beginning to use PBL may gravitate towards what is most familiar or what has worked in the past (Ertmer & Simons, 2005). In these situations, it is not uncommon for teachers to incorporate methods such as traditional lectures and tests within PBL instruction. However, the practice of merging elements of PBL and traditional instruction can have adverse effects because the degree that PBL elements are employed by teachers can influence its effectiveness (Hung, 2011). Unfortunately, this can exacerbate the problem because if students are unsuccessful, teachers may feel their practices are ineffective.

Although qualities of persistence and resilience are necessary when teachers are implementing any new instructional strategies, these qualities are essential when establishing the optimal PBL environment (Pecore & Bohan, 2012). Beltman, Mansfield, and Price (2011) claimed that resilient teachers are confident, take credit for their accomplishments, and have higher levels of self-efficacy. These assertions are supported by Tschannen-Moran, Hoy, and Hoy (1998) who found that teacher resilience for change is related to levels of self-efficacy. For those with lower levels of self-efficacy, attempts for new strategies may be abandoned too early or avoided altogether (Bandura, 1995).

Lee and Blanchard (2018) found this to be true in their research: Thirty percent of the teachers they surveyed felt uncomfortable using PBL and thus did not implement it. For these reasons, it is critical to explore the influence of teacher's self-efficacy when implementing new instructional practices such as PBL.

Self-Efficacy

Self-efficacy, defined as an individual's belief in his or her ability to perform an action (Bandura, 1995), can be an important factor to consider with teaching. Self-efficacy is framed in social cognitive theory, meaning that behaviors, cognition, and environmental influences are used in the development of a belief system. Further, because self-efficacy develops from past experiences, it is situational (Ross & Bruce, 2007). This means that efficacy is malleable. Further, an individual can be more efficacious in one area than another.

Efficacy is established through a balance of cognitive processes, actions, and self-regulation (Bandura, 1995). These components are used by individuals to manage expectations for new experiences. From those expectations, they develop a belief for their ability to cope with change. For example, problem-solving and goal setting are included in cognitive processes. According to Ross and Bruce (2007), it is typical for an individual with higher levels of efficacy to think critically to solve challenging problems. However, individuals with lower levels of efficacy will typically rely on recall or single sources of information.

Feelings of efficacy shape an individual's behaviors and actions, thus influencing participation in activities and interaction with different environments (Bandura, 1995). For example, a teacher judges effectiveness based on her or his satisfaction for goals met (Bruce & Ross, 2007). Beliefs developed from this self-assessment can affect teachers'

willingness and preparedness to try new teaching strategies (Wahlstrom & Louis, 2008).

Highly efficacious teachers typically demonstrate more effort, persistence, enthusiasm,

and commitment (Tschannen-Moran et al., 1998). Further, individuals with high levels of

self-efficacy are likely to set higher personal goals, are more optimistic about their ability

to achieve goals set (Bandura, 1995), and are typically more flexible when adjusting to

change (Tschannen-Moran & Hoy, 2001a).

In contrast, when self-efficacy is low, individuals do not believe time spent

attempting new strategies is valuable (Tschannen-Moran & McMaster, 2009). Hartman

and colleagues (2018) warned that while teachers with higher levels of self-efficacy are

more likely to take risks and try new strategies, those with low levels are more likely to

give up. Teachers' comfort in the new environment and confidence to integrate new

methods, roles of facilitation, and resources influence their use (Grant & Hill, 2006).

When self-efficacy for a practice is low, individuals anticipate what might go wrong and

as a result demonstrate avoidance behaviors (Bandura, 1995). These beliefs affect the

attitude of teachers toward the instructional process. Further, teachers with low efficacy

self-perceptions show weaker commitments to teaching, leave the profession early, and

spend less time trying in subject areas they perceive themselves as weaker (Bandura,

1995). Thus, teachers' self-efficacy can be an important factor to consider when

beginning instruction that includes PBL (Silm et al., 2017).

Influences of Self-Efficacy

Self-efficacy is malleable and therefore can be influenced either positively or

negatively (Ross & Bruce, 2007). Four sources that influence self-efficacy beliefs were

presented by Bandura (1995): (a) physiological state, (b) social persuasion, (c) vicarious

experiences, and (d) mastery experiences. Efficacy is developed through an individual's

reflection on the four sources. Each can positively or negatively influence choices, efforts, and persistence.

Physiological state. The first source of self-efficacy beliefs aligns with the physiological or emotional state of beginning something new. The physiological state is a perception an individual must be good or masterful at a task (Ross & Bruce, 2007) and can be developed through a teacher's feelings of responsibility for student learning (Hawkins, 2009). For example, how a teacher feels about teaching as well as his or her ability to influence learning can contribute to the physiological state to initiate new tasks. An individual with high levels of self-efficacy for a task feels assured and eager while low levels of efficacy may leave one feeling anxious or fearful. Thus, if teachers feel unsure of their ability to use new instructional methods in their classrooms, the fear of failing may hinder their attempts altogether (Tschannen-Moran & Hoy, 2001a). On the other hand, high levels of self-efficacy are related to a teacher's ability to present an effective lesson (Saklofske, Michayluk, & Randhawa, 1988). Further, if a teacher possesses high levels of self-efficacy and overcomes challenges when teaching, self-efficacy is enhanced (Beltman et al., 2011).

Social persuasion. Social persuasion, described by Bandura (1982) as pep talks, feedback, or other general discussion that provide encouragement, can be useful to increase self-efficacy. Collaboration among teachers, such as co-teaching and feedback is highly valued and leads to increased self-efficacy (Schleicher, 2015). These practices were supported by Liu (2013) who claimed self-efficacy is enhanced through teacher collaboration. Additionally, self-efficacy can be enhanced when highly efficacious teachers collaborate with others (Poole & Okeafor, 1989).

The effectiveness of social persuasion is dependent on many factors. First, teachers need opportunities for significant conversations (Sterman, 2018) because quick conversations rarely provide the time needed for reflection and consideration of new practices. Additionally, the credibility and trustworthiness of the persuader is considered (Bandura, 1986), an assertion supported by Tschannen-Moran and McMaster (2009) who found that feedback from colleagues and administrators can strengthen teachers' beliefs about their abilities to achieve. Persuasion from colleagues was also found to positively affect efficacy in a study conducted by Ross and Bruce (2007). However, while social persuasion has had positive influences for self-efficacy, its use alone is not enough because it typically provides a short-term effect that does not lead to long-term beliefs (Tschannen-Moran & McMaster, 2009).

Vicarious experiences. Self-efficacy increases when teachers experience using practices that work (Ross, 1998). Sometimes, teachers may observe success modeled by a colleague, which presents a vicarious experience contributing to feelings of self-efficacy. The model provides a standard and helps establish goals (Tschannen-Moran & McMaster, 2009), thus increasing self-efficacy for the observing teacher (Tschannen-Moran & Hoy, 2001a). Witnessing the success of others provides reassurance and affirms confidence (Ginns & Walters, 1996). Effective examples of how modeling affects self-efficacy were described by Knight (2005). In a cohort of teachers receiving support from an instructional coach to model lessons, 85% of teachers implemented new instructional practices within the first six weeks of school. Teachers credit their increased confidence and risk-taking to the support and modeled strategies of an instructional coach (Knight, 2005). However, positive results such as these occur only if the model performs well. If

the model does not perform well or if the intended goals are not achieved, self-efficacy of the observer will decrease (Bandura, 1977).

Mastery experiences. Mastery experiences are the most powerful source of self-efficacy because they provide an authentic evidence of success (Bandura 1977; Tschannen-Moran & McMaster, 2009). When teachers contribute their own actions to student success, efficacy increases (Ross & Bruce, 2007). Responses from teachers in a study conducted by Ginns and Walters (1996) supported the assertion that experience leads to confidence. A sense of personal accomplishment increases self-efficacy for the task (Hawkins, 2009). Further, experience is most effective if it occurs early in the learning process and produces few setbacks (Tschannen-Moran & McMaster, 2009). Mastery experiences that are established early result in increased confidence and frequency of attempts; however, the success must be attributed to ability and effort (Bandura, 1977). If success is attributed to luck or assistance from others, self-efficacy is not strengthened (Schunk, Meece, & Pintrich 2014).

Influences of Teacher Self-Efficacy

Although multiple options exist with potential to influence teachers' self-efficacy, the most effective methods typically include multiple sources of efficacy (Tschannen-Moran & McMaster, 2009). One method that uses multiple sources of self-efficacy is instructional coaching. Effective actions by instructional coaches include observation, data collection, modeling, and feedback. These actions align with sources of self-efficacy because teachers have opportunity to gain efficacy through mastery experiences during observed lessons. Further, teachers' self-efficacy can increase when skills are acquired from modeled practices and feedback (Bruce & Ross, 2008; Tschannen-Moran & McMaster, 2009). Reflection and modeling can encompass social persuasion and

vicarious experiences. Due to its relationship to sources of efficacy, instructional

coaching can positively influence teachers' confidence to use new methods of instruction

in their classrooms. Therefore, the influences of instructional coaching should be

explored to increase self-efficacy among teachers.

Instructional Coaching

According to a study funded by the Bill and Melinda Gates Foundation, (Learning

Forward, 2018), teachers prefer continuous, non-evaluative feedback, support to

strengthen their teaching strategies, and collaborative professional learning. One way to

address these learning preferences is instructional coaching, a cyclical process that

extends what is learned in traditional professional development sessions (Showers, 1985).

When instructional coaching is employed, teachers learn by receiving support from

teacher leaders within their own classroom (Croft et al., 2010).

Instructional coaching personalizes adult learning, enhances practices through

reflection, and encourages instructional feedback (Croft et al., 2010). Essential

characteristics for instructional coaching are equality, choice, and reciprocity, meaning

that teachers and coaches have an equal and collaborative partnership that is built on trust

(Knight, 2017). Coached teachers benefit from the choice to focus on their own growth

and learning in a trusting environment (Netolicky, 2016). Coaches act as critical friends

to provide support, guidance, and mentoring to teachers (Joyce & Showers, 1981; Killion,

2004). In addition to providing support through coaching, actions of coaches alternate

between consulting and collaborating to help teachers reflect, generate ideas, and increase

self-awareness (Wellman & Lipton, 2004). Additionally, coaches collaboratively plan

and teach lessons with teachers, provide immediate feedback on teachers' performance in

the classroom, and offer suggestions for differentiated instructional strategies to support the learning needs of diverse students (Killion, 2004).

In the most effective coaching collaborations, a teacher sets goals for an area of improvement and the instructional coach employs dialogue and questioning to promote teacher's self-reflection (Knight, 2017). Wellman and Lipton (2004) described methods of effective dialogue as those that include (a) pausing to allow time and space for thinking; (b) paraphrasing to establish relationships and increase understanding; (c) inquiring to invite new ideas, connections, or meanings; (d) probing to clarify thinking; and (e) extending skills by providing resources and information. Collaborative conversations that include methods of inquiry help teachers learn about themselves and what they do (Wellman & Lipton, 2004). Additionally, teachers that are coached have opportunities to share and extend knowledge with others (State of Victoria Department of Education and Early Childhood Education, 2010). Thus, learning often occurs for the coach and the teacher (Sinkinson, 2011).

The instructional coach is responsible for coordinating with school leaders to facilitate training and provide opportunities for teachers continued professional growth (Danielson Group, 2014; Killion, 2004). Instructional coaching provides learning opportunities to help teachers enhance and master effective instruction through a process of planning, feedback, examining results, and refining practices (Joyce & Showers, 1981; Learning Forward, 2016). Professional learning for teachers may take place before or after school, during a teacher's planning time, or even during class with students (Croft et al., 2010). Coaching may sometimes follow a cycle of pre- and post- meetings with individual teachers to identify a targeted area for improvement or learning through

observation, data collection and analysis, and reflection (Hanover Research, 2015; Knight, 2009; Knight et al., 2015). Frequently, the coach's role is to model lessons and instructional strategies for teachers.

Responsibilities of an instructional coach may vary across schools and districts. For example, an instructional coach may also fulfill the role of data coach, curriculum specialist, instructional specialist, or learning facilitator (Killion, 2004). Regardless of the title, the tasks and responsibilities of an instructional coach are often the same: (a) provide ongoing, professional learning during the school day and (b) support teachers in the classroom (Hanover Research, 2015; Killion, 2004). The Danielson Framework for Instructional Specialists (Danielson Group, 2014) provided a structure for instructional coaches to use when they plan and prepare for change, deliver services, and collaborate with teachers. According to the framework, actions of coaches should include collaboration with teachers to (a) design rigorous instruction, (b) address individual teachers' instructional improvement needs, (c) engage teachers in learning new instructional strategies and practices, (d) provide relevant and timely feedback, and (e) provide responsive and professional support.

Even though instructional coaching can positively influence implementation and is recommended in professional literature, it is not widely used by school districts. In a survey conducted by Learning Forward (2017), only 25% of participating teachers indicated that instructional coaching was available in their school. Further, these teachers felt that without receiving direct support within their classrooms, little time existed for feedback on new implementations.

Instructional coaching is a collaborative experience that includes input from the teacher, and thus, there are variances in what coaching looks like across schools. Learning Forward (2018) recommended that roles within schools be expanded to include teacher leadership, thus increasing opportunity for teachers to receive feedback from peers. Regardless, an effective coaching program includes reciprocal relationships between teachers, resulting in shared learning responsibilities (Yopp et al., 2011).

Influences of Instructional Coaching

Coaching for teachers can be more effective than professional development alone (Johnson et al., 2017). One reason why coaching is so beneficial is because it addresses specific needs of each teacher in an authentic setting, particularly when teachers receive support in their own classrooms (State of Victoria Department of Education and Early Childhood Education, 2010). When teachers have the opportunity and support to try new strategies immediately and then receive feedback, they develop a better understanding of when, how, and why specific instructional strategies should be used.

Elements of instructional coaching promote the reflection necessary to master new skills and strategies (Showers, 1985). For example, collaborative coaching conversations include techniques of pausing, paraphrasing, inquiring, and probing to encourage reflection for teachers to learn about themselves and what they do (Lipton et al., 2003; Wellman & Lipton, 2004). According to Knight (2005), these reflective techniques lead to increased competency, and reflection with colleagues allows for a more accurate understanding of perceived and actual abilities. While individual teachers may have opportunities to practice new skills, they may not always reflect on their performance or what has been learned (Showers, 1985). Without reflection and feedback, it is possible that teachers will fail to adequately appraise their ability to implement

practices. Further, instructional coaching may be an effective intervention to better align beliefs of efficacy with performance. For example, Awkard (2017) reported positive results when using coaching strategies for reflection, which were used to align teachers' perceptions of self-efficacy with their actual performance when implementing a prescribed curriculum. Without reflection, teachers may be unable to analyze their performance effectively, thus preventing their continuous growth.

Multiple benefits result from the self-reflection encouraged by instructional coaching. Ideas and suggestions are made based on evidence from observations. Coaching practices of questioning and listening encourage self-determined learning among teachers, which increases self-efficacy, self-confidence, and self-awareness (Blaschke, 2012; Cornett & Knight, 2009; Rhodes & Fletcher, 2013).

Influences of Instructional Coaching on Self-Efficacy

The knowledge, preparation, and personal background a teacher possesses can contribute to one's beliefs and abilities for teaching. These elements develop a teacher's physiological state, which contributes to readiness to initiate a task (Bandura 1977; 1997). While an individual's physiological state may affect the perception of challenges or risks, Bandura (1995) suggested that if individuals are guided to mastery using the support of another skilled individual, less distress will occur. A skilled individual, such as a colleague or instructional coach, provides support and encourages success by scaffolding learning opportunities to successfully build efficacy beliefs for others. The levels of support teachers receive can influence beliefs (Knobloch & Whittington, 2002). For example, a teacher's physiological state may be affected if assistance such as non-evaluative feedback is available. In this situation, the teacher may feel more prepared to

attempt new strategies and possibly have higher beginning levels of efficacy. However, if a teacher feels isolated, he or she may feel uncomfortable or reluctant.

Instructional coaches can influence teachers' beliefs and confidence by activating multiple sources of efficacy such as social persuasion and vicarious experiences (Bruce et al., 2010; Bruce & Ross, 2008; Tschannen-Moran & McMaster, 2009). For example, an effective coach may utilize social persuasion by seeking support from other teachers through reflection and feedback. Additionally, options such as engaging in observations through instructional rounds can provide vicarious experiences for teachers (Killion, 2004). Leveraging multiple sources to develop efficacy increases learning opportunities for the teachers and coach, which can influence teachers' confidence to use new strategies for instruction.

Coaching contrasts the one-size-fits-all approach to typical professional development because its design can be adjusted to fit the unique needs of individual teachers or schools. For example, Netolicky (2016) found the individualization of coaching cycles to be a meaningful practice for professional learning. Teachers reported that when they were coached, they had choice in determining the focus of coaching and could engage in conversations about the focus on their desired growth. Further, teachers found that being coached shifted their beliefs about learning and teaching. Therefore, the individualization within coaching can benefit all teachers, including those that are highly efficacious, which is an assertion by Beltman and colleagues (2011) who found that efficacy is enhanced when teachers with high levels of efficacy have opportunity to overcome challenges in their teaching.

Coaching can also be a valuable way to influence teacher efficacy during new initiatives. When teachers' perceptions of their efficacy are lower, they typically spend less time trying to implement new strategies because they think their efforts will be futile (Tschannen-Moran & McMaster, 2009). However, the support of a coach can increase teachers' efficacy and lead to improved implementation. For example, when professional development alone did not lead to desired outcomes, Bruce and Ross (2008) implemented models of coaching and emphasized opportunities for teachers to receive social persuasion and vicarious experiences through observations and feedback. By doing so, self-efficacy among teachers was enhanced. Similarly, Cantrell and Hughes (2008) studied teacher efficacy when implementing literacy strategies into content areas. When participating teachers received monthly coaching visits to review data, collaboratively plan, and observe modeled lessons, a significant increase in teachers' sense of personal efficacy for teaching literacy between pre-study ($M = 3.69$) to post-study ($M = 4.18$) was identified.

If teachers are provided guidance and support when developing new skills, confidence increases (Wellman & Lipton, 2004). Teachers who are coached report that collaborative dialogue provides opportunities for them to work through concerns and build confidence to take risks and change (Wineburg, 1995). Coaching provides opportunity for teachers to see models, receive feedback, and practice new techniques. All these actions leverage the sources of efficacy, which leads to increased self-efficacy.

Influences of Instructional Coaching on PBL Self-Efficacy

Confidence and competence are major factors that contribute to an individual's decision to try something new (Knight, 2018). If an individual feels uncertain, the situation will likely be avoided (Bandura, 1995). The effort, persistence, and choices

teachers make to implement new strategies are influenced by their levels of self-efficacy and thus affect how strategies are implemented (Tschannen-Moran & Hoy, 2001a; Wahlstrom & Louis, 2008).

PBL is an instructional method that differs from traditional teacher-directed instruction in many ways. It includes student-centered practices, such as collaboration, teamwork, research, and creative problem solving. Students must develop solutions for an authentic challenge or question that does not have a clear answer (Hartman et al., 2018). Due to the problem-solving methods students must use in a PBL classroom, teachers must shift methods of instruction from content delivery to exploratory learning facilitation. Teachers must find balance between teaching content and supporting student exploration, (Czajka & McConnell, 2016; Quigley et al., 2011). Sometimes when teachers are experiencing these shifts in instruction, they may feel less confident in their teaching abilities (Ertmer, 2009). These concerns may create disequilibrium for teachers, which may then affect their feelings for using PBL in their classrooms. Altogether, these factors may lessen teacher confidence and readiness, affecting their physiological state.

Feelings of efficacy can shape teachers' willingness and persistence when attempting new strategies in their classrooms (Wahlstrom & Louis, 2008). Because PBL does not include elements from traditional teaching models, when teachers first attempt to use it in their classrooms, they may perceive themselves as less effective. Joyce and colleagues (2004) explained that teachers feeling uncomfortable to try new strategies is not unusual. Further, according to their research, if teachers feel uncomfortable when using a new strategy, they will not attempt its use unless they receive support from school personnel. Thus, support for teachers to experiment and become comfortable with PBL

can significantly influence teachers' ability to achieve the desired results in their classrooms (Lam, Cheng, & Choy, 2010). Instructional coaching is one method schools can employ to support and assist teachers' comfort for using new learning strategies required by PBL. DeChenne and colleagues (2014) reported positive results in self-efficacy for teachers who used instructional coaching when beginning to use PBL in their classrooms. Specifically, teachers stated that the assistance of an instructional coach was beneficial because feedback increased their confidence and their ability to teach effectively.

Instructional coaching can be an effective method to increase teachers' self-efficacy. For example, Nugent and colleagues (2016) reported positive results after middle school teachers beginning to use PBL participated in one year of coaching. Ninety-three percent of the coached teachers felt confident to use the new methods, compared to 80% of the uncoached teachers. These findings were supported by Havice, Havice, Waugaman, and Walker (2018) who utilized the expertise of coaches following training of PBL in science and mathematics classrooms. Teachers who participated reported increases in self-efficacy from pre-study ($M = 2.5$) to post-study ($M = 4.3$). Thus, support in the form of observations, feedback, and reflection provided during coaching can be an effective way to increase self-efficacy for PBL.

When beginning to implement PBL, instructional coaches can use dialogue such as paraphrasing, probing, and extending to influence teachers' self-efficacy through social persuasion (Duran et al., 2009). Coaching strategies such as these allow teachers to reflect about their use of PBL and consider strategies perceived to be effective. Additionally, instructional coaching strategies allow teachers to reflect and consider

opportunities for improvement and strengthen areas of weaknesses. As a result, teachers experiment with the new teaching strategies more often and therefore increase levels of efficacy for their use.

Summary

Skills of authentic problem solving, communication, and collaboration are now included with rigorous content knowledge in the newly adopted Missouri Learning Standards. One method of instruction that incorporates both skills and content knowledge required of the new learning standards is PBL. However, teachers at Lancaster Schools expressed concerns for changing instructional practices from a traditional, lecture-based learning environment to one that engages students in collaborative problem solving. Feelings of lowered confidence when changing instructional methods to include student-centered practices such as PBL are consistent with lowered levels of perceived self-efficacy. Because teacher efficacy has many implications for effective implementations of PBL at Lancaster Schools, measures should be taken to address teacher self-efficacy.

During large-scale change, professional development alone may not be enough to influence teachers' beliefs to use new practices in their classrooms. Effective methods of change often involve additional support from instructional coaches. Support provided by instructional coaching allows teachers and coaches to observe and model lessons, review data collected during observations, and reflect on practices as they occur. Instructional coaching also has potential to address sources of self-efficacy, thus leading to increased levels of efficacy. Therefore, to address teacher self-efficacy when implementing PBL instruction, a model of instructional coaching was offered to teachers at Lancaster Schools. The purpose of this mixed-methods action research was to explore how instructional coaching affects perceptions of self-efficacy among Lancaster Schools'

teachers who are required to implement project-based learning in their classrooms. The

action research plan and methodology are presented in Chapter 2.

CHAPTER 2

ACTION RESEARCH DESIGN AND PLAN

The goal of this study was to explore the effectiveness of an intervention to influence the self-efficacy among Lancaster Schools' teachers to implement project-based learning (PBL) in their classrooms. All teachers at Lancaster Schools received professional development for PBL during the Fall 2018 semester. Their professional development included in-depth instruction about PBL elements such as inquiry-based learning, authenticity, scaffolding within inquiry, and assessment. Teachers also viewed models of instruction and developed a unit of instruction incorporating elements of PBL. Following professional development, some teachers described concerns about implementing PBL in their classrooms. Teachers requested support during implementation to assure their questions were answered and assistance was provided. Many teachers also expressed needing more time to feel comfortable using the new teaching method. I met with the school superintendent to present teacher feedback, develop a plan to alleviate teacher concerns, and assist with PBL implementation. Thus, instructional coaching was determined to be the appropriate intervention to increase teachers' sense of self-efficacy to implement PBL in their classrooms.

In this chapter, I present the organizational context of Lancaster Schools and my role as a contracted instructional specialist for the district. A plan to influence teachers' self-efficacy and implementation of PBL is addressed using a six-phase mixed-methods action research design (MMAR). Research questions are stated, and the study procedures, data collection plan, and data analysis strategies for each phase are described.

Research Setting

Lancaster Schools is a rural Pre-kindergarten-Grade 12 school district in Missouri. Two school campuses, Adams and Taft, house a total of 300 students. As a result of low student enrollment, a single teacher is employed per each grade and discipline area. In addition to two principals and guidance counselors, faculty includes 32 teachers between the two campuses. Six teachers are shared between sites, and three teachers work part-time. The teachers' workday for both campuses includes seven scheduled 47-minute instructional periods and one 47-minute conference planning period. Little ethnic diversity exists among the students served at Lancaster Schools. Ninety-three percent of the enrolled students identify themselves as White. Additionally, 60% of students qualify for free or reduced-priced meals. Lancaster Schools boasts a 96% graduation rate, which is 7% higher than the average for Missouri.

Adams Campus

Nineteen teachers work at the Adams Campus and serve the 206 students in Pre-kindergarten-Grade 8. Teaching experience ranges from 1-36 years, and 11 teachers have advanced degrees. Ten teachers have been faculty members at Lancaster Schools for less than five years, which means they have probationary employment status.

Teachers of Pre-kindergarten through Grade 5 collaborate to develop their own unique schedules around their scheduled conference period. Teachers of electives and academic courses in Grade 6-8 have a more rigid schedule. For these teachers, a schedule is developed by the principal and counselor. Each teacher is scheduled to teach seven different courses throughout the day. For most of these class periods, teachers have multiple preps, which means new content for different grade levels are taught in each period.

Content taught by teachers at the Adams Campus follows a traditional curriculum of mathematics, English language arts (ELA), science, and social studies. Additionally, all students in Kindergarten-Grade 8 receive instruction in music, art, library, computer technology, and physical education. Remediation and enrichment are provided during the school day for all grade levels.

Taft Campus

Ten full-time and three part-time teachers are employed at the Taft Campus and serve 94 students enrolled in Grades 9-12. Teaching experience of the faculty ranges from 4-28 years. Of the ten teachers, seven have probationary status as defined by MoDESE's tenure system. Five faculty members also have advanced degrees.

The counselor and principal develop the school schedule, and teachers typically teach a different course each period. Traditional face-to-face instruction takes place for all classes except for online Spanish language instruction.

MoDESE requires high school students to complete 24 credits of instruction over 4 years in order to graduate. Required core discipline credits include four units of ELA and three units each of mathematics, science, and social studies. Advanced, college-preparatory, and dual credit college courses are options for students in each of the core areas. In addition to core discipline courses, students are also required to complete one unit each of fine arts, practical arts, and physical education, one-half unit each of personal finance and health, and seven units of electives.

Organizational Structure

The organizational structure of Lancaster Schools is hierarchical. The superintendent, Mr. Smith, oversees all operations and provides direct supervision to building principals. Mr. Johnson, principal at Taft, oversees and directly supervises all

full- and part-time teachers who serve students at the Taft Campus. Mr. White, principal at Adams, oversees all faculty who serve students at the Adams Campus. Both principals supervise the curriculum director, who is also a classroom teacher at Adams. The superintendent, principal, and curriculum director meet regularly to plan and discuss opportunities and challenges in curriculum and instruction as well as professional development needed by teachers.

The small number of faculty at Lancaster Schools requires multiple responsibilities of teachers in addition to their teaching assignments. All teachers assume responsibilities for multiple classes, which requires them to prepare and develop lessons for five to seven different courses each day. Most teachers have additional responsibilities engaging with students through sponsoring or supporting clubs, athletics, and class cohorts. Although these additional responsibilities add to teacher's workloads, they are embraced by faculty, who perceive the added responsibilities as an element of interdependence with other faculty members. Thus, teachers celebrate the culture of their school and appreciate the cooperation and collaboration of other teachers.

Professional Development

Annually, MoDESE requires 15 hours of professional development for teachers in public schools. At Lancaster Schools, the superintendent and principals typically arrange all professional development experiences for faculty, which often exceeds the state-required minimum depending on current initiatives and goals. The school calendar is developed around needed professional development days and prepared one year in advance. All professional development activities typically occur during the school year (August to May).

The superintendent and building principals at Lancaster Schools often rely on the expertise of outside members to provide professional development activities (i.e., workshops or seminars) for faculty and staff. Although this model allows teachers to receive high quality professional development from experienced facilitators, little opportunity for follow up exists. It is difficult for the school district to grow professionally and build capacity from what is learned when the expertise is external. Further, teachers lack opportunity to receive feedback for their implementations.

Two common methods of learning are used with faculty and staff at Lancaster Schools: training and development. Training, as described by Fitzgerald (1992), includes the acquisition of new knowledge and skills for present tasks. For example, at Lancaster Schools this would include training for new technology systems or programs. Development, however, provides employees with skills for long-term improvement (Pynes, 2013). The learning teachers experienced for PBL instruction was an example of development. In this case, teachers participated in multiple interactive sessions that included modeling, gaining new information, analyzing current practices, and applying new information to their classrooms. These practices were collaborative, reflective, and tied directly to student learning. Wei and colleagues (2010) suggested including these elements during professional development to increase the likelihood of success for teachers and the implementation of new learning opportunities. PBL was a new method of teaching at Lancaster Schools and the desired result was for system-wide change throughout the district. Thus, instructional practices aligning with components of PBL were used in a workshop format as a model for teachers.

Researcher Role and Experience

My experience leading and training teachers in curriculum design began in 2008. Working as a full-time instructional coach for another Missouri school district, I participated in and provided over 600 hours of professional development over a four-year period. I completed training in cognitive coaching as one of three certified coaches in the district. I also obtained certifications in instructional design from Google for Education, eMINTS, Intel Teach, and Buck Institute for Education (BIE). My responsibilities as an instructional coach were divided into two categories: (a) developing unique long-term professional learning programs for teachers using constructivist principles and PBL instruction and (b) providing support in teachers' classrooms as they were implementing new strategies.

The certification I received from BIE enhanced my ability to design and lead implementation processes for PBL instruction. In this training, I received advanced preparation for designing and critiquing PBL instruction, which allowed me to train teachers in PBL and constructivist learning principles. I used skills gained from this certification to develop a unique comprehensive professional development program and provide district-wide support for PBL in another Southwest Missouri school district. Additionally, I led a team of instructional coaches to fully implement PBL instruction in Grades 9-12 in a Missouri high school with a student enrollment of 2200 students.

After obtaining experience as an instructional coach in three different Missouri school districts and serving in central office positions dedicated to improving teaching practices, I began providing independent consulting services for rural school districts that did not have the resources available to hire full-time instructional specialists. My specialties as a freelance trainer included support and training to develop teams of

instructional coaches and to provide professional development for PBL instruction. I assisted multiple school districts throughout the country in these areas. Thus, my partnership with Lancaster Schools began as an external consultant.

From August 2015 to April 2016 I served as an external consultant for Lancaster Schools. I was employed full time by the district from May 2016-May 2018. Although I was no longer contracted by Lancaster Schools after May 2018, I agreed to provide professional development to teachers throughout the 2018-2019 school year. Therefore, my role in this study was that of a consultant and mentor.

My experience as an instructional coach and my expertise in facilitating professional development for PBL allowed me to design and personalize an instructional coaching model specific to the needs of faculty. Thus, in this study, my responsibilities included design and facilitation of additional professional development, instructional coaching, data collection, and data analysis.

Methodological Framework

This study used mixed-methods action research (MMAR) to inform the development of instructional coaching within a small rural school district. The goal of the study was to explore how instructional coaching might influence teacher efficacy and advance the implementation of project-based learning as an instructional practice in teachers' classrooms.

The six-step methodological framework utilized to diagnose the problem in this study (i.e., gather data through a stage of reconnaissance, develop a plan for intervention, act and implement the intervention, evaluate results, and continually monitor progress) is presented in Figure 2.1. The text below describes the study design, including detailed timing, procedures of data collection and analysis for each phase of the MMAR process,

participant roles and recruitment strategies, and potential issues researchers must be

cognizant of during the study period.

Diagnosing

Monitoring

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┌─────────────────────────────────────┐        ┌──────────────────────────────────────┐
│                                      │        │  • Identification of lowered efficacy  │
│  Continue to monitor teachers' use   │        │    to implement PBL instruction        │
│  of PBL                              │        │    following PD                        │
│                                      │        │  • Review literature to identify       │
└─────────────────────────────────────┘        │    interventions                       │
                                                └──────────────────────────────────────┘
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Reconnaissance

Evaluation

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┌─────────────────────────────────────┐        ┌──────────────────────────────────────┐
│  • Collect and analyze post-         │        │  Collect quantitative data:            │
│    implementation TSES ratings       │        │  * TSES                                │
│  • Analyze observational data from   │        │  * Inquiry Protocol (EQUIP)            │
│    classrooms (EQUIP)                │        │                                        │
│  • Analyze content of coaching       │        │  Collect qualitative data:             │
│    conversations                     │        │  • Classroom Observations (EQUIP)      │
│  • Interview teachers to explore     │        │  • Administrator Interviews            │
│    their self-efficacy of PBL        │        │  • Open-ended teacher questionnaire    │
│    implementation                    │        │                                        │
└─────────────────────────────────────┘        └──────────────────────────────────────┘
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Planning

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┌─────────────────────────────────────┐        ┌──────────────────────────────────────┐
│  • Begin instructional coaching      │        │  • Analyze and present data to         │
│    (monthly contact with teachers).  │        │    administrators                      │
│  • Additional professional           │        │  • Develop a plan to implement         │
│    development for teachers          │        │    instructional coaching              │
│  • Observe classrooms for teacher    │        └──────────────────────────────────────┘
│    actions (Reiterate throughout     │
│    study period)                     │
└─────────────────────────────────────┘
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Acting

Figure 2.1 Methodological framework identifying stages of action research. Arrows represent cyclical stages. Hashed lines represent potentially repeated cycles.

Mixed Methods Action Research Plan

The purpose of this MMAR study was to explore how instructional coaching

affects the self-efficacy among Lancaster Schools' teachers to implement PBL in their

classrooms. Data were collected sequentially from April 2019 through December 2019 to

assess the influence of instructional coaching. In the initial phases of the study, data were

collected to determine what support teachers needed to implement PBL in their

classrooms. In later stages, data were analyzed to understand how an instructional coaching model influenced teachers' self-efficacy and implementation of PBL in their classrooms. Hence, I sought answers to the following research questions in this study:

1. In what ways does instructional coaching influence implementation of project-based learning in teachers' classrooms?

2. In what ways does instructional coaching support the development of teacher self-efficacy in using project-based learning?

This study was designed to support teachers in successfully implementing PBL in their classrooms. An instructional coaching model was developed by me in response to teachers' beliefs and needs regarding use of PBL in their classrooms. The data collected in each stage are presented in Table 2.1 and are discussed in later sections of this chapter.

Table 2. 1

Data Sources by Phase

Data source	Data type	Data collected	Sample	Phase
Teacher efficacy scale (TSES)	Quantitative	Teachers' self-efficacy	Teachers	Reconnaissance, Evaluation
EQUIP	Mixed	Level of inquiry during instruction	Teachers	Reconnaissance, Acting
Implementation Support Questionnaire	Qualitative	Support for PBL implementation, Goals for future implementation	Teachers	Reconnaissance, Acting
Administrator interview	Qualitative	Goals and expectations for implementation	Superintendent, building principals	Reconnaissance
Coaching conversations	Qualitative	Dialogue, responses to data collection and unit development	Teachers	Acting
Teacher interviews	Qualitative	Teacher efficacy, implementation of PBL	Teachers	Evaluation

Quantitative and qualitative data consisted of (a) surveys of teachers' feelings of self-efficacy to implement PBL, (b) classroom observations to determine the frequency and quality of instructional strategies aligned with PBL, (c) surveys of teachers' experiences with typical opportunities for PBL implementation, (d) detailed field notes and conversations from individual and group coaching sessions, and (e) interviews with teachers and administrators to ascertain their responses to PBL implementations in core classrooms. Data were collected and analyzed sequentially. At the conclusion of research, study findings were shared with teachers and administrators.

Methods and Procedures

This MMAR study used a sequential mixed methods action research design for data collection and analysis in six stages. Quantitative and qualitative data were used to answer each research question using Quan–Qual–Quan timing. The data collection period for qualitative data occurred from April 2019-December 2019 and encompassed three phases of this action research study: Reconnaissance, Acting, and Evaluation. Qualitative data were used to explore and elaborate on what was gained from quantitative data. Due to the emphasis throughout each phase, qualitative data were prioritized. A final quantitative survey was administered in the culminating stage of the study as a post-measure for the intervention.

Diagnosing Phase

The first stage of an MMAR study is a Diagnosing Phase, in which a problem area is identified (Ivankova, 2015). In this phase, the purpose of the study, outcomes, and research questions were developed. A review of the literature was conducted to learn more about the problem area. Potential opportunities that may influence the problem were researched.

From September 2018-November 2018 I facilitated PBL professional development at Lancaster Schools. Topics and activities outlined in Table 2.2 describe the learning outcomes for teachers. Throughout the four professional development sessions, teachers learned the process of PBL and received instruction in designing lessons using the PBL gold standard model (Larmer & Mergendoller, 2015). At each session, teachers worked independently to develop a PBL unit for their own use.

Table 2. 2

Professional Development Topics and Outcomes

Date	Topic	Learner outcomes
September 24, 2018	Key knowledge, understanding, and success skills	Develop authentic learning experiences based on learning standards
October 8, 2018	Voice and choice, sustained inquiry, authenticity, and student roles	Scaffold instruction for student abilities during inquiry.
		Identify how authentic learning experiences, student voice, and choice impact motivation.
October 22, 2018	Public product and audience	Develop learning experiences that result in authentic products
November 5, 2018	Assessment	Develop authentic assessments based on learning standards and objectives

Participation

Professional development was provided for all 29 full-time teachers of Pre-kindergarten through Grade 12. On each training date, a total of 26 teachers were in attendance. Both principals participated in the professional development sessions.

Teacher Reflections

Teachers' responses to what was learned were collected four times through professional development reflection forms, each as a closing activity for professional development sessions. Reflections gathered from teachers following each professional

development session gauged the degree that teachers understood the objectives taught, which were aligned to the learner outcomes presented in Table 2.2. Open-ended questions provided opportunity for teachers to address what was learned and how teachers planned to implement PBL. Further, these reflections assessed teachers' perception of self-efficacy concerning the use of PBL into their instruction. Teachers rated their feelings of efficacy on a scale of one (*I need a lot of help*) to four (*I can do this tomorrow*). Responses collected following professional development were anonymous. Reflection forms were presented to teachers at the culmination of each session, and teachers were instructed to indicate their school campus on the form. A table was placed by the exit of the training facility to ensure all responses were anonymous. Open- and closed-ended questions on the printed reflections were modified with permission from a previously conducted study (Browne-Ferrigno, Ellis, & Thompson, 2016).

Review of Reflections

Reflections were reviewed using two methods. Open-ended questions were sorted to determine the number of participating teachers who had questions, misconceptions, or confidence of learning objectives met. Measures of central tendencies were determined for closed-ended questions. Both question types were used to gauge teachers' understanding of the learning goals. Reviewing responses helped me to determine if content should be reviewed in subsequent professional development sessions.

I became curious when reviewing teachers' responses following the final PBL training. On reflections from the final training, teachers' ratings of confidence for their ability to implement PBL contrasted open-ended questions. For example, by the end of the six-week training period, the average rating among teachers at both campuses was 2.85. The median and mode reported from reflections were 3.0 (*I think I can do this*).

However, open-ended responses after the final training contrasted the overall rating of confidence. Comments made by teachers included concerns that they were unsure of their ability to use PBL effectively. For example, one-third of the teachers ranked their ability to use PBL in their classrooms as 3.0 on a 4-point scale but also expressed doubts in their open-ended comments. Teachers expressed fears that PBL would not benefit student learning, and that the classroom would be difficult to manage when using PBL instruction. Additionally, common requests from teachers included supportive assistance from others and time to learn more before implementing.

Teachers' responses on closing reflections included expressions of uncertainty, fear, or inability to manage the classroom, and contrasted beliefs of confidence. These responses were likely representative of teachers' physiological state, which describes the emotions felt before initiating a task. According to Bandura (1995), the physiological state of individuals with higher levels of self-efficacy appear enthusiastic while those with lower levels of self-efficacy appear fearful, anxious, or restless. Thus, the contrast between teachers' responses for closed- and open-ended questions suggested misalignment between perceived and actual efficacy.

Efficacy beliefs influence the persistence, effort, goals, and levels of aspiration individuals display when learning new skills (Bandura, 1995; Tschannen-Moran & Hoy, 2001a). Teachers with higher self-efficacy are more likely to take risks and attempt new strategies with their instruction (Guskey, 1988; Tschannen-Moran & Hoy, 2001a; Wahlstrom & Louis, 2008). Further, efficacious teachers are less vulnerable to discouragement (Bandura, 1995). These characteristics of efficacious individuals contrasted the comments made by teachers at Lancaster Schools when they reflected on

their abilities to use PBL in their classrooms. Further exploration was needed to understand how teachers felt about their ability to shift their instruction to incorporate PBL regularly. Therefore, an intervention to explore misalignment and increase teachers' self-efficacy was conducted to improve levels of PBL implementation following professional development.

Instructional Coaching Intervention

I met with the district superintendent, two principals, and curriculum director to share the data collected during professional development sessions and develop a plan to explore methods to influence teacher self-efficacy and enhance implementation of PBL. I proposed an instructional coaching intervention to explore teachers' self-efficacy to implement PBL in their classrooms. Practices of instructional coaching did not exist within Lancaster Schools at the time of the intervention. Typically, feedback for teachers was provided by supervisors and was perceived as evaluative. Lancaster Schools' superintendent and building principals sought opportunities to address teachers' concerns by participating in this action research initiative, and six full-time faculty members from their school campuses were invited to participate in this study. Thus, in the Reconnaissance Phase, data were gathered and analyzed to consider the needs of teachers to address the problem and develop a specific instructional coaching model.

Sample

Participants of this study included the superintendent, building principals, and a purposefully selected group of teachers. Identical sampling was used throughout this study; however, participants had different roles depending on the action research phase. For example, the superintendent and building principals provided qualitative data from a semi-structured interview during the Reconnaissance Phase. In subsequent phases, I met

with the superintendent and principals to report findings and collaboratively develop plans for instructional coaching.

A purposefully selected group of six teachers were invited to participate in this study and provide quantitative and qualitative data in the Reconnaissance, Acting, and Evaluation phases. Purposefully selected teachers were intentionally chosen due to their teaching assignment, which included a diverse range of grades and content taught. The population of teachers invited to participate in this study included four core academic teachers and two teachers of elective classes. Thus, data gained from purposefully selected teachers assisted me in understanding the problem and how instructional coaching influenced teachers' self-efficacy to implement PBL in diverse grade levels and content areas. Further, these faculty members held informal roles as teacher leaders in their buildings. Thus, their participation in this study had potential to influence faculty members who were not participating.

Expectations for teachers participating in the research study included responding to pre- and post- intervention surveys, allowing access to their classroom for data collection, meeting during individual planning or conference times for instructional coaching, attending additional professional development trainings as necessary, and participating in post- intervention group interviews. The superintendent, principals, and participating teachers participated in member checking to establish credibility of qualitative data collected throughout each phase of the study.

Experience of purposefully selected teachers ranged from 4 to 15 years and are described below. Administrators each had less than six years of experience in their current positions at the time of this study. Pseudonyms are used throughout the

dissertation for all personnel involved in this study as well as for the school and district. Table 2.3 presents the position, experience, and education of each participant.

Table 2. 3

Study Participants

			Years of experience	
Name	Position	Advanced degree	Pk-12	Current role
Abigail Anderson	Curriculum director and elementary teacher	Yes	11	5
Charlotte Brown	Middle school teacher	Yes	12	5
Ava Davis	Preschool teacher	Yes	15	14
Logan Johnson	Taft campus principal	Yes	17	3
Noah Miller	High school teacher	Yes	4	4
Oliver Smith	Superintendent	Yes	15	3
Mason Taylor	Electives teacher	No	6	1
Jacob White	Adams campus principal	Yes	14	6
Olivia Williams	Electives teacher	Yes	6	6

Time was allocated during a regularly scheduled professional development day to inform study participants of the length of the study period and their role in the study. The presentation to the faculty included (a) rationale for the study, (b) research questions addressed, (c) proposed intervention, (d) data collection process, (e) plans for sharing key findings with participants and administrators, and (f) responsibilities and actions from participating teachers and their students. A follow-up email detailing the study was sent to teachers and administrators after the presentation.

Reconnaissance Phase

The Reconnaissance Phase was used to collect, analyze, and interpret data to understand the problem. In this study, the purpose of the Reconnaissance Phase was to understand what specific support teachers needed for PBL implementation and how to best implement an instructional coaching model that fit the needs of faculty. An extensive literature review was conducted to identify conditions needed for PBL implementation. Conditions necessary for successful PBL implementation were described by Lam and colleagues (2010) as support in competency, autonomy, and collegiality. Thus, implementation is most effective when teachers have gained confidence from mastery experiences, believe their opinions and ideas have been acknowledged, and perceive security and support from their colleagues (Lam et al. 2010).

The district superintendent, two school principals, and a previously discussed sample of six teachers collaborated with me to develop an instructional coaching intervention beginning in April 2019. Data from the Reconnaissance Phase of this study were used to develop a model and framework for instructional coaching which occurred over a seven-month period, ending in December 2019.

Data Collection

The use of mixed methods allows for diverse data to be combined, information to be synthesized, and conclusions produced from both quantitative and qualitative data (Creswell, 2009). Quantitative data were collected through closed-ended teacher surveys in the Reconnaissance Phase. Data were used to inform the researcher of teachers' self-efficacy and level of implementation following their participation in professional development for PBL instruction. Following analysis of quantitative survey data, additional qualitative data were gathered to inform the researcher of teachers' and

administrators' beliefs for PBL implementation and their experience with instructional

coaching. Qualitative data were collected through open-ended teacher questionnaires,

classroom observation protocols, detailed field notes, and administrator interviews. Data

collected in the Reconnaissance Phase were used to develop an instructional coaching

model to increase teachers' self-efficacy and implementation of PBL. All reconnaissance

data collection began in April 2019 and spanned a period of 10 days.

Quantitative data. Quantitative data collected in the Reconnaissance Phase were

used to determine the self-efficacy of teachers in the study sample and their current level

of PBL implementation. Further, quantitative data collected in the Reconnaissance Phase

were compared to data collected in the Evaluation Phase. Table 2.4 details the schedule

for quantitative data collected during the Reconnaissance Phase.

Table 2. 4

Quantitative Data Collected in Reconnaissance Phase

Data source	Data collected	Sample	Collection period
Teacher efficacy scale (TSES)	Teachers' self-efficacy	Teachers	April 2019
Inquiry protocol (EQUIP)	Level of inquiry during instruction	Teachers	April 2019

Efficacy scale. The quantitative instrument used in the Reconnaissance Phase was

the Teachers' Sense of Efficacy Scale (TSES) presented in Appendix A. The TSES was

developed by Tschannen-Moran and Hoy (2001b) and consists of 24 items related to

student engagement, instructional strategies, and classroom management. Teachers

responded to each question by rating their opinions on a scale ranging from one (*None at

all*) to nine (*A great deal*). The TSES was chosen for this study because of its reliability

in previous studies (Tschannen-Moran & Hoy, 2001a) and its relation to components of

PBL (i.e., student creativity, critical thinking, appropriate challenge). The scale and permissions for using the TSES are available online (Tschannen-Moran & Hoy, 2001b)

The purpose of the TSES was two-fold: (a) to inform the researcher of the teachers' perceived efficacy for PBL implementation, and (b) to serve as a pre-intervention measure for comparison in subsequent stages. The survey was administered via Qualtrics, and a link was provided through email to participating teachers. Responses gained from the TSES provided pre- intervention data for research question two and were compared using paired sample *t*-tests in the final Evaluation Phase.

Inquiry protocol. Another instrument, the Electronic Quality of Inquiry Protocol (EQUIP) was used to measure the quantity and quality of inquiry instruction (Marshall, Horton, Smart, & Llewellyn, 2009). The EQUIP is a mixed instrument that measures the level of inquiry during instruction with seven sections that contain quantitative and qualitative questions. In Section I (see Appendix B), descriptive information about the teacher, students, and the lesson were collected. Sections II and III of the EQUIP were used to collect qualitative data and are discussed in the next section (see Appendix C). Quantitative data were collected using sections IV-VII of the EQUIP, which uses 19 indicators across four constructs to measure the level and frequency of inquiry used in PBL instruction (see Appendix D).

The EQUIP was originally designed to measure the quality and quantity of inquiry in science and mathematics classes but is useful to identify elements of PBL in multiple content areas. For example, the construct *instruction* includes indicators to measure instructional strategies, the teacher's role during instruction, depth of knowledge, and student exploration, which correlates to the PBL element *sustained*

inquiry. Another indicator, *discourse*, includes student questioning, the level of challenge presented, and interactions between students and the teacher, which share characteristics with the PBL element *challenging problems or driving questions*. The indicator of *assessment* included in EQUIP provides measurement for student reflection and authentic assessment, which are also included within the eight elements of PBL instruction. And finally, *curriculum factors* measured using EQUIP include depth of content and student exploration, which are also represented in the PBL elements of *student voice and choice* and *key knowledge, understanding, and success skills*. Thus, it was determined that this instrument would effectively measure the implementation of PBL in teachers' classrooms and provide guidance for increasing the use and quality of PBL instruction.

Quantitative portions of the EQUIP consist of a scale that measures four levels of inquiry instruction across the 19 indicators discussed above. For each indicator, levels of integration are numbered from 1 (*Pre-inquiry*) to 4 (*Exemplary inquiry*). Scores are then averaged for each construct and provide a final inquiry score. The EQUIP instrument, permissions, and trainings for use are available online (Marshall et al., 2009). Results from teachers' level of implementation as measured by the EQUIP provide pre-intervention data for research question one.

Qualitative data. Qualitative data collection occurred after the analysis of quantitative data in the Reconnaissance Phase and consisted of an open-ended teacher questionnaire, classroom observations, and an administrator interview. Purposefully selected teachers discussed in earlier sections of this chapter, Lancaster Schools' superintendent, and school principals provided qualitative data to help me explore in-depth how confident, competent, and capable teachers feel to implement PBL. Data were

collected independently, and a schedule for qualitative data collection for the

Reconnaissance Phase is outlined in Table 2.5.

Table 2. 5

Qualitative Data Collected in Reconnaissance Phase

Data source	Data collected	Sample	Collection period
Open-ended teacher questionnaire (Implementation Support Questionnaire)	Support for PBL implementation Beliefs of abilities to implement PBL	Teachers	April 2019
Classroom observations (EQUIP)	Actions of teachers for using PBL elements during instruction	Teachers	April 2019
Administrator interview	Goals and expectations for implementation	Superintendent and principals	April 2019

Open-ended teacher questionnaire. All teachers discussed in previous sections of

this chapter provided responses to an open-ended, researcher-designed questionnaire. The

purpose of this questionnaire was to explore teachers' needs and perceptions of support

during PBL implementation. The questionnaire, presented in Appendix E, was designed

to include three questions in each area of competence support, autonomy support, and

collegial support (Deci & Ryan, 2000; Lam et al., 2010). Nine questions were developed

based on a review of the literature for effective PBL instruction and teachers' needs for

support during PBL implementation. Two additional questions explored teachers'

experiences with instructional coaching and goals for PBL implementation.

Questionnaires were administered via Qualtrics, and the link was emailed to teachers.

Instructions, as well as estimated time for completion, were provided in the email and

questionnaire instructions. Data gathered through the questionnaire were intended to

provide insight needed to design an effective instructional coaching intervention for the

acting phase of this study.

Classroom observations. Structured classroom observations of teachers were conducted one time in the Reconnaissance Phase and recorded using the EQUIP instrument. The EQUIP is a mixed instrument with seven sections of quantitative and qualitative questions to measure the quality of inquiry instruction (Marshall, Horton, Smart, & Llewellyn, 2009). Sections II and III of the EQUIP include qualitative components and are presented in Appendix C. Data collected from these observations included coded descriptions of classroom instruction occurring in five-minute increments. For each five-minute increment, descriptive activity codes that described the level of inquiry, student engagement, critical and creative thinking, and assessment were recorded on the instrument. Additionally, descriptive field notes collected during observations of participating teachers' classrooms were written on the protocol. Data collected provided guidance for me to explore teachers' actions during PBL instruction.

Classroom observations were scheduled with teachers in the Reconnaissance Phase to collect baseline data for teachers' use of PBL in their classrooms. Observations were conducted in participating teachers' classrooms for 30-60 minutes each, depending on the grade level of instruction. The EQUIP instrument, permissions, and trainings for use are available online (Marshall et al., 2009). Results from the EQUIP provided pre-intervention data for research question one.

Administrator interview. One semi-structured group interview was conducted with the superintendent and building principals during the Reconnaissance Phase. The purpose of an interview with administrators was to determine goals for district-wide implementation and gain perspectives regarding challenges for implementation. A list of guiding questions was developed (see Appendix F), but additional questions were asked

and discussed depending on the responses of the administrators. Data gained from an interview with administrators were used to develop an instructional coaching model that fit the needs of the district and the participating teachers.

Data Analysis

Data analyzed in the Reconnaissance Phase informed me of teachers' beliefs about instruction, their beliefs of their abilities to use PBL as an instructional strategy, and their current level of PBL implementation. Further, information gained through data analysis provided me with understandings of opportunities and challenges felt by teachers and administrators that could affect implementation of PBL.

I explored results from the quantitative data with subsequent qualitative interviews, surveys, and observations. Data were compared to determine alignment between perceived and actual use of PBL instruction. Thus, I understood the level and type of support teachers needed from an instructional coach. Using a sequential process strengthened the study and allowed me to draw more accurate conclusions to share with administrators and develop a plan for instructional coaching during the Planning Phase. Reconnaissance data were used to develop an instructional coaching program to enhance teacher efficacy and improve PBL implementation.

Quantitative data analysis. Quantitative data from closed-ended surveys and inquiry protocols were prepared in Excel and analyzed using descriptive statistics of central tendencies (i.e., mean and median), range, and standard deviation for each sample. Analyzing data using central tendencies provided a summary score of what is typical for participants, thus allowing identification of trends and patterns. Analyses of quantitative data were used to determine baseline levels of implementation and used for comparison in later stages.

Qualitative data analysis. Qualitative data gathered in the Reconnaissance Phase included open-ended questionnaires, classroom observations, and a group interview with administrators at Lancaster Schools. Responses were used to explore the experiences and needs of faculty in depth. Data were organized and prepared for analysis independently and sequentially. Detailed field notes from observations were typed and comments from interviews were transcribed. Qualitative data were analyzed using Dedoose, a qualitative coding software, which assisted me in coding, organizing, and analyzing themes of a diverse data set. Open coding, which groups categories of information into five to seven themes that describe findings, was applied. Applied codes followed recommendations of Creswell (2009) and included information that was expected based on the literature, surprising or unanticipated, and unusual or interesting. A codebook was developed based on these findings and used throughout the study (see Appendix I).

Quality Assurance and Ethical Considerations

Multiple actions were taken to ensure reliability, validity, and confidentiality in the Reconnaissance Phase of this study. Quantitative instruments were specifically chosen for their reliability to determine baseline data and later address research questions. Tschannen-Moran and Woolfolk Hoy (2001b) found the reliability of the TSES to be .94. Reliability coefficients measured by Cronbach's alpha are .898 for the EQUIP instrument (Marshall et al., 2010). Systematic procedures were used to ensure consistency for all data collected.

Cognitive testing by individuals not participating in the study was used to identify problems, improve quality, and clarify questions included in researcher developed questionnaires and potential interview questions. Adjustments to questions were made based on feedback. To diminish qualitative data collection issues, I developed a codebook

that included a precise definition of codes, guidelines for using each code, and examples as a reference. Member checking was used to protect against researcher bias. Triangulation was also used between diverse data sets for comparison, which was described by Creswell (2009) as a method to increase the validity of qualitative data.

Additional actions to protect participants and guard against misconduct that would reflect poorly on the school district were also taken. The purpose of this action research study was explained to each purposefully selected participant in a scheduled meeting. Stakeholders were informed about the research questions and data collection methods to demonstrate transparency. When presenting the study to potential participants, I described the benefits of participating, explained participant roles clearly, and answered questions honestly. Participants were informed that the researcher and participants equally benefited from this study but if teachers chose not to participate, no negative actions were taken. My intentions in each of these practices was to encourage collegial relationships and ethical research practices in the school district.

To ensure confidentiality of study participants, pseudonyms were given to the district, school, and study participants. Responses were anonymous for all surveys, but participants responded using individual assigned identification codes in place of names. The use of assigned identification codes allowed me to compare data in the final stage of the study. Collected data were stored on my personal computer using password protection in Dropbox, Dedoose, Qualtrics, Word, and Excel.

Consent letters fully describing the purpose of the study were provided to all participating teachers and administrators. Consent letters ensured voluntary participation and that no negative consequences were experienced by those choosing not to participate.

Pseudonyms were given to study participants and the participating school district to protect identities. I held current CITI certification, and the study was presented to IRB for approval prior to data collection. The purpose of these actions was to protect participants.

Planning Phase

During the Planning Phase, data gained from the Reconnaissance Phase were used to develop a specific instructional coaching model to influence teachers' efficacy for PBL instruction, and ultimately levels of implementation. Data gained from the Reconnaissance Phase indicated a need for additional professional development. I collaborated with teachers and administrators to develop a schedule for professional development that fit the needs of teachers and the district. For example, to accommodate schedules of teachers throughout the summer months, teachers chose from a traditional face-to-face, online, or blended model of professional development. Further, because different models of coaching exist, data gained from the Reconnaissance Phase were used to determine which model would most benefit PBL implementation, individual teachers, and the district.

These different options were determined after analyzing data gathered during the Reconnaissance Phase. The goal of this phase was to develop a specific instructional coaching structure and approach to influence implementation of PBL. The needs of teachers and the school district were considered when designing the model. Analyzed data and the proposed plan were shared with administrators and participating teachers in May 2019.

Acting Phase

The Acting Phase of this study occurred from June 2019 to November 2019. During this phase, the instructional coaching model designed in the Planning Phase was

implemented with a sample of teachers which have been previously discussed. The

purpose of the intervention was to influence teacher self-efficacy for implementation of

PBL instruction. Data were collected sequentially throughout this phase, which allowed

me to compare data and identify trends that occurred over time. Further, analyzed data

from the Acting Phase were used for triangulation purposes in the final Evaluation Phase.

Data Collection

Sequential data collection occurred in regular meetings with participating teachers

from June 2019 to November 2019. The exact structure and purpose of these meetings

was determined following analysis of the Reconnaissance data. A detailed description of

the intervention is presented in Chapter 3, and agendas used for professional development

are presented in Appendix J.

Table 2. 6

Acting Phase Data Collection

Data source	Data collected	Sample	Collection period
Inquiry protocol (EQUIP)	Level of inquiry during instruction	Teachers	August-December 2019
Classroom observations (EQUIP)	Actions of teachers for using PBL elements during instruction	Teachers	August-December 2019
Coaching conversations	Discussion, ideas generated, responses to data collection and unit development	Teachers	June-November 2019

A schedule for data collection in the Acting Phase is provided in Table 2.6.

Quantitative data collection from August 2019 to November 2019 included the degree to

which teachers employed PBL in classroom instruction, as measured by the EQUIP

inquiry protocol. Qualitative data collected during this phase enhanced what was learned

from quantitative data and included descriptive field notes from classroom observations

and the coaching conversations that followed. Qualitative data in this phase were emphasized due to the length of the data collection period and because qualitative data gathered in this phase provided insight for both research questions.

Inquiry protocol. Sections IV-VII of the EQUIP inquiry protocol collects quantitative levels for teachers' inclusion of PBL elements in instruction and has been previously discussed in this chapter. When school was in session, study participants and I scheduled monthly observations of participating teachers' classrooms in pairs to determine the degree to which elements of PBL were integrated into instruction. Peer coaches and I used inter-rater accountability to compare accuracy following observations to increase the reliability of data. The observations recorded using the EQUIP instrument were analyzed and then used to conduct coaching conversations. The researcher's copy of the EQUIP instrument was collected after each observation and stored in a password-protected location on my personal computer for data analysis. Data gained from the inquiry protocol supported answering research question one.

Classroom observations. Classroom observations of teacher actions when using PBL in their classrooms were conducted monthly when school was in session. Descriptive field notes concerning teachers' actions during implementation of PBL were recorded on the EQUIP observation protocol. Observed elements written in descriptive field notes and the level of integration were used for discussion during coaching sessions. Data gained from observations supported answering research question one.

Coaching conversations. Coaching conversations were collected independently and sequentially throughout the Acting Phase and included exchanges between participants from online discussion boards and face to face coaching conversations. Data

collected from coaching conversations included dialogue, questions, or reflections between participants.

Conversations from planned face-to-face instructional coaching sessions were recorded using the Coaching Dialogue Form (see Appendix G). The Coaching Dialogue Form is a researcher developed, descriptive note-taking form used to capture dialogue, questions, and actions of the coach and the teacher. Following coaching sessions, the form was used by the researcher to reflect on what occurred.

Descriptive notes taken during coaching conversations and statements made in online discussion boards presented an accurate account of the dialogue that occurred when teachers were coached. Conversations over the seven-month study period allowed me to (a) collect unique or unexpected information that may affect implementation of PBL, (b) understand beliefs that affect teacher efficacy, and (c) explore changes that occurred over time. Thus, data were useful to show trends and potential growth among study participants. Dialogue of participant commentary and discussions were collected throughout the study period and stored separately for each participating teacher in a password protected area on my personal computer. Commentary from coaching conversations supported answering both research questions.

Data Analysis

Data analyzed during the Acting Phase informed me of teachers' level of PBL implementation and the influence of instructional coaching for PBL instruction. Data were analyzed upon collection and were used for comparison in each subsequent cycle to demonstrate growth or other changes over the course of the study period.

Qualitative analysis. Qualitative data gained from coaching conversations and detailed field notes from classroom observations were typed, organized by date, and

prepared for coding using Dedoose. Themes were developed by the analysis of common, unusual, or interesting material that were chunked or segmented during data analysis. A codebook was developed from responses of study participants and observations throughout the research period that contained codes, definitions, and examples. Data were reported using rich descriptions that described the depth PBL elements were employed in each teacher's instruction.

Quantitative analysis. Quantitative data gathered using the EQUIP instrument were used to assess the level of participating teachers' inclusion of PBL elements during instruction. Data were analyzed in Excel using descriptive statistics. The level that teachers employed PBL elements in their classrooms were compared for each subsequent observation.

Evaluation Phase

The goal of the Evaluation Phase was to collect evidence for the intervention's effectiveness (Ivankova, 2015). The Evaluation Phase of this study occurred in December 2019, after the completion of a six-month instructional coaching intervention designed to provide support for teachers to influence efficacy and implementation of PBL instruction. In this stage, both quantitative and qualitative data were used to inform me of the effectiveness of the instructional coaching model and to determine potential changes to the initial action plan. Data were gathered in this stage using closed-ended surveys and a semi-structured interview with teachers. Previously collected and analyzed data from the Acting Phase were also used during data analysis for triangulation purposes. Finally, data were presented to the superintendent of Lancaster Schools following analysis to plan and determine future recommendations.

Data Collection

During the Evaluation Phase, quantitative and qualitative data were gathered

sequentially to determine the effectiveness the instructional coaching model had to

influence teacher efficacy and PBL implementation. Quantitative data were collected

through the TSES, which is a closed-ended survey to measure teacher self-efficacy. The

TSES has been discussed in earlier sections of this chapter. Following analysis of

quantitative surveys, qualitative data were collected from a single group interview with

teachers who participated in an instructional coaching intervention. A schedule of data

collection gathered in the Evaluation Phase is displayed in Table 2.7.

Table 2. 7

Data Collection, Evaluation Phase

Data source	Data collected	Sample	Collection period
Teacher efficacy scale (TSES)	Teachers' self-efficacy	Teachers	December 2019
Teacher interviews	Teacher efficacy and implementation of PBL	Teachers	December 2019

Quantitative data. Quantitative data collected in the Evaluation Phase included

administration of the TSES. In this study, data from the TSES provided insight to how

participation in an instructional coaching intervention influenced teachers' efficacy for

PBL instruction and how that compared to baseline data collected during the

Reconnaissance Phase.

The survey was administered via Qualtrics to participating teachers at the

culmination of the research period through a link provided through teachers' email.

Responses were anonymous, but participants responded using an individually assigned

identification code for comparison in earlier phases. Responses gained from the survey supported answering research question two.

      Qualitative data. Qualitative data collected in the Evaluation Phase provided additional understandings to enhance quantitative data, inform the researcher of further study needed, and provide insight for the final, monitoring phase of the study. A semi-structured teacher group interview was conducted to assess levels of teacher self-efficacy and implementation of PBL in classroom instruction. A list of proposed questions to guide the interview were developed, but additional questions were asked depending on teacher responses. See Appendix H for teacher interview questions. Interviews occurred after the last scheduled instructional coaching session during a time that was convenient for the participating teachers and me and were audio-recorded using software on my personal computer. Data collected through teacher interviews assisted me in answering both research questions.

Data Analysis

      Data analysis was conducted in stages according to each data collection schedule. Unique analysis procedures were used for qualitative and quantitative data. Data were merged after analysis for triangulation purposes. Data analyzed in this final stage were compared to data collected in earlier phases.

      Quantitative data analysis. Quantitative data analyzed in the Evaluation Phase included responses from the TSES survey. Responses were analyzed for central tendencies in Excel. Paired sample *t*-tests were used to compare results from pre- and post-intervention. Responses from the Reconnaissance Phase were compared to responses gained in the Evaluation Phase to answer research question two.

Qualitative data analysis. Teacher comments gathered during a semi-structured interview were analyzed to describe teachers' feelings of efficacy for PBL instruction. Additionally, comments identified ways that teachers implemented PBL as a result of an instructional coaching intervention. Data were organized and prepared for analysis by transcribing comments from teacher interviews. Qualitative data were analyzed using Dedoose computer software, which assisted me in coding, organizing, and analyzing themes of a diverse data set. Open coding was used to develop categories of information, and a codebook was developed. Data from teacher interviews supported both research questions.

Table 2. 8

Triangulation Matrix

Research question	Data sources	
	Quantitative	**Qualitative**
In what ways does instructional coaching support development of teacher efficacy in using problem-based learning?	TSES scale (pre- and post- study)	Implementation Support Questionnaire (pre- study)
		Coaching conversations (7 times throughout study)
		Teacher interviews (post-study)
In what ways does instructional coaching influence implementation of project-based learning?	EQUIP	Classroom observations (4 times throughout study)
		Implementation Support Questionnaire (pre- study)
		Coaching conversations (7 times throughout study)
		Teacher interviews (post-study)

Comparison of data types. Data analysis must be carefully conducted in mixed methods studies so that data gathered from multiple sources can lead to the development of accurate meta-inferences (Ivankova, 2015). Data were integrated using a combined mixed methods technique to assure credibility of study conclusions. In combined mixed methods data analyses, quantitative and qualitative data were analyzed independently and then compared (Ivankova, 2015). Data were organized using a triangulation matrix that aligned the collected data with research questions. Table 2.8 details the triangulation matrix, organized by data type and research question. Quantitative and qualitative data were integrated and compared to develop inferences and answer research questions during the Evaluation Phase.

Quality Assurance

Consideration was given to address the quality and integrity of the action research process and data collection throughout the study. A systematic process of data collection, analysis, and comparison examined consistency of results between each data type. Quantitative and qualitative data collected for each research question used between-strategies mixed methods analysis, which triangulated data so multiple data sources addressed multiple research questions. The process of cross-checking and verifying data from multiple points led to a more credible study and strengthened my ability to draw conclusions. Additionally, cycles of quantitative and qualitative data were collected multiple times throughout the study. Quantitative data were collected for pre- and post-study comparison and analysis. Cycles of qualitative data collection collected regularly throughout a six-month study period demonstrated changes among study participants and strengthened conclusions drawn from data analysis. An iterative cycle of data collection was beneficial in this study and resulted in increased accuracy of results.

Multiple points of data utilized in this study allowed me to triangulate results between data types and research questions, which is recommended by Ivankova (2015) to draw better conclusions in the final stage of the study. Triangulated data results in fewer errors and uses multiple methods to answer complex problems (Creswell, 2009). Further, a combined mixed-methods data analysis to compare results between quantitative and qualitative data increases validity of qualitative data and credibility of results (Creswell, 2009). Thus, quantitative and qualitative data gained in this study were integrated to enhance and elaborate understandings of instructional coaching and its influence on teacher efficacy and PBL implementation. Data were merged for comparison during analysis. For example, quantitative data gained through responses on the TSES were compared to integration levels on the EQUIP, teachers' comments and responses through coaching conversations, and interviews. Common themes in coaching conversations were compared to descriptive field notes taken during classroom observations. Together, these techniques provided evidence to support study findings and increase the methodological rigor of the study.

Monitoring

Following Evaluation, study results and conclusions were shared with administrators. Together, we developed a plan for continued implementation of PBL instruction, which is detailed in Chapter 3. Additionally, progress and revision for the chosen instructional coaching model was monitored and adjustments were made as necessary, due to study results. Post-intervention adjustments and plans are described in Chapter 3.

Study Limitations

Study limitations include boundaries that can affect the researcher's ability to generalize data for other contexts (Joyner, Rouse, & Glatthorn, 2013). In this study, limitations included limited human resources, the unique teaching assignments of teachers at Lancaster Schools, scheduling concerns of participants, and a limited study time frame. Limited human resources included the small faculty of Lancaster Schools and their teaching assignments. There was no opportunity for educators to collaborate with other teachers of the same discipline, which could have hindered teachers' ability to identify examples and apply project-based learning in all content areas. Also, because only one teacher was employed for each content or grade level at Lancaster Schools, there was no opportunity for direct comparison between treatment and non-treatment groups.

The small sample size required full participation from all teachers, principals, and the superintendent. Teachers' additional responsibilities to athletics, club sponsorships, or other school-related functions limited teachers' abilities for regular participation. Outcomes were influenced for members unable to participate in all activities. Finally, the school calendar and schedule of classes presented limitations to the study time frame. For example, the data collection period of Acting Phase occurred over six months but was limited due to the school's summer break. Scheduling to observe PBL in classrooms during the initial stages of implementation was difficult. Further, it was unrealistic to expect teachers to incorporate PBL within all instruction. A data collection schedule was created, but the timing of data collection was limited due to my own work schedule. It is possible that elements of PBL occurred during unobserved classes.

Conclusion

Through this mixed methods action research study, I explored models for instructional coaching that increase teachers' self-efficacy which leads to successful implementation of project-based learning. The need for this study was identified due to hesitations expressed by teachers following professional development for incorporating PBL. Concerns of teachers were consistent with characteristics of low self-efficacy. Thus, I collaborated with the school superintendent and building principals to identify goals, existing support systems, and teachers' level of implementation to develop a specific instructional coaching model to increase teacher efficacy for PBL implementation. In Chapter 3, I report results of the action research, make recommendations, and reflect on study findings.

CHAPTER 3

RESULTS

The goal of this study was to explore the effectiveness of an instructional

coaching intervention designed to influence the self-efficacy among Lancaster Schools'

teachers to implement PBL in their classrooms. A six-phase mixed methods action

research design was used to diagnose and explore teachers' efficacy for using PBL, plan

and implement an instructional coaching intervention, report findings, and monitor

progress for the continued use of PBL. Data were collected over a six-month instructional

coaching intervention to answer the following research questions:

1. In what ways does instructional coaching influence implementation of project-
   based learning in teachers' classrooms?

2. In what ways does instructional coaching support the development of teacher
   self-efficacy in using project-based learning?

This chapter begins with a report of results from the Reconnaissance Phase. A

specific instructional coaching intervention used to increase teacher efficacy for

incorporating PBL in classroom instruction is presented, and the procedures used to

implement the coaching program are described. Results of data collected over the six-

month Acting Phase are reported and used to answer each research question in the

Evaluation Phase. Recommendations for future professional development and expanding

the intervention throughout Lancaster Schools are presented.

Reconnaissance Phase Findings

The purpose of the Reconnaissance Phase was to assess the problem and inform

development of the intervention implemented in the Acting Phase (Ivankova, 2015). In

this study, quantitative and qualitative data consisting of open- and closed-ended surveys,

classroom observations, and interviews were collected during the Reconnaissance Phase. Teachers' responses to open- and closed-ended surveys offered insight for me to understand teachers' self-efficacy for PBL, their needs, and their perceptions of support during PBL implementation. Current levels of inquiry used in classroom instruction were measured by the Electronic Quality of Inquiry Protocol (EQUIP) during observations of instruction. A semi-structured interview with the school superintendent and two building principals provided insight for district-wide goals for PBL instruction and challenges for implementation. Data collected in the Reconnaissance Phase assisted me in the development of a unique instructional coaching program to increase teachers' self-efficacy for PBL implementation at Lancaster Schools. Quantitative and qualitative data in the Reconnaissance Phase were collected over a two-week period, analyzed independently, and results for both data types were merged for comparison. Findings are discussed below.

Quantitative Results

Quantitative data were collected using two instruments, the Teacher Self-Efficacy Survey (TSES) and the EQUIP observation protocol. The TSES (see Appendix B) measured participants' perceptions of self-efficacy for teaching. Data gained from the TSES were used as a pre-intervention measure for comparison in later stages. The EQUIP instrument (see Appendix E) was used to measure the level and frequency of inquiry within observed instruction.

Teacher efficacy. Teachers rated their opinions for each of the 24 TSES questions using a scale ranging from one (none at all) to nine (a great deal). Scores were analyzed using descriptive statistics for each individual teacher. I also analyzed responses

to identify strengths and weaknesses based on teachers' experience, advanced degrees, school building, grade level, and content area taught.

Data from the TSES indicated that teachers initially felt efficacious in their teaching abilities ($M=7.326$). Scores reported on the TSES for the six teachers surveyed during the Reconnaissance Phase ranged from 6.92 to 7.75. Mean scores were highest in the area of classroom management ($M=7.957$). According to participant responses, teachers felt least efficacious in the area of student engagement ($M= 6.91$). There were no relationships between efficacy and experience, content area or grade level, or advanced degrees. Data are presented in Table 3.1.

Table 3. 1

Reconnaissance TSES Efficacy Ratings

Teacher	Cumulative score	Student engagement	Classroom management	Instructional strategies
Charlotte Brown	6.92	7.00	6.88	6.88
Olivia Williams	7.08	6.62	8.25	6.38
Abigail Adams	7.30	7.13	7.63	7.25
Noah Miller	7.38	5.88	8.75	7.50
Mason Taylor	7.50	7.13	8.13	7.25
Ava Davis	7.75	7.75	8.00	7.50

When self-efficacy beliefs are high, the teacher feels competent and capable to influence student learning, regardless of the situation. However, if efficacy beliefs are low, a teacher may feel efforts to influence student learning are outside the scope of control (Tschannen-Moran & Hoy, 2001a). The mean score of teachers' self-efficacy rating in the Reconnaissance Phase was defined as "having quite a bit" of ability, resources, and opportunity to complete given classroom scenarios (Tschannen-Moran & Hoy, 2001b). Thus, teachers' ratings meant they felt quite able to influence student learning, independent of any additional factors.

Inquiry in instruction. The quantity and quality of inquiry used during

instruction were collected using Sections IV-VII of the EQUIP observation protocol. The

school superintendent and principals accompanied me during observations, and inter-rater

accountability was used to establish credibility of collected data. Scores were

disaggregated by teacher, grade, school, and content taught to identify strengths,

weaknesses, and interesting factors for each construct.

Pre-intervention levels of inquiry used by teachers during instruction were low

(M=1.88). The average rating of observed instruction in participating teachers'

classrooms was categorized as *Pre-Inquiry* by the EQUIP, and the range of scores for

each participating teacher was 1.2 to 2.84. Individual and collective scores are presented

in Table 3.2.

Table 3. 2

Reconnaissance EQUIP Construct Scores

Teacher	Total score	Instruction	Discourse	Assessment	Curriculum
Olivia Williams	1.20	1.60	0.00	1.60	1.75
Noah Miller	1.50	1.20	1.40	1.67	1.75
Charlotte Brown	1.52	1.60	1.40	1.60	1.50
Abigail Anderson	1.80	3.00	1.00	1.40	2.00
Mason Taylor	1.85	1.60	2.40	1.40	2.00
Ava Davis	2.84	3.40	2.60	2.40	3.00
Total	1.88	2.10	1.76	1.68	2.00

The construct of instruction was identified as a strength during initial observations

(M=2.1). A level within the range of *2* is categorized as *Developing Inquiry* on the

EQUIP. Instruction included the use of (a) various learning strategies, (b) activities, (c)

roles of the students as active investigators, (d) role of the teacher as a facilitator, and (e)

depth of knowledge. The weakest area identified during observations was in the construct

of discourse (M=1.76). Scores within this range are categorized as *Pre-Inquiry* on the

EQUIP. Discourse included (a) higher order questioning, (b) discussion, (c) communication between students, and (d) communication between teachers and students. The range of discourse was 0 to 2.6.

Qualitative Findings

Qualitative data in the Reconnaissance Phase were collected using an open-ended questionnaire (Implementation Support Questionnaire), detailed field notes from classroom observations (EQUIP sections II and III), and an administrator interview. Participating teachers, the school superintendent, and school principals provided qualitative data to explore in-depth how confident, competent, and capable teachers felt to implement PBL instruction.

Open-ended teacher questionnaire. The Implementation Support Questionnaire was used to explore teachers' needs and perceptions of support during PBL implementation. Questionnaires were administered via Qualtrics through a link that was emailed to teachers. During analysis, four common themes emerged from the collected data: (a) colleague support, (b) examples, (c) feedback, and (d) school support. These themes were used as codes, and definitions are presented in Appendix I.

Colleague support. Teachers' responses on the questionnaire indicated beliefs that assistance from colleagues would be beneficial when implementing PBL in individual classrooms. Three teachers suggested methods to increase support, stating that colleagues could provide feedback and suggestions for effective PBL use. However, it was noted by one teacher that feedback from either colleagues or administrators would be considered helpful only if individuals offering feedback were knowledgeable about PBL. Additionally, one teacher indicated feeling comfortable assisting others.

Examples. Teachers' responses on the questionnaire also provided insight to their feelings of competency to incorporate PBL. Overall, teachers felt additional support was necessary to feel competent using the new instructional methods. Specifically, assistance from other teachers currently incorporating PBL instruction in their classrooms was requested. For instance, teachers expressed needing testimonials from other teachers, example lessons, and modeled instruction to feel prepared to use PBL in classrooms. Additionally, requests to view PBL instruction modeled in other classrooms was specifically suggested as a method to increase teacher preparedness by five of the six teachers surveyed. Three teachers also indicated the need to observe the effectiveness of using PBL. One teacher explained, "when I see others having success, I want to try it."

Feedback. The most frequent response to questions related to feelings of competency included teachers' requests for regular feedback. On all six surveys, teachers expressed a belief that feedback would lead toward improved implementation of PBL. Further, three teachers specifically requested an opportunity to discuss and receive feedback from peers. One teacher elaborated:

> I have been observed and given feedback by other instructors. I feel it is beneficial to be observed and given ideas of areas to make improvement. I think I benefit from somebody observing my weak areas and making suggestions for improvement.

School support. Teachers also expressed needing resources from the school to support implementation of PBL. Requested resources included time, materials, and allocation of additional professional development to feel comfortable implementing the new teaching methods. Of these, continued professional development was the most requested form of support. One teacher described that it would be important for the district to continue to offer PBL training to ensure that PBL was used consistently

throughout the district. Another teacher suggested that the school use scheduled professional development days to continue to train teachers in PBL.

Classroom observations. Structured classroom observations of teachers were conducted one time during the Reconnaissance Phase to determine levels of inquiry used during instruction. The quantity and quality of inquiry used during instruction by teachers in the Reconnaissance Phase served as a baseline for comparison in later phases. The use of inquiry during instruction was measured using sections II and III of the EQUIP. The school superintendent and principals participated in member checking to establish credibility of data collected.

Qualitative data collected using sections II and III of the EQUIP included the quality of inquiry instruction and was measured using coded descriptions occurring in five-minute increments. Descriptive activity codes included levels of inquiry, student engagement, critical and creative thinking, and assessment. Descriptive field notes of observed instruction were also collected using the protocol. Data were analyzed independently for each section and then compared for accuracy and support.

Activity codes. Coded descriptions for each five-minute increment were averaged to identify the percentage of time spent in each area of inquiry, student engagement, critical and creative thinking, and assessment. Few formative or summative assessment skills were observed in classrooms. Monitoring of student progress was coded 63-100% of the time, which included the teacher's role of using proximity to check student progress.

Levels of inquiry and critical thinking used by students appeared to influence student engagement. Proficient inquiry, which included student-centered activities and

guided inquiry facilitated by the teacher, was used by one teacher for 92% of the observed instruction. Two other teachers used proficient levels of inquiry for 38-60% of the observed instruction. Further, two teachers engaged students in critical and creative thinking (60-83% of observed instruction), while skills of analysis and application were used most frequently (62% of the time). In these classrooms, students attended to 75-100% of the lesson during the observed period.

In the remaining three classrooms, proficient levels of inquiry were not observed. Rather, teacher-centered instruction in which no inquiry was attempted was used 50-100% of the time. Receipt of knowledge and lower-order thinking skills were observed 50-100% of the time in classrooms using teacher-directed instruction. In these classes, students attended to 30-50% of the lesson during the observed period.

Descriptive field notes. Descriptive field notes written during observation of instruction were analyzed using open coding. Three major themes developed: *curriculum connection, questioning*, and *student engagement*. Definitions of the themes are presented in Appendix I.

The most frequently used theme was curriculum connection, which was used to identify authentic and real-world connections of content. Real world connections of content were attempted in four of the six observations. However, in two observations curriculum connections were weighted using a negative scale. Thus, in these observations the content taught did not align to the teacher's content objectives.

Questioning strategies were observed by four teachers during classroom observations. In two classrooms, the teachers used inquiry-based questioning skills. For example, one teacher facilitated instruction and utilized probing questions, which

encouraged students to think deeper about the concepts that were learned. Another teacher predominantly lectured to students but effectively incorporated questions of analysis and evaluation to elicit class discussion throughout the lecture. Questioning strategies used by two other teachers appeared to be for purposes of checking background knowledge and attempts to engage individual students.

Comments about student engagement were specifically noted during three classroom observations. In two observations, I noticed that students were compliantly attending to the lesson but were not fully participating. Researcher comments that support the finding of low levels of engagement included "students are very passive, taking notes. When a question is asked, one student will answer," and "two of the students are consistently answering questions."

In contrast, in another classroom observation, comments described high levels of student creativity and higher-order thinking. However, the activities did not support the learning objectives for the grade and content area. Field notes described the activity,

> Students are creating and using higher order thinking, but it is not really inquiry. The lesson does not appear to be directly related to learning goals or standards. Rather, it is a fun and engaging activity for students.

Administrator interview. One semi-structured interview with the school superintendent and two building principals was conducted during the Reconnaissance Phase to (a) identify goals for district-wide implementation and (b) explore potential challenges for PBL implementation. Three major themes emerged from the administrator interview that served as codes: *building confidence, evaluation and feedback,* and *sustainability*. The codes and definitions are presented in Appendix I.

Building confidence. Administrators contributed teachers' level of confidence to two factors: (a) the professional development teachers received the previous semester, and (b) teachers' experience implementing one PBL lesson prior to the end of the 2019 school year. Administrators described teachers' experiences teaching PBL units as successful, with positive reactions from students. Although administrators felt that teachers had positive experiences with using PBL so far, they also expressed concerns that they may only be hearing from teachers with a higher comfort level. The recognition that not all teachers may have the same comfort level for using PBL appeared to be a concern for administrators. Thus, administrators made supportive comments related to building teacher confidence for PBL. Specifically, "if it's not going well… we need to be aware… to help motivate [the teacher] through that… let them know it's okay…and support them through some failures so they don't get discouraged and just give up."

Evaluation and feedback. The most frequently used theme identified from the administrator interview was evaluation. Evaluation was used either in reference to conducting evaluations related to teacher performance, or in reference to providing feedback for teachers. For example, administrators' comments described visiting classrooms, but comments indicated their purposes were directly tied to teacher evaluation. Administrators felt it was their responsibility to ensure PBL was used. The administrators suggested if teachers shared when PBL units were taught, an evaluation of teacher performance could be conducted at that time.

Additional comments made by administrators suggested that advice from an instructional coach could result in improved performance. However, two codes (feedback and evaluation) were applied to these comments. For example, one administrator stated:

I'm looking forward to [having a coach] with the PBL. It would be advantageous to get that input and another set of eyes in those classrooms on those lessons… You know, what types of things we want to tweak or what positives they see that we can put out there to share.

Similarly, another statement by an administrator was "[coaching] gives [the teacher] a chance to take into account what the supervisor would see and maybe, you know, tie to their evaluation."

Instructional coaching was defined by Barkley (2017) as job-embedded professional development to emphasize dialogue and reflection, resulting in teacher growth. While dialogue and reflection can be beneficial for teachers as they are experiencing change, the above statements made by Lancaster Schools administrators align more with evaluation of performance. Comments such as these demonstrate a misunderstanding of the purposes for instructional coaching. Therefore, I believe it can be very difficult for administrators to separate performance reviews from dialogue to encourage growth in teacher performance.

Sustainability. The theme sustainability was used to describe administrators' responses for continuing the district-wide initiative for PBL instruction. When asked about further professional development in PBL, administrators paused. Although 100% of the professional development during the 2018-2019 school year was devoted to PBL instruction, a different initiative would begin the following year. Administrators indicated their beliefs that the focus and time allocated to PBL instruction from the 2018-2019 school year should serve as an understanding to teachers that PBL is important; otherwise that amount of time would not have been spent on one goal. Thus, administrators believed teachers' recognition of the importance of incorporating PBL would result in their continued use. However, the school district experienced a 24% turnover in faculty

from 2019 to 2020. It is possible that new teachers may not have the knowledge or skill to develop and teach a PBL lesson.

Reconnaissance Phase Discussion

Quantitative and qualitative data collected during the Reconnaissance Phase justified the development of a specific instructional coaching model designed to influence teachers' self-efficacy to implement PBL at Lancaster Schools. This section includes inferences developed through data analysis and a connection to the literature supporting the design of a coaching model to address the needs of teachers at Lancaster Schools.

Implementation of PBL

Data collected to support answering research question one were analyzed to determine baseline levels of PBL instruction and for comparison in later phases. Teachers' initial uses of inquiry instruction, which is a key component of PBL (Larmer & Mergendoller, 2015), were rated as pre-inquiry when using the EQUIP measurement instrument ($M = 1.88$). Pre-inquiry is the lowest rating on the EQUIP. Thus, levels of inquiry used during classroom observations indicated teachers had not yet effectively implemented PBL in their classrooms.

Changing instructional methods to include PBL can be challenging for teachers (Ertmer & Simons, 2006). However, Poole and Okeafor (1989) found implementation of new practices can be increased if teachers are provided with support from administrators and other teachers. Lancaster Schools' teachers responded accordingly on the Implementation Support Questionnaire. For example, responses from teachers indicated support from administrators and other teachers as essential to implement PBL in their classrooms. Specifically, teachers indicated needs of additional training and feedback to be most necessary.

In response to how the school could support PBL implementation, two teachers indicated that further professional development was needed. However, when asked about additional professional development opportunities in an interview, administrators responded that district-wide professional development was allocated to a different area for the 2019-2020 school year. Thus, for teachers to solve problems and answer questions during PBL implementation, support other than traditional professional development would be necessary.

The most overwhelming type of support teachers described needing to effectively implement PBL was feedback. As previously discussed, four of the six teachers' responses on the Implementation Support Questionnaire indicated their need for receiving feedback during PBL implementation. Additional data collected during observations of instruction aligned with teachers' requests for support. For example, at the completion of classroom observations, two teachers immediately requested suggestions for improvement. Teachers' written and verbal requests for feedback indicated that suggestions or advice to implement PBL instruction in their classrooms were essential. Opportunity to share, discuss, and collaborate are commonly requested by teachers during implementation of PBL. For example, teachers in a study conducted by Love, Duggan, and Martin (2018) unanimously agreed that to implement PBL, time for collaboration was needed. Likewise, 75% of teachers who participated in a study conducted by Goodnough, Pelech, and Stordy (2014) indicated that collaboration with teachers to share what was learned was necessary as a component for PBL implementation. Responses gained from teachers in this study corroborated these

findings. Thus, it was essential to increase opportunity for collaboration among teachers at Lancaster Schools.

PBL was a new method of teaching at Lancaster Schools and during initial observations, levels of inquiry were identified as pre-inquiry. Although teachers had participated in professional development for PBL instruction, learning and understanding does not always lead to transfer of skills. Rather, to fully implement new teaching practices in their classrooms, teachers need additional opportunity to demonstrate, practice, and receive coaching (Joyce & Showers, 2002). However, low levels of implementation, teachers' needs for additional support, and requests for feedback suggest that without intervention, sustainability of PBL instruction could be at risk at Lancaster Schools.

Efficacy for PBL

The purpose of collecting data to support answering research question two was to identify a baseline level of teachers' efficacy for PBL instruction. Data collected using the TSES efficacy scale were compared to responses gained in the Implementation Support Questionnaire. As indicated on the TSES, teachers felt efficacious in their teaching abilities ($M=7.32$). However, teachers' responses on the Implementation Support Questionnaire conflicted with highly efficacious beliefs. For example, four of the six teachers surveyed requested regular feedback for improvement in instruction. Five requested opportunities to observe classrooms in which PBL was implemented effectively. One teacher specifically shared a lack of confidence in using PBL instruction. Teachers' requests for feedback and models of effective PBL align with sources of efficacy (i.e., social persuasion, vicarious experiences). These responses indicated that

without feedback and models, teachers may not feel confident in their ability to use PBL instruction, which conflicts with teachers' ratings of efficacy on the TSES.

The conflict between teachers' efficacy as measured by the TSES and the Implementation Support Questionnaire was a surprising result. I explored the data further by comparing TSES scores of teacher efficacy to EQUIP scores of inquiry used during instruction. Results corroborated my assumption that participating teachers felt efficacious in their teaching abilities, but not in their ability to use PBL. Table 3.3 compares TSES scores of teacher efficacy to EQUIP scores for each teacher. Although the teacher with the highest EQUIP score also has the highest TSES, the remaining EQUIP and TSES were inversely related. In fact, the teacher with the lowest score for incorporating inquiry has one of the highest self-efficacy scores.

Table 3. 3

Comparison of EQUIP and TSES Mean Scores

Teacher	TSES	EQUIP
Mason Taylor	7.50	1.20
Noah Miller	7.38	1.50
Charlotte Brown	6.92	1.52
Abigail Anderson	7.30	1.80
Olivia Williams	7.08	1.85
Ava Davis	7.75	2.84

Although questions on the TSES compare to elements of inquiry used for PBL (i.e., critical thinking, questioning, creativity, differentiation), time to develop and test a valid and reliable efficacy scale specifically for PBL instruction was unavailable. Thus, while teachers may feel efficacious in their teaching abilities, their responses in open-ended surveys indicate that they do not feel efficacious for using PBL.

Self-efficacy is developed from sources of physiological state, social persuasion, vicarious experiences, and mastery experiences (Bandura, 1997) Teachers' requests for feedback and models of effective instruction correlate with these sources of efficacy. For example, social persuasion is described as feedback or encouragement to influence one's beliefs for their abilities to complete a task (Bandura, 1982). Additionally, vicarious experiences provide models of a skill being performed by someone else. Tschannen-Moran and McMaster (2009) stated that a model provides a standard of performance and can be used to assist teachers in setting goals. Therefore, the types of assistance requested by Lancaster's teachers included two of the four sources of efficacy. These requests support my beliefs that the teachers possess low levels of efficacy for using PBL instruction.

Planning Phase

The third phase of Ivankova's (2015) action research process is Planning. In this phase, data from the Reconnaissance Phase were used to develop an instructional coaching intervention to improve the self-efficacy of Lancaster's teachers to implement PBL in their classrooms. From data collected and analyzed during the Reconnaissance Phase, I found that although the participating teachers felt efficacious in their teaching abilities, they did not feel efficacious in their ability to use PBL in the classroom. To feel confident to implement PBL, teachers requested feedback, models of effective PBL instruction, and additional professional development. Although administrators were highly committed to teachers' use of PBL instruction, continued professional development for PBL was not planned. Further, a 24% turnover in faculty from 2018 to 2019 suggested that PBL implementation could be at risk unless capacity for using PBL instruction was developed throughout the district. Thus, I determined that a peer coaching

model for Lancaster's teachers would be most beneficial to influence teacher efficacy for PBL implementation.

Peer coaching is a process in which colleagues learn from each other through observation, reflection of practices, and collaboration of skills and ideas (Barkley, 2017; Robbins, 1991). Peer coaching is not unlike instructional coaching in that it includes two or more teachers collaborating to influence colleagues and improve specific, predetermined practices (York-Barr & Duke, 2004). During peer coaching, teachers agree to provide support for each other through co-planning, questioning, data collection, and analysis for a chosen implementation (Jewett & MacPhee, 2012; Showers & Joyce, 1996). Although practices of peer coaching are like instructional coaching, they differ from evaluation and feedback. Evaluation is an activity in which a teacher's performance is judged using a set of criteria (Barkley, 2017). In contrast, when peer coaching is utilized the teacher chooses the purpose and timing of an observation. Rather than receiving feedback for performance, the peer coach uses skills of paraphrasing, pausing, and questioning to encourage dialogue and reflection of the instruction.

The effectiveness of peer coaching was illustrated by Johnson, Finlon, Kobak, and Izard (2017) who developed a specific coaching model with the aims of supporting teachers, increasing efficacy, and building collaborative relationships in a sustainable and cost-effective way. Teachers responded positively to the program, and 58% of the participating teachers felt comfortable coaching their peers. Jewett and MacPhee (2012) described similar positive results. In their study, teachers described (a) appreciation for the collaborative relationship of peer coaching, (b) increased confidence for teaching, and (c) reduced feelings of isolation. Further, Sinkinson (2011) reported benefits of peer

coaching as a successful way to promote reflection. Thus, the decision to implement a peer coaching program with teachers at Lancaster Schools was deemed beneficial for influencing teacher efficacy for PBL instruction. Peer coaching offered needed support for teachers through modeled instruction, dialogue, and reflection as they implemented PBL in their classrooms. Additionally, peer coaching presented an opportunity to increase capacity among teachers and influence the sustainability of PBL instruction by teachers throughout the district. Data and a plan to begin peer coaching were shared with administrators.

Acting Phase

The Acting Phase of this study occurred between June 2019 and November 2019. The purpose of the intervention was to influence teacher self-efficacy for implementing PBL instruction. In this phase, a peer coaching model was implemented with a sample group of teachers. Teachers participated in professional development, structured classroom observations, and follow-up coaching conversations. Quantitative and qualitative data from structured classroom observations and instructional coaching conversations were collected. Data were collected sequentially, which allowed me to compare and identify trends that occurred over the six-month intervention period.

Participants

Six purposefully selected teachers agreed to participate in this study and provided data in the Reconnaissance Phase. However, prior to the first training in the Acting Phase, two teachers were dismissed from the study. One teacher was no longer eligible due to a career change that resulted in her leaving her teaching position at Lancaster Schools. Another teacher requested to be removed from the study due to personal circumstances that interfered with attendance during professional development. Thus,

four classroom teachers provided data in the Acting and Evaluation Phases. Participant names, teaching positions, advanced degrees, and years of experience are presented in Table 3.4.

Table 3. 4

Acting Phase Study Participants

			Years of experience	
Name	Position	Advanced degree	Pk-12	Current role
Abigail Anderson	Curriculum director and elementary teacher	Yes	11	5
Ava Davis	Preschool teacher	Yes	15	14
Noah Miller	High school teacher	Yes	4	4
Olivia Williams	Electives teacher	Yes	6	6

Professional Development

Implementing a peer coaching intervention required training for participating teachers. Although teachers had participated in a six-week PBL training during the fall semester of 2018, none had received training as an instructional coach prior to this study. Thus, professional development was designed to offer support for teachers in two needed areas: (a) development of additional PBL units and (b) practices of peer coaching.

Professional development topics. Professional development occurred during June 2019 and July 2019. Topics included training and assistance for developing new PBL units and utilizing techniques of instructional coaching. Standards from The Danielson Framework for Instructional Specialists (Danielson Group, 2014) served as a foundation for the instructional coaching intervention. Using that framework, I developed specific learner outcomes that served as training objectives in peer coaching. Table 3.5

displays the standards and learner outcomes that were used in the development of a peer

coaching program to influence teacher efficacy to implement PBL.

Table 3. 5

Standards and Outcomes used in Development of Peer Coaching Program

Danielson's Framework Standards	Demonstrates understanding of the underlying research, theories, knowledge, and skills of the discipline.
	Identifies clear, specific, and appropriate goals for the instructional support program.
	Creates a respectful and emotionally safe culture that promotes collaboration.
	Establishes clearly defined norms for professional conduct.
	Promotes a culture of continuous instructional improvement.
	Collaborates with teachers to design rigorous, standards-based classroom instruction.
	Engages teachers in learning new instructional strategies and practices.
	Provides responsive professional support. Enhances professional capacity through ongoing professional learning.
	Demonstrates professionalism by adhering to the highest standards of integrity and confidentiality.
Learner Outcomes	Teachers will develop personal goals for PBL and define guiding milestones as they work towards their goals.
	Teachers will develop collaborative norms for use during peer coaching.
	Teachers will recognize components of effective dialogue used during coaching.
	Teachers will apply coaching skills to role-playing scenarios.
	Teachers will develop PBL units for their classroom with the guidance of an instructional coach.
	Teachers will apply techniques of effective dialogue used during coaching.
	Teachers will apply skills of instructional coaching in follow-up conversations after classroom observation.

The professional development also included online resources and support in the development of a PBL unit. I offered support for teachers as they developed their unit with synchronous and asynchronous instructional coaching activities. Teachers shared their units with me through Google Docs and developed a single section of the unit each week. Asynchronous instructional coaching was provided by me in comments made in shared Google Docs throughout unit development. Additionally, I hosted two synchronous virtual coaching sessions during the summer months to coach teachers on specific portions of their units.

Professional development format. Professional development occurred during the summer months. At Lancaster Schools, training and professional development typically occurred during the regular school year. Participating teachers were not contracted during in the summer; therefore, they were given choice among three training options. An electronic mail message was sent to teachers, which included a link to a Google form to collect training preferences. The survey also collected preferences for meeting dates, including times and dates to avoid (i.e., personal vacations, athletic coaching commitments). Most participants preferred a blended training that included online and face-to-face training. Dates of face-to-face trainings were emailed to teachers, and a training platform was created using my personal Canvas account.

Face-to-face training and virtual coaching sessions in Zoom occurred once monthly, and online modules in Canvas were completed by teachers weekly. Activities during face-to-face trainings included the application of instructional coaching techniques and role-playing. The weekly online modules consisted of readings, audio-visual resources, and reflection questions focusing on techniques of instructional coaching and

PBL. A monthly virtual coaching session occurred in which I coached teachers during the planning of their PBL units. I modeled techniques of coaching in face-to-face trainings, weekly online activities in Canvas, and through comments made on shared online unit plans. The school superintendent and building principals were provided with dates of face-to-face sessions and were invited to the online training platform in Canvas as teaching assistants. Table 3.6 presents a schedule of topics, goals, and format of professional development. Training agendas are presented in Appendix J.

Table 3. 6

Professional Development Topics and Formats

Week	Format	Instructional coaching topic	PBL topic
June 5, 2019	Face-to-face	Defining instructional coaching Questioning types	Goals for implementing PBL
June 10-15, 2019	Online	Paraphrasing	Key knowledge and success skills
June 17-22, 2019	Online	Positive presuppositions	Assessment
June 26, 2019	Virtual	Role playing and modeling	Driving questions
July 1-6, 2019	Online		Engage with the PBL
July 10, 2019	Face-to-face	Cognitive Coaching: States of mind	Sustained inquiry
July 15-20, 2019	Online	Shifting states of mind	Authenticity Voice and choice
July 24, 2019	Virtual	Role Playing and modeling	Reflection Critique and revision Public product
August 9, 2019	Blended		EQUIP

Peer Coaching Intervention

Observation of classroom instruction and collaborative coaching occurred between August 2019 and November 2019. Teachers scheduled monthly classroom observations with a peer coach and me, and an instructional coaching session was

conducted following the observation. Quantitative and qualitative data were collected from structured classroom observations and dialogue that occurred in instructional coaching sessions. Quantitative data included the level of inquiry used in classroom instruction. Qualitative data included (a) coded descriptions of classroom instruction, (b) descriptive field notes from classroom observations, and (c) dialogue from instructional coaching conversations. Data collected throughout the Acting Phase informed me of the influence instructional coaching had for teachers' efficacy to implement PBL in their classrooms. Data were collected sequentially and analyzed upon collection for comparison to data collected in subsequent stages.

Evaluation Findings

The purpose of the Evaluation Phase was to assess the effectiveness of the intervention (Ivankova, 2015). The Evaluation Phase of this study occurred in December 2019, which was after the completion of a six-month peer coaching intervention. In this phase, quantitative and qualitative data were collected from a closed-ended survey and group teacher interview. Teachers' responses in closed-ended surveys and a semi-structured interview provided insight for me to understand the effectiveness of the peer coaching model and teachers' post-implementation self-efficacy for PBL. Quantitative and qualitative data in the Evaluation Phase were collected over a one-week period, analyzed independently, and results for both data types were merged for comparison. Previously collected and analyzed data from the Acting Phase were also used during data analysis for triangulation purposes. Qualitative data were emphasized due to the length of the data collection period and the number of participants in the study. Results are discussed below.

Quantitative Results

The purpose of collecting quantitative data post-intervention was two-fold: (a) to identify the influence peer coaching had for teachers' self-efficacy to use PBL and (b) to determine how teachers' PBL implementation changed throughout the six-month intervention. Quantitative data were collected using two instruments, the TSES and EQUIP observation protocol. Quantitative data were gathered sequentially and compared to previously analyzed data from the Reconnaissance and Acting Phases.

Teacher efficacy. Teachers' self-efficacy to use PBL in their classrooms was measured using the TSES. The efficacy scale was administered via Qualtrics where a link was sent electronically to teachers, and data were analyzed in Excel using descriptive statistics. Six teachers provided data in the Reconnaissance Phase; however, only four teachers provided data during the Evaluation Phase. Thus, previously reported mean scores from the Reconnaissance Phase were analyzed a second time to remove responses of non-participating teachers.

The self-efficacy of participating teachers in the Reconnaissance Phase was high ($M = 7.39$), but post-implementation results indicated a slight decrease in teachers' self-efficacy beliefs ($M = 7.36$). TSES ratings ranged from 7.21 to 7.50 in the Evaluation Phase. Post-implementation results were compared to data gained from the Reconnaissance Phase using paired sample *t*-tests (two tailed). A significant, but negative, difference between pre- and post-intervention responses was evident for one participant.

Results were disaggregated by teacher, school building, grade, and content taught. Comparison of pre- and post-intervention data indicated increased teacher efficacy for Abigail and Olivia but revealed decreased teacher efficacy for Ava and Noah. Ava and

Noah's decreases in teacher efficacy was a surprising result because both teachers' efficacy was rated highest in the Reconnaissance Phase. Table 3.7 displays a comparison of pre- and post-intervention TSES scores.

Table 3. 7

Teachers' Pre- and Post- Intervention TSES Scores

Teacher	Pre-Intervention	Post-Intervention	Difference
Abigail	7.33	7.42	.09
Ava	7.75	7.33	-.42*
Noah	7.38	7.21	-.17
Olivia	7.08	7.50	.42
Totals	7.39	7.36	-.03

Note. $*p = .05$

Pre- and post-intervention scores of each TSES subscale were compared to explore decreases in teachers' efficacy. The comparison revealed interesting information. For example, the subscale of student engagement measured teachers' beliefs in their abilities to incorporate critical thinking, utilize methods of motivation, and engage all students. The student engagement subscale was the only area in which trends emerged, revealing increased efficacy for teachers at Taft High School but decreased efficacy for teachers at Adams Elementary.

In the subscale of instructional strategies, efficacy increased for three of the four teachers. This subscale measured teachers' beliefs in their ability to differentiate instruction, incorporate questioning, and include appropriate assessment methods. Each of the efficacy statements measured in the subscale of instructional strategies align with constructs on the EQUIP, which was used to measure the level of PBL implementation incorporated by teachers in the Acting Phase. Thus, it appears that discussion of these

elements in instructional coaching conversations strengthened most teachers' efficacy for PBL.

The subscale of classroom management appeared to have the most influence in teachers' self-efficacy beliefs. Three teachers reported differences in their efficacy for classroom management from pre- to post-implementation. Two teachers reported lowered efficacy post-intervention, which resulted in lower self-efficacy ratings overall. Although the lower ratings could be an area of concern, the decrease in classroom management was consistent with reduced student attention identified in classroom observations. Data from classroom observations indicated that as the level of inquiry increased on the EQUIP, the level of off-task behavior of students also increased. It was possible that teachers and students were experiencing some uncertainty when transitioning to increased use of PBL. Hence, feelings could have influenced beliefs for managing the classroom. Further, student enrollment differed from the Reconnaissance and Evaluation Phases. Pre-intervention self-efficacy ratings were collected in the spring of 2019, but the Evaluation Phase occurred in the fall of 2019. Thus, teachers rated their self-efficacy in the Reconnaissance Phase based on feelings and experiences with different students. Tschannen-Moran and Hoy (2001a) described teacher efficacy as situation-specific. A teacher may feel very competent in one subject area or with one group of students, but not another. Thus, varied experiences teachers had with the different enrollments could have influenced results. Table 3.8 displays a comparison of teachers' self-efficacy pre- and post-intervention for each subscale measured on the TSES.

Table 3. 8

Pre- and Post- TSES Subscale Ratings

	Pre-Intervention			Post-Intervention		
Teacher	Student engagement	Classroom management	Instructional strategies	Student engagement	Classroom management	Instructional strategies
Abigail	7.13	7.63	7.25	6.63	8.13	7.50
Ava	7.75	8.00	7.50	7.25	7.38	7.38
Noah	5.88	8.75	7.50	6.00	7.88	7.63
Olivia	6.63	8.25	6.38	7.13	8.25	7.13
Total	6.84	8.16	7.16	6.74	7.87	7.42

Inquiry in instruction. The quantity and quality of PBL elements incorporated in teachers' instruction were collected in structured classroom observations and measured using sections IV-VII of the EQUIP inquiry protocol (Appendix D). Peer coaches and I observed classroom instruction of participating teachers monthly when school was in session. Data were collected by me, and inter-rater accountability was used to prevent bias. Ratings for each indicator were averaged to determine a score for each construct and an overall comprehensive score. Following the observation, the observed teacher received a copy of the ratings. The level of inquiry was compared to subsequent observations and pre-intervention data gained during the Reconnaissance Phase.

Results gleaned from data collected in the Acting Phase indicated positive results for the quantity and quality of PBL elements incorporated in instruction. Overall, teachers demonstrated growth in the incorporation of PBL elements during instruction when compared to data from the Reconnaissance Phase. Teachers' use of inquiry in the Reconnaissance Phase was categorized as pre-inquiry ($M=1.88$); however, post-intervention mean scores were categorized as developing inquiry ($M=2.94$). Another

area of improvement was in teachers' use of discourse. Discourse included complexity

and critical thinking incorporated in the teachers' questioning and classroom discussions.

Data from the Reconnaissance Phase indicated teachers' use of discourse was a weakness

(M= 1.76). However, post-intervention data indicated improvement (M= 2.89), and mean

scores for all constructs were comparable. Table 3.9 presents a comparison of teachers'

pre- and post- mean scores overall and for each construct.

Table 3. 9

Pre- and Post- Intervention EQUIP Mean Scores

Construct	Pre- Intervention	Post- Intervention
Total Score	1.88	2.94
Instruction	2.10	2.99
Discourse	1.76	2.89
Assessment	1.68	2.86
Curriculum	2.00	3.02

Scores were disaggregated by teacher and building to identify strengths,

weaknesses, and interesting factors. The use of PBL elements increased for all teachers

throughout the Acting Phase. Pre- and post- intervention mean scores for each teacher are

presented in Table 3.10.

Table 3. 10

Pre- and Post- Intervention EQUIP Mean Scores by Teacher

Teacher	Pre- Intervention	Post- Intervention
Abigail	1.80	2.99
Ava	2.84	3.17
Noah	1.50	2.81
Olivia	1.85	2.88

Considerable differences in the incorporation of PBL elements were noted in each school building. Although increased use of PBL elements was observed in classrooms at both buildings, teachers at Taft High School demonstrated the most growth from pre- ($M=1.67$) to post-intervention ($M=2.83$). Increased utilization of PBL elements were observed in both classrooms, but the greatest increase in the level and quality of PBL elements used in instruction occurred in Noah's classroom. Pre-intervention instruction was categorized as pre-inquiry ($M=1.5$). However, Noah's use of inquiry changed considerably during the peer coaching intervention. Although mean scores for the intervention period were categorized as developing inquiry ($M=2.81$), two of the four observations were categorized as proficient inquiry. Scores increased with each observation but declined slightly in the final observation, which could be indicative of an attempt to use inquiry with a new grade and content area. Table 3.11 details the level and quality of PBL elements used in high school classrooms throughout the research period.

Table 3. 11

High School Teachers' Pre- and Post- Intervention EQUIP Mean Scores

Observation	Noah	Olivia
Reconnaissance	1.50	1.85
1	1.78	2.53
2	2.74	2.79
3	3.53	2.89
4	3.10	3.10

At Adams Elementary, increased use of PBL elements were evident, but teachers' incorporation varied by observation. Although scores fluctuated between observations, considerable increases occurred for the constructs of discourse and assessment. Pre-

intervention scores for each construct were categorized as pre-inquiry. However, post-intervention scores for discourse were developing inquiry ($M= 2.94$), and assessment scores were categorized as proficient inquiry ($M= 3.09$). Further, although increases in these constructs were evident in both classrooms, considerable increases were observed in Abigail's instruction. Table 3.12 presents the discourse and assessment scores for each observation of instruction in elementary classrooms.

Table 3. 12

Elementary Teachers' EQUIP Discourse and Assessment Scores

Observation	Ava[a]		Abigail	
	Discourse	Assessment	Discourse	Assessment
Reconnaissance	2.6	2.4	1.0	1.4
1	2.6	2.6	1.8	2.2
2	3.6	3.6	3.4	3.0
3	3.0	3.4	3.2	3.0
4			3.4	3.6

[a]*Three observations and coaching sessions occurred for this teacher.*

Qualitative Findings

Qualitative data consisting of observations of instruction, teachers' comments in coaching sessions, and an interview were used to assess the effectiveness of a peer coaching intervention to influence teachers' efficacy to implement PBL in their classrooms. Participating teachers provided qualitative data to explore the level and frequency in which PBL elements were incorporated in classroom instruction and how confident, competent, and capable teachers felt to implement PBL instruction. Data were collected sequentially throughout the Acting Phase using detailed field notes from (a) classroom observations (EQUIP sections II and III) and (b) instructional coaching

conversations. A group teacher interview was conducted in the Evaluation Phase. Data were analyzed upon collection and compared to previously analyzed data from the Reconnaissance and Acting Phases.

Classroom observations. Structured classroom observations occurred monthly from August 2019 to November 2019 to assess the quantity and quality of inquiry used during instruction. Each participating teacher scheduled a monthly observation in the Acting Phase and data were collected using sections II and III of the EQUIP. Qualitative data collected with the instrument included coded descriptions of classroom instruction and detailed field notes. Participating teachers provided member checking and inter-rater agreement to establish credibility of data collected. Field notes were typed and uploaded to Dedoose for analysis, then open coding was applied. Data were analyzed independently and compared to previously analyzed data from the Reconnaissance and Acting Phases. Information gained offered insight for teachers' level of PBL implementation and were used for discussion in follow-up coaching conversations.

Activity codes. Coded descriptions for each five-minute increment were analyzed to determine the quality and frequency of time spent in each area of inquiry, student engagement, critical thinking, and assessment. Analyzed data were disaggregated by teacher, school building, and activity date to identify strengths, weaknesses, and interesting factors. Data were compared to previous observations.

Overall, teachers' use of inquiry instruction increased when compared to data from the Reconnaissance Phase. Proficient levels of inquiry were observed 38% of the time and exemplary levels of inquiry were observed in 12% of teachers' instruction. Although proficient levels of inquiry were observed in the Reconnaissance Phase (49% of

observed instruction), exemplary levels of inquiry were not observed. Thus, the frequency of inquiry remained the same throughout the study period, but the quality of inquiry used during instruction increased when compared to data from the Reconnaissance Phase.

Little change occurred in the use of critical thinking and student engagement when data were compared from classroom observations in the Reconnaissance and Acting Phases. Critical thinking was observed 68% of the time in the Reconnaissance Phase and 65% of the time in the Acting Phase. Although teachers' incorporation of critical thinking decreased slightly during the intervention period, the categories of critical thinking differed. For example, in the Reconnaissance Phase 40% of critical thinking observed was categorized as creating. In the Acting Phase, 48% of critical thinking observed was categorized as either application, analysis, or evaluation. Creating was observed 17% of the time in the Acting Phase. The increased use of application, analysis, and evaluation was likely a result of the timing of the observation. The culmination of lessons was not observed in the Acting Phase; rather, teachers requested observations at the beginning or middle of a unit when student exploration occurred.

Critical thinking used in classroom instruction appeared to influence levels of inquiry. Critical thinking skills were used by each teacher in 10 separate observations (60-100% of observed instruction), and proficient levels of inquiry were observed 50-100% of the time in these classrooms. In contrast, when critical thinking was not used, the level of inquiry also decreased. For example, in one observation, lower order thinking skills were observed 67% of the time and the observation was coded as 100% developing inquiry. Similarly, in another observation, the level of cognitive skills was coded as 100%

receipt of knowledge and the instruction was coded as 100% pre-inquiry, which is defined as teacher-centered instruction with no inquiry attempted.

The type and level of assessments used in the Acting Phase differed greatly from the assessments incorporated in the Reconnaissance Phase. In the Reconnaissance Phase, 83% of the assessment used by teachers was coded as monitoring. Monitoring is defined on the EQUIP as "circulating around the room, probing for understanding, checking student progress, commenting as appropriate." Although monitoring was used in the Acting Phase, 58% of assessment observed was coded as formative or diagnostic. Formative and diagnostic assessments are defined on the EQUIP as "assessing student progress, instruction modified to align with student ability," and "checking for prior knowledge misconceptions, and abilities." The use of formative and diagnostic assessments greatly influenced the level of inquiry used in instruction because teachers utilized higher order questioning strategies, held discussions with students, or challenged student ideas. Therefore, the interactions between teachers and students were rich with discussion in the Acting Phase. In the Reconnaissance Phase, the use of monitoring was primarily used for classroom management and proximity.

Data were disaggregated by individual teacher and compared to findings in the Reconnaissance Phase. The comparison of data revealed increased use of inquiry for three of the four participating teachers. One specific example of increased inquiry occurred in observations of Noah's instruction. The level of inquiry most frequently observed in Noah's classroom during the Reconnaissance Phase was categorized as developing (40%). Similarly, no inquiry was attempted in the first observation of Noah's instruction in the Acting Phase. However, in the second observation, 100% of the lesson

used proficient levels of inquiry. Consequently, the level of inquiry observed in Noah's classroom throughout the Acting Phase ranged from proficient (50%) to exemplary (40%).

Data for each school building were also compared, and the incorporation of proficient and exemplary inquiry levels was more frequent at Taft High School (53%) than Adams Elementary (48%). This comparison was interesting because observations in the Reconnaissance Phase indicated the quantity and quality of inquiry was higher among elementary teachers (82% proficient levels of inquiry). Thus, teachers at the Taft building experienced more growth throughout the intervention period than teachers at the Adams building. Another interesting comparison was identified between the incorporation of inquiry and student engagement at Taft High School. Although high levels of student engagement (73%) were present throughout the Acting Phase, an inverse relationship was noticed when levels of inquiry increased. As the incorporation of inquiry increased in classrooms, the amount of off-task student behaviors also increased. Thus, it appears that high school students initially experienced a period of disequilibrium as their teachers incorporated more inquiry in the classroom.

Descriptive field notes. Descriptive field notes collected during structured observation of instruction were analyzed using open coding. Two themes were developed: efficacy and PBL implementation. Definitions of each are provided in a qualitative codebook (see Appendix I). Data were disaggregated by teacher and school to identify strengths, weaknesses, and interesting factors. Data from each observation were compared to data gained from previous phases.

Efficacy. Teachers' efficacy to use PBL in their classrooms was evident from data obtained during structured classroom observations at the Taft campus. Although efficacy was applied less frequently in data analysis, I felt it was meaningful due to the impact it had for two teacher's feelings for incorporating PBL instruction.

The first example occurred early in the observation period. Olivia verbally expressed a lack of confidence for using PBL instruction during summer professional development and coaching sessions. However, she requested an observation of her PBL lesson on the second day of the school year. Immediately before the observation, she described a decision made to reorganize the lesson due to a previous instructional coaching conversation. Instead of presenting a driving question and facilitating an activity, she would present the activity and require students to develop a driving question to synthesize the elements of the unit. She shrugged, stating she felt high school students should be able to develop driving questions. Although Olivia's willingness to incorporate new strategies into her classroom was characteristic of individuals with high levels of efficacy, her body language did not exhibit confidence. Nonetheless, the PBL lesson was a success. All students were successful in developing a statement that synthesized the target goals of the unit, as she hoped. Thus, the success of this lesson, which occurred on the second day of school, served as a mastery experience for Olivia. Bandura (1977) describes mastery experiences as the most powerful source of self-efficacy. Further, initial success leads to increased confidence in future attempts (Bandura, 1995). The effects of the initial success were evident in a later discussion with Olivia. She described the success of the first lesson as the turning point for developing her self-efficacy to

incorporate PBL instruction. She explained, "From that point, I saw it [PBL] worked so I kept doing it."

Accordingly, Olivia's confidence was demonstrated with her continued use of PBL instruction in new and unique ways. For example, in a subsequent lesson, she used elements of PBL to teach vocabulary. Although the lesson was not a Gold Standard PBL lesson and the inquiry was coded as developing, her activity included student choice and inquiry. Incorporating elements of PBL in a vocabulary lesson was indicative of increased efficacy because it demonstrated her confidence to attempt new strategies within everyday lessons.

Similar to the risks Olivia took to use PBL in new and unique ways, Noah also demonstrated comfort in using PBL elements in the final observation of the Acting Phase. Previously, Noah had scheduled two observations in a history class consisting of upperclassmen. Due to the success he experienced with those lessons, it appeared logical that his incorporation of PBL would remain focused with that group of students. However, he requested his final observation occur in a new grade level and content area. His request was significant because he requested an observation of instruction with a class of at-risk freshmen students. Thus, Noah's confidence for using elements of PBL with all students demonstrated increased efficacy for PBL implementation.

PBL implementation. Teachers' use of the BIE Gold Standard PBL Elements increased when compared to data gained in the Reconnaissance Phase. The eight elements include (a) key knowledge and success skills, (b) driving question or challenging problem, (c) sustained inquiry, (d) student voice and choice, (e) authenticity, (f) critique and revision, (g) public product, and (h) reflection. Although elements of

authenticity, questioning, and inquiry were observed in four of the six Reconnaissance Phase observations, two observations lacked connection to key knowledge and success skills. Thus, only two pre-intervention observations incorporated PBL elements and grade-level content. However, observed instruction in the Acting Phase contrasted what was observed in the Reconnaissance Phase. Multiple PBL elements were regularly incorporated in teachers' instruction, and each incorporated a strong curricular connection. Further, teachers' incorporation of PBL elements increased throughout the Acting Phase.

Sustained inquiry was incorporated into teachers' instruction in multiple classrooms. Sustained inquiry is defined as an active, in-depth process in which students engage in questioning and problem-solving to generate answers over a given time period (Larmer & Mergendoller, 2015). Although sustained inquiry was evident in observations occurring earlier in the Acting Phase, the depth of inquiry increased throughout the intervention period. One example of sustained inquiry occurred in Noah's classroom. In this observation, students researched answers to a driving question and compared ancient civilizations. The teacher facilitated, stopping in with groups to discuss content, ask probing questions, and sometimes challenge student responses. Researcher's detailed field notes from the observation noted:

> This lesson used inquiry when students discussed, researched, and communicated back the information that was found. Students were comparing previously learned content to new information. This was not a full PBL lesson, however it used key knowledge, student voice and choice, and sustained inquiry… This lesson was a direct contrast to the previous lesson observed by this teacher, in which the teacher used direct instruction.

The above example of inquiry used in Noah's instruction exhibits higher levels of inquiry and increased depth of knowledge. The lesson was significant for two reasons. First, it served as an exemplary PBL model for the peer coach. Secondly, after experiencing success with this lesson, Noah incorporated multiple PBL elements in subsequent observations, and all used the element of sustained inquiry. Thus, the lesson taught in this observation served as a turning point for Noah to regularly incorporate PBL elements in instruction. At the culmination of the Acting Phase, similar inquiry-based examples were noted for all teachers. However, the use of PBL elements were more frequently observed at Taft High School.

The incorporation of student voice and choice was also considered a strength for teachers at Lancaster Schools. When voice and choice is incorporated, students are given options about the products they create, how they work, and what resources are used (Larmer & Mergendoller, 2015). All teachers used student voice and choice throughout the Acting Phase, however the level in which it was incorporated varied. For example, choice was observed in six of the seven observations at the Adams elementary building. Abigail frequently offered students choice with open-ended resources, such as classroom books or online reading material. Additionally, she incorporated creative techniques for students to discuss opinions in writing. Meanwhile, students in Ava's classroom were provided choice in methods used to demonstrate understanding. Teachers at Taft High School also incorporated voice and choice; however, their incorporation differed due to the inclusion of sustained inquiry. Thus, although the types of voice and choice used within the two buildings were similar, the incorporation of additional PBL elements increased the quality of use in high school classrooms.

A common characteristic of instruction in final observations was discussion among teachers and students. For example, as teachers in the Adams elementary building incorporated more questioning, students began to discuss and answer questions in small groups. Together, students offered ideas, sought assistance from each other, and questioned the accuracy of information learned. Likewise, high school teachers elicited discussion with students by incorporating higher order questioning and problem-solving. Teachers challenged students' ideas and required them to provide explanations, which resulted in rich discussions between students and teachers. The use of discussion was not observed prior to the final two months in the Acting Phase. Thus, it was considered a significant finding that positively influenced the implementation of PBL in teachers' classroom.

Coaching conversations. Online and face-to-face coaching conversations provided insight for teachers' efficacy for using PBL in their classrooms and supported answering research question two. Online coaching was conducted during professional development that occurred in June and July 2019. Online professional development modules included weekly tasks to guide teachers in the development of their unit, and teachers shared with me a copy of the PBL unit they were developing in Google Docs. I coached teachers asynchronously by commenting on shared PBL units to model skills of paraphrasing and questioning. Synchronous instructional coaching occurred in face-to-face professional development sessions and in follow-up coaching conversations with the observed teacher and a peer coach. Questions to guide discussion were developed in advance to elicit dialogue between the teacher, peer coach, and me.

Qualitative data from coaching conversations were collected using the Coaching Dialogue Form (see Appendix G). Data were typed directly in the instrument and uploaded to Dedoose for coding and analysis. Data gained from coaching conversations were sorted by collection date and individual teacher to identify potential changes in each teacher's efficacy for implementing PBL throughout the study period. Open coding was applied, and three major themes emerged: online training, efficacy, and PBL implementation. Definitions are presented in a qualitative codebook (see Appendix I).

Online training. Results suggested that an online summer training was not an effective method for coaching teachers in the development of PBL unit plans due to the lack of opportunity for some teachers to participate in coaching conversations. The online training required teachers to complete a single section of their unit each week and share the unit with me via Google Docs. I used techniques of coaching (i.e., positive presuppositions, paraphrasing, and questioning) in weekly online comments in Google Docs to initiate an asynchronous dialogue with teachers. Although the training was designed for teachers to be coached weekly over a period of eight weeks, technology challenges prevented some teachers from fully participating in the weekly modules. Each teacher developed a unit, but not all teachers completed the units in the weekly progressive format presented in the online training. Thus, the opportunity to be coached on PBL units was inconsistent among the participating teachers and comments rarely resulted in a dialogue. In contrast, synchronous virtual coaching sessions that occurred in Zoom demonstrated positive results. For example, researcher reflection after the final virtual coaching session noted:

> Coaching is much more effective when it is live rather than asynchronous.
> I could see and hear the teachers stopping, thinking, and reflecting before

answering today. When I coach online (which is modeling), I don't know if they're getting anything from it or not. Coaching is a dialogue. It has to be a back and forth reciprocal discussion to be effective. It can't just be an answer and that be the end of it.

Efficacy. Data collected throughout the six-month intervention phase indicated positive results for teachers' efficacy to use PBL in their classrooms; however, the rate of development differed. For example, positive influences for self-efficacy were evident for teachers at Taft High School.

Over the course of the six-month intervention, incremental changes led to Olivia's increased self-efficacy. Throughout the online professional development period, Olivia regularly engaged in asynchronous dialogue with me in Google Docs and Canvas. She responded to questions posed and confirmed paraphrased comments. In one asynchronous comment, she expressed she was "struggling to turn over the reins." We continued to exchange dialogue leading up to our final synchronous event, in which we discussed her concern in a coaching conversation. Although she continued to express doubts, researcher's reflection of the conversation described the progress she made:

> She says she's struggling to turn over the reins. This is very typical of a teacher who feels efficacious for traditional instruction, but less efficacious for PBL. By developing a unit that incorporates all PBL elements, she is taking a risk. It appears that she is willing to make attempts, though. Her willingness and the dialogue we are exchanging is beneficial for her PBL implementation. With each conversation, she appears to be developing ideas that are closer to the Gold Standard elements of PBL. She is receiving support through verbal persuasion. By continuing to offer support I hope to increase her self-efficacy throughout this semester.

Although Olivia expressed feeling uncertain, she began the PBL unit on the second day of school. The lesson was successful and in our follow-up coaching conversation, she stated, "the reflection has been helpful. I'm asking myself questions. I

don't do enough reflection after lessons." In later coaching conversations, she continued to explain how the reflection gained from peer coaching was beneficial. For example, she described, "I always like to reflect on what I need to improve. Like, were the kids learning? Are they involved? The kids were doing the task, just not exactly how I thought they would."

In the final coaching conversation of the Acting Phase, she discussed her confidence for using PBL and credited increased self-efficacy to reflection gained from peer coaching. She stated, "I like these conversations because I don't typically take enough time to reflect about what worked and what I need to change. When I reflect more, I make changes for next time."

Positive influences were also evident for Noah's efficacy to use PBL instruction, however the development occurred abruptly. For example, the second observation of instruction in Noah's classroom incorporated proficient levels of inquiry, but he expressed frustration with the outcome. He stated the lesson "went OK," then elaborated that he was discouraged by some students he felt should have worked harder during the lesson. After discussing the benefits of using inquiry within the unit, he presented his goals to incorporate more inquiry, stating he felt "kids will retain [content] better." However, he then elaborated with concern for using PBL:

> What I struggle with is connecting [PBL] to standards so students
> are still mastering the content. If I lecture, I know exactly what the
> students are learning. If they explore it, they might come up with
> something different. I feel like there has to be a balance.

However, in the next coaching conversation his body language, positive reflection of the lesson, and plans to incorporate the lesson as a regular component of his curriculum exhibited his confidence. Further, while the conversation served as evidence for his

increased efficacy for using PBL instruction, it was also beneficial to learn about his

perception of students' increased comfort for using PBL. He described the students "were

coming along and getting used to a different method of learning." In later observations,

Noah continued to incorporate PBL in new ways and with different classes. In the final

coaching session of the Acting Phase, he stated:

> I'm at a point where I want to use more inquiry… It's just more engaging.
> Instead of passively taking notes or waiting until it's your turn to read. So
> I'm trying this to get more and better results. I know it's working because
> I've got more students engaged in the lesson as opposed to whole class
> instruction.

Thus, the high school teachers' feelings for incorporating PBL instruction

changed throughout the study period. Teachers were initially uncertain about using PBL

in their classrooms. However, after participating in the peer coaching intervention, both

teachers felt confident and competent in their abilities to teach using PBL.

In contrast, teachers' level of efficacy for incorporating PBL instruction at Adams

Elementary was situational. Teachers expressed feeling confident and capable to use

elements of PBL in their instruction, but comments made also indicated their efficacy

was still developing. For example, in one coaching conversation, the teacher expressed

liking the results she experienced when using questioning strategies with her students,

which provided challenge. However, she also compared an observation to a previously

observed problem-solving activity that incorporated high levels of inquiry. She explained

feeling unhappy with the results from the lesson:

> I don't know if I'd do some of the lessons you've observed again. I liked
> how this one challenged them. But the [problem-solving lesson] one, I
> didn't get what I wanted from it… They [the students] just don't know
> what to do.

Although the problem-solving lesson the teacher referred to incorporated multiple elements of PBL and used exemplary levels of inquiry, she did not feel comfortable with the students' abilities.

Another example of situational efficacy occurred when one teacher expressed feeling that not all students were ready for PBL instruction. Although the teacher felt confident in using PBL with some classes, she appeared hesitant to incorporate PBL with all students. For example, in the first peer coaching session, the teacher described the abilities of one class of students, stating "that class can definitely do more group discussion. It's the maturity of those kids." But in contrast, comments made in a different peer coaching conversation indicated feelings of doubt for younger students' abilities to use PBL. Further, she stated "next year, I will feel more comfortable with [using PBL] because [the students] will know the process." In the final peer coaching conversation, the teacher's hesitation remained evident with her concern to incorporate multiple PBL elements in her instruction:

> I think it [PBL] could work, but I base things like that on class to class. The 4th grade would be a good class to try it out with. They're very adaptable. I'm afraid I'd fail if I tried it in 3rd grade. The large range of skill might make me fail… I would feel better to try that [PBL] with some groups I feel more confident with.

The feelings expressed by teachers to teach lessons incorporating fewer PBL elements could be a result of low efficacy to incorporate PBL. Teachers at the Adams campus expressed challenges with student behaviors and abilities, and challenging classroom circumstances can affect teacher self-efficacy (Caprara, Barbaranelli, Steca, & Malone, 2006; Schleicher, 2015). Although instructional coaching aligns with sources of self-efficacy (i.e., verbal persuasion, vicarious experiences), teachers at the Adams

campus felt reluctant to try using PBL with students that presented the most challenge.

For these teachers, verbal persuasion in coaching conversations was not enough to fill the

needed source of efficacy. Tschannen-Moran, Hoy, and Hoy (1998) claimed that teacher

efficacy is related to a teacher's persistence, resilience, and commitment to change. One

factor that could have influenced teachers' feelings about incorporating PBL could be

related to reduced opportunities for coaching. One teacher requested more time in the

first month of school to establish routine with her students prior to beginning classroom

observations and peer coaching sessions. Technology barriers prevented another teacher

from fully participating in the summer online professional development. Thus, fewer

observations and coaching sessions were conducted for both teachers, which could have

influenced results.

   Group teacher interview. One semi-structured interview with the participating

teachers was conducted in the Evaluation Phase to assess levels of teacher self-efficacy

and implementation of PBL in classroom instruction. Four major themes emerged from

the interview: PBL implementation, efficacy, continuation, and peer coaching.

Definitions of each theme are provided in a qualitative codebook (see Appendix I).

   PBL implementation. In a final interview with participating teachers, evidence

was presented for teachers' knowledge, understanding, and ability to implement PBL

after participating in a peer coaching intervention. Teachers initially described the

benefits for student learning as a result of the PBL implementation. Benefits included

increased motivation, application of skills in subsequent lessons, and actively engaged

learners. At the high school level, teachers also felt the authenticity and relevance of PBL

instruction was especially beneficial. For example, Noah described how the incorporation

of PBL and authentic connections had influenced his teaching practices. He stated,

> What's authentic about it [the content], how do we communicate that and convey it to students? I've found greater relevance in doing that so students see the value in all our lessons and units…PBL provides a context…they [students] can apply those skills and knowledge they're learning in a larger way… this [a PBL lesson], maybe there's a small lecture, but it's more student-centered and there's more pieces involved. Kids are getting to apply those skills we want them to have.

Additionally, teachers at both campuses demonstrated an understanding of how to

incorporate PBL, the depth at which it should be used, and when single elements could be

incorporated into traditional lessons. For example, in response to advice the teachers

would provide to someone just beginning to use PBL, all four teachers agreed best

practices should include the incorporation and development of one PBL element over

time. Further, teachers described that single elements could be incorporated within

traditional units as a means of development. For example, both elementary teachers felt

the use of questioning with students had significant impact on their instruction and was

an area to continue to develop. Ava described questioning as the most significant change

in her practice, stating the importance of making students think rather than providing an

answer. Abigail elaborated:

> It's really easy for them [students] to ask you a question and you just turn around and give them the answer…but just getting them to think more without regurgitating answers they heard you say.…I rephrase the way I talk to students and ask them questions now.

Thus, teachers' statements indicated growth in their abilities to use single and multiple

elements of PBL. Although some teachers were still developing in their use, they

demonstrated progress and an understanding of what steps should be taken as they

continued their practice.

Efficacy. All teachers described feeling much more confident for using PBL instruction after participating in a peer coaching intervention. Additionally, comments described their progression in developing efficacy to implement PBL over time. For example, teachers described the planning process as stressful prior to the peer coaching intervention but explained how continued practice and early successes influenced development of their efficacy to use PBL instruction. For instance, teachers discussed how meticulous planning was necessary for planning a PBL but felt attempting the incorporation of individual elements was an effective "way to practice" and develop comfort for regular use. Teachers agreed their participation in the study was beneficial in understanding how to plan the PBL, which resulted in increased incorporation of PBL elements. Abigail expressed the stress she initially felt when planning:

> How do I get all this in? How do I keep kids on task? Now I realized this is the easier way to go. Exposure really made a difference because I had never done PBL before. . . . I feel more confident now and I could answer questions and help somebody with it.

Further, teachers explained that other colleagues may still feel overwhelmed for using PBL. For example, teachers participating in this study recognized the progression they experienced in developing their ability to incorporate PBL. Thus, they felt colleagues would also need that same amount of time and support to develop confidence. One teacher stated, "they [other teachers] would probably benefit from a little group like ours."

Teachers' statements then transitioned to a discussion of the influence peer coaching had for developing efficacy to use PBL. An interesting observation occurred, serving as evidence for strengths of bonds and relationships developed by teachers

throughout the intervention period. Throughout the interview, teachers began to finish

one another's sentences. For example, Abigail began:

> Just because it works with one class doesn't mean it should work perfectly
> with another. Having conversations with you guys helped me see it
> doesn't have to be perfect every single time. It might fail miserably but…

Olivia finished her statement by stating, "you learn from it." The pair then explained

benefits of observing others' classrooms and how modeled instruction led to increased

confidence. Abigail then remarked,

> It also had this really safe space of being able to either do one [a PBL] and
> …opening your room up to have other people come in and have
> conversations with it [the implementation], or going into somebody else's
> room. So that gives you confidence… but going through this [peer
> coaching] too, where you're able to not only plan it, but get really good
> feedback from other people who are doing it. And watching others! I had
> the chance to watch all three of you do part of your PBL unit and it was
> invaluable to me to be able to see other people do it too.

Olivia agreed, stating, "You have great ideas I never would have thought of, so I love

having the feedback and reflection on my part of 'you do that. I need to try that.'"

Teachers' confidence was also evident as they described goals for continuing to

use PBL in their classrooms. For example, Abigail explained, "[PBL] needs to be

something everybody really wants to do because it's important to them and to the district.

You aren't just checking the requirement off the list. You want to do them." Thus,

teachers' comments indicated they felt greater confidence for using PBL as a result of the

peer coaching intervention. Further, they felt their use could influence the beliefs of other

colleagues.

Sustained use. Teachers' discussion of sustained use for PBL instruction was a

surprising result. Teachers described the timeframe used to evaluate instructional

practices and initiatives as "often too short" and compared their experience of focusing

on PBL for two school years with their experience in previous initiatives. Teachers explained their success incorporating PBL was partially due to a continued focus for two school years. They felt inconsistencies from year to year resulted in teachers' inability to develop confidence in their skills. Thus, the teachers felt more prepared to implement PBL in their classrooms due to the continued focus on development and opportunity to "practice." Further, teachers explained the continued focus on PBL resulted in comfort to develop units, which reduced planning time. Teachers described feeling more prepared to adjust and expand previously developed PBL units, which resulted in confidence for creating new units.

Additionally, teachers expressed their hopes for continued implementation of PBL instruction. Rather than an expectation of administrators, teachers desired PBL to be a characteristic of the school district's culture. For example, Olivia hoped that "PBL becomes a natural thing that's just what we do." Noah agreed, and expressed his beliefs that PBL should be a "sticking point" for Lancaster Schools due to its benefit for student learning. Upon hearing that statement, Abigail followed with, "This [PBL] is the culture of our district. This is what we've built." Thus, teachers firmly believed PBL should be continued and other teachers in the district could benefit from the increased confidence provided from peer coaching.

Peer coaching. Teachers in this study expressed positive feelings from their participation in the peer coaching intervention. Lancaster Schools did not employ an instructional coach; therefore, the opportunity to participate in a dialogue to influence beliefs and improve practices would most likely be led by building principals without a peer coaching intervention. Teachers expressed powerful feelings regarding the benefits

of exchanging dialogue with a peer coach, contrasting it to evaluation from principals which was perceived as a "number that is going to follow me around." Although teachers recognized the official evaluations from administrators as an effort to improve practices, they described that evaluations "feel like a judgment on who we are as a person." In contrast, they described "coaching feels like support." Further, teachers described specific benefits of dialogue, which led to reciprocal relationships with colleagues. Noah presented his perspective of the support and relationships gained from peer coaching as an opportunity to "grow together."

One frequent reference made during the final group interview dealt with the reflection teachers experienced in coaching conversations. Reflection was identified as a positive influence for teachers' beliefs to use PBL in their classrooms and was expressed by teachers multiple times in the Acting Phase. For example, Olivia described "looking forward" to coaching sessions because she appreciated the reflection that resulted. Other teachers expressed benefits instructional coaching had for their reflection by describing, "the outside perspective causes me to think about what I've done and decide what else I can do. It's not feedback, it's here's what we saw. Let's reflect on it." Teachers explained that without peer coaching, they rarely took time to reflect on instruction. Thus, the peer coaching implementation was effective for developing teachers' efficacy to incorporate PBL instruction.

Integration of Quantitative and Qualitative Data

Quantitative and qualitative data consisting of surveys, classroom observations, coaching conversations, and an interview were gathered in the Acting and Evaluation Phases and used to answer each research question. Data were analyzed independently and

compared for consistency and support. Results were merged, and integration of data were used to answer research questions in the study and develop conclusions.

PBL implementation. Quantitative data consisting of the quantity and quality of inquiry used in teachers' classrooms were merged with qualitative data, which consisted of structured instructional observations and teachers' comments in a final group interview. The results were used to explore how a peer coaching intervention influenced PBL implementation at Lancaster Schools and supported answering research question one.

Quantitative data indicated increased PBL implementation for all participating teachers throughout the six month intervention period. However qualitative data provided additional depth to understand the level and frequency of teachers' incorporation of PBL elements. All teachers were successful in implementing elements of PBL in their classroom. However, teachers at the Taft campus had effectively implemented multiple PBL elements in their instruction, while teachers at the Adams campus continued to develop their incorporation of PBL.

High school teachers' implementation of PBL as measured by the EQUIP instrument increased in the Acting Phase ($M = 2.83$). The range of mean scores was 1.78 to 3.526. Additionally, detailed field notes from observations described students working in collaborative teams, using sustained inquiry to solve problems, and making authentic connections between content and the real world. For example, researcher's field notes from one observation in Olivia's classroom included:

> Students were paired in groups to discuss content and four stations were prepared for rotation. Questions and activities students engaged in utilized critical thinking skills. Students had discussions with each other about the content and justified their beliefs in discussion. Students had choice in

how they organized information and how information was categorized. Students were engaged in authentic problem-solving activities.

In a coaching conversation, she described, "I'm doing less lecture and notes assignments. The kids are responding to that. Yesterday was a totally different lesson [than what was previously taught]." In a later coaching conversation, she continued to explain instructional changes she incorporated:

> I feel like I revamped everything this year. I see the kids are working… and they're still learning. I felt like I was in a rut before. It's easy to get in a rut, because I've got my lesson plan book here with all the old lessons I've taught. But I've been trying to branch out more.

Likewise, coaching conversations with Noah included his plans to incorporate PBL elements when lessons were taught in the future:

> I think it [the coaching conversation] helped me to situate this project in my category of what is going well. This lesson is going to be a huge part of my curriculum going forward. We want to do something that is authentic… they're relating history to our present lives.

and

> I think getting in the groups helped with inquiry. I usually just teach this in whole class popcorn reading. I ask questions as we go along. When I do it that way, the students are passive. In this way, it was more active and I'm hoping the learning will be deeper.

Quantitative data gained from teachers' incorporation of PBL at the Adams campus presented higher levels of implementation when compared to data collected at the Taft campus. Teachers' level of inquiry incorporated in instruction was rated proficient according to scales on the EQUIP instrument, and mean scores for observations ranged from 2.99 to 3.17. However, qualitative data indicated proficient levels in a single area of PBL. Teachers demonstrated strengths in their use of higher order questioning but had not yet expanded their repertoire to incorporate additional elements of PBL.

Although multiple elements of PBL were not incorporated in teachers' instruction, considerable improvement occurred when teachers focused on a single element. For example, in Abigail's instruction, the use of discourse was rated proficient according to constructs on the EQUIP instrument ($M = 3.0$). While the incorporation of discourse observed in the Reconnaissance Phase was rated 1.0, the range in the Acting Phase was 1.8 to 3.4. Thus, her focus on one element of PBL resulted in significant growth. Further, in one coaching conversation she claimed:

> Just doing this [coaching] helps me to ask better questions of the kids.
> Using open-ended questions with the kids helps [include inquiry]. What
> kinds of inquiry the kids do is usually based on the kinds of questions I
> ask…I ask them to think about things at a deeper level…

She also expressed how the use of questioning and inquiry had influenced her teaching practices in the final group interview:

> The inquiry [has changed] mine because sometimes… it's really easy for
> the kids to ask you a question and you just straight give them the answer…
> but being able to get them to think more where they're not just
> regurgitating an answer that they heard you say… or rephrasing the way
> that I talked to the kids and ask them questions.

Likewise, Ava commented in a group interview and explained how the use of questioning influenced her teaching practices in general: "I think that's [the inquiry] the biggest [influence] of mine. Not giving them the answer. But making them think. Making them think about what questions I'm asking."

Results from the analysis of quantitative and qualitative data support increased incorporation of PBL elements at Lancaster Schools. Although quantitative data indicated higher use of PBL at the Adams campus, qualitative data indicated otherwise. Teachers at the Adams campus incorporated a single element of PBL exceptionally well, which resulted in increased construct scores on the EQUIP instrument. In contrast, teachers at

the Taft campus incorporated multiple components of PBL in their instruction. While the level of PBL appeared lower at the Taft campus, the observed instruction was more characteristic of PBL instruction. Adams teachers' focus on one area of instruction was effective for their development. Further, incorporating higher order questioning was presented by Marshall (2013) as an effective way for novice users to begin incorporating inquiry. Thus, teachers at the Adams campus should continue to develop their skillset by increasing their incorporation of PBL elements over time.

Teacher self-efficacy. Quantitative results gained from teachers' responses to a closed-ended survey (TSES) were merged with qualitative results, gained from teachers' comments during coaching conversations and a final group interview. The results were used to explore how a peer coaching intervention influenced teachers' efficacy to implement PBL instruction at Lancaster Schools and supported answering research question two. Discrepancies between quantitative and qualitative results were evident.

Comparison of teachers' TSES ratings indicated self-efficacy decreased for two teachers when compared to ratings from the Reconnaissance Phase. The TSES measures efficacy on a scale of 1-9. Feelings rated a 9 are described as situations having "a great deal" of ability, resources, and opportunity to complete. Feelings rated a 7 are described as situations teachers have "quite a bit" of ability and opportunity to complete. Teachers' pre-intervention ratings were high ($M = 7.39$), which means teachers felt quite competent, confident, and capable in their teaching abilities. Thus, the relatively high score from the Reconnaissance Phase could have influenced the slight decline in the Evaluation Phase ($M = 7.351$). However, the declines of individual teacher efficacy could also be a result of different classroom dynamics and behaviors. For example, while a comparison of pre-

and post-implementation scores showed decreased self-efficacy for Noah, data gained from qualitative EQUIP scores indicate lowered student engagement as the use of inquiry increased. Further, when classroom management sections of the TSES were removed, Noah's efficacy ratings increased by 0.12. Additionally, Noah demonstrated high levels of efficacy to use PBL in the final observation of the Acting Phase when he integrated elements of PBL into a new content area with a group of at-risk students.

Additional decreases in teacher efficacy were evident when comparing pre- and post-intervention TSES ratings for Ava, which declined by 0.44. Although qualitative data aligned with the lowered efficacy for PBL in the Acting Phase, it is important to note pre-intervention ratings were gathered in the spring with a different group of students. Thus, the teacher could have felt more efficacious in her abilities to teach the previous group of students than those enrolled in her class during the Acting Phase. Additionally, the teacher experienced a larger class size in the Acting Phase and described challenging student behaviors that influenced the dynamics of the classroom. Further, fewer observations and coaching sessions were conducted with the teacher due to her request to establish routine in her classroom prior to being observed. These factors could have resulted in lowered efficacy to use PBL instruction.

Although all teachers reported feeling more confident to incorporate PBL instruction in a post-implementation interview, discrepancies were evident. Comments made by teachers at the Adams campus during coaching conversations indicated teachers did not feel confident using PBL with all classes. For example, teachers avoided incorporating PBL with classes described as challenging due to student behavior and

ability. Nonetheless, teachers at the Adams campus did incorporate specific PBL elements with classes they felt more comfortable teaching.

Discussion

Peer coaching was an effective intervention to increase teachers' efficacy to implement PBL instruction at the Taft campus, but did not have the same affect for teachers at the Adams campus. Teachers at the Taft campus reported increased efficacy in coaching conversations, a final interview, and ratings on an efficacy scale (TSES). Further, Taft teachers' increased efficacy was evident in the implementation of PBL observed in classroom observations. Although teachers at the Adams campus reported feeling efficacious, the teachers did not exhibit characteristics of efficacy. This section explores the conclusions developed from data analysis and their relation to the literature.

Teacher Self-Efficacy

The peer coaching intervention used in this study aligned with multiple sources of efficacy, but individual sources were addressed at different times during the Acting Phase. For example, during the blended professional development that occurred in June and July, I modeled techniques of instructional coaching in an online format by leaving paraphrased comments and probing questions on teachers' PBL units and discussion board posts. These practices were characteristic of social persuasion, which was described by Bandura (1982) as feedback or a pep talk. However, results of this study suggest online instructional coaching did not influence teachers' efficacy to implement PBL. Although I used techniques of instructional coaching in an online format, the teachers did not exhibit increased efficacy for incorporating PBL at the end of the professional development phase. These results were consistent with research conducted by Tschannen-Moran and McMaster, (2009) who found that although social persuasion

can strengthen one's beliefs in their ability to complete a task, it often leads to short-term effects. Thus, social persuasion was not enough to change the teachers' feelings of their ability to incorporate PBL instruction.

Additional sources of efficacy were incorporated throughout the peer coaching intervention. For example, in addition to social persuasion, each teacher observed modeled instructional practices of peers, which aligned with vicarious experiences. Vicarious experiences were described by Tschannen-Moran and McMaster (2009) as an opportunity to observe someone else experience success with a skill. However, not all teachers in this study observed successful PBL implementation. For instance, results of this study present a range of observed implementation levels. Although eight observations were rated proficient, seven observations were pre-inquiry or developing. Thus, teacher efficacy could have been negatively influenced due to inconsistent levels of implementation. Although teachers reported feeling efficacious to use PBL in this study, Bandura (1977, 1997) explained enhancements in efficacy occur through vicarious experiences if the model performs well. Thus, teachers may have compared their own level of implementation to poor models, resulting in differences between actual and perceived efficacy.

One factor that appeared to positively influence teachers' feelings to incorporate PBL in their classrooms was the presence of mastery experiences. Mastery experiences have been described as the most influential source of efficacy because they provide individuals with evidence of success (Bandura, 1997; Tschannen-Moran & McMaster, 2009). Results of this study support these assertions. For example, teachers at Taft High School were uncertain about their abilities to incorporate PBL regardless of receiving

coaching. However, when teachers attempted to incorporate PBL and experienced success, their beliefs changed, resulting in increased confidence to incorporate PBL in their instruction. In contrast, teachers at the Adams campus did not report a mastery experience with PBL and remained hesitant to use PBL with all students. Thus, self-efficacy increased for teachers at the Taft campus, but did not for teachers at the Adams campus. These results suggest teachers' self-efficacy was most influenced by mastery experiences, which aligns with Bandura's (1977) research, presenting mastery experiences as the most powerful source of self-efficacy.

It is important to note that although efficacy was lower for Adams teachers, it appeared to be developing. Although discrepancies were evident when quantitative and qualitative data were compared, teachers' feelings about implementing PBL appeared to be more relative to specific student characteristics, such as ability and behavior. Concerns such as these were characterized by Marshall (2013) as stress related to management, and often result in teachers feeling less efficacious. For example, in a study conducted by Klassen and Chiu (2010), lower efficacy was reported by teachers when high levels of classroom stress related to student misbehavior, rudeness, or noisiness occurred. These results are consistent with statements made by teachers at the Adams campus, who indicated they were experiencing similar classroom stress challenges. For example, teachers reported challenges with large class sizes, wide ability ranges, and behavior problems. Although teachers at the Adams campus were on board and willing to use PBL, their use appeared to be hindered by stress from the classroom. As a result, there was no opportunity for teachers to achieve mastery experiences.

PBL Implementation

　　　Implementation of PBL increased throughout the Acting Phase in this study, however the degree of implementation varied by campus. For example, at the Taft campus, teachers incorporated multiple PBL elements in their instruction (i.e., sustained inquiry, authenticity, student voice and choice). Teachers' incorporation included students working in teams to solve authentic, challenging problems, selecting individual resources, and gathering data. The activities observed at the Taft campus aligned with descriptions of effective PBL implementation identified by Larmer (2016) and were also characteristic of Marshall's (2013) description of advanced use of inquiry. Thus, the peer coaching intervention was an effective method to influence implementation of PBL for teachers at the Taft campus.

　　　The level in which PBL was implemented at the Adams campus was in development at the culmination of this study. There, teachers incorporated single elements of PBL in observed instruction, such as open-ended questioning and student choice. While implementation was lower when compared to levels used at the Taft campus, teachers' use of single elements was acceptable. Results of teachers' implementation aligned with recommendations made by Larmer (2016) that when beginning to use PBL, teachers should start small. PBL was a new instructional method for teachers at Lancaster Schools, and it takes time to reach full implementation levels (Colburn 2000; Savery, 2006). Nonetheless, both teachers reported a change in their instructional practices to regularly include higher-order questioning, discussion, and paraphrasing of student questions. Changes in practices such as these are integral for further PBL implementation and are recommended as a method to promote inquiry and increase teachers' comfort for using PBL (Colburn, 2000; Marshall, 2013). Additionally,

both teachers credited the dialogue gained from peer coaching as a model for questioning strategies that influenced their teaching methods. Thus, the peer coaching intervention was influential for PBL implementation at Lancaster Schools.

Monitoring Phase

The purpose of the Monitoring Phase in this action research study was to provide guidance on revisions to the intervention based on the interpretation of data analyzed in the Evaluation Phase. In this phase, I shared findings with the superintendent at Lancaster Schools. Together, we developed recommendations for revisions based on study findings. Three goals were developed: (a) maintain teacher efficacy and implementation of PBL for participating teachers at Taft High School, (b) continue to develop teacher efficacy and implementation of PBL for participating teachers at Adams Elementary, and (c) expand the practice of peer coaching throughout both campuses.

The first goal focused on maintaining teacher efficacy to implement PBL at Taft High School. Teachers had made considerable progress in their ability to implement PBL throughout the peer coaching intervention. Further, both high school teachers reported feeling confident and competent to continue incorporating PBL in their classrooms. Thus, it was determined that time would be allotted for all teachers to continue practices of peer coaching as previously conducted in the Acting Phase, but a different data collection instrument would be used for observer note-taking and ratings.

The second goal focused on the continued development of teachers' self-efficacy to implement PBL at the Adams campus. Teachers needed additional time to develop efficacy for using PBL with all students. Further, additional time was needed to incorporate multiple elements of PBL instruction. At the culmination of this study, teachers at the Adams campus demonstrated considerable growth in their incorporation of

one PBL element. However, neither teacher reported having a mastery experience when incorporating multiple elements of PBL in their instruction. Thus, while time would be provided for teachers at Adams to continue peer coaching as conducted in the Acting Phase, instructional planning conversations would be added to the model. Planning conversations focus on goals, specific success indicators, and necessary approaches used by teachers (Thinking Collaborative, 2018). This is supported by Lipton and colleagues (2003) who recommended coached planning conversations as a method to increase confidence and capacity for new practices.

Finally, the third goal included expansion of the peer coaching model throughout Lancaster Schools. In addition to addressing teachers' self-efficacy to implement PBL, participants also reported positive feelings for peer coaching. Teachers described the dialogue shared during peer coaching as supportive and safe. Further, teachers reported learning from observations of another teachers' instruction. Thus, plans were developed to seek additional volunteers to participate in peer coaching. Further, school principals would receive training to begin using coaching strategies with practices of teacher evaluation.

Additionally, Lancaster's superintendent and I developed a plan to continue PBL training for all teachers in the district. Teachers participating in this study reported lack of time to plan as a challenge for implementing quality PBL instruction. Teachers also expressed feeling more comfortable using PBL due to a sustained focus for two school years. Further, due to a 24% turnover in teachers employed in the district, not all teachers had been trained in using PBL instruction. Thus, a plan was developed to use scheduled professional development days to provide personalized training for teachers. Annually,

Lancaster develops a school calendar including seven professional development days. All teachers report to professional development on these scheduled days and regular classes with students are not held. Two-hour work sessions would be incorporated into the professional development, and faculty would be provided with two options, dependent upon current needs. Online modules from professional development in the Acting Phase of this study would be converted into face-to-face PBL training for new teachers or those who desired follow-up training. The second professional development option would be designed as a work session for teachers to create new PBL units and receive support from a peer coach. The peer coaches who participated in this study would facilitate the professional development and provide support to teachers using skills of instructional coaching.

Implications and Reflections

The goal of this action research study was to explore how instructional coaching influenced teachers' self-efficacy to implement PBL instruction at Lancaster Schools. However, it was unknown prior to data analysis in the Reconnaissance Phase that sustainability of PBL instruction at Lancaster Schools was at risk. Thus, peer coaching held the most promise to influence teacher efficacy for incorporating PBL and develop capacity among teachers in the district. In this section, I discuss the implications of the study's findings, a reflection of my role as participant leader in the research, future research considerations, and lessons learned in organizational leadership and action research.

Implications for Organizational Leadership

The use of PBL was a transformational change for teachers at Lancaster Schools. As a result, teachers expressed discomfort as they began to incorporate new practices.

Common requests from teachers in the initial stages of implementation included

supportive assistance and additional time to develop comfort for using the new methods.

Concerns such as these are common for individuals when change occurs. Therefore,

when organizational members experience change, the opportunity to study, reflect, and

discuss experiences is necessary for improvement (Burke, 2014; Collinson & Cook,

2007). Existing roles and relationships must be realigned to ensure success of new

initiatives (Bolman & Deal, 2013). Thus, the implementation of peer coaching as an

intervention to develop teacher efficacy to implement PBL had major implications for

organizational leadership and learning. Peer coaching provided opportunity to build

capacity for professional learning and developed teacher leaders to support and sustain

PBL implementation throughout the district.

Peer coaching also developed capacity for change in the organization. Prior to this

study, professional development at Lancaster Schools was a short-term experience, and

the school district often relied on the expertise of outside members to present new

information to faculty. Although the former model provided teachers with high quality

professional development, there was no opportunity for follow-up. However, the

development of a peer coaching model changed the landscape of teacher development

from a single event to an ongoing, job-embedded program. Due to the use of classroom

teachers as peers promoting dialogue through questioning, paraphrasing, and probing,

teacher leaders were developed. Thus, the establishment of teacher leaders resulted in

greater capacity for change in the organization.

Implications for Teaching and Learning

Collegial relationships that developed as a result of peer coaching were influential

in transforming instructional practices of teachers participating in this study. At Lancaster

Schools, only one teacher is employed for each grade in Pre-kindergarten through Grade 5. Likewise, only one teacher is employed for each content area in middle and high school. Thus, teachers often felt isolated and lacked opportunity to receive support from colleagues teaching common grade levels and content. However, the relationships gained through the peer coaching intervention resulted in support, trust, and cooperation among teachers. Prior to this study, building principals indicated that teachers often collaborated on strategies used to manage the classroom and motivate students. However, throughout the study period collaboration among peer coaches expanded and began to influence instructional methods and curricular planning.

Modeled instruction from peer coaching provided opportunity for teachers to learn from each other. As a result, teachers began to transfer observed instructional methods to their own classrooms, which Robbins (1991) presented as a benefit of peer coaching. In preparation for coaching conversations, peer coaches reflected on what was observed and discussed specific effective strategies considered to be unique. In a final interview in the Evaluation Phase, teachers described the value of observing peers. One teacher exclaimed, "he does that, and I should try that!" Thus, peer coaching was a shared learning experience among teachers. All teachers agreed that observing other classrooms resulted in an invaluable learning experience. Further, teachers expressed gratitude for the opportunity to learn from one another in a safe, supportive environment. Due to the focus of facilitating dialogue rather than providing feedback, teachers learned from each other in a reciprocal manner.

Additionally, observations of classroom instruction influenced the curricular nature of teachers' units. Teachers began to recognize curricular connections between

grade and content areas. For example, the dialogue shared between two teachers of similar grade levels led to collaboration of an interdisciplinary unit. Further, teachers of the same content area began to recognize the vertical alignment of their curriculum and began collaborative efforts to use consistent language, vocabulary, and methods to reinforce concepts between grade levels.

Although these examples were a result of collaboration between study participants, the collaboration was not limited to participating teachers. The peer coaches in this study were teacher leaders in their respective buildings. Further, the schedules of the high school peer coaches were adjusted as a result of their participation in this study to provide time for peer coaching throughout the school district. As a result, the dialogue and reflection provided by peer coaching provided potential to influence the instructional practices used by all teachers at Lancaster Schools.

Implications for School Policy

The school superintendent and building principals regularly requested my guidance for the development of instructional policies for using PBL. Specifically, the administrators sought guidance for the quantity of PBL lessons taught per year and if requirements should be individualized based on grade and content. The results of this study mitigated the need to develop specific instructional policies related to the quantity of PBL units taught annually. Study results indicated that all participating teachers were equally able to incorporate elements of PBL. Although PBL is often associated with content areas such as science, Walker and colleagues (2018) recommended that teachers in the beginning stages of PBL implementation start with topics that can easily incorporate problem-solving strategies. Then, teachers should reflect about the effectiveness of the new instructional methods. In this study, the incorporation of peer

coaching provided opportunity for regular reflection. The teachers who received coaching throughout the study period exchanged dialogue, reflected about the instructional methods used, and set goals for their next lessons. Eventually, these teachers began incorporating elements of PBL in new and unique ways regardless of content. Thus, it was not recommended to develop instructional policy to address how many PBL units are taught per year. Rather, policy should be developed to address teachers' progress in mastering single PBL elements within their classrooms. A growth model provides increased potential for PBL implementation in all classrooms.

Annually, Missouri teachers are required to collaborate with their supervising principal to develop an individual growth plan. Growth plans are a clearly articulated set of goals aligned to state-provided examples of evidence. Teachers develop their growth plan to focus on specific results within a given timeframe. Currently, teachers at Lancaster Schools use methods of personal reflection to track progress toward meeting goals. However, the utilization of peer coaching in conjunction with individualized growth plans can be beneficial for teachers' progress towards meeting set goals. Although participating teachers in this study improved in their implementation of PBL elements, teachers did not improve at the same rate. However, each teacher in this study verbalized a PBL element to prioritize in future implementation. Continued dialogue with peer coaches provides a useful method for teachers to define goals based on observational data. Further, the reflection used during coaching conversations provides opportunity for teachers to analyze progress made.

Future Research

One unexpected result of peer coaching did not relate to teacher efficacy for using PBL: rather, peer coaching appeared to fill teachers' needs for connection, collaboration,

and appreciation for their efforts. Throughout this study, I often wished I had developed research questions to explore teachers' responses to peer coaching. Thus, teachers' perceptions of peer coaching is an area for future study at Lancaster Schools.

Additionally, in a final interview, teachers compared feelings of support gained from coaching conversations with principal evaluations. Missouri teachers receive two formal evaluations by their building principal per year. Between these formal evaluations, principals are also required to provide consistent feedback from regularly conducted walk-through observations. The comments made in the interview indicated that teachers felt coaching conversations were supportive. However, teachers' perception of principal feedback contrasted these feelings. One teacher explained, "Our evaluations feel like a judgement on who we are as a person, but coaching felt like an opportunity to grow together." Due to the contrasting perceptions of supervisory feedback and the dialogue from coaching conversations, principals received additional training in cognitive coaching to increase skills of questioning, paraphrasing, and positive presuppositions. Consequently, further research should be conducted to determine how principals' incorporation of coaching skills influence teachers' perceptions of feedback and evaluations.

Researcher Reflection

Implementation of this action research study required balancing the role of participant-leader and participant-researcher. Challenges emerged as I balanced dual roles. In my role as participant-leader, I served as an insider with in-depth understandings and experience for using instructional coaching as a method to support teachers in their implementation of PBL instruction. Teachers recognized my expertise in both areas and turned to me for support. The assistance required by the teachers allowed me to model

techniques of instructional coaching and was beneficial in developing trust with the teachers. Initially, it appeared teachers desired or expected feedback in coaching sessions. Further, peer coaches often interjected feedback or asked pointed questions that could easily be perceived as judgmental or evaluative. Although Joyce and Showers (2002) reported that novice coaches regularly slip into practices of feedback, it was critical in this study that comments associated with feedback cease so teachers would feel safe and supported during coaching conversations. Thus, I incorporated additional supportive practices for the peer coaches. Prior to a scheduled observation, I emailed the peer coach a reminder. My message provided the date, time, and class to be observed. Resources, such as the coaching memory mat and States of Mind cards from the blended training, were attached. Peer coaches were reminded to use the resources to encourage dialogue rather than feedback. Following the observation, peer coaches and I developed questions to elicit dialogue together. Teachers recognized through my actions that instructional coaching was not evaluative, but supportive.

My role as participant-researcher was that of an outsider, which increased my need to involve stakeholders in this study. Initially, the outside role brought challenges as I attempted to implement professional development and peer coaching with teachers in a school district in which I was not employed. For example, I was not involved with professional development conducted independently of this study, and my contact with teachers and administrators was limited. The participation of teachers in summer training was not desirable, and scheduling peer observations that accommodated multiple schedules was difficult. Thus, communication between all participants was essential. To remedy these challenges, I modeled skills of positive presuppositions in weekly

announcements to teachers and administrators during the professional development period. Further, I created a shared calendar of scheduled visits with all participants, and emailed weekly reminders for observations to teachers, peer coaches, the building principal, and superintendent.

Additional challenges arose as I began to step away from the role as lead coach and require more action from the peer coach. For example, some coaching conversations led by peer coaches felt like interviews rather than dialogue. I feared peer coaches may not be prepared to lead an effective discussion with observed teachers in my absence. Thus, refining the techniques of peer coaches became a primary concern as the culmination of the study approached. As a result, I changed the reminder electronic mail messages that peer coaches received to include additional resources. In addition to a reminder of the time, date, and classroom of the observation, I added additional training documents to the email with an explanation for their use. I requested peer coaches to stay an additional five minutes after the coaching conversation to reflect on their use of approachable voice, rapport, pausing, and paraphrasing.

Further, peer coaches sometimes desired to ask questions that did not relate to teachers' self-efficacy to incorporate PBL. Rather, the questions were oriented toward academic content or student skills. Although the questions were not inappropriate, they did not align with the research questions in this study. As a researcher, I had to remain balanced and consistent to answer the research questions. Thus, I used coaching techniques to guide peer coaches toward the development of questions related to self-efficacy for PBL instruction.

Finally, proper data collection instruments that align fully with the PBL model used at Lancaster Schools should be developed to identify the level in which PBL is incorporated in teachers' instruction. Two teachers regularly incorporated a single element of PBL at proficient or exemplary levels. However, overall comprehensive scores were determined by averaging each construct rating on the EQUIP instrument. As a result, there were occurrences in which the exceptional use of a single element influenced the overall score of implementations to appear higher than what was observed. Consequently, teachers may have perceived their incorporation of PBL to be higher than their actual use. Thus, a different instrument would be recommended for further observations.

Lessons Learned

I learned early in the study to be flexible and accommodating. As an outside researcher, I was unaware of available resources and teachers' individual schedules. I was provided the opportunity to demonstrate my flexibility throughout the professional development that occurred during June 2019 and July 2019. Teachers chose a blended training that required online participation, but not all teachers had access to reliable technology resources in the summer months. Adjustments to the online professional development were made to increase access using mobile devices, but barriers remained. Additionally, personal schedules, vacations, and extra-curricular commitments interfered with professional development and scheduling classroom observations. When problems arose, I took the opportunity to communicate and identify solutions by modeling instructional coaching techniques (i.e., positive presuppositions and cognitive shift).

My role as a researcher in this study also made me aware of the challenge some teachers experience to use PBL effectively. My comfort for incorporating PBL was

developed over a decade. During that time, I completed nearly 450 professional development hours and gained training certifications from two nationally recognized PBL organizations. Due to my own comfort, I had forgotten the difficulties novices often experience. For example, it is unrealistic to expect teachers to relinquish all former practices and fully implement PBL instruction immediately following professional development. Leaders must allow time and reassurance as the new practices are developing (Burke, 2014). Although some teachers were effectively able to implement PBL in their instruction by the end of the six-month study period, other teachers incorporated single PBL elements. Thus, the rate at which teachers implemented new practices in this study align with Burke's (2014) assertions that individuals need time to become comfortable as they let go of one practice and begin another.

Individuals experiencing change often feel anxious, uncomfortable, and perhaps reluctant (Burke, 2014). Thus, Burke recommended involving organizational members throughout the implementation process to increase stakeholder buy-in and sustainability. Therefore, when I developed the peer coaching model for this study, I incorporated solutions for the exact needs of Lancaster Schools' teachers and administrators. For example, the model was designed to fill gaps identified from quantitative and qualitative data gained from participants in the Reconnaissance Phase of this study. Further, the process of observing and exchanging dialogue with peers required teachers' action. Teachers were provided opportunities to explore new methods and express concerns in a "safe space." Bolman and Deal (2013) assert that a successful leader must provide listening opportunities during change implementation to ensure all individuals have the

talent, confidence, and expertise to modify their practices. However, I learned through this study that simply listening and allowing participant voice is insufficient.

A leader must also orchestrate multiple components in the background to ensure success. In the case of this study, I aimed to increase teachers' self-efficacy to implement PBL. However, I also trained and implemented a peer coaching model with teachers. Due to the need for extensive training in the short study period, I learned to solve challenges quickly and efficiently. For example, challenges due to low participation and skill emerged throughout the 6-month Acting Phase. To resolve these challenges, I modeled techniques of instructional coaching and provided additional resources to fill potential gaps.

The most challenging lesson learned occurred through my own reflection while conducting the study. I realized through reflection on coaching conversations the importance and need to step back and allow the peer coaches to lead. Thus, I exercised Rost's (1991) principles of leadership by establishing multi-directional interactions to promote real change. Peer coaches easily stepped into the role as leaders. Further, the success of developing leaders was evident in the final interview when one teacher expressed, "This is the culture we have built."

Finally, I learned lessons in conducting action research. Although I had prior experience using action research, the nature of this study differed. For example, the analysis of Reconnaissance Phase data resulted in specific, yet unanticipated needs for sustainability that prompted me to design a peer coaching model. Although developing a peer coaching model was effective to meet the school district's needs for sustainability of PBL, the timing was inappropriate. Teachers were not familiar with instructional

coaching practices and the study period was quite short. Thus, the implementation of peer coaching required more professional development than I anticipated. The emphasis on training teachers to provide instructional coaching resulted in a difficult balance that I worried would detract from developing teacher efficacy to implement PBL.

Nonetheless, this action research study provided a valuable experience. Collecting data in the Reconnaissance Phase provided an opportunity for me to develop a solution for problems that may be underlying or misunderstood. As a result of this action research, a specific intervention was developed to address the needs of teachers in Lancaster Schools and a plan for monitoring its sustainability was developed.

Conclusion

Peer coaching is a promising practice to increase teachers' self-efficacy for implementing PBL at Lancaster Schools. Results of this study indicated positive influences for high school teachers' efficacy to incorporate PBL instruction. Although peer coaching was influential in the development of elementary teachers' self-efficacy to use PBL, teachers need additional time to fully incorporate the new instructional methods with all grades and content areas.

Findings from this action research study served as a foundation for further investigation at Lancaster Schools. Although four teachers volunteered to participate in this study, they were purposefully selected due to their teaching abilities prior to incorporating PBL. Future studies should be conducted to identify how peer coaching influences teacher efficacy of additional faculty members. Additionally, it would be beneficial to study the influence of coaching techniques used by school principals as a method of support for teachers beginning to implement PBL in their instruction.

APPENDIX A

Teacher Sense of Self-Efficacy (TSES) Survey

This questionnaire is designed to help us gain a better understanding of the kinds of things that create challenges for teachers. Your answers are confidential.

Please indicate your opinion about each of the questions below by marking any one of the nine responses in the columns on the right side, ranging from (1) *None at all* to (9) *A great deal* as each represents a degree on the continuum.

1	2	3	4	5	6	7	8	9
None at all		Very Little		Some Degree		Quite a Bit		A Great Deal

Please respond to each of the questions by considering the combination of your current ability, resources, and opportunity to do each of the following in your present position.

1. How much can you do to get through to the most difficult students?
2. How much can you do to help your students think critically?
3. How much can you do to control disruptive behavior in the classroom?
4. How much can you do to motivate students who show low interest in school work?
5. To what extent can you make your expectations clear about student behavior?
6. How much can you do to get students to believe they can do well in school work?
7. How well can you respond to difficult questions from your students?
8. How well can you establish routines to keep activities running smoothly?
9. How much can you do to help your students value learning?
10. How much can you gauge student comprehension of what you have taught?
11. To what extent can you craft good questions for your students?
12. How much can you do to foster student creativity?
13. How much can you do to get children to follow classroom rules?
14. How much can you do to improve the understanding of a student who is failing?
15. How much can you do to calm a student who is disruptive or noisy?
16. How well can you establish a classroom management system with each group of students?
17. How much can you do to adjust your lessons to the proper level for individual students?
18. How much can you use a variety of assessment strategies?
19. How well can you keep a few problem students from ruining an entire lesson?
20. To what extent can you provide an alternative explanation or example when students are confused?
21. How well can you respond to defiant students?
22. How much can you assist families in helping their children do well in school?
23. How well can you implement alternative strategies in your classroom?
24. How well can you provide appropriate challenges for very capable students?

Electronic Quality of Inquiry Protocol
Descriptive Information

Complete Sections I (descriptive information) before and during observation, Sections II (time usage analysis) and III (lesson descriptive details) during the observation. Complete sections IV-VII (constructs of instruction, discourse, assessment, and curriculum factors) immediately after the observation. If a construct in Sections IV-VI absolutely cannot be coded based on the observation, then it is to be left blank.

Observation date: _____   Time Start: _____   Time end: ____ Observer: _____

School: _____   District: _____   Teacher:_____   Course:_____

Descriptive Information

Teacher Descriptive Information:

Teacher gender____ Male (M), Female (F)

Teacher ethnicity___ Caucasian (C), African-American (A), Latino (L), Other (O)

Grade level(s) observed _____ 4. Subject/Course observed _____

5. Highest degree _____   6. Number of years experience _____

7. Number of years teaching this content _____

Student/Class Descriptive Information

Number of students in class: _____

Gender distribution: _____ Males   _____Females

Ethnicity distribution: _____ Caucasian (C) _____African-American (A) _____Latino

(L) _____Other(O)

Lesson Descriptive Information

1. Is the lesson an exemplar that follows the 4Ex2 Instructional Model?
2. Working title for lesson:
3. Objectives/Purpose of lesson: Inferred (I), Explicit (E) ____:
4. Standards addressed: State (S), District (D), None Explicit (N) ____:

APPENDIX C

Electronic Quality of Inquiry Protocol
Time Usage

Complete Sections II (time usage analysis) and III (lesson descriptive details) during the observation.

Section II

Time Usage Analysis						
Time	**Activity Codes**	**Organization Codes**	**Student Attention to Lesson Codes**	**Cognitive Codes**	**Inquiry Instruction Component Codes**	**Assessment Codes**
0-5						
5-10						
10-15						
15-20						
20-25						
25-30						
30-35						
35-40						
40-45						
45-50						

Activity Codes – facilitated by teacher

Code		Definition
0	Non-instructional time	administrative tasks, handing back/collecting papers, general announcements, time away from instruction
1	Pre-inquiry	teacher-centered, passive students, prescriptive, didactic discourse pattern, no inquiry attempted
2	Developing inquiry	teacher-centered with some active engagement of students, prescriptive though not entirely, mostly didactic with some open-ended discussions, teacher dominates the explain, teacher seen as both giver of knowledge and as a facilitator, beginning of class warm-ups
3	Proficient inquiry	largely student-centered, focus on students as active learners, inquiries are guided and include student input, discourse includes discussions that emphasize process as much as product, teacher facilitates learning and students active in all stages, including the explain phase
4	Exemplary inquiry	student-centered, students active in constructing understanding of content, rich teacher-student and student-student dialogue, teacher facilitates learning in effective ways to encourage student learning and conceptual development, assumptions and misconceptions are challenged by students and teacher

Organization Codes –led by teacher

W	S	I
Whole class	Small group	Individual work

Student Attention to Lesson Code—displayed by students

Code	Level of attention	Definition
L	Low attention	20% or fewer attending to the lesson. Most students are off-task – heads on desk, staring out the window, chatting with neighbors, etc.
M	Medium attention	between 20-80% of students are attending to the lesson.
H	High attention	80% or more of the students are attending to the lesson. Most students are taking notes or looking at the teacher during lecture, writing on the worksheet, most students are volunteering ideas during a discussion, most students are engaged in small group discussions even without the presence of the teacher.

Cognitive Code—displayed by students

Code	Definition
0	Other -e.g. classroom disruption, non-instructional portion of lesson, administrative activity
1	Receipt of knowledge
2	Lower order (recall, remember, understand) and/or activities focused on completion exercises, computation
3	Apply (demonstrate, modify, compare) and/or activities focused on problem solving
4	Analyze/Evaluate (evidence, verify, analyze, justify, interpret)
5	Create (combine, construct, develop, formulate)

Inquiry Instructional Component Code—facilitated by teacher

Code	Level of inquiry	Definition
0	Non-inquiry	activities with the purpose of skill automation; rote memorization of facts; drill and practice; checking answers on homework, quizzes, or classwork with little or no explanation
1	Engage	typically situated at the beginning of the lesson; assessing student prior knowledge and misconceptions; stimulating student interest
2	Explore	students investigate a new idea or concept
3	Explain	teacher or students making sense of an idea or concept
4	Extend	[Extend is important but is not coded as such because it typically is a new Engage, Explore, or Explain]

Assessment Code—facilitated by teacher

Code	Assessment type	Definition
0	No assessment observed	
1	Monitoring	circulating around the room, probing for understanding, checking student progress, commenting as appropriate
2	Formative assessment	assessing student progress, instruction modified to align with student ability
2	Diagnostic assessment	checking for prior knowledge, misconceptions, abilities
3	Summative assessment	assessing student learning, evaluative and not informing next instructional step

Section III

Time (mins into class)	Classroom Notes of Observation	Comments

Lesson Descriptive Details

APPENDIX D

Electronic Quality of Inquiry Protocol
Inquiry Constructs

Complete sections IV-VII (constructs of instruction, discourse, assessment, and curriculum factors) immediately after the observation. If a construct in Sections IV-VI absolutely cannot be coded based on the observation, then it is to be left blank.

IV. Instructional Factors					
Construct Measured		Pre-Inquiry (Level I)	Developing Inquiry (2)	Proficient Inquiry (3)	Exemplary Inquiry (4)
I1.	Instructional Strategies	Teacher predominantly lectured to cover content.	Teacher frequently lectured and/or used demonstrations to explain content. Activities were verification only.	Teacher occasionally lectured, but students were engaged in activities that helped develop conceptual understanding.	Teacher occasionally lectured, but students were engaged in investigations that promoted strong conceptual understanding.
I2.	Order of Instruction	Teacher explained concepts. Students either did not explore concepts or did so only after explanation.	Teacher asked students to explore concept before receiving explanation. Teacher explained.	Teacher asked students to explore before explanation. Teacher and students explained.	Teacher asked students to explore concept before explanation occurred. Though perhaps prompted by the teacher, students provided the explanation.
I3.	Teacher Role	Teacher was center of lesson; rarely acted as facilitator.	Teacher was center of lesson; occasionally acted as facilitator.	Teacher frequently acted as facilitator.	Teacher consistently and effectively acted as a facilitator.
I4.	Student Role	Students were consistently passive as learners (taking notes, practicing on their own).	Students were active to a small extent as learners (highly engaged for very brief moments or to a small extent throughout lesson).	Students were active as learners (involved in discussions, investigations, or activities, but not consistently and clearly focused).	Students were consistently and effectively active as learners (highly engaged at multiple points during lesson and clearly focused on the task).
I5.	Knowledge Acquisition	Student learning focused solely on mastery of facts, information, and/or rote processes.	Student learning focused on mastery of facts and process skills without much focus on understanding of content.	Student learning required application of concepts and process skills in new situations.	Student learning required depth of understanding to be demonstrated relating to content and process skills.

V. Discourse Factors					
Construct Measured		Pre-Inquiry (Level 1)	Developing Inquiry (2)	Proficient Inquiry (3)	Exemplary Inquiry (4)
D1.	Questioning Level	Questioning rarely challenged students above the remembering level.	Questioning rarely challenged students above the understanding level.	Questioning challenged students up to application or analysis levels.	Questioning challenged students at various levels, including at the analysis level or higher; level was varied to scaffold learning.
D2.	Complexity of Questions	Questions focused on one correct answer, typically short answer responses.	Questions focused mostly on one correct answer; some open response opportunities.	Questions challenged students to explain, reason, and/or justify.	Questions required students to explain, reason, and/or justify. Students were expected to critique others' responses.
D3.	Questioning Ecology	Teacher lectured or engaged students in oral questioning that did not lead to discussion.	Teacher occasionally attempted to engage students in discussions or investigations but was not successful.	Teacher successfully engaged students in open-ended questions, discussions, and/or investigations.	Teacher consistently and effectively engaged students in open-ended questions, discussions, investigations, and/or reflections.
D4.	Communication Pattern	Communication was controlled and directed by teacher and followed a didactic pattern.	Communication was typically controlled and directed by teacher with occasional input from other students; mostly didactic pattern.	Communication was often conversational with some student questions guiding the discussion.	Communication was consistently conversational with student questions often guiding the discussion.
D5.	Classroom Interactions	Teacher accepted answers, correcting when necessary, but rarely followed-up with further probing.	Teacher or another student occasionally followed up student response with further low-level probe.	Teacher or another student often followed up response with engaging probe that required student to justify reasoning or evidence.	Teacher consistently and effectively facilitated rich classroom dialogue where evidence, assumptions, and reasoning were challenged by teacher or other students.

VI. *Assessment Factors*					
Construct Measured		Pre-Inquiry (Level 1)	Developing Inquiry (2)	Proficient Inquiry (3)	Exemplary Inquiry (4)
A1.	Prior Knowledge	Teacher did not assess student prior knowledge.	Teacher assessed student prior knowledge but did not modify instruction based on this knowledge.	Teacher assessed student prior knowledge and then partially modified instruction based on this knowledge.	Teacher assessed student prior knowledge and then modified instruction based on this knowledge.
A2.	Conceptual Development	Teacher encouraged learning by memorization and repetition.	Teacher encouraged product or answer-focused learning activities that lacked critical thinking.	Teacher encouraged process-focused learning activities that required critical thinking.	Teacher encouraged process-focused learning activities that involved critical thinking that connected learning with other concepts.
A3.	Student Reflection	Teacher did not explicitly encourage students to reflect on their own learning.	Teacher explicitly encouraged students to reflect on their learning but only at a minimal knowledge level.	Teacher explicitly encouraged students to reflect on their learning at an understanding level.	Teacher consistently encouraged students to reflect on their learning at multiple times throughout the lesson; encouraged students to think at higher levels.
A4.	Assessment Type	Formal and informal assessments measured only factual, discrete knowledge.	Formal and informal assessments measured mostly factual, discrete knowledge.	Formal and informal assessments used both factual, discrete knowledge and authentic measures.	Formal and informal assessment methods consistently and effectively used authentic measures.
A5.	Role of Assessing	Teacher solicited predetermined answers from students requiring little explanation or justification.	Teacher solicited information from students to assess understanding.	Teacher solicited explanations from students to assess understanding and then adjusted instruction accordingly.	Teacher frequently and effectively assessed student understanding and adjusted instruction accordingly; challenged evidence and claims made; encouraged curiosity and openness.

VII. Curriculum Factors					
Construct Measured		Pre-Inquiry (Level 1)	Developing Inquiry (2)	Proficient Inquiry (3)	Exemplary Inquiry (4)
C1.	Content Depth	Lesson provided only superficial coverage of content.	Lesson provided some depth of content but with no connections made to the big picture.	Lesson provided depth of content with some significant connection to the big picture.	Lesson provided depth of content with significant, clear, and explicit connections made to the big picture.
C2.	Learner Centrality	Lesson did not engage learner in activities or investigations.	Lesson provided prescribed activities with anticipated results.	Lesson allowed for some flexibility during investigation for student-designed exploration.	Lesson provided flexibility for students to design and carry out their own investigations.
C3.	Integration of Content and Investigation	Lesson is either content-focused or activity-focused but not both.	Lesson provided poor integration of content with activity or investigation.	Lesson incorporated student investigation that linked well with content.	Lesson seamlessly integrated the content and the student investigation.
C4.	Organizing and Recording Information	Students organized and recorded information in prescriptive ways.	Students had only minor input as to how to organize and record information.	Students regularly organized and recorded information in non-prescriptive ways.	Students organized and recorded information in non-prescriptive ways that allowed them to effectively communicate their learning.

*Summative Overviews**		*Comprehensive Score***
Summative view of Instruction		
Summative view of Discourse		
Summative view of Assessment		
Summative view of Curriculum		
Overall view of Lesson		

*Provide brief descriptive comments to justify score.

**Score for each component should be an integer from 1-4 that corresponds with the appropriate level of inquiry. Scores should reflect the essence of the lesson relative to that component, so they need not be an exact average of all sub-scores in a category.

APPENDIX E

Implementation Support Questionnaire

1. In what ways do you feel prepared to incorporate the eight elements of PBL on a regular basis?

2. What actions have been beneficial for increasing your confidence to use PBL instruction?

3. What efforts to implement something new in your classroom have worked for you in the past?

4. In what courses or classes do you feel you have the most opportunity to implement PBL? Why?

5. What motivates you to try new teaching strategies in your classroom?

6. What might influence your choice to include PBL on a regular basis?

7. How can support from your colleagues influence your use of PBL?

8. In what ways could the school support your implementation of PBL?

9. In what ways do you think you could assist others with PBL implementation?

10. What past experiences have you had with instructional coaching?

11. What are your goals for using PBL in your classroom?

APPENDIX F

Administrator Interview Questions

1. What effective uses of PBL have you seen in your buildings?

2. What are your short-term goals for PBL implementation in your schools? What about long-term goals?

3. What advantages exist to meet the goals for PBL implementation? What might be considered a disadvantage?

4. How confident do you believe teachers feel to implement PBL? What might be influencing teachers' implementation?

5. How confident are you in assisting the teachers should they have questions?

6. What is something that has surprised you about PBL implementation in classrooms?

7. What effective learning opportunities do teachers participate in? What do you think made those learning opportunities effective?

8. What do you feel will be necessary for sustaining the PBL instructional model?

Coaching Dialogue Form

Use the Note Taking section on this form to collect field notes of actions and dialogue used between teachers and coaches. Immediately following observation, use the *Note Making* section to reflect on what occurred.

Teacher: Date: Time:

Note Taking	Note Making

APPENDIX H

Teacher Group Interview Questions

1. How do you feel about PBL now compared to a year ago? What has influenced those feelings?
2. What are your beliefs about how PBL affects student learning?
3. How capable do you feel to continue building PBL units? Why do you feel that way?
4. What advice would you give to someone just beginning to use PBL instruction?
5. What helped you meet your goals? Was there anything that interfered with your goals?
6. In what ways do you feel your experiences with PBL the last six months have influenced your teaching practices?
7. What is something you think is still needed to take the PBL to the next level in your classroom?

APPENDIX I

Qualitative Codebook

Code	Frequency used	Definition	Example
Building Confidence	18	Activities or examples that have led teachers to feel more confident, prepared, and capable to use PBL	The experience of teaching a PBL helped me to know what I should expect.
Colleague support	14	Peer to peer feedback and assistance	My peers can give me suggestions, share ideas, and discuss what is working or not working
Curriculum Connection	24	Alignment of skills and concepts with content standards and goals	The lesson was directly tied to grade-level learning standards
Efficacy	148	Feelings or beliefs one holds to feel confident, competent, and capable to complete a task.	I feel more confident to change things up. OR I know if I tried that, I'd fail.
Evaluation	26	A critique of performance	My evaluation is a number that follows me around.
Examples	12	Models of effective PBL instruction	Witness how other teachers incorporate it into their classrooms
Feedback	42	Suggestions or advice, resulting in improved performance	It's good to hear what others think. Hearing the perspective of others helps me consider teaching methods.
Online training	12	An outcome of conducting learning events in an online format	The teacher and I commented back and forth in a Google Doc.
PBL implementation	247	The degree to which PBL elements are used for instructional purposes	Students used critical thinking and inquiry to explore. The teacher facilitated. The lesson included key knowledge, student reflection, and sustained inquiry.
Peer coaching	14	The use of pausing, paraphrasing, and questioning to elicit dialogue between two peers.	Our discussion allowed me to reflect.
Questioning	36	Queries posed by teachers to elicit information from students	The teacher checked in with groups to encourage discussion and the application of content, challenging as necessary.

Code	Frequency used	Definition	Example
Reflection	30	Thoughtful consideration of actions and practices	I feel like it went according to plan, but next time I will…
School support	9	Resources provided by the school to assist with PBL implementation	We need professional development, models of effective instruction, and feedback
Student engagement	23	The level at which students are participating and learning the intended learning objectives	Students were on task and regularly interacting with the teacher.
Sustained use	10	Continued practice of the implementation from year to year	We did it and we stuck with it.
Sustainability	11	Efforts administrators are taking to support teachers in implementation and continued use of PBL instruction	How do we get new staff members up to speed? That's an immediate issue.

APPENDIX J

Acting Phase Training Agendas

Professional Development: Training One

Danielson Coaching Standards: 1c. Identifies clear, specific, and appropriate goals for the instructional support program. 2a. Creates a respectful and emotionally safe culture that promotes collaboration. 4f. Demonstrates professionalism by adhering to the highest standards of integrity and confidentiality. 2d. Establishes clearly defined norms for professional conduct. 2b. Promotes a culture of continuous instructional improvement. 1a. Demonstrates understanding of the underlying research, theories, knowledge, and skills of the discipline. 3a. Collaborates with teachers to design rigorous, standards-based classroom instruction. 3c. Engages teachers in learning new instructional strategies and practices. 3d. Provides relevant and timely feedback to teachers. 3e. Provides responsive professional support. 4e. Enhances professional capacity through ongoing professional learning.

Learner Outcomes:
   ● Develop norms for peer coaching.
   ● Recognize components of effective dialogue used during coaching.

Driving question: What actions are characteristic of effective coaching?
So what's our why? Share the overall goals for the study.

Engage (15 minutes): In the best possible world, what do we want coaching to look like, sound like, and feel like? Ask teachers to complete the chart below:

What does coaching look like?	What does coaching sound like?	What does coaching feel like?

Clarify and discuss.

Explore (30 minutes)
What is coaching?
Unpack the Danielson Coaching Standards listed at the top of the training agenda: unpack
"How do we act?" to collaboratively develop norms. Collect in a Google Doc:

We agree to:

- Offer support for each other
- Guide each other
- Be learners, and be present
- Our feedback is constructive
- Be professional -
  - Confidential, safe and private environments
  - Courteous - compliment sandwiches
  - Building rapport and trust
  - Being honest
- Start on time, end on time

Unpack the second section: "What we need to know"

Reflect: What do these mean? What is the deep, overarching concept? What's the big
picture?

Brass Tacks: 20 minutes
Describe the blended training:
- Weekly modules, chunked for small bits of work to be done over the week
- Online meeting: still want it to be a Wednesday morning?
- Gradual release of coaching
- Development of PBL models along the way
- Coaching in the fall (monthly)

Enroll in Canvas, also show app

10:00am Explore:
Place teachers in small groups - HS and Elem
Provide coaching scenarios: (* denotes pseudonyms)

Mr. White is a go-getter. He not only implements new ideas, he immediately puts it into
practice. He is a model for teachers. He gets a new idea for a lesson, but needs a little
help with it. He asks you if you'd be willing to come to his class daily on his plan time to
work on it together. What kinds of things do you think you'll say to him?*

You drop into Ms. Smith's classroom and observe her teaching a lesson. Afterwards, she
asks you what you thought. What are some examples of what you think you might say to
her?*

You've just visited Mr. McGill's* classroom. He approaches you after the lesson and says it was the worst lesson ever. What would you say to him?

How would you respond to these teachers? Discuss in small groups and share whole group.

Show Picture of Coaching continuum - (Barkley, 2018)

What do you notice about the continuum? What do you think the differences between each of these would be?

Provide teachers with The Three Stances chart (Jordan Curriculum & Staff Development, 2015; Lipton et al., 2003)
Compare and contrast the Three stances - consulting, collaborating, coaching.

Ask teachers: Where did your responses fall on the coaching continuum? What would it look like for you to go to the coaching side? (Whole group)

View video (Switster, 2013) with effective coaching, then pick it apart for coaching stances.

Then view video for strategies, using the Inquiring, Probing, Extending graphic organizer as a guide.

Notice voice inflection and body language. Discuss what each of these look and sound like. Make a chart in Google Docs, then present the cognitive coaching checklist.
Use cognitive coaching checklist - what did we see here?

11:00am Explain:
Take the information from here, Combine "What we need to know" with a new one: "What we need to do."

Ask teachers: Given this small overview of coaching that we've seen today (this is just the tip of the iceberg), what actions should we begin to take?

Work in collaborative groups to discuss personal actions and group actions. Use T-Chart for each individual teacher:

Personal Actions	Group Actions

11:30am Develop a list of questions for your next focused learning conversation.

11:45: Closing: Repeat engage activity

Professional Development: Online training: Week 1

Teachers will comment in Canvas discussion boards:
You all have some excellent goals for using PBL in your classroom and have provided that information in previous surveys. Before we go any further, let's discuss the specifics of those goals. Before you have dinner on Thursday, respond to this thread and include:

1. Your specific goal for using PBL in your classroom this school year.
2. What that will look like in your classroom once it is met.
3. What each milestone will be when reaching for this goal. (what, when, where, how)
4. What things do you wonder about that might influence you meeting (or not meeting) this goal?

Evaluation or coaching:

One of the most confusing aspects about coaching is that it looks so different in so many different settings. TRUE coaching is not about feedback, evaluation, or telling someone what to do. It's about helping them understand on their own.

We've looked at the coaching continuum to identify where we might be on the scale. Before you get your weekend started on Friday, listen to Barkley's (2017) podcast. Respond to what you've heard using the submission link below (you can type it, record yourself responding out loud, or upload a document - whatever you like). What I really want to know is this - Steve and Brianna discuss some actions that were implemented at Brianna's school. How do you anticipate these actions will influence your use of PBL in the upcoming year? How will that influence the goal you set earlier?

References

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        coaching/

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        http://mentor.jordandistrict.org/files/Mentoring-Stances.pdf

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        focused relationships*. Arlington, MA: MiraVia, LLC.

Schwitster, S. (2013, July 9). Model coaching conversation [Video file]. Retrieved from
        https://youtu.be/AfbvspitraU

	Definition	Visual Representation	Question Stems
Inquiring	Offers an individual three things: ● An invitation to engage and think ● A topic to think about ● A cognitive focus for thinking about the topic (Source: Lipton, L., Wellman, B. M., & Humbard, C. (2003). *Mentoring matters: A practical guide to learning-focused relationships*. Arlington, MA: MiraVia, LLC.		How might… What would… What might be some… In what ways…
Probing	Intended to help an individual think more clearly and specifically about the situation at hand.	**Deep**	How many students, specifically? What else were you considering when… What criteria will show you that… What are the connections between...
Extending	Strategies used to help an individual consider additional steps that could be taken.		What do you think would happen if… How do you decide… How might you...

Professional Development: Training Two
Implementation Stage One - Training Two

Online PBL Training - Unpacking Standards:

Present in content page:

A big challenge teachers face is the way in which we approach learning standards. So often, we look at what we teach as items "to cover." After we've taught something, we check it off our list and move on to the next piece. I think all of us do this from time to time. What it simply comes down to is that when we're stressed, rushed, or unsure, it's much easier to replicate the way we were taught, whatever that might have looked like.

Do you remember the video we watched last fall that showed PBL in action? (Edutopia, 2010).

In that video, the students were all very engaged in the learning. Part of this was because they weren't covering the standards, but instead, uncovering information through discovery. Beginning this week, we are each going to begin building lessons such as these. The first part is finding the key knowledge, understanding, and success skills.

Choose a set of standards that you will either use with your students near the beginning of the school year. Maybe September?

Do you need a refresher on unpacking your standards? Have your them ready and follow the instructions in this video (Rader, 2015) to not just unpack our standards, but to go one step beyond and develop an overarching concept. As you're doing this, it will be helpful to think general and broad. Don't worry about specifics - they will come later.

This week we are going to begin working on our PBL unit that will be taught in the fall. A lesson design template is linked to your name in the table below. Click on your name, which will force you to make a copy of the template that will be stored in your Google Drive. Please don't forget to share it with me at raderklista@gmail.com!

Ava	Olivia
Abigail	Noah

You'll be building your lesson (unit) throughout the course. Before the sun goes down on Thursday, copy and paste your standards in the section titled "Standards." After completing the task in the video, provide an overarching theme (umbrella) as well. Your overarching theme will be a short phrase or maybe even just a word. You will type this in the "Unit Overview" section.

Then, respond to the discussion board:

What will students <u>know</u> and <u>be able to do</u> as a result of the PBL unit you are working on right now? Tell us about those things in this discussion board. Before you do something fun on Friday, please post here so we can all hear about the great things you're planning!

Grades 3-12 Lesson Plan Template

Subject Area:
Course:
Teacher:
Grade:
Unit Title:

Unit Overview: Provide a brief description of the unit. Include rationale or overarching theme (umbrella). Our target audience is members of our community (school, businesses, families, etc)

Define the Problem:
Authentic Connection(s): In what ways will students apply learning in a real world context? What scenario might help students connect inquiry learning in an authentic situation? Students are involved in a challenge in which they must solve a real world problem or issue.

Learning Standards: What curriculum Learning Standards will you be addressing in this unit?

Evidence of Success: What behaviors will students demonstrate if they understand the content and skills taught?

Driving Question

Instructional Considerations:

What real life roles will students participate in?

-

Will students be put in groups? If so, what strategies will be used for interdependence? How many students will be in each group?

What ways might you differentiate content, process, or product for this lesson?

Instructional Procedures Organized by 5 Es (These are not necessarily sequential steps, but areas that will be hit. It is possible that students will revisit areas throughout the unit)

Engage: Capture students' attention, stimulate thinking, activate prior knowledge. It is something the students are emotionally and physically engaged in (This is the hook to draw them in.)

Explore: Give students time to think, plan, investigate, and organize information. (This is how they will build their basic knowledge. They may be searching for information using print resources, hands on exploration, etc.)

Explain: Involve students in analysis of their explorations. Use reflective activities to clarify and modify their understanding. (This is pushing their new learning to higher levels by fitting it into their current understanding and also an opportunity for formative assessment.)

Elaborate: How will students take new understanding and apply it in real world solution or situation? (What will they do with this new knowledge? How will they transform their learning into new understanding by doing something with it? This is the end product students will create.)

Evaluate: (Throughout the unit) Explain how learning standards are addressed through unit assessments. Evaluation tools should be developed by teacher and should target what students must know and do. List and hyperlink (when possible) formative and summative assessments in the assessment timeline.

Management: How will resources be managed (shared supplies or devices)? How will the unit be broken into manageable lessons over a period of days?

Assessment Timeline	
Formative Assessments ● ● ●	Summative Assessment ● ● ●

Grades PK-2 Lesson Plan Template

Subject Area: **Course:** **Teacher:** **Grade:** **Unit Title:**	**Unit Overview:** Provide a brief description of the unit. Include rationale or overarching theme (umbrella). **Define the Problem:** Authentic Connection(s): In what ways will students apply learning in a real world context? What scenario might help students connect inquiry learning in an authentic situation? Students are involved in a challenge in which they must solve a real world problem or issue.
Standard(s)	What curriculum Learning Standards will you be addressing in this unit?
Driving Question	The driving question is: ● open ended ● elicits critical thinking, ● Are meant to be investigated, argued, and looked at from different points of view in and across units. ● Raises other important questions
Evidence of Success	What behaviors will students demonstrate if they understand the content and skills taught?
Resources Needed	
Instructional Considerations	
Anticipatory Set	Capture students' attention, stimulate thinking, activate prior knowledge. It is something the students are emotionally and physically engaged in (This is the hook to draw them in.)
Intro/Mini Lesson (I do…)	What questions will you pose to students? Describe the skills you will model and how you will model them (think aloud, demonstrate, questioning, etc.. What will students do during this part of the lesson? (observe, interact, etc.)

Guided Instruction (We do…)	
Work Session (You do together…)	How will students be placed in groups? What individual roles will students be responsible for? What problems will students be solving together? How will students reflect on and extend their knowledge?
Independent Learning (You do)	What will students do independently? What culminating activity will students complete/develop/create?
Closing	How will students present their understanding to a larger audience?
Assessment	How will students be assessed?
Management	How will resources be managed (shared supplies or devices)? How will the unit be broken into manageable lessons over a period of days?
Assessment Timeline	(Throughout the unit) Explain how learning standards are addressed through unit assessments. Evaluation tools should be developed by teacher and should target what students must know and do. List and hyperlink (when possible) formative and summative assessments in the assessment timeline.

Online Coaching - Paraphrasing:

Present in content page:

You have learned about inquiring, probing, and extending. Those question techniques are extremely valuable in coaching situations because they offer guidance to the teacher and assist in getting to the "heart of the matter," whatever that may be.

These skills are quite useful, but we usually can't use them in the most effective way unless we are truly listening. In addition to fully listening, the teacher we are working with needs to KNOW we are listening. One way to show we understand, or even empathize, is with the paraphrase.

Read about how Steve Barkley (2017) presents the skill of paraphrasing in this blogpost.

Then, listen to his podcast (Barkley, 2018) that discusses it in more detail. Use the purposes of paraphrasing graphic organizer to collect your thoughts and ideas while you're listening. (Again, it will force copy so you can edit on your device). Post your answer to the last question, *"Why do you think paraphrasing is important to use in coaching?"* on the discussion board.

Purpose of Paraphrasing			
Non-verbal actions used with paraphrasing	Confirming **facts**	Confirming **feelings**	
		Opinions	
		Actions	
		Commitment	
How do you know which of these skills/actions to use when coaching?			
Why do you think paraphrasing is important to use in coaching?			

References

Barkley, S. (2017, December 10). Coaches' listening skills [Web log post]. Retrieved from https://barkleypd.com/blog/confirmatory-paraphrase/

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Edutopia. (2010, January 21). An introduction to project-based learning [Video file]. Retrieved from https://youtu.be/dFySmS9_y_0

Rader, K. (2015, April 6). Focusing on significant content [Video file]. Retrieved from https://youtu.be/A2moYJOdcrM

Professional Development: **Training Three**

Week 3 Online PBL Training:

Provide for participants in Content Page:

Now that we have our content, we're going to backwards plan the rest of our lesson or unit.

Our goal is to make our study related to the real world (remember the wing study PBL - this isn't a fictitious situation!). Watch the video again here. (PBLWorks, 2009b).

Start by focusing on both the overarching theme and the discipline of your lesson. For example, let's say I am building a math lesson and my overarching theme was identifying trends. I am going to ask myself, "How do professionals use this skill in the real world?" How do professionals analyze statistics in the real world every day? I'm going to brainstorm a list of ways people use, read, and react to statistics and data.

Now, decide on one of those every day, real world uses that your students could create or develop. Going back to the statistics example, I might have said that we use statistics to determine and make recommendations based on consumer wants and needs. If that's the case, then I may want my students to gather data regarding how people in my community prefer to use their recreational time and then develop opportunities for these activities in conjunction with my local city council.

It's the job of the teacher to align this real-world piece to our standards and the overarching theme.

Do those two steps now.
1. From the standards and theme you've decided to focus on, brainstorm how the skills and the theme are used in the real world.
2. Determine what real-world activity your students will be able to do as a result of this study.
3. Now, think of what that will look like. If my students are developing ways for my community to be involved in recreation with the city council, what will students be doing at the end? Maybe making proposals for new types of recreation to appear on the next ballot? Maybe they need to take a different approach and encourage people to take part in what already exists. Whatever it is, how will they communicate this message? And better yet, what if we simply said, "You will communicate a message..." rather than telling them what methods or mode to use for communication. This leaves it wide open so that students can utilize choice in making a video, a website, a brochure, a newspaper advertisement, etc. (For Ava - a picture, a story, etc.)
4. Decide what that end product will be.
5. Now, throughout this process we have to be sure we're continuing to align our learning targets with our intended outcomes. Use this Project Assessment Map (Buck

Institute for Education, 2019) to capture what learning goals and standards you'll be needing to assess.

This is how you can ensure that you're providing students with choice while still measuring the learning, not the end product. (Do you remember that story I told about how I once planned a PowerPoint research project instead of a poster and only assessed the PowerPoint?) Aside from the fact that there was no critical thinking in this project at all, I had given my students no chance to prove to me their knowledge of animal classification. Had I used a project assessment map, the criteria in my rubric would have been centered around the content, standards, and critical thinking, not how it was displayed.

Developing a rubric aligned to my learning goals allows for my students to take control of the learning and develop the product they think is best to represent their study. That is the final step. Before the sun sets on Friday, you will take your content, overarching theme, and Project Assessment Map and create a rubric. You rubric should assess what your students will know and do in the end for the culmination of your project. Scroll down to the very bottom of the lesson plan template and you can insert a table in the last box to build your rubric.

Remember, you should already have most of your rubric criteria ready if you are using your mastery criteria aligned with your standards. You're probably just copying and pasting the criteria from each standard into a new rubric that groups all your assessed standards together.

After you've got this piece done, everything else for your lesson will just simply flow.

Week 3 Online Coaching:

Before you complete the coaching activities this week, watch this YouTube video (TEDxTalks, 2013) for some additional perspective.
This is a 10-minute video, but you can watch it at 1.25 speed to make it about 7 minutes.

A presupposition is defined as something that is assumed at the beginning of some action. For example, there may be presuppositions about what we thought coaching might be or what we assume we will learn about it.

In this activity, you will watch a presentation titled Positive Presuppositions (Rader, 2019) and use the graphic organizer for the activity described at the end.

When you complete the activity, you will write 5 positive presuppositions. You will post two (any two - your choice) to the discussion board. Feel free to pause throughout the video to jot down your notes.

Positive Presupposition Graphic Organizer

A **positive presupposition** is a statement or question that conveys a positive belief about someone's ability and willingness to do something.

"Even [insert name] was engaged!"

vs.

"**It looks like you've intentionally chosen strategies to encourage engagement**. What criteria was used to determine your strategies?"

The statement that has been bolded acknowledges the teacher's hard work and commitment to strategies.

The underlined question probes and also encourages the teacher to reflect on past experiences.

Positive Presupposition "Do"	Example
Show positive intent	Knowing that our goal for PBL is….
Focus on reflective solutions	What options/strategies are you considering….
Invite dialogue and vision	After you finish your PBL unit, what will you be celebrating?
Include specific actions	As you're starting to plan your PBL, what is your first step?
Consider resources	What resources are you utilizing in the Explore section?
Connect to the goal	(Notice that PBL was in each statement - PBL is the goal here)
Encourage responsibility for action	So as we wrap up, what are some things you're thinking you want to do between now and the next time we talk?

Building a Positive Presupposition (add each of these items to your response)		
Acknowledgement	Value	Question Stem
Knowing your level of commitment… As someone who… Given your experience… As a teacher that/who...	Based on… In what ways… Using data... Relying on… Having tried… Since ___ happened...	What… When… How… Which...

Consider these two hypothetical statements that a teacher might say. Using your skills of paraphrasing, write a positive presupposition for each.

"PBL is confusing for my students."

"I only hear from parents when they are upset about something."

Consider these three questions that currently presume negative intent. Using your skills of inquiring, probing, and extending, write a positive presupposition for each.

"Are you using cooperative learning in your PBL?"

"What things are you going to change for the next PBL unit you teach?"

"Can you think of any reasons students would act that way?"

References

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    http://resultscoachingglobal.com/positive-presuppositions-the-questions-we-ask/

Buck Institute for Education. (2019). *Project assessment map*. Retrieved from
    https://my.pblworks.org/resource/document/project_assessment_map

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    https://youtu.be/WftJ1rGsJi0

Thinking Collaborative (2019). *Positive presuppositions in the classroom*. Retrieved from
    https://www.thinkingcollaborative.com/stj/positive-presuppositions-classroom/

Rader, K. (2019, June 8). Positive presuppositions [Video file]. Retrieved from
    https://youtu.be/fkJSpYCBtEU

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    Retrieved from https://youtu.be/7XFLTDQ4JMk

Thinking Collaborative. (2019). *Using positive presuppositions to invite thinking*. Retrieved from:
    https://www.thinkingcollaborative.com/stj/positive-presuppositions-invite-thinking/

Professional Development: **Training Four**

Week 4 Online PBL Training:

The next part of lesson design is developing a driving question. Remember, these are different from essential questions. Essential questions are sometimes described or viewed as a list of questions to ask our students. They are sometimes thought of as the 2.0 version of Checking for Understanding questions. The driving question drives the inquiry of the lesson or unit. It's thought provoking, has multiple answers, and makes us ponder. Now we are going to create a driving question for the lesson or unit we are working on. This video will guide you in developing your question:

Also, you may find these resources helpful if you'd like a refresher about developing driving questions:

Driving Question Tubric (Buck Institute for Education, 2019)
Driving Question Checklist:

Element	Description	Present	Needs Work	Not Present
Higher Order Thinking	*Takes into consideration evaluation, synthesis, and analysis.*			
Open Ended	*Cannot be answered with yes/no, or fact based answers. Answering the question will allow for altering viewpoints.*			
Engaging	*Follows the "Need to Know" principle. Sparks interest and excitement from students.*			
Theme of question	*Product oriented (creating), Role oriented (from perspective of a professional or culture), Philosophical or debatable*			
Aligned with learning goals	*Obviously follows learning goals determined by the teacher.*			

This week, brainstorm several driving questions for your PBL unit. During our virtual coaching session on Wednesday, we will discuss them. They are definitely an art, and one you get better at with practice. Please share your driving questions with me prior to Wednesday morning using Google docs or email (you can add all of the potential DQ's to your lesson plan template if you'd like). They will be a great way for us to practice some coaching, so we're going to do some role playing with them!

Don't forget to add your "final" driving question to the unit plan template you've been working on at the end of the week!

Virtual Coaching Session: Driving Questions

Meet in Zoom. Coach teachers individually at the time their question(s) are presented and reflect as a whole group after each teacher is coached.

References

Buck Institute for Education. (2019). *Driving question tubric 2.0*. Retrieved from
      https://my.pblworks.org/resource/document/driving_question_tubric

Professional Development: **Training Five**

Online PBL Training: Engage/Anticipatory Set:

Post in Canvas Page:

This week you will be developing the Engage, or Anticipatory Set of your PBL unit. Use the guides provided in this week's module for a refresher of your instructional design model:

Gradual Release of Responsibility   5 E Model

Gradual Release of Responsibility Online Training:

The GRR can be used with any grade level. The idea is that by using GRR to teach a new skill, students build their understanding through practice and experience. Then, they take that knowledge and understanding and apply it to a new situation. This outline by Fisher and Frey (2013) does a nice job of defining each section. Let's look at them and how they relate to PBL:

Focus Lessons	The idea with focus lessons is that the purpose is shared with the learner. This is probably going to be how the teacher communicates the Driving Question to the students and can bridge the Anticipatory Set and the "I Do." The teacher will use think alouds to model skills students will be using.
Guided Instruction	Guided Instruction is part of the "We Do." In this step, the teacher facilitates learning by guiding students, asking questions, and providing opportunity for students to make connections. A few examples of how this might be used with PBL include hands on activities, cooperative learning activities, or scaffolded research.
Productive Group Work	During this stage, students are collaborating about what was learned. This stage is the "We Do Together" stage. Students should be sharing ideas with each other and making conclusions based on these ideas.
Independent Learning	In this final stage, students are evaluated according to their understanding. Students will "show what they know" using their strengths. This stage is the "You Do."

The Gradual Release video below (Citizens Academy Cleve, 2011) demonstrates how GRR is used in an upper elementary classroom. You'll see students collaborating and making sense of what they're learning by thinking out loud, collaborating with others, and sharing what they've learned. You'll see the teacher modeling a skill and then facilitating learning by asking probing questions and challenging students as needed.

5 E Online Training Module:

The 5 E instructional model was actually designed in 1987 by Biological Sciences Curriculum Study (BSCS) as a way to employ constructivist learning theories in science classrooms. The goal of the 5E instructional design model was to encourage critical thinking, allow exploration through inquiry, and to extend knowledge of a single concept to a deep understanding that is applied to the real world. The video below discusses some of the background of the 5E model, as well as some do's and don'ts of using it.

This chart by Bybee et. al (2006) also serves as a great resource for understanding each step of the 5E model. Be sure to notice what is consistent for each stage and also check to see if the "inconsistencies" might help confirm your beliefs about inquiry-based learning.

Remember that this opening part of the unit should:
● be interesting and engaging
● incorporate higher order thinking
● get students thinking right away and make them curious to learn more

If you need ideas, check out Jennifer Gonzales' (2014) post about Anticipatory Set. Jump down to "Getting the Most from Your Anticipatory Set." Even though the term may be different in the 5E model, the idea is the same. That can help guide you in developing the activity that will get students thinking about your topic. Add this section to your unit plan by Saturday, July 6.

Week 5 Online Coaching Training:

It has officially been a month since we started our peer coaching journey! In that time, we've learned about using questioning strategies, paraphrasing, positive presuppositions, voice inflection, and body language to lead a coaching conversation.

It's hard. (but valuable!)

This week we are going to reflect on those characteristics of effective coaching while watching two videos of coaching in action. While you're watching, notice:
● where the coaching strategies listed above are used
● if there is opportunity to use the strategies listed above, but the coach didn't utilize them
● if the coach used a different technique, like feedback, closed-ended questions, etc.

Your videos are linked below:
Cognitive Coaching Reflection Conversation   Seeding District Wide Innovation (Edutopia,
(Thinking Collaborative, 2015)   2015)

Use the Coaching Conversation Reflection graphic organizer to gather your thoughts. Then, reflect about what you saw and heard in the videos. Post your thoughts about what occurred on the discussion board by Saturday.

Use this graphic organizer to collect your thoughts while watching the two coaching conversations linked in the Week 5 Module.

Similarities	Differences
●	●

Opportunities
What opportunities existed for the coaches to use the techniques of questioning, paraphrasing, and positive presuppositions? Were these missed opportunities, or did the coach seize their chance? What techniques did you notice that were more closely related to the opposite end of the coaching continuum?

Now, reflect on what you've written above. Post your thoughts about what you viewed in these two videos in the discussion board linked in Canvas.

References

Bybee, R. W., Taylor, J. A., Gardner, A., Van Scotter, P., Powell, J. C., Westbrook, A., & Landes, N. (2006). *The BSCS 5E instructional model: Origins, effectiveness, and applications.* Retrieved from http://www.bscs.org/bscs-5e-instructional-model

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Edutopia. (2015, September 18). Instructional coaching: Seeding district-wide innovation [Video file]. Retrieved from https://youtu.be/G0IrZ5jrvCo

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Gonzalez, J. (2014, September 14). Know your terms: Anticipatory set [Web log post]. Retrieved from https://www.cultofpedagogy.com/anticipatory-set/

Thinking Collaborative. (2015, October 1). Carolee & Ochan (consultant) - Reflecting conversation [Video file]. Retrieved from https://www.thinkingcollaborative.com/video-11-2/

Professional Development: **Training Six (Face to Face)**

Danielson Coaching Standards:

1c. Identifies clear, specific, and appropriate goals for the instructional support program.
2b. Promotes a culture of continuous instructional improvement.
1a. Demonstrates understanding of the underlying research, theories, knowledge, and skills
     of the discipline.
3a. Collaborates with teachers to design rigorous, standards-based classroom instruction.
3c. Engages teachers in learning new instructional strategies and practices.
3d. Provides relevant and timely feedback to teachers.
3e. Provides responsive professional support.
4e. Enhances professional capacity through ongoing professional learning.

Learner Outcomes:
- Teachers will identify and apply the 5 states of mind to given scenarios for use in peer coaching.
- Teachers will identify and apply appropriate dialogue for use in peer coaching.

Driving question: How do our beliefs influence our actions?

Engage: (10 minutes) Watch a video clip (University of Virginia, 2012a) of a classroom situation.

What is your reaction to this? What do you want to say to this teacher?

What's our WHY? Costa, Ellison, Hayes, and Garmston (2015) say that when we feel stuck, it's because we're low in our ability to use a particular state of mind. I think of these as frames:
- Craftsmanship
- Flexibility
- Interdependence
- Efficacy
- Consciousness

We act out of these depending on our situations. They are valuable because they help us to think about our actions and know what is motivating our actions. For peer coaching, they are valuable because they can guide us to move between mindsets to work towards a goal.

Explore: (60 minutes) Show Figure 7.1 (Costa et. al, 2015).
States of mind are capacities. So think of them like 5 buckets we have. Each individual's buckets may be filled at different levels.

Efficacy: an efficacious individual values competence, lifelong learning, self-empowerment, goal achievement, and mastery (Costa et. al, 2015).
- Characteristics:
    - turn energy towards a demanding task (rather than not attempt because it's too hard)
    - Set challenging goals
    - Persevere
    - Learn from mistakes or mishaps
    - Optimistic and confident

Flexibility: flexible thinkers are comfortable with ambiguity, they look for and create new possibilities, are open-minded, and willing to change their mind if they obtain new data that leads in a different direction. They do not just use one method of problem solving. (Costa et. al, 2015)
- Characteristics:
    - Risk-taking
    - Use micro and macro attention - the small bits that make up the whole (anticipate problems and generate alternative solutions)
    - Enjoy problem solving and the challenge it presents
    - Demonstrate empathy for others
    - Value the differences between people
    - Embrace change

Consciousness: conscious individuals can focus on an activity at will, pay attention to their own intentions, and deflect distractions. They can engage in these activities for however long it takes them to achieve a goal. They monitor their own values, thoughts, behaviors, and effects on the environment in which they interact. (Costa et. al, 2015)
- Characteristics:
    - Uses deliberate actions rather than automatic reactions
    - Can be strengthened with self-observation
    - Deep understanding of what is happening all around
    - Actively aware of certain events that are happening and actively directing the course of those events
    - Self-monitoring and reflective

Craftsmanship: value excellence in performance. Strive for perfection, refinement, and specific actions that will lead to perfection. Individuals high in craftsmanship vision success, generate goals, and monitor progress toward meeting the goals. (Costa et. al, 2015)
- Characteristics:
    - Assess their own performance and results
    - Seek data that informs them of their work and how to improve it
    - Strive for continuous improvement
    - Monitor progress toward goals
    - Monitor and manage time
    - Distinguish between perfection and excellence

  ○ Set high expectations for themselves and their practice

Interdependence: Recognize that the whole is greater than the sum of its parts. "We-ness over Me-ness." Contribute to the good of the group, seek partnerships of those they work with, and draw on the specific skill sets of colleagues. Recognize conflict as valuable because it is an opportunity to share beliefs, concerns, or perspective.

- Characteristics:
  - Recognize the benefit of working collaboratively
  - Willing to change to benefit the greater good
  - Use their energy and skills to achieve group goals
  - Draw on the resources of others
  - Seek collaboration
  - Value conflict

Spend 20 minutes researching each state of mind from different perspectives. One person will research from high levels of state of mind, one will research from low levels of state of mind, and one will research from the coach's perspective, that will be analyzing state of mind to know the approach to use with teachers.

Provide different colored notecards for the different perspectives for note-taking. After 20 minutes, put them together to make an affinity diagram. Put the "big idea" card at the top, categorize all others underneath it, and look for connections. Add colored Avery dots for connecting ideas.

Use these links to research:

The Coaching Role (University of Virginia, 2012b)	What Mindsets Drive Teacher Effectiveness (Costa, Garmston, & Zimmerman, 2012)

Teachers and facilitator build the cards together - Half is provided with the state of mind, definition, scale of not using the state of mind to mastering the state of mind.

Teachers will collaborate to build a Looks like/Sounds like for each state of mind card and will address what high levels of the mindset look like and low levels.

View videos and identify what frame the teacher is working from:
High in flexibility, consciousness, craftsmanship: (Edutopia, 2019a)
High in self efficacy and flexibility: (Edutopia, 2019b)
High in interdependence: (Edutopia, 2018)

Watch the video from Engage again and analyze the State of Mind.
Also watch this example (University of Virginia, 2012b). What is the teacher's state of mind?

Elaborate: (30 minutes): draw cards (below) about PBL scenarios and role play to apply the states of mind for a teacher and a coach.

Efficacy	Sally is a teacher who is reluctant to use PBL because she's afraid her students won't learn as well from it. She knows she has to though, so she changes one of her existing units so it will use more of the Gold Standard PBL elements. After just a couple of days in, she becomes extremely frustrated. Her students are not engaged. They are doing one of two things: either speeding through the research stage or spending the entire class time reading one article. It's like they don't know how to research. Sally knew PBL wasn't going to work. Tomorrow, she'll regroup the class by reintroducing the unit and starting over again using the traditional methods she's used before. That way, she'll be much more confident that students will learn what they need to.
Consciousness	Beth thinks this whole PBL thing is a waste of time. She teaches science, and this is just getting in the way of her accomplishing her goals. She wants her students to do hands-on experiments, perform dissections, learn about the research of other scientists, and maybe even replicate some of that research in the local area. She is going to try to fly under the radar. If she's pressed, she'll come up with something. But she's not going to be happy about it. Why won't they just let teachers teach?
Craftsmanship	Pat has been working on developing a PBL unit, but knows it's far from being an exemplar. In fact, it's easily described as mediocre. But this is just going to have to be "good enough." Pat has done what she can at this point. She can say she's taught her PBL (which was required) and then she can move on to everything else she has to teach. She (and her students) are just not ready for this. They'll do what they can to check the to-do list and not worry about it anymore.
Interdependence	Bob is thinking about his PBL unit. He's reluctant on many levels. But one thing is this whole idea of inquiry

	and research. He doesn't teach inquiry and research! He is a social studies teacher. He tells kids the dates and what happened on those dates, they write them down, they memorize them, and done. His PBL coach has suggested he work with another teacher to include more research and inquiry, but that's a lot of work. He just isn't sure they'll be able to coordinate everything. It will just be a lot easier to go about this solo. Even if he is working outside of his comfort zone, at least he knows he can depend on himself. He'll figure it out. He always does.
Flexibility	Johnny is just about finished planning his PBL unit. He was very careful to use many of the Gold Standard elements because he knows it is important to make his PBL a REAL PBL, not a dessert PBL. But he's still not crazy about two things: cooperative learning and voice and choice. How is he supposed to grade everything with fidelity if one kid is turning in a PowerPoint and another kid is turning in a written report? And what if someone wants to present their findings orally? There's not really time to do that in class because this PBL is actually taking a lot more time than it would if he just stood in the front of the class and taught it the way he's always done before… And his students never do well when they are working in groups. They fight, one person does all the work, they just sit and talk… Enough. Johnny decides he's just going to make the decision for the students. He is not going to include any cooperative learning and he will tell students what to research and what to create at the end. It will be easier this way. And then he can be sure that students actually learn what they're supposed to.

Closing: Reflect: Which area do you feel like you're highest in? Which area are you lowest in? What actions can you begin practicing to fill your low buckets?

References

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University of Virginia. (2012c). The coaching role: Creating a character [Video file]. Retrieved from
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Consciousness

Conscious individuals can focus on an activity at will, pay attention to their own intentions, and deflect distractions. They can engage in these activities for however long it takes them to achieve a goal. They monitor their own values, thoughts, behaviors, and effects on the environment in which they interact. (Costa et. al, 2015).

What high levels of consciousness looks like	What high levels of consciousness sounds like
● Aware of how to manage resources effectively ● Empathy and/or sympathy ● Engaged with your surroundings ● Prepared for and directing the "what if"	● "Because I knew…" ● Comforting someone ● "I understand that…" ● "I realize that…" ● "I can make adjustments by…"

Our goal when coaching someone with varied levels of consciousness is to use skills of abstraction shift to recognize additional factors that may influence the situation. We may shift up or down to either get more specific or to consider ideas from a broader perspective, depending on the situation.

Question stems to shift levels of consciousness	"How many students, specifically?" "What are the connections between…" "What did you notice about _____ when _____?" "What data was used to inform _____?" "How will you know when…"

Mastering the state of mind	Ranging to...	Not using the state of mind
Uses intentional, deliberate actions		Relies on automatic reactions
Uses self-reflection and self-observation for improvement		Feels that current practices are fine
Actively aware of what is happening in and around a particular setting		Oblivious to what is occurring
Actively directs the course of events based on observation		Regularly in a reactive state due to inattentive actions
Uses data to for improvement efforts		Actions are impulsive or spontaneous

References

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Craftsmanship

Individuals who value craftsmanship strive for excellence in performance. They take pride in their actions, their job, and are willing to work toward excellence to achieve their goals (Costa et. al, 2015; Thinking Collaborative, 2016).

What high levels of craftsmanship looks like	What high levels of craftsmanship sounds like
- Prepared and skilled - Taking pride in one's work - Self-assessment - Monitors progress towards goals	"I spent a lot of time on this." "Some other ways I can improve are…" "I'm proud of this because…" "My next step is…"

When we coach individuals with varied levels of craftsmanship, we should consider skills, vision, and goals. Then, we need to consider what criteria will assist in meeting the desired outcome. Data is a guide for individuals with varied levels of craftsmanship.

Question stems to shift levels of craftsmanship	"What outcomes will help you decide…?" "What data will support…?" "What do you consider when…?" "What criteria shows you that…?"

Mastering the state of mind	Ranging to...	Not using the state of mind
Assessing one's own performance		Lacks the ability to self-reflect, or simply chooses not to
Uses data to inform their work and improvement efforts		Does not seek available data, or does not analyze the data to identify positive and/or negative results
Monitors progress toward goals		Does not set goals, or perhaps does not intentionally apply actions that result in meeting goals
Monitors and manages resources, including time		Uses resources haphazardly and inconsistently
Has high expectations for themselves and their practice		Appears apathetic about their actions

References

Costa, A. L., Ellison, H., Hayes, C., & Garmston, R. J. (2015). *Cognitive coaching: Developing self-directed leaders and learners* (Vol. Third edition). Lanham, MD: Rowman & Littlefield Publishers.

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Efficacy

An efficacious individual values competence, lifelong learning, self-empowerment, goal achievement, and mastery (Costa et. al, 2015). They are optimistic, resourceful, and reach levels of self-actualization (Thinking Collaborative, 2016).

What high levels of efficacy look like	What high levels of efficacy sound like
- Self-confidence - Takes responsibility for actions - Ambitious	"I can do this." - Willing to be open to new ideas "How can I learn from this?" "I'm looking forward to trying…"

Our goal when coaching someone who feels less efficacious is to focus on their strengths and use those strengths to build confidence, perceived levels of competence, and actual capabilities to complete a task.

Question stems to shift levels of efficacy	"What has worked in the past?" "What do you feel you are most skilled at?" "What resources can you draw from to…" "What specific part of PBL do you feel emphasizes your strengths?" "How do you know when you're making a difference?"

Mastering the state of mind	Ranging to...	Not using the state of mind
Turning one's energy to a demanding task		Not attempting something because it looks too hard
Set challenging goals		Set limits on what can be achieved
Perseverance		Giving up
Learn and grow from mistakes and wrong turns		Never try again because "of last time."
Optimistic and confident		Discouraged and negative

References

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Flexibility

Flexible thinkers are comfortable with ambiguity, they look for and create new possibilities, are open-minded, and willing to change their mind if they obtain new data that leads in a different direction. They do not just use one method of problem solving. (Costa et. al, 2015)

What high levels of flexibility look like	What high levels of flexibility sound like
● Able to accept trying new things ● Willing to try new things ● Values different mindsets ● Thrives in challenging situations	● "What if we tried…" ● "I like how ____ tried ____…" ● "How is that different than…" ● "Am I meeting my students' needs?" ● "I am willing to give it a shot."

When coaching individuals with varied levels of flexibility, our goal is to recognize the position the individual is coming from and potentially shift the individual to feeling comfortable with other possibilities.

Question stems to shift levels of flexibility	"In what ways…" "What are the short term results? What about the long term?" "How do you think this will impact…" "What are your thoughts about…" "How do you think [student name] perceives this?"

Mastering the state of mind	Ranging to...	Not using the state of mind
Risk taking		Not attempting due to fear of the "what if..."
Demonstrates empathy for others		Fails to recognize other viewpoints and perspectives
Values differences in others		Feels that multiple perspectives makes things more difficult
Appreciate the challenge of problem solving		Prefers the ease of typical or ordinary situations
Embraces change		Prefers to "do what we've always done."

References

Costa, A. L., Ellison, H., Hayes, C., & Garmston, R. J. (2015). *Cognitive coaching: Developing self-directed leaders and learners* (Vol. Third edition). Lanham, MD: Rowman & Littlefield Publishers.

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Interdependence

When we practice interdependence, we are recognizing that the whole is greater than the sum of its parts. Being interdependent means we contribute to good of the group, seek partnerships of those they work with, and draw on the specific skill sets of colleagues. (Costa et. al, 2015).

What high levels of interdependence looks like	What high levels of interdependence sounds like
- Involved - Teamwork - Willing to commit resources for others' benefits - Recognize and draw from strengths in others - Reciprocally addresses weaknesses - Seeks camaraderie	"Welcome to my classroom!" "We're working together for the kids." - Accommodating - Collaborative - Offering unprompted assistance - Taking initiative

The goal when coaching individuals who are lower in levels of interdependence is to encourage the benefit of relationships as well as the reciprocal contributions team members provide each other.

Question stems to shift levels of interdependence	"What resources do you think _____ might have that could help?" "What benefits do you think would result from working with _____?" "What skills do you think you could offer when working with _____?" "How might you balance the desired outcomes between _____?"

Mastering the state of mind	Ranging to...	Not using the state of mind
"We-ness"		"Me-ness"
Willing to change to benefit the team, group, or organization		Unwilling to change, regardless of the reason
Uses energy and skills to meet group goals		Acts to achieve their own goals
Utilizes the resources and skills of others		Works independently
Values conflict as a way to share perspectives		Avoids conflict

References

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Professional Development: **Week Seven Training**

Week 7 Online PBL Training

Post in Canvas Page:

Take a look at the elements included in the BIE Gold Standard PBL model (Larmer & Mergendoller, 2015):

● Key Knowledge and Success Skills ● Challenging Problem and Driving Question ● Student Voice and Choice ● Sustained Inquiry	● Critique and Revise ● Authenticity ● Reflection ● Public Product

So far, we have selected our challenging problem or question and designed the sustained inquiry. Authenticity and Student Voice and Choice have been embedded into each of these in the following ways:

Authenticity	Voice and Choice
Relevant problems or questions that connect to students' lives and/or communities	Emphasizing student strengths through differentiated activities, inquiry, and research

This week we will continue with Voice and Choice and begin with Reflection as we design the next step of our unit. After students have been engaged in Sustained Inquiry, they will need to "Show what they know." After students complete this step successfully, they'll move on to the big, culminating project you've designed.

For the next step of your unit, determine how students will show understanding of what they've learned so far AND how they can begin using higher order thinking skills to reflect on that knowledge. By doing so, you'll be incorporating Voice and Choice that aligns with the UDL guidelines. (CAST, 2018)

Remember, we used the chart below when we first learned about PBL to consider multiple ways students can demonstrate understanding and express themselves. If you'd like to use that resource to brainstorm ideas, feel free to make a copy or print the chart:

Ways students can gain knowledge	Ways students can show what they know
1.	1.
2.	2.

3.	3.
4.	4.
5.	5.

Additional resources as you work on this week's activities:

GRR Instructional Design Model	5E Instructional Design Model
If you are using the GRR instructional design model, you should refer back to the GRR framework in our Canvas modules.	If you are using the 5E instructional design model, you should refer back to the 5E framework in our Canvas modules.
Your focus will be the "Productive Group Work" section.	Your focus will be the "Explain" section.

Be sure to complete this section on your unit plan by Friday to receive coaching on this step.

Week 7 Online Coach Training:

Post in Canvas Page:

Let's reflect about where we've been and what we've learned about coaching.
    1. Coaching is a dialogue between individuals.
    2. We use skills of questioning, paraphrasing, and pausing when we coach.
    3. Positive presuppositions serve as a guide during a coaching conversation.
    4. Each individual operates from different states of mind, and each may have different capacities.

For our final coaching element, we are combining all of this knowledge to apply to "the shift."
There are two types of shift, and you use one to achieve the other.
The first type is abstraction shift. The coach uses techniques of abstraction shift to change the focus of the conversation. The idea is to shift "up" to look at the situation with a broad lens, or shift "down" to consider more concrete ideas.

As you watch the demonstration below, take note of two things.
    1. The State of Mind the teacher is operating from.
    2. The formula for shifting:

Paraphrase	Summarize and organize information	Shift

The second type of shift is called cognitive shift. During a successful coaching conversation, the person being coached is the one who experiences cognitive shift. Watch both the videos on the Thinking Collaborative (2015) website to see how the coaching techniques result in cognitive shift.

We use one type of shift to achieve the other. Our resources to practice shifting techniques are linked below. On each State of Mind card, question stems have been added to guide abstraction shift.

The Coaching Chart linked here lists the "formulas" for building positive presuppositions, questioning, paraphrasing, and shifting. Feel free to print each of these charts out to use as resources.

Now, let's practice putting all our skills together to shift. Before you have dinner on Thursday, use these resources to paraphrase, summarize, and shift in response to the situation linked in the discussion board.

References

CAST (2018). *Universal design for learning guidelines version 2.2.* Retrieved from
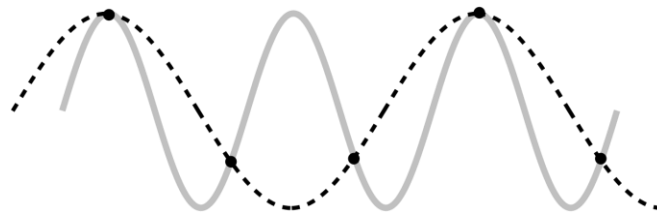   http://udlguidelines.cast.org

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Coaching Chart

	Questioning Stems
Inquiring	How might… What would… What might be some… In what ways…
Probing	How many students, specifically? What else were you considering when… What criteria will show you that… What are the connections between...
Extending	What do you think would happen if… How do you decide… How might you...

	Paraphrasing Stems
Facts	So you're finding that… You're not sure… What happened was… The problem is...
Feelings	You feel… I see that you are… It sounds like you are...
Opinions	So your view is that… You would like to… You believe that… You wish it were...

Don't forget approachable voice!

Abstraction Shift		
Acknowledge	**Summarize**	**Shift**
You feel… So you're finding that… You wish it were… So your view is that…	And you're finding that the issues are… While _____ is a concern, you're also concerned about _____. And you're recognizing that some areas of focus are… It appears that you're seeing a pattern...	[Use questioning stem to shift the state of mind]

Building a Positive Presupposition		
Acknowledgement	**Value**	**Question Stem**
Knowing your level of commitment… As someone who… Given your experience… As a teacher that/who...	Based on… In what ways… Using data... Relying on… Having tried… Since ___ happened...	What… When… How… Which...

References

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Professional Development: Training 8
Online Coaching Training:

You are reaching the final step of your PBL unit! Now, what will students do to extend and apply their knowledge? Let's start by taking a look at the elements included in the BIE Gold Standard PBL model (Larmer & Mergendoller, 2015).

● Key Knowledge and Success Skills ● Challenging Problem and Driving Question ● Student Voice and Choice ● Sustained Inquiry	● Critique and Revise ● Authenticity ● Reflection ● Public Product

In this stage, you will likely include the following elements (resources have also been linked for you):

Element	Resources
Student Voice and Choice	Above and Beyond (FableVision, 2011) Free UDL Tools (CAST, 2019)
Authenticity	2nd Graders as City Planners (Lee, 2017)
Reflection	Reflective Thinking (University of Hawaii, 2010)
Critique and Revision	Austin's Butterfly Drawing (EL Education, 2012)
Public Product	Watershed Project (PBLWorks, 2009a) PBL at ACE Leadership High School (PBLWorks, 2013) An Introduction to Project Based Learning (Edutopia, 2010) Hathaway Brown School's Project Based Learning Approach in Early Childhood Education (Hathaway Brown, 2016)

This week, you'll think about that big thing students will do at the end. In what ways can you design that project to include as many of the above elements as possible? Add that piece to the "Elaborate" section if you are using the 5E instructional design model. Add it to the "You Do" section if you are using GRR.

References

CAST. (2019). *Free learning tools*. Retrieved from http://www.cast.org/whats-new/learning-tools.html#.XeG6A5NKgWp

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Hathaway Brown. (2016, January 16). Hathaway Brown School's project based learning approach in early childhood education [Video file]. Retrieved from https://youtu.be/zCjWp62MbIg

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PBLWorks. (2013, May 15). PBL at ACE Leadership High School [Video file]. Retrieved from https://youtu.be/dwcIYLN2Y3c

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Professional Development: EQUIP Training

Learner Outcomes:
- Teachers will identify and define aspects of each EQUIP construct.
- Teachers will analyze observed classroom instruction to determine EQUIP levels.
- Teachers will accurately determine EQUIP levels based on observations.

Online training
At the end of the month, we will begin classroom observations and collect data for the levels of inquiry used during instruction. To keep observations consistent, we will be using an instrument called EQUIP to guide the observations. The EQUIP was developed by a group in the College of Education at Clemson University and is linked above for you to view.

Before we begin using the EQUIP to collect data for inquiry used in classroom instruction, we must learn how to score each section. The developers of this instrument have made this instructional video (Inquiry in Motion, n.d.) to demonstrate the instrument and how to use it in the classroom. When you open the link, it will direct you to a new tab. Click " Open Adobe Connect" to view. Before we meet on Friday, be sure to watch the video so you have background knowledge about using the instrument.

For your convenience, I've provided some resources and examples linked below:

Example EQUIP	This example demonstrates how data is recorded for Sections 2-7.
EQUIP Codes	Printable codes for handy access
EQUIP template	Template of instrument. New copies should be made and printed for each observation.

Beginning at the end of August, we will begin observing classrooms. Data will be collected using the EQUIP. The data collected will then be used as reflection during the coaching session.

Face to Face:

Driving question: How do we measure levels of inquiry?

Engage: (5 minutes) Start with Why:
Our why comes back to our driving question. How do we measure levels of inquiry? How do we define levels of inquiry?
We each may have different opinions or ideas about using inquiry. The purpose of our training today is to calibrate our opinions/ideas and practice using instruments to measure levels of inquiry.

Introduce new knowledge: (10 minutes)
Review the EQUIP construct rubric. (Begin with curriculum, then assessment, instructional, and end with discourse).
For each, compare to the PBL elements checklist. How do these relate?

Need to know with EQUIP: (10 minutes)
Target is a 3. 4's are awesome and can be a goal. But the target is a 3.
What do you see as the distinguishing factors between levels 2 and 3 for each construct?
Turn and talk: What mental image do you have in your mind about what this would look like?

The constructs are determined AFTER the lesson is over. Sometimes we feel like we need some support, or some data, to base our decisions on during this section. That's what the EQUIP codes are for. Present codes and review. (10 minutes)
What stands out to you about the codes?
How do they relate to the measurement criteria listed below?
What items in the codes correlate with items you try to be aware of when you plan lessons anyway?

Coding during a lesson:
The codes are collected in 5 minute increments. So the observer is constantly scanning the room and observing for what is occurring.
Tips:
- Everyone starts and stops at the same time
- Have a printed copy of the codes with you
- Half of the codes become consistent as the lesson goes on

Watch two training videos. Discuss differences and identifying factors that determined placement. Point out that we are calibrating our measurements.
Code, then define the constructs. (20 minutes)
Review together to calibrate.

During our observations, you will choose one focus area you want to receive coaching with.

Review goals from first Canvas post. Does your goal point out something specific and measurable so you can begin taking small steps toward that goal? If not, break it down right now. Don't make the goal so lofty that you don't have any way to know if you're on the right path. Focus on the little things you'll see along the way.

References

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APPENDIX K

IRB Approval Letter

University of Kentucky | Office of Research Integrity
IRB, RDRC

XP Initial Review

Approval Ends: IRB Number:
4/20/2020   50431

TO: Klista Rader, M.S. Ed
           Educational Leadership Studies
           PI phone #: 4174990410

           PI email: klista.rader@uky.edu

FROM: Chairperson/Vice Chairperson
           Non Medical Institutional Review Board (IRB)

SUBJECT: Approval of Protocol

DATE: 4/22/2019

On 4/21/2019, the Non Medical Institutional Review Board approved your protocol entitled:

Instructional Coaching: Developing Efficacy for Project-Based Learning

Approval is effective from 4/21/2019 until 4/20/2020 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, the IRB approved consent/assent document(s) to be used when enrolling subjects can be found in the "All Attachments" menu item of your E-IRB application. [Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.] Prior to the end of this period, you will be sent a Continuation Review (CR)/Administrative Annual Review (AAR) request which must be completed and submitted to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigator's responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" available in the online Office of Research Integrity's IRB Survival Handbook. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at 859-257-9428.

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Education

Midwestern State University	
Master of Science in Instructional Technology	2008
Midwestern State University	
Bachelor of Science in Elementary Education	2002

Professional Experience

Course Instructor II	December 2019-present
Western University	
Course Instructor I	2018-2019
Western University	
Curriculum Director	2016–2018
Lancaster Schools	
Technology Integration Specialist	2015-2016
Sahale Schools	
Founder and Consultant	2014-2017
21 Vision Education	
Director of Information and Implementation Technology	2013-2014
Harrison Schools	
Technology Integration Coordinator	2009-2013
Harrison Schools	

Professional Certifications

Google for Education Certified Innovator	2012
Buck Institute for Education, PBL	2012
eMINTS Affiliate Trainer	2010
eMINTS Certified Teacher	2008