The Impact of Lesson Study on Intermediate Teachers' Abilities to Teach Critical Thinking, Develop Professionally, and Gain Efficacy

by

Leonor Aguilar Lawlor

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

Approved March 2012 by the
Graduate Supervisory Committee:

Debby Zambo, Chair
Cory Hansen
Patty Horn

ARIZONA STATE UNIVERSITY

May 2012

ABSTRACT

Federal mandates, such as, No Child Left Behind (NCLB) set high standards, but in reality did little to promote critical thinking instruction and learning in our nation's schools. Race to the Top is our nation's current attempt to improve education and thanks to this legislation there is now a set of common core standards aimed at infusing critical thinking into the curriculum. Districts in Arizona are struggling to provide common core training to prepare teachers to teach these new, rigorous standards. This is a problem because teaching critical thinking is challenging. While grade level teams often get together, little time is devoted to create lessons that are focused on deep learning and little time is set aside to observe lessons and reflect on student engagement. One potential solution to this may be lesson study. Lesson study is a method of professional development that encourages teachers to reflect on their teaching through a cycle of collaborative lesson planning and observation. The lesson study cycle connects with the constructed nature of learning provided by Vygotsky Space.

This action research was designed to explore how 10 fourth, fifth, and sixth grade teachers at a K-8 school in Arizona learned how to infuse critical thinking into their lessons. This study took place from July to November of 2011. A mixed methods approach was used to collect data. Quantitative measures included Likert-items on a survey and lesson plans scored with the district rubric. Qualitative measures included open-ended survey items, transcriptions of lesson debriefs, reflective learning logs, and the researcher's personal field notes. Data were analyzed separately and then triangulated to reduce bias.

Findings from this study indicate that although it was challenging for the teachers, lesson study enabled them to successfully integrate critical thinking into their lesson plans. The process of lesson study increased the teachers' efficacy to create lessons, and it helped them understand how important critical thinking was for their students. The teachers also came to value the lesson study process as a positive approach to professional development. Based on these findings, implications are made, and further action research cycles suggested.

DEDICATION

To God for being the center of my world and giving me the wisdom and strength to do this; To Gabriela and Maximo--my kids who sacrificed long days and nights without their Mama and who I LOVE more than anything in the world-now it's your turn... To Grammy Tucson who traveled as much as possible to our home in Goodyear to clean, wash, cook and do whatever was needed to keep my family afloat so I could "study"; For my Dad who brought her and always believed his munchkin could do it; To Grandma Honey who couldn't believe that I was doing this (like her son), but did whatever she could to help including picking up her grandchildren from school and taking them to tennis practice and feeding them dinner; To Nino/Uncle Chris who took them to tennis while I wrote, babysat (our Manny), and irritated me along the way by saying, "LeeAnn you have to get this done because we all believe you can do this"; To sister Lisa aka Elsa for praying for me, and for Nino Rudi and Nina Kat and Uncle Jimmy who also helped take care of my kids when I had no one else. They ALWAYS said yes; To the late teacher and friend Beverly Froehlich who reminded me about why I started my study in the first place--our passion for kids to learn how to think critically despite… ; to Linnea and Alfredo who supported me through the entire doctorate program--what would I have done without you? YOU ARE BOTH SO SPECIAL! To all my dear friends, including my best friends Denise, Shahla, and Sonia, who I neglected these past three plus years but I think still love me--ultimately they believed that I could do this; and finally to the one person in

the world who I could NEVER have done this without--my best friend and husband Ken E. I love you! "Yo Ken…WE DID IT!"

ACKNOWLEDGMENTS

To Dr. Juliet Mendez for introducing me to this doctoral program and encouraging me to apply; to my assistant principal Siobhan who did more than her share at work while I was working on this program; to Phyllis for ALL her support and superior lesson study facilitator skills; to Dr. Patty Horn who supported me with her excellent lesson study knowledge and being my third chair; to Olivia and Cece (I am so glad you were born to Tony and Sonia) that supported my stats and editing; to Jeremy, Katie, Sarah, Vicki, Sierra, Marlene, Shaun, Shawna, Doug, and Susan--the teachers who brought lesson study to life and taught me SO much; to Mike D for working with me to integrate critical thinking into your seventh grade classes, To Martha, my wonderful school secretary who spent long hours transcribing and making sure everything was kept anonymous;To Dr. Cory Hansen for supporting me as my second chair and to the one and only Dr. Debby Zambo--the one person who pushed and supported me more than ANY other person on this earth. I sincerely don't know if I could have done this without you!

TABLE OF CONTENTS

Page

LIST OF TABLES x

LIST OF FIGURES xi

CHAPTER

1 INTRODUCTION 1

Purpose of the Study 4

2 REVIEW OF SUPPORTING SCHOLARSHIP 9

Lesson Study 9

Lesson Study in Japan 10

Planning Lessons and Developing Professionally 11

Challenges to Implementing Lesson Study 12

Effective Lessons 14

Critical Thinking 14

Critical Thinking Instruction, Equity, and Social Justice 15

Theoretical Lenses 17

Vygotsky Space 18

Teacher Efficacy 19

3 RESEARCH DESIGN 22

Introduction 22

Situational Context/Setting of My Innovation 22

Participants 23

Institutional Review Board 24

CHAPTER Page

Implementing My Innovation 24

Vygotsky Space 30

Research Methodology 32

Data Collection Tools 33

Teacher Survey 33

Piloting the Survey on Teacher Efficacy 34

Lesson Plans 35

Reflective Learning Logs 36

Audio Recordings and Transcriptions 37

Field Notes 38

Validity of Qualitative Analysis 38

Action Research and My Role as Researcher and Practitioner 41

4 ANALYSIS AND RESULTS 43

Quantitative Data Analysis 43

Teacher Survey 43

Reliability of Survey 44

Analysis of Teacher Survey 46

Teacher Survey Results 46

Analysis of Lesson Plans 52

Lesson Plan Results 53

Qualitative Data Analysis 56

CHAPTER Page

Open-Ended Survey Comments, Reflective Learning Logs, Lesson Study Audio Recording Transcriptions and Personal Field Notes 56

Analysis of Open-Ended Survey Questions 58

Open-Ended Survey Results 59

Analysis of Reflective Learning Logs 63

Reflective Learning Logs Results 64

Analysis of Lesson Study Transcriptions 69

Transcription Results 70

Analysis of Personal Field Notes 77

Field Notes Results 77

5 FINDINGS 81

Research Question 1 82

Research Question 2 85

Research Question 3 86

Research Question 4 87

6 CONCLUSIONS 89

Discussion 89

Unintended Effect 93

Implications for Practice 93

Concerns for Principals Wanting to Implement Lesson Study 94

CHAPTER Page

Substitute Teachers 94

Concept of Lesson Study 94

Limitations of My Study 95

Time 95

Participants 95

My Position 96

Future Implications 96

What is Next? 97

Educational Leadership 97

Closing Thoughts 98

REFERENCES 99

APPENDIX

A PARTICIPANT INFORMATION AND CONSENT LETTER ... 106

B EVALUATION RUBRICS 109

C TEACHER'S SENSE OF EFFICACY AND CRITICAL THINKING SCALE 112

D PILOT ALPHA CRONBACH 117

E INSTITUTIONAL REVIEW BOARD APPROVAL 119

F PERMISSION TO USE INSTRUMENT 122

LIST OF TABLES

Table Page

1. Research Questions and Data Collection Methods Used To Triangulate After Analysis 40

2. Final Cronbach Alpha 45

3. Pre/Post Survey Constructs, Items, and Descriptive Results 50

4. Paired Sample T-Test 51

5. Constructs With Effect Size Results 52

6. Lesson Planning and Student Engagement Rubric Scores From August to November 55

7. Qualitative Data Source Summary 58

8. Themes From Teacher Pre/Post Open-Ended Survey Results By Construct 63

9. Seven Themes Constructed and Codes from Reflective Learning Logs 68

10. Seven Themes Constructed and Codes from Audio Recordings Of the Lesson Study Debriefs 76

LIST OF FIGURES

Figure Page

1. Lesson study cycle 10

2. Using Vygotsky Space as a theoretical lens 19

3. The QUAN-QUAL model used in this study 33

4. Line graph trends for lesson planning and student engagement rubrics 56

Chapter 1 Introduction

"We want students to think outside of our classrooms and see what is not there."

E. Burger (2011)

Do students today possess the ability to think critically? Does our current public education system adequately prepare students to participate successfully in a global 21st century society? I believe these question stem from outside influences and as a principal, I ask myself these questions every day. In my years as a principal of a K-8 school, I have struggled with No Child Left Behind (NCLB, 2001) and the narrow teaching that has resulted from it. Although I think NCLB was a noble and ostentatious objective set by the government, this national movement to improve education, I contend, has inadvertently eliminated opportunities for students to become critical thinkers, and this is a major oversight. Like Wiggins (2011), I believe this is an essential skill necessary for student success in adulthood. The main focal points of NCLB are basic fluency, skills, and factual knowledge, and although these are important, they are not enough to advance our children's education to the next level.

Today, Race to the Top is the current national attempt to improve the quality of education for our students. Compared to NCLB, the focus of this legislation is moving in the right direction because it is asking states across our nation to promote world-class academic standards that foster critical thinking (The White House, n.d.). Although the Race to the Top legislation speaks to the need to infuse critical thinking into the curriculum, overall it has not yet impacted

the curriculum, teacher training, or lessons being taught (Duncan, 2011; Jacobs, 2010).

In the world today, educators must continuously teach higher levels of thinking for all students, even those who have not already attained proficiency on state reading and math standards (The National Association of Elementary School Principals, NAESP, 2010; Wiggins, 2011). Our teachers are preparing students for their future as adults, and this future will demand them to solve problems and think critically about complex situations (Moore & Berry, 2010; Wiggins, 2011). The National Association of Elementary School Principals (NAESP) states that, "Students in the United States need to know more about the world than ever before…they need high levels of knowledge and skills to thrive in an increasingly competitive and collaborative society. Skills such as global literacy, problem solving, ethics, social responsibility, teamwork, communications, innovation, and creativity have joined the list of high academic skills that are critical for success in the 21st century" (NAESP, 2010). I say this because in a recently published book, *Curriculum 21: Essential Education for a Changing World,* editor Heidi Hayes Jacobs (2010), cites evidence that though not the intention, during the NCLB movement, schools across the nation ended up lowering standards in order to teach children how to read and write by ignoring other parts of the curriculum, including the teaching of critical thinking skills. According to Schlechty (2009), "In a democracy, all citizens must develop a taste for excellence so that the judgments they make will lead to excellence rather than mediocrity…Simply put, modern democracy requires an elite education for nearly every student" (p. 15).

This notion was reinforced through a speech and article written by Education Secretary Arne Duncan who continues to advocate for changes to current academic expectations of students to include critical thinking skills (Duncan, 2010, 2011).

In the district where I served as principal, I witnessed this problem first-hand. The implementation of critical thinking, although recognized to be important by teachers and myself, continued to be pushed aside. Educational mandates from top-down initiatives had taken control of the curriculum and narrowed what teachers at my school could teach. My feelings aligned with others. According to Renee Moore and Barnett Berry (2010), teacher-leaders on the TeachersSolutions 2030 Team, educational decision-makers are out of touch with what teachers want or need and rarely ask teachers for their ideas. Additionally, to prove how discontented teachers are, they further go on to say:

> Like many other colleagues across the United States, we feel trapped in a logical inconsistency: We are held accountable for raising student scores on standardized tests but simultaneously exhorted to tailor our teaching to individual students' needs. This inconsistency becomes an absurdity when local districts and schools, operating on sheer survival instinct, micromanage our curriculum and teaching methods in a desperate attempt to meet regressive high-stakes testing benchmarks. (p. 37)

Teaching is a profession and removing teachers' autonomy to make curricular judgments robs them of the ability to plan effective lessons for their students. This practice demoralizes teachers and removes the most powerful weapon we

have in our schools-–our teachers (Hargreaves, Earl, Moore, & Manning, 2001; Ravitch, 2011). If training has not prepared teachers to think critically or deeply about the type of lessons students need to meet today's challenges, they will provide lessons that are devoid of students' real needs (Kincheloe & Weil, 2004). If curriculum and professional development rely on scripts and drills, teachers will become mere dispensers of information instead of facilitators of critical thought. As Paul (2009) notes, "Teachers are therefore uncomfortable in an intellectual discussion…the result is that most teachers would have difficulty modeling careful reasoning for their students…that the general distaste of many teachers for intellectual presentations is a sign of a very serious problem in education today" (par. 13).

Purpose of the Study

Given the current focus on performance, policy that mandates stripping the curriculum of critical thinking, and the lack of teacher confidence action needs to be taken. I say this because as a principal, I came to realize that accolades and celebrations do little to promote real learning. I believe disappointments based on low scores or a school label do little to motivate teachers or students. Instead students should be given the skills they need to succeed and be measured by their ability to think deeply and critically. I wanted the students at my school to be prepared for their future as adults in a global 21st century society. I wanted the teachers at my school to feel confident to teach to this level.

When I originally planned to work with teachers to infuse critical thinking into their curriculum, my intentions were to provide lessons that would teach

students how to answer the difficult higher-level questions on the state assessments. Students at my school were struggling with questions that asked them to infer, predict, and determine cause and effect; these seemed important to me. My thinking was that if we could figure out how to teach students to think deeply, critically, and wisely, to answer these questions, they could exceed in life, rather than meet a middle performance level on a test. Thus, as the school principal and practitioner researcher, I attempted to bring critical thinking into the curriculum at my school by implementing two previous cycles of action research. I worked with a middle school social studies teacher and a middle school reading teacher to bring critical thinking into their classrooms over the course of two semesters. These cycles of action research were somewhat successful because the teachers acquired new skill in planning lessons that encouraged critical thinking. But they were also disappointing because student written responses and discussions showed that they did not know how to respond to these lessons. These cycles opened my eyes to the difficulties and challenges of implementing critical thinking into the curriculum.

To spark interest in critical thinking at my school, during the 2009-2010 school year, I asked each grade level Professional Learning Community (PLC) to read a book called *Rigor is NOT a Four Letter Word* (Blackburn, 2008) and with this make a presentation on a chapter during one of our weekly faculty meetings. Reading this book opened up a myriad of dialogue of the possibilities of infusing rigor and higher-level thinking opportunities and instructional practices for students beyond the expectations of the standards-based curriculum they are

mandated to teach. As a member of the audience during these presentations, I witnessed first-hand the excitement the teachers had sharing and learning from each other; however, one book study was not substantial to meet our goal. We needed continuous dialogue and learning about critical thinking to change and enhance our instructional practices. After some investigation, I came to believe that lesson study could be the way to meet the professional development needs of my teachers.

As the principal of a K-8 school in the southwestern United States, I worked with teachers who expressed a desire to engage their students in higher levels of thinking. As their principal, I wanted to help my teachers design effective lessons that focused on critical thinking instruction for all the students at my school. My goal in doing this stemmed from my frustration with the constraints prescribed by eight years of No Child Left Behind (NCLB, 2001) mandates and promises of improved student learning through the restrictive lens of "scientifically-based research lessons." It was my personal belief that it is the teachers themselves, given the opportunity and support, who could become their own best professional developers and trainers.

Because of what I had learned through my previous action research cycles, class observations, and dialogues with my teachers, I realized that my teachers and I shared a common vision. We wanted to develop critical thinkers, but we were struggling with how to do this, especially when it came to infusing critical thinking into our curriculum. The teachers at my school had the desire to teach critical thinking but they were struggling to plan lessons that encouraged critical

thought. We had this goal, but it was not easy. Research showed that planning this type of thinking has been and will continue to be a struggle because explicit instruction and assessment of critical thinking is complex (Kincheloe & Weil, 2004; Paul, 1996). My teachers wanted to infuse critical thinking into our curriculum, but most of them had not been trained in how to do this important task. I wanted my teachers to incorporate critical thinking into their lessons so I provided professional development in a new and different way. Lesson study fit into what researchers believe teachers need for effective professional development. Teachers require more than traditional in-services and workshops to learn best practices (Fullan, 1993; Guskey, 2000). Instead of using traditional teacher workshops, the professional development I offered met individual needs of my teachers, and fit into structures already established at my school. Teachers meeting in grade level Professional Learning Communities (Dufour & Eaker, 1998) to plan lessons and develop professionally are common at my school. Thus I took action and facilitated a group of fourth, fifth and sixth grade teachers through the professional development process of lesson study to determine if together they could plan lessons that incorporated and promoted critical thinking. Lesson study differed from the process teachers typically used to lesson plan and teach. This was important because currently after teachers planned in their PLCs, they returned to their classroom and taught the lesson in isolation. The lesson study process would allow teachers to teach their collaboratively planned lesson, observe the lesson in action, and collect data during the observation. After the observation, teachers would have an opportunity to meet to debrief, dialogue

about the experience, and improve the lesson based on the behavior of the students. "The lesson study approach is a method of professional development that encourages teachers to reflect on their teaching practice through a cyclical process of collaborative lesson planning, lesson observation, and examination of student learning" (Caskey & Lenski, 2010, p.442). As I guided the teachers through my innovation, *using lesson study to teach critical thinking*, I studied and investigated the learning of my teachers through the following research questions:

1. How and to what extent will teachers at my school engage in the process of lesson study?
2. How and to what extent will lesson study help teachers write effective lessons that incorporate critical thinking?
3. How and to what extent will the process of lesson study and incorporation of critical thinking in lesson plans raise the efficacy of the 4th, 5th and 6th grade teachers at my school?
4. How will leading the process of lesson study change me as an instructional leader?

The following chapter provides a review of supporting scholarship on lesson study, effective lesson planning, critical thinking, its role in education, and professional development. Additionally, I explain my theoretical lenses, Vygotsky Space and efficacy.

Chapter 2 Review of Supporting Scholarship

To contextualize and establish the need for my study this chapter presents my review of scholarship and theoretical lenses.

Lesson Study

Lesson study is built directly on teacher knowledge and experience because it presumes teachers are experts in their field. Stigler and Hiebert (1999) authors of *The Teaching Gap*, elaborate this point by stating, "it [lesson study] is in marked distinction to teacher-development programs in the United States, which imparts knowledge and expects teachers to transfer it into one's context (for example, knowledge produced by educational researchers) and translate it into the messy and complex world of the classroom" (p. 122).

Having the opportunity to view student learning outside the lens of one's own classroom is integral to improving learning for both teachers and students. The dialogue and discussions that follow during debrief sessions (Lenski & Caskey, 2010; Lewis, 2002; Stigler & Hiebert, 1999) are of the utmost importance. These notions are reiterated throughout the literature on lesson study (Lenski & Caskey, 2010; Lewis, 2002). Teachers build on their collective wisdom as they watch each other teach, collect data, talk together, and consider how best to analyze and improve their lessons to support student learning (Lenski & Caskey, 2010). The lesson study cycle is displayed below in Figure 1.

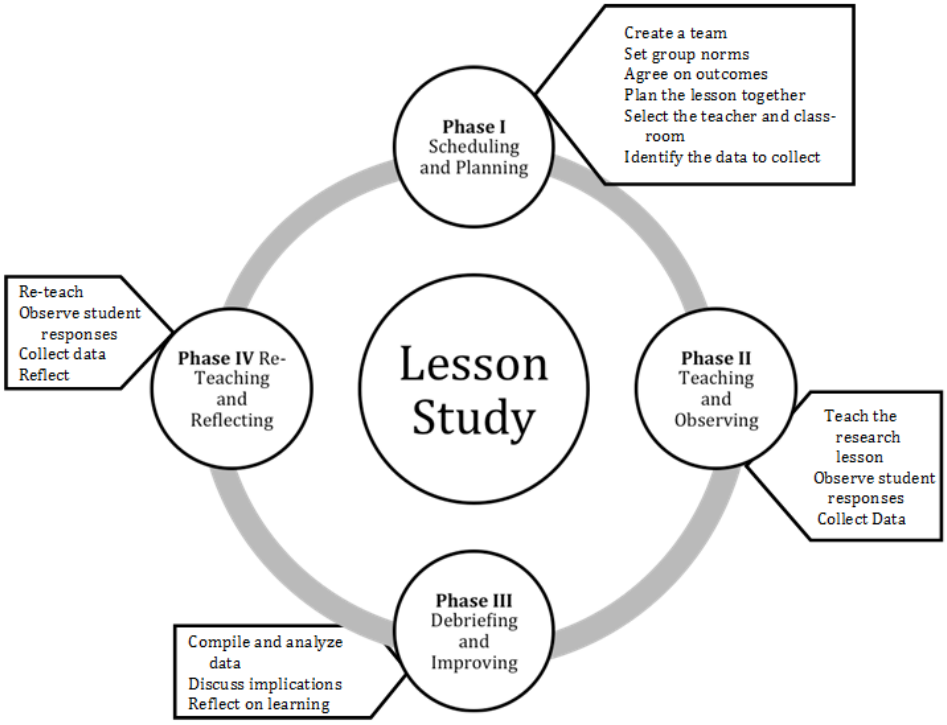

Figure 1. Lesson study cycle
(Adapted from Florida Department of Education Bureau of Curriculum and Instruction, Lesson Study Presentation, 2009)

Lesson study in Japan. For decades lesson study has been the chosen professional development used by teachers in Japan (Lenski & Caskey, 2010; Lewis, 2002; Yoshida, 1999). Lesson study, as defined, is a form of long-term professional development in which teams of teachers systematically and collaboratively conduct research closely on their lessons, and then use what they learn about student engagement and thinking to become more effective with their own instructional practices (Brown & Wiburg, 2007; Lenski & Caskey, 2010; Lewis, 2002). In Japan, time is allotted for lesson study and lesson study is expected to produce small improvements in teaching over periods of time (Lewis,

2002; Stigler & Hiebert, 1999). International ranking polls continue to show Japanese students out-performing the students in the United States and other democratic nations since 2000 despite the fact that the amount of money dedicated to education in Japan is well below that of what the United States spends (CBS News, 2010).

Lesson study in Japan is not viewed as a nationwide process for educational reform; it is simply how the nation trains and develops its teachers. In Japan it is understood that educational training courses at the university are merely the initial phase of a teacher's training and that the primary place teachers learn is on the job (CBS News, 2010; Stevenson & Stigler, 1992). In Japan, teachers spend approximately 60% of their time with students and 40% of time with other teachers planning and learning from each other. Professional development is collaborative and ongoing and non-intrusive (CBS News, 2010; Cooke, 2005).

Planning Lessons and Developing Professionally

"…And time for reflection with colleagues is for me a lifesaver, it is not just a nice thing to do if you have time. It is the only way you can survive."

M. Wheatley (2004)

The above quote captures how lesson study is intended to nurture ongoing professional development for teachers. Research concerning skillful planning reiterates that teachers need time to reflect on what they are doing, and they need to see that their efforts are improving and enhancing student achievement (Knipe & Speck, 2005; Lemov, 2010; Schmoker, 2011).

Researchers continue to agree that teachers who collaborate when planning optimize the potential to create reflective and effective lessons that utilize best educational practices for student learning (Darling-Hammond, 2011; Darling-Hammond & Bransford, 2005; Dufour & Eaker, 1998; Guskey, 2000; Marzano, Pickering, & Pollack, 2001; Schlechtly, 2009). Lesson study is a collaborative approach to teacher planning and professional growth that extends beyond the expectation of professional learning communities (Dufour & Eaker, 1998). Using lesson study teachers become practitioner researchers (Cochran-Smith & Power, 2010; Lewis, 2002; Rock & Wilson, 2005). They observe each other teach, research effective lesson strategies, reflect and revisit the lesson. Changes made as a result of the observation produce optimal learning conditions for their students with future lessons (Brown & Wiburg, 2007; Lewis, 2002; Rock & Wilson, 2005; Stigler & Hiebert, 1999). Additionally, teachers learn how to observe and collect data as to what to look for in students to improve how they deliver their instruction (Lewis, 2008).

Challenges to Implementing Lesson Study

Change is not easy and research on lesson study indicates teachers often fail to understand its potential. Instead of seeing lesson study as a means to professional development, they see it as a threat to their autonomy and a lengthy time commitment (Schmoker, 2006; Stigler & Hiebert, 1999). These concerns are common and legitimate because researchers have shown that the method of lesson study takes weeks or months to develop. It takes a lot of time to study students, predict how they might respond, research the lesson, study student learning while

a lesson is taught through data collection, debrief post observation to discuss and enhance instruction, refine the lesson, and resume the process all over again (Appel, Leong, Mangan, Mitchell & Stepanik, 2007; Stigler & Hiebert, 1999). The debrief stage, in itself, is an essential component of lesson study (Appel et al., 2007; Stigler & Hiebert, 1999). This is where teachers must take the time to review their observational notes and be candid in open discussions (Appel et al., 2007) with their peers on how a lesson could be enhanced beyond mere opinions and discourse that may appear to personally attack (Appel et al., 2007; Wang-Iverson & Yoshida, 2005) to ultimately implement what research describes as best practices (Dufour & Eaker, 1998; Marzano et al., 2001).

The concern regarding allocation of time during the school week (Appel et al., 2007) to commit to the process of lesson study can be a systems problem. If lesson study is going to be a valued component of teachers' professional development, principal support is integral (Knipe & Speck, 2005) and time to meet with teachers should be honored and considered a priority. Also, given that teachers traditionally teach in isolation and are not accustomed to their peers observing them instruct, fear becomes an issue to overcome (Appel et al., 2007; Caskey & Lenski, 2010; Stigler & Hiebert, 1999). Until, and if, lesson study becomes mainstream, the above challenges--time, autonomy, scheduling, support, isolation, and honest discourse during debriefing--will continue to create barriers to teacher-leaders who aspire to use lesson study to improve instructional practices (Appel et al., 2007; Brown & Wiburg, 2007; Caskey & Lenski, 2010). It is important to note that during any innovation there may be an implementation

dip where professional development does not appear to be functioning at the level of expectation. This dip may be explained by understanding what Michael Fullan (2001), author of *Leading in a Culture of Change*, calls the implementation dip. He writes, "The implementation dip is literally a dip in performance and confidence as one encounters an innovation that requires new skills and new understandings" (p. 40).

Effective Lessons

Effective lessons are recognized to be one of the most influential factors in successful teaching (Hunter & Russell, 2006; Lemov, 2010; Schmoker, 2011). Teachers who plan and present effective lessons prompt students to learn more than just surface knowledge, and at the same time, systematically move students to deeper and more rigorous thought (Blackburn, 2008; Hargreaves & Fink, 2006; Hattie, 2002; Kuhn, 2005). According to educational leaders today, it will be the teachers who are relied on to plan effective lessons that will make the difference for students as they prepare for their future in the 21st century. This future will require them to have access to critical thinking instruction (Hargreaves & Fink, 2006; Kuhn, 2005; Schlechty, 2009).

Critical Thinking

Critical thinking has been defined in a myriad of ways. It is difficult to conceptualize. According to the Foundation for Critical Thinking (Elder, 2007), the term critical thinking has its roots in the mid-late 20th century and can be defined as follows:

> Critical thinking is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fair-minded way. People who think critically consistently attempt to live rationally, reasonably, and empathetically. They are keenly aware of the inherently flawed nature of human thinking when left unchecked…They use the intellectual tools that critical thinking offers-- concepts and principles that enable them to analyze, assess, and improve thinking…They strive to improve the world in whatever ways they can contribute to a more rational, civilized society. (par. 7)

Edward Glaser (1941) defines critical thinking in a similar, but slightly different way:

> The ability to think critically…involves three things: (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of methods of logical inquiry and reasoning, and (3) some skill in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends… (p.5)

Critical Thinking Instruction, Equity, and Social Justice

Since the birth of our nation, the notion that its citizens need to think critically was foreseen as an integral part of a democratic society (Dewey, 1944; Gore, 2007; Gutek, 1991). However, to date, there seems to be no consistent evidence to prove critical thinking has ever been a core element in our educational

system (Cuban, 1993; Elder, 2010). While there have been attempts to infuse critical thinking into the public school system in the name of progressive education, curriculum in our nation's schools remains at the basic knowledge level (Apple, 2004; Cuban, 1993; Gutek, 1991; Kuhn, 2005). Instructing students merely at a knowledge level, as recognized by teachers, is the initial stage of Bloom's Taxonomy (Anderson & Krathwohl, 2001; Bloom, 1956) and will not advance students towards higher levels of literacy and preparation for the 21st century global society in which we live (Apple, 2004; Kuhn, 2005; Kincheloe & Weil, 2004). Why, then, is learning to think critically not intentionally woven into the curriculum and a norm in public schools for all students?

There are select students who traditionally have had access to critical-thinking instruction. These students are formally assessed and identified as gifted and are serviced by a gifted provider segregated from the mainstream classroom (Foucault, 1979; Kuhn, 2005; Paul, 2009). Rather than seeing the strengths in all students and embracing gifted education and its focus on critical thinking, educators continue to provide an alternative space for gifted students outside of the traditional institution (Foucault, 1979). Critics of this practice argue that preparing students to think and reflect critically is educationally appropriate for all students, not just ones that score high on a test (Kuhn, 2007).

Michael Apple (2004), author of *Ideology and Curriculum*, characterizes factions that advocate very different ideals of what schools should be teaching. Policymakers, Apple notes, have prescribed agendas that omit embracing learning to think critically. This is not new, even framers of the United States

Constitution, such as, Thomas Jefferson, believed that although education should be available to all citizens, only a select few should be afforded the right to a more thorough education that included learning to think critically (Gutek, 1991). Critical theorists have noted the omission of critical thinking from our schools. They characterize the downplay of critical thinking skills as a purposeful hidden curriculum (Apple 2004; Anyon 1980): an institutional approach to providing power to a select few (Foucault, 1979), an attempt to keep thinking out of the curriculum to oppress (Freire, 1970), or justify it as a more conservative versus radical approach to educating children (Kincheloe & Weil, 2004). Foucault (1979) might ask us to ponder the question, Do leaders of educational institutions or politicians running for office truly want their students, teachers or constituents to question?

Theoretical Lenses

The purpose of my innovation was to gain an understanding of what teachers thought about lesson study and critical thinking, reveal the process teachers went through as they learned and applied these ideas to their practice, and see how and if this learning helped them design lessons that were cognitively engaging and demanding. I had two hypotheses. I believed this learning would happen in a cyclical manner and because of this, Vygotsky Space became my first theoretical lens (Lave & Wenger, 1998; Vygotsky, 1978). I also hypothesized that information provided and social learning would improve the instructional efficacy of teachers and because of this, efficacy was my second lens. I believed efficacy mattered because it motivates teachers to be open to new ideas and to

persist when challenges arise (Tschannen-Moran & Woolfolk Hoy, 2001). Vygotsky Space and Bandura's theory of efficacy fit my hypothesis and were used to design, measure, and determine the effectiveness of my innovation. Through lesson study the teachers should be better able to infuse critical thinking into their lessons and promote critical thinking in their students. If this occurred, my data would demonstrate that my innovation was effective.

Vygotsky Space

Lev Vygotsky was a teacher turned psychologist who believed that learning occurred in social contexts (Daniels, 2001; Moll, 1990, 2003). He believed that "all knowledge is socially and culturally constructed…and learning is not natural, but depends on interactions with more expert others" (Gallucci, DeVoogt, Van Lare, Yoon, & Boatright, 2010, p. 925)… [Vygotsky Space] "represents learning in terms of relationships between collective and individual actions and between public and private settings" (Gallucci et al., 2010, p.8). The four quadrants are appropriation, transformation, publication and conventionalization. The appropriation phase encompasses training and vision. Transformation is how individuals negotiate meaning of the new information and data they are learning. The third phase, publication, depicts how teachers practice and learn while the fourth phase, conventionalization is where individuals make their new learning fit their personal learning situation.

I used Vygotsky Space to understand how teachers learn, make sense of, and use new information. Figure 2 summarizes how lesson study teachers traveled through each quadrant of Vygotsky Space.

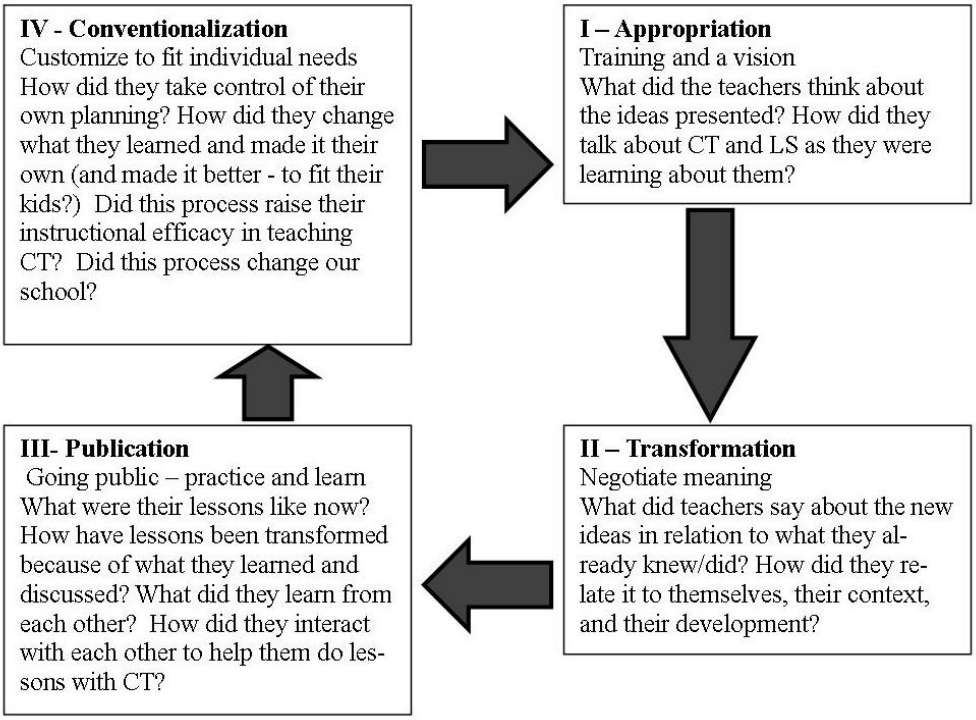

Figure 2. Using Vygotsky Space as a theoretical lens

Teacher Efficacy

" Evidence indicates that teachers' beliefs in their instructional efficacy partly determine how they structure academic activities in their classrooms and shape student evaluations of their intellectual capabilities." A. Bandura, 1997, p. 240

Efficacy is highly associated with teacher motivation, which in turn affects student achievement (Bandura, 1997). Teachers with a high sense of efficacy tend to spend more time planning, designing and organizing what they teach. They are open to new ideas, willing to try new strategies, set high goals, and persist through setbacks and times of change (Goddard, Hoy & Woolfolk Hoy, 2000). In other words, teachers with a strong sense of efficacy believe they can

and do make a difference in the lives of their students and that their students can and will achieve. However, research measures used to determine individual teacher beliefs regarding their personal efficacy shows that it is a complex construct (Hoy & Woolfolk, 1993).

In order to encourage positive efficacy, researchers identified a number of variables that are related to teacher efficacy (Bandura, 1997) which include providing teachers with on-going and accurate feedback of their instructional practices and encouraging teachers to work collaboratively to problem solve (Darling-Hammond & Bransford, 2005; Dembo & Gibson, 1985; Dufour & Eaker, 1998). Lesson study empowers teachers to work collaboratively to research and plan best instructional practices specific to their students or situational context as opposed to having outside consultants continuously proclaim to know the answers when it comes to instructional support of their students (Lewis, 2002; Systma, 2006). Lesson study used as professional development for teachers is supported by what Phillip Schlechty (2009) concludes in his book, *Leading for Learning* stating "If we are to provide every child with the best education possible, we need schools that give a central place to creativity and imagination and enforce standards of excellence through shared commitments, collegial reinforcement, and collaborative agendas rather than through bureaucratically managed external controls…" (p. 21).

In conclusion, each quadrant, as explained in the Vygotsky Space Model, overlaps with one another as they move through the phases. This researcher developed methods, both qualitative and quantitative, using the Vygotsky Space

framework that captured teacher learning throughout my lesson study innovation, along with measuring improved efficacy using a pre and post teacher efficacy scale to answer my research questions. Chapter three provides a guide for how I implemented my innovation along with an overview of the methodology and data collection tools I gathered over the course of my innovation.

Chapter 3 Research Design

Introduction

Chapter Two provided a review of supporting scholarship and overview of my theoretical lenses, Vygotsky Space and efficacy. In this chapter, the process I used to implement my innovation, using lesson study to infuse critical thinking into the curriculum at my school and the research methodology for my innovation is described. Here I describe the situational context, participants, data collection measures, and a description of the validity and credibility of these measures. This section also includes my role in the study.

Situational Context/Setting of My Innovation

The school is one of 13 kindergarten through eighth grade schools in the district, located in the southwestern United States. The school serves approximately 830 students. There are thirty classroom teachers, one instructional coach, four special area teachers, two special education teachers, one part-time gifted teacher, two full-time interventionists, and two part-time school interventionists. The demographics of the school include: 14% African American, 57% Hispanic, 24 % White, and 5% Asian, American Indian and Middle Eastern. Overall, not funded as a Title One school, the school qualifies with a free and reduced lunch count of approximately 60%. The school offers gifted education. The goal of the gifted program is to promote an environment that produces critical thinking opportunities; however the program is only provided to students who pass the state and district approved gifted test. Approximately 70 students from third through eighth grade receive gifted services

four days a week for 30 to 45 minutes. The gifted students represent eight percent of the school population.

Participants

Since they volunteered and are within my sphere of influence, the intermediate teachers at my K-8 school are considered a nonrandom/purposive sampling (Fraenkel & Wallen, 2006; Miles & Huberman, 1994). Nonrandom/purposive sampling was determined to be appropriate for my study because any group of teachers at the school would fit the context of my study, as the purpose is to learn how teachers will develop professionally through the process of lesson study. The specific teachers I chose for the study are the fourth, fifth and sixth-grade teachers. I chose to work with these teachers because I believe they represent an appropriate mix of novice and experienced teachers with a strong history of working well together as a grade level Professional Learning Community (PLC). Ten teachers participated in my study-- three fourth-grade teachers, four fifth-grade teachers, and three sixth-grade teachers. Additionally, one of the school interventionists participated in the study as a facilitator and not as a lesson study participant.

The school interventionist has eighteen years of teaching experience in multiple grade levels including art. She has been the school part-time interventionist for four years. I have been a principal for the school district for ten years. Collectively the range of experience among the teachers in my study, not including the school interventionist, will be a teacher beginning their second year to teachers with over ten years of experience. The fourth and fifth-grade teachers

teach all content areas. The sixth-grade teachers are departmentalized as one teaches math, the other writing, and the other reading. These grade level teachers plan together weekly, however, none of the teachers have ever observed each other teach a lesson that they prepared as a collective group.

Institutional Review Board

Securing confidentiality and providing ethical protection for each participant and the school site was paramount to this study. As such, a request to conduct the study was submitted to the Institutional Review Board (IRB) for the Protection of Human Subjects in Research at the University. Each participant signed and retained a copy of the informed consent form describing the parameters of the study, participant involvement, measures of protections, including the right to withdraw at anytime, and the intended use of the data (Appendix A). The researcher used pseudonyms for all participants in the program and the location. In no case was any staff member or student identified by the researcher or in the research.

Implementing My Innovation

Lesson study is a teacher-led instructional improvement cycle (Lewis, 2002) that I used as the vehicle to provide teachers at my school an environment to learn how to implement critical thinking instruction and learning into their classrooms. The following guidelines describe how the innovation came to life during the first several weeks of school, August to November 2011.

In May, prior to school concluding I met with my 2011-2012 fourth, fifth, and sixth-grade teachers to provide them a brief overview of what to expect at the

beginning of the school year. I shared my excitement of having the opportunity to work with them on lesson study and my mission to support them with infusing critical thinking into the curriculum. I provided an overview of the two action research cycles I completed with the seventh and eighth-grade students and teachers and the conclusion; critical thinking is a challenge for both students and teachers. Then, my school interventionist, an experienced facilitator in lesson study, provided an overall background of how lesson study would be used for their professional development in the fall of 2011. I adapted, with permission, the materials that were created through the Northern Arizona University Teacher Induction Program and components from the research I discovered in my scholarly review to create a PowerPoint presentation for my teachers. I then provided them with literature, book titles, and the critical thinking websites that they could peruse over the summer if they decided to participate in my innovation for the next school year.

In July and the first week in August when teachers returned, and prior to the students' first day, I met with them on two half days for a total of eight hours. During the July meeting, I had the teachers fill out a pre-survey on instructional efficacy for teaching critical thinking. The survey consisted of six constructs: efficacy in student engagement, efficacy in instructional strategies, efficacy in classroom management, teacher beliefs about lesson planning, teacher beliefs about their peers, and teacher beliefs about critical thinking. After each construct, teachers were asked to write a response to an open-ended question related to each construct. Then, because it was essential to connect what we were doing to the

district and state expectations, during that first meeting, teachers were provided with time to reflect on the year's prior book study on rigor and specifically what was learned about critical thinking in school, and if they learned anything new over the summer. Their reflections were recorded on chart paper. Then, any concerns were addressed regarding what they were expected to do via district expectations and what we were doing to increase student thinking through lesson study. I assured them that the district was aware of and approved the exciting professional growth opportunity they were participating in.

After we established how what we are doing was enhancing district initiatives, we looked at various definitions and the history of critical thinking in education. I shared a few websites that provided an overview of critical thinking including a key site, livestrong.com. Resources were provided for the teachers in the form of several articles, books, and the use of the Internet, including time to access the critical thinking website. After about an hour, each grade level PLC collaborated and prepared an overall team definition of critical thinking. They shared with each other and all definitions were recorded and a dialogue was facilitated to share learning.

During the August workshop, each grade level teacher looked at their grade level curriculum guides and developed long-range pacing guides with their PLCs. After they determined their yearlong curriculum map, teachers created a pacing guide for the month of August. I asked the teachers to highlight the areas in their curriculum in which they wanted to infuse critical thinking instruction into their weekly lesson plans. They agreed on the content they would use to plan

their first “research lesson.” Fourth and fifth-grade levels chose to use math as their content. The sixth-grade team was departmentalized and planned lessons using their content: reading, math and writing. The lesson study cycle was then reviewed and discussed. The cycle is as follows: 1. Goal Setting and Planning (Explain); 2. Research Lesson (One member of the team agreed to teach the lesson while the others observed and collected data on student thinking.); 3. Lesson debriefs; analyze data collected, share critical thinking that worked, improve lesson based on data collected; and, 4. Refine and another team member taught while others observed (Brown & Wiburg, 2007; Lewis, 2002). It was imperative that teachers understood the “thinking” part of lesson study--the fact that lesson study’s emphasis is on student thinking (Lewis & Perry, 2008). Stressing the importance of goal setting to reach higher levels of thinking was additionally integral to a successful lesson study process. Both sections of the cycle could be a challenge. The school interventionist and I spent time discussing this, and she shared her previous experiences with lesson study.

Afterwards, I passed out our school calendar and a schedule of the days we planned on meeting as a team for lesson study. I asked teachers to meet in their individual grade level PLCs and provide me with their team norms and plans for observing each other using what they learned about the lesson study process. I provided them with substitute teachers that were coordinated so grade level teachers had minimal loss of prep time.

At this time, I introduced reflective learning logs to teachers and explained what they were going to be used for and let them know this was part of my data

gathering process. I asked each teacher to respond to the first learning log. To maintain confidentiality, they individually completed the logs via the computer and sent them to the school secretary, who in turn, deleted their names and sent them to me. I also let teachers know that the hours they completed throughout lesson study would be documented and they would earn professional clock hour points to be used for teacher recertification. I let them know the certificates would be presented in November just after the Thanksgiving break.

Teachers met with me again in August during the second week of school. During this meeting, we discussed what they learned about the new students who were in their class. Understanding since they had only two weeks to learn about them, they listed ideally what they wanted students to be able to do based on what they knew about critical thinking learning. At this time, the teachers used this information to develop their goal and plan their first lesson. I collected this lesson plan. Teachers then were given samples of how they might collect data during the lesson observation. Teachers then determined roles for this lesson study: who was presenting the lesson and data collectors. They determined which students they would focus on and asked our school coach to videotape. I arranged for substitute teachers. I made sure my teachers understood that when they went in to observe the lesson they planned collaboratively, they were not evaluating their peers. I, along with my interventionist who was assisting with the lesson study facilitation, modeled how to observe the lesson using student behaviors as a guide for improvement. We helped the teachers understand that the lesson was created as a team and the goal was to enhance the lesson, and not to evaluate the teacher.

After the observations and when the teachers met together, I tape-recorded their discussions and the process they used to revise the lesson. I collected a copy of the “revised” lesson plan.

The rest of the lesson study cycle followed this pattern and allowed teachers the freedom to infuse their ideas and learning to update their plans as they continued to learn from each other and their students. A calendar with the scheduled meetings for each grade level was determined in August during the first lesson study session. Lesson study debrief sessions were recorded at the beginning, middle and end of the innovation. Midway through the lesson study innovation to support teachers even further with infusing critical thinking into their lesson planning, I invited an expert trainer in lesson study, Dr. Patty Horn, professor of teaching and learning at Northern Arizona University, to meet with and work with my teachers during an early release day at my school. This training was beneficial and well received by my teachers as it added to their understanding of how to use essential questions to get to the critical thinking portion of their lessons.

By November, when my innovation was complete, I collected revised lesson plans and asked teachers to respond to a final learning log. The last week of the innovation, I also asked teachers to complete the post survey. We then had a final debrief session. Each grade level PLC wrote up their overall experience to share with the rest of the staff at our school, the superintendent, and the district staff development leaders. I gave certificates for professional development recertification points to my participants.

Vygotsky Space

I relied heavily on Vygotsky Space to understand the learning of the teachers in this study. The following demonstrates how my innovation was designed to help the teachers travel through the four defined quadrants of this lens:

Quadrant I- Appropriation: Teachers were introduced to the process of lesson study and told how it could be used to collectively develop lessons that incorporate critical thinking and infuse it into the curriculum. I shared my knowledge of critical thinking by showing the teachers various websites and resources pertaining to quality critical thinking and instruction. I described the process of lesson study and how it would be used to collectively incorporate critical thinking into the lessons each grade level PLC would plan together over the course of the innovation. I offered time for the teachers to learn and share about critical thinking by perusing the research and websites I provided. I asked teachers to work in their grade level PLCs to look through their grade level curriculum guide and highlight content areas that were conducive to integrating critical thinking. Because my teachers had only received a brief introduction to lesson study, I provided a more thorough presentation (see Figure 1) of how lesson study worked. At the end of the working session, I asked teachers to submit responses to learning log questions.

Quadrant II- Transformation: As teachers worked in their grade levels to create critical thinking lessons, I listened to their discourse and watched their interactions to understand how they were making meaning and connecting their new learning, and if they were connecting it to what they already knew. I audiotaped these discussions and collected a copy of their first lesson plan.

Quadrant III- Publication: During this period, one individual taught the research lesson as he/she interpreted it, while the other teachers observed and recorded how students were responding to the lesson being taught, paying particular attention to the behavior of the students. Afterwards, teachers met to debrief about the lesson to discuss areas that needed refinement based on their observation notes. They updated the lesson and planned for another observation. I captured the first and last debrief sessions on tape to determine if these sessions revealed a transformation of learning that would continue to grow throughout the weeks of lesson study. I asked the teachers to respond to learning log questions at the end of various debrief sessions. I collected a copy of each revised lesson.

Quadrant IV- Conventionalization: This phase transpired from Quadrant III and was when teachers added to their new learning and customized it to fit their teaching style and their students' needs. This phase is one of convention because it is making lesson study and critical thinking a part of their routine practice. During this phase teachers adapt and enrich the lessons. This phase is where deeper learning experiences are seen and efficacy should be raised. I asked teachers to respond to a post survey and a final learning log entry.

Research Methodology

Mills (2007) defines action research as, "any systematic inquiry conducted by teacher researchers, principals, school counselors, or other stakeholders in the teaching/learning environment to gather information about how well their students learn" (p.5). Insiders conduct action research to make things better and close the theory/practice divide (Hinchey, 2008; Stringer, 2007). Utilizing an action research framework, I employed a mixed-methods approach to examine if providing professional development through the process of lesson study would help the intermediate teachers at my school incorporate critical thinking in their lessons. I also sought to understand if this process raised their efficacy. In this study, I took the approach of a pragmatist (Christensen & Johnson, 2008; Creswell & Plano Clark, 2007; Miles & Huberman, 1994) because I was not concerned about finding "final proof" to answer my research questions. Instead, I attempted to meet John Dewey's standards of "warranted assertability " (Christensen & Johnson, 2008, p. 448). I collected qualitative and quantitative data (Fraenkel & Wallen, 2006), simultaneously using a mixed-methods one-phase triangulation design (Creswell & Plano Clark, 2007) as shown in Figure 3 to create objectivity, provide a more complete description of the situation, and achieve validity (Fraenkel & Wallen, 2006).

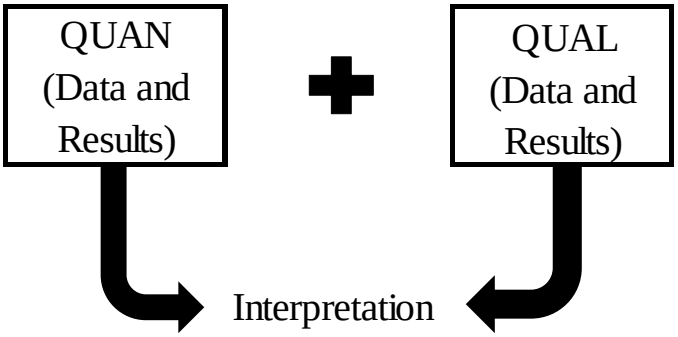

Figure 3. The QUAN-QUAL model used in this study
Adapted from Creswell & Plano Clark (2007). *Designing and conducting mixed-methods research*.

To ensure I answered my research questions, I considered where (location), how often (time), and how much (frequency) data was needed to be collected and analyzed (Fraenkel & Wallen, 2006). My selection of data sources include a pre and post survey with open and closed items, lesson plans created by the teachers, audio-recordings of the teachers during lesson debriefs, and learning logs. I also took field notes to capture my learning during the process of my research.

Data Collection Tools

Teacher survey. The survey provided perspectives to these questions: 1) How and to what extent, will the process of lesson study and incorporation of critical thinking in lesson plans raise the efficacy of the fourth, fifth, and sixth-grade teachers at my school? 2) How and to what extent, will teachers at the school engage in the process of lesson study? All of the teachers participating in the study completed the pre survey in July 2011, several weeks prior to the start of

the innovation implemented from August to November 2011. The same survey was given after my innovation was concluded in late November 2011. The survey included six constructs with 27 closed items. I included an open-ended comment section after each of the six constructs in order to gather anything additional my teachers wanted to add. The survey took fifteen to 30 minutes to complete. To maintain anonymity the teachers used a code in lieu of their name—the first two initials of their middle name and year they graduated from high school.

Piloting the survey on teacher efficacy. In order to ensure reliability and test out a survey with a few teachers at my school, I elected to use a survey already written by Tschannen-Moran & Woolfolk Hoy (2001), "The Teachers' Sense of Efficacy Scale", and one that I could adapt to fit my research needs. I used most of the items on the original survey, but deleted a few questions that I deduced did not concern my study. The Tschannen-Moran and Woolfolk Hoy survey included three constructs: efficacy on student engagement, efficacy on classroom management, and efficacy on instructional strategies. I added three additional constructs: teacher beliefs regarding critical thinking, beliefs about their peers, and beliefs about lesson planning. The pilot survey contained 30 closed questions. The original survey consisted of a 9 "a great deal" to 1 "nothing" Likert-item scale and did not include open-ended response questions. I disseminated the survey in January of 2011 to six teachers at my school. The directions asked the teachers to provide me with feedback on the pilot both positive and negative so that improvements could be made for the survey I would

be using for my study. Five of the six teachers returned the pilot survey to me with ideas for revisions and suggestions for improvements.

Lesson plans. Lesson plans helped provide perspectives for the following research question: How and to what extent, will lesson study help teachers write effective lessons that incorporate critical thinking? Written lesson plans are a district requirement for every teacher. At my school, as part of the lesson study innovation, teachers wrote lesson plans to infuse critical thinking into their instruction. They did this within their grade level PLC. Each month from August to October 2011, I collected two lesson plans, and one plan was collected in November. When each lesson plan was collected, it was scored by myself and my assistant principal using the two rubrics I determined would be applicable from my district's teacher evaluation: lesson planning and student engagement (See Appendix B). The reason I chose the above two rubrics out of the five total from the evaluation, is that the lesson planning rubric identified specific written teacher actions and plans related to the infusion of critical thinking. The second rubric, which focused on student engagement, specifically described how teachers engaged their students in critical thinking during the lesson. Both evaluation rubrics were based on a five-point rubric with 5 being exceeds, 3 proficient, 2, approaching, 1 developing and 0 unsatisfactory. Specifically, in order to achieve an 'exceeds' score on the engagement rubric, a teacher must plan for the elicit teacher to student and student to teacher interaction to implement questioning strategies and activities that: 1) Increase the retention, application, and extension of content by constructing, scaffolding meaningful connections and experiences;

2) Move students to higher levels of thinking and performance in a planned and deliberate manner; and 3) Elicit student to student interaction and discussion to reinforce application of key vocabulary, new content or concepts. Both rubrics (See Appendix C) used collectively were scored to determine if the lessons teachers create improved their ability to teach and engage their students to think critically over the length of the research study--especially when their main objective was to enhance and update the lesson after an observation and during the debrief session. To increase reliability, I had the assistant principal score the lessons using the rubrics. I did this to eliminate bias and attempt to create inter-rater reliability (www.socialresearchmethods.net; Stronge & Tucker, 2003).

Reflective learning logs. Learning logs provided perspectives for the following research questions: How and to what extent, will teachers at the school engage in the process of lesson study? How and to what extent, will the process of lesson study and incorporation of critical thinking in lesson plans raise the efficacy of the fourth, fifth, and sixth-grade teachers at my school? Each teacher in the study completed a learning log entry after each lesson study session because they have been used in adult learning to promote metacognition (Commander & Smith, 2010; Siribaddana, 2010) and capture what has been learned. In order to maintain anonymity, teachers responded to the learning log on the computer. Each learning log entries took between fifteen to thirty minutes.

The following is a list of learning log questions asked:

- Do you think all teachers should have to teach critically thinking?
- Do you feel you understand how to teach and plan for critical thinking? Please explain.
- I have been learning how to…
- The most important thing/s I learned today was…
- My PLC incorporated critical thinking into the lesson by…
- After the observation (if applicable), my PLC enhanced the lesson by…
- Explain how competent you feel to incorporate critical thinking into the lesson plan.
- Explain how comfortable you felt (if applicable) having your peers observe the lesson you planned together.
- How do you feel about the process of lesson study in regards to developing professionally as a teacher?
- What do you think about incorporating critical thinking into your lessons?
- Do you think all students should learn how to think critically?
- Other comments:

The teachers sent the completed logs via the computer to the school secretary and used the same name codes they used on the survey. The school secretary sent the completed logs to me.

Audio recordings and transcriptions. I audio recorded the fourth, fifth, and sixth-grade teachers lesson planning together to provide perspectives for the following research questions: How and to what extent, will teachers at the school

engage in the process of lesson study? How and to what extent, will lesson study help teachers write effective lessons that incorporate critical thinking? How and to what extent, will the process of lesson study and incorporation of critical thinking in lesson plans raise the instructional efficacy of the fourth, fifth, and sixth-grade teachers at my school? The lesson study planning sessions and debriefs were transcribed in order to capture the details from the discussions and dialogues of my teachers as they cycled through the process of lesson study. As my guide, I coded the transcriptions using my theoretical lenses of Vygotsky Space and efficacy.

Field notes. My field notes provided a personal perspective to help answer all my research questions and additionally the following research question: How will leading my teachers through the process of lesson study change me as an instructional leader? There were several steps during my innovation. I noted reflections from my action research implementation of lesson study in my field notebook starting after the teachers took the pre survey in July 2011. I then took reflective field notes in an attempt to capture and document what I learned from my teachers throughout the entire process of my innovation.

Validity of Qualitative Analysis

In order to avoid "unfounded assertions" (Amrein-Beardsley, 2008) and increase credibility and validity, I triangulated my data collections using the QUAN-QUAL model to interpret my results. Gay, Mills, and Airasian (2009) define triangulation of the data as "a process of using multiple methods, data collection strategies, and data sources to obtain a more complete picture of what is

being studied and to cross-check information" (p.377). By triangulating the data (see Table 1), I was able to balance the weakness and strengths of the instruments and their consistency (Fraenkel & Wallen, 2005). Table 1 shows my research questions and the data I used to triangulate during the analysis phase of my study to establish reliability to answer my research questions.

Table 1

Research Questions and Data Collection Methods used to Triangulate After Analysis

Research Questions and Data Sources	Teacher Surveys Pre/Post and Open-Ended Questions	Reflective Learning Logs	Audio Recording of lesson debriefs	Lesson Plans	Field Notes
1. How and to what extent will teachers at the school engage in the process of lesson study?	QUAN/ QUAL	QUAL	QUAL		QUAL
2. How and to what extent will lesson study help teachers write effective lessons that incorporate critical thinking?			QUAL	QUAN	
3. How and to what extent will the process of lesson study and incorporation of critical thinking in lesson plans raise teachers' efficacy?	QUAN/ QUAL	QUAL	QUAL		
4. How will leading the process of lesson study change me as an instructional leader?					QUAL

Action Research and My Role as Researcher and Practitioner

The most challenging part of implementing my innovation was that at the time of my study I was the school principal and I recognized that my ideas for instruction were sometimes different from those of my teachers. I was a Social Studies teacher prior to becoming a school administrator. I had my own vision of what an engaging and critical thinking classroom should look like. Although I would have enjoyed being part of a Professional Learning Community as a teacher, I also know that back in the days when I taught middle school Social studies, 1989-1995, I did not have the pressures of No Child Left Behind, nor was I expected to meet weekly in a Professional Learning Community to share ideas and commit to improving reading and writing through my content so students could pass a test.

Stringer (2007), author of *Action Research*, writes about the legitimacy of an action research project versus one that is scientifically based. In the section of his book titled, "Power, Control and Subordination" (Stringer, 2007, pp.194-197), he notes those who implement action research in an environment where they hold a dominant position need to be careful of the power they hold. Since I implemented an action research project in a school where I was principal, I needed to be cognizant of the power I had over my teachers and students. With this realization, I did whatever possible to eliminate the bias I brought to the implementation of my innovation.

As a leader of an innovation I faced pressures from my district office because they continuously repeated that district initiatives and "non negotiables"

should be based on scientifically based research strategies. Although I understood district leaders were under enormous pressure to hold their schools accountable, and I empathized with them, I respectfully rejected these initiatives because I felt they were not the best way to increase teachers' professional development. This idea aligns with Stringer who writes, "Centrally devised best practices rarely take into account the dynamic social and cultural forces that operate in diverse contexts in which professional practitioners work and therefore place them and their clients and students in untenable situations" (Stringer, 2007, p. 194). The mandates I was facing had nothing to do with critical thinking, nor did it allow my teachers to utilize their own researched-based best practices and expertise. My teachers were being asked to teach by reading from a script. As their principal, I knew this was no way to raise their efficacy or increase the achievement scores of the students at my school.

Chapter 4 Analysis and Results

In the previous chapter I explained my methodology and data collection tools. In this chapter I describe my data analysis plan, then present the results from both my quantitative and qualitative data. The first section describes how I analyzed my quantitative data (pre and post survey closed-ended items and lesson plans) and provides the results from my analysis. The second section explains how I analyzed my qualitative data (pre and post open-ended items, transcriptions from grade level teacher lesson debriefs and discussions, reflective learning logs, and personal field notes) and provides the results from my analysis.

Quantitative Data Analysis

Teacher survey. The teacher survey was administered to answer the following research questions: 1) How and to what extent, will the process of lesson study and the incorporation of critical thinking in lesson plans, raise teachers' efficacy? 2) How and to what extent, will teachers at the school engage in the process of lesson study? Because my intention was to gather "honest" feedback regarding the process of lesson study and critical thinking, teachers completed the survey anonymously and without me present. I did not want my role as their principal to influence their answers and did not want to be able to identify who provided specific answers, so the teachers used the first two letters of their middle name and the year they graduated from high school in lieu of their names. The pre survey was given at the end of July 2011, which was prior to implementation of my innovation, to ten teachers. The survey was administered again in November 2011 to the same ten teachers at the conclusion of my

innovation. The survey consisted of 27 closed-items with six constructs, three meant to gather information on their perceptions of their efficacy in student engagement, instructional strategies and classroom management, and three to measure teachers' beliefs about their ability to create good lesson plans, be influenced by their peers, and teach critical thinking. The survey contained a 4-point Likert scale that ranged from a great deal, somewhat influence, very little, and not at all. Each time the survey was taken, it took approximately 20 minutes for the teachers to complete.

To gain more insight and allow participants to voice their ideas, open-ended questions were added at the conclusion of every construct. This addition created a survey with mixed data. The qualitative data analysis and results will be discussed later. A copy of the updated pre/post survey that was given in July and November 2011 is included in Appendix C.

Reliability of survey. To determine the reliability of the survey I used the Statistical Package of Social Sciences (SPSS) to calculate the Cronbach Alpha (Cronbach, 1951). In order for a survey to be deemed reliable it must receive a score of 0.70 or higher (Cronbach, 1951). Initially, after the first calculations, the total survey appeared to be reliable as the overall value of the Cronbach Alpha was 0.87. However, when I ran the individual constructs, only the efficacy constructs from the Tschannen-Moran and Woolfolk Hoy efficacy survey were reliable. The three constructs I wrote about teacher beliefs did not achieve a 0.70 or higher (See Appendix D). Given the low Alpha on the belief portions of the survey I wrote, I added additional questions to the three individual constructs

about teacher beliefs' to improve its reliability. I also removed questions from the original efficacy survey because they did not fit the needs of my study. The first time I reran the survey per construct to calculate the Cronbach Alpha the reliability calculation did not score 0.70 or higher. I recalculated the survey a third time after removing two questions from the construct, efficacy for student engagement, and one question from beliefs about critical thinking. This time all six constructs were above the 0.70 and were deemed reliable. These results are provided in table 2.

Table 2

Final Cronbach Alpha

Construct	Item #'s	Cronbach Alpha
Efficacy in Student Engagement	1,2,5,6	.735
Efficacy in Instructional Strategies	7,8,9	.773
Efficacy in Classroom Management	10,11,12,13,14,15	.764
Beliefs about Lesson Planning	16,17,18,19,20	.741
Beliefs about Peer Support	21,22,23,24	.917
Beliefs Amount of Critical Thinking Instruction	26,27	.731

Analysis of teacher survey. To measure the impact of my innovation, I analyzed my quantitative data using descriptive and inferential statistics (Gay et al., 2009). To organize my data, I created an Excel spreadsheet that was color coded by construct. I then entered each teacher's responses to the closed items. If the response was a great deal of influence I entered a 4, somewhat influence was entered as a 3, very little influence 2, and no influence at all was entered as 1. I interpreted this to mean scores between 4.00-3.50 would denote they thought they had a great deal of influence, 3.49-2.50 somewhat influence, 2.49 – 1.50 very little influence and 1.49- 1.00 no influence at all. Then using the Statistical Package for the Social Sciences (SPSS) I ran descriptive statistics to calculate means (*M*) and standard deviations (*SD*) for each construct. Inferential statistics were then used to compare pre and post survey results using a *t*-test.

To calculate effect size (http://cogntiveflexibility.org/effectsize/) in order to determine the magnitude of the innovation (Gay et al., 2009), I used Cohen's *d*. Effect size is a "numerical way of expressing the strength or magnitude of a reported relation" (Gay et al., 2009, p. 96). Cohen (1992) defines a medium effect to be "visible to the naked eye of a careful observer" (p. 156). The effect size helps "cue the researcher regarding the noteworthiness of…anomalous results" (Thompson, 1996, p. 28) that can occur with a small sample size (Coe, 2002). The general index for magnitude for Cohen's *d* is: 0.20 small effect, 0.50 medium effect and 0.80 large effect.

Teacher survey results. The first construct measured how much they could influence student engagement, and there were six items meant to capture

how strongly teachers felt they could effectively impact all students in their class to value learning or promote critical thinking. Additional items measured their beliefs about their influence to motivate students to learn through varied teaching strategies and assessment measures. Analysis showed the teachers in my study believed they had a great deal of influence on student engagement before and after the innovation (M = 3.63, SD = 0.22).

The second construct measured efficacy in instructional strategies. This construct measured how strongly teachers believed they could adjust their lessons to influence comprehension. It also measured teachers' beliefs of their ability to meet the individual needs of students no matter their level of understanding. The survey revealed that my teachers believed they had somewhat of an influence in their instructional strategies prior to the innovation (M = 3.30, SD = 0.45). However, after my innovation, the survey showed that teachers believed they had a great deal of influence on instructional strategies (M = 3.67, SD = 0.27).

The third construct measured efficacy in classroom management. My teachers responded to six questions that were meant to gauge the strength of their beliefs about their abilities to respond to difficult questions from their students, as well as their abilities to craft good questions. This construct also asked whether or not they felt they had the influence to challenge their students during instruction. The total pre survey mean score for the construct efficacy in classroom management was M = 3.16, SD = 0.37 which revealed that teachers believed they had at least some influence on classroom management. However, the post survey M = 3.55, SD = 0.31 revealed my teachers felt that they had a

great deal influence on their classroom management after full implementation of my innovation.

The fourth construct measured teacher beliefs about lesson planning. My innovation encouraged teachers to plan lessons with the intention of infusing critical thinking and revise these lessons based on the behavior of students. I asked four questions to measure whether or not teachers believe good lesson planning helped them improve their teaching and if they take student behaviors into account as they plan their lessons. Additionally, as part of this construct, I asked teachers to reflect on their current lesson planning and determine if they intend to incorporate critical thinking into their future lesson plans and if they believe lesson planning to teach critical thinking was important for their student's future as adults. The results pre and post my innovation revealed that teachers believed a great deal in the importance of lesson planning and incorporating critical thinking into their plans, pre survey (M = 3.72, SD = 0.38); post survey (M = 3.92, SD = 0.19).

The fifth construct measured teacher beliefs about planning and teaching with their peers. Because lesson study required teachers to plan together and observe each other implement the lessons they created, these questions focused on whether they believed planning and observing each other helped them improve. The survey results indicated that pre and post the innovation teachers believed their peers had a great deal of influence on their personal improvement, pre survey (M = 3.51, SD = 0.77); post survey (M = 3.70, SD = 0.41).

The final construct measured teacher beliefs about critical thinking. My innovation was about infusing critical thinking into the curriculum so I wanted to determine if my teachers believed critical thinking should be part of their instructional day. I also wanted to know the confidence teachers had in teaching critical thinking along with opportunities they felt they had for learning about critical thinking teaching and learning. The total pre survey revealed the teachers believed they had somewhat of confidence in infusing critical thinking instruction and believing it should be integrated into the curriculum (M = 3.28, SD = 0.43). However, the total post survey mean for this construct grew even higher which revealed teachers felt they had a great deal of influence on their beliefs after my innovation (M = 3.80, SD = 0. 23). The following table shows the results by each construct for my pre and post survey mean scores with the pre and post standard deviation.

Table 3

Pre/post Survey Constructs, Items and Descriptive Results

Construct	Pre		Post	
	M	*SD*	*M*	*SD*
Efficacy in Student Engagement1,2,3,4,5 and 6	3.63	0.22	3.63	0.22
Efficacy in Instructional Strategies 7, 8, 9	3.30	0.45	3.67	0.27
Efficacy in Classroom Management 10,11,12,13,14,15	3.16	0.37	3.55	0.31
Teacher Beliefs about Lesson Planning 16, 17,18,19,20	3.72	0.38	3.82	0.19
Teacher Beliefs about Peers 21,22,23,24	3.51	0.77	3.70	0.41
Teacher Beliefs about Critical Thinking 25,26,27	3.28	0.43	3.80	0.23

The results from the paired sample t-test comparing the pre and post survey mean scores of the above constructs are reported below. Of the six constructs, three had significant differences after the lesson study innovation. First, efficacy in student engagement had significant improvement with t (9) = 3.103, p = .013. Efficacy in classroom management had significant improvement with a t (9) = 4.116, p= .003. The last significant result was regarding teacher beliefs about critical thinking instruction with a

t (9) = 4.043, p= .003. Three remaining constructs, efficacy in instructional strategies, beliefs about lesson planning, and beliefs about peers, were not significant p> .05. The three constructs that were significant all had a less than 5% probability of occurring by chance; therefore there is confidence that the innovation caused the improvement and not any other extraneous factors or variables. Table 4 below shows the results of my paired sample *t*-test.

Table 4

Paired Sample t-test

Construct	*t*	Average Difference	*p*
Efficacy in Student Engagement	3.103	0.292	0.013*
Efficacy in Instructional Strategies	1.994	0.367	0.077
Efficacy in Classroom Management	4.116	0.383	0.003*
Teacher Beliefs About Lesson Planning	1.500	0.200	0.168
Teacher Beliefs About Peers	0.600	0.188	0.563
Teacher Beliefs About Critical Thinking	4.043	0.517	0.003*

*Significant p<.05

To determine if my innovation made an impact, I used Cohen's *d* to calculate the effect size of my six constructs. Four constructs showed large effect size: efficacy in student engagement 1.01, efficacy in instructional strategies 0.84, efficacy in classroom management 1.38 and teacher beliefs about critical thinking 1.42. One construct, teacher beliefs about lesson planning, had a medium effect

size of 0.65. The final construct, teacher belief about peers, had a small effect size 0.29. The effect size results from my Cohen's *d* calculations are reported below in Table 5.

Table 5

Constructs With Effect Size Results

Construct	Effect Size Cohen's *d*
Efficacy in Student Engagement	1.01
Efficacy in Instructional Strategies	0.84
Efficacy in Classroom Management	1.38
Teacher Beliefs about Lesson Planning	0.65
Teacher Beliefs about Peers	0.29
Teacher Beliefs about Critical Thinking	1.42

Analysis of lesson plans. Lesson plans were collected and scored to answer the following research question: How and to what extent, will lesson study help teachers write effective lessons that incorporate critical thinking? The school's assistant principal and I used two 5-point evaluation rubrics to score seven lesson plans that I collected from the teachers after they planned for initial lesson study observations and after debriefs which occurred about every two weeks. The plans were scored from August 15th to November 1, 2011. Scoring the lesson plans took approximately 10 minutes to complete per plan. There were seven lesson plans total. Therefore, the amount of time it took to score all the

lesson plans totaled approximately 70 minutes for each of us. The two rubrics used, lesson planning and student engagement, were taken from the district evaluation instrument (see Appendix C). The scores from each rubric were averaged and ranged from 5 exceeds, 3 meets, 2, approaching, 1 developing and 0 unsatisfactory. The assistant principal and I created an Excel spreadsheet to keep track of the rubric scores each time a lesson was collected and scored. We interpreted the range of the evaluation scores to mean scores between 5.0-3.76 exceeds the standard, 3.75-2.75 meets the standard, 2.74-2.00 approaches the standard, 1.99-1.00 is developing and 0.99 to 0.0 is unsatisfactory. At the end of the innovation, I used descriptive statistics to calculate the overall mean scores from the Excel spreadsheets to determine if scores for grade level lesson plans improved during the innovation.

Lesson plan results. The first lesson plans scored by my assistant principal for lesson planning averaged 2.0 *approaching* and mine was 3.0 *meets.* The student engagement scores for both my assistant principal and I were 3.0 *meets.* On August 30th my assistant principal scored a 2.0 *approaching* for lesson planning and my score on lesson planning was 3.0 *meets.* The assistant principal gave a score of 4.0 *above meets* for student engagement and my score was 3.0 *meets.* The lesson planning scores for my assistant principal for the September 1st lesson planning was 2.0 and 3.0 for me. The student engagement rubric score from my assistant principal was 3.0 *meets* and 2.0 *approaching* from me. On September 15th, the lesson plan scored by my assistant principal was 1.7 *developing* and 2.3 *approaching* from me. Student engagement scores from my

assistant principal were 2.5 and 2.0, both at *approaching*. On October 1st, the lesson planning rubric score from my assistant principal was 2.3 *approaching.* My rubric score was 3.0 *meets.* The student engagement rubric score from my assistant principal was 2.0 *approaching* and mine was 3.0 *meets.* For the October 15th lesson plans my assistant principal scored the rubric 2.3 *above approaching*. I scored lesson planning 3.0 *meets.* The student engagement score on October 15th from my assistant principal was 4.0 *exceeds* and mine was 3.0 *meets.* The final scoring took place on November 1st. My assistant principal scored lesson planning 3.3 *meets* and I scored it 4.3 *exceeds.* The final student engagement rubric score from my assistant principal was 4.0 and my score was 5.0 both *exceed.* Our agreement was high and consistent. One hundred percent of the time our scores were within one point or less from each other. The scores demonstrate that the teachers improved their scores on the rubrics for lesson planning and student engagement from the onset of the innovation to its conclusion. It appears that this improvement occurred as a result of the lesson study innovation to infuse critical thinking into the curriculum. Table 6 below displays the lesson planning and engagement rubric scores from both school administrators.

Table 6

Lesson Planning and Student Engagement Rubric Scores from August to November

Date Lesson Plans Scored	Lesson Planning Rubric Mean Scores Assistant Principal	Lesson Planning Rubric Mean Scores Researcher	Student Engagement Rubric Mean Scores Assistant Principal	Student Engagement Rubric Mean Scores Researcher
August 15	2.0 approach	3.0 meet	3.0 meet	3.0 meet
August 30	2.0 approach	3.0 meet	4.0 exceed	3.0 meet
September 1	2.0 approach	3.0 meet	3.0 meet	2.0 approach
September 15	1.7 develop	2.3 approach	2.5 approach	2.0 approach
October 1	2.3 approach	3.0 meet	2.0 approach	3.0 meet
October 15	2.3 approach	3.0 meet	4.0 exceed	3.0 meet
November 1	3.3 meet	4.3 exceed	4.0 exceed	5.0 exceed

To identify trends for lesson plans throughout the course of the innovation, I averaged our evaluation scores together then I created a line graph (Figure 4) of scores from August to November 2011. The figure below shows that in November both rubrics for lesson planning and student engagement were above August scores. Both lesson planning and student engagement rubric scores took a dip midway through the innovation in September to early October. This dip, as

discussed earlier in Chapter 2, may be explained by understanding what Michael Fullan, author of *Leading in a Culture of Change* (2001), calls the implementation dip (Fullan, 2001), an expected drop while teachers are working through change and a new innovation.

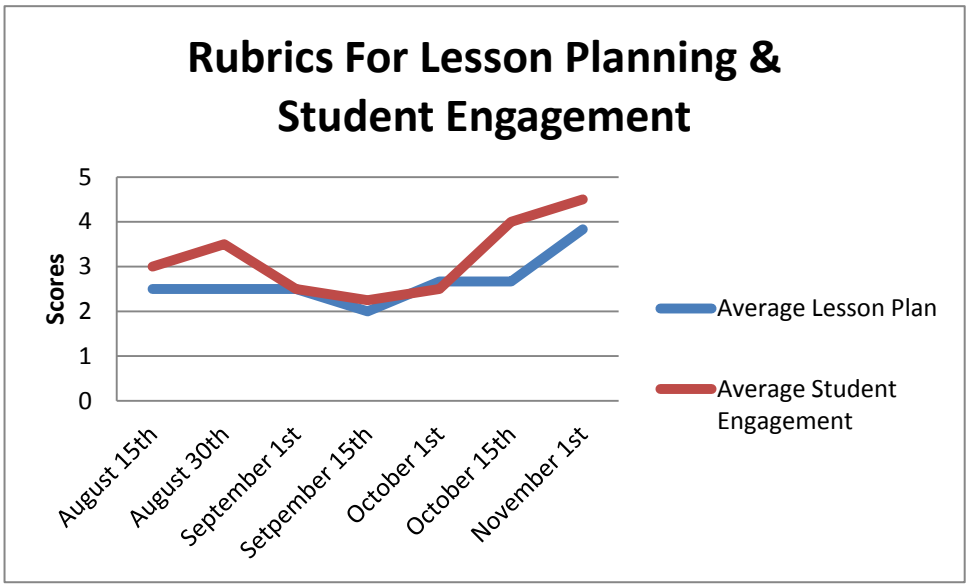

Figure 4. Line graph trends for lesson planning and student engagement rubrics

Qualitative Data Analysis

Open-ended survey comments, reflective learning logs, lesson study audio recording transcriptions and personal field notes. Grounded theory (Strauss & Corbin, 1998) and a priori codes were used to analyze the qualitative data I collected because I made generalizations about the data I collected (Strauss & Corbin, 1998). Qualitative data were gathered from open-ended survey questions, learning logs, recordings of teachers' meetings, and my journal. All qualitative data were coded and categorized to uncover similar evidence to

describe findings from my innovation and eventually identify themes (Gay et al., 2009; Miles & Huberman, 1994). From my research questions, review of supporting scholarship and theoretical lens,Vygotsky Space and efficacy, 27 initial a priori codes (Johnson & Christensen, 2012) were identified. Then, I continued my analysis by open-coding (Corbin & Strauss, 1998; Glaser & Strauss, 1967) to search for additional codes and literally see what "opened up." I used "HyperRESEARCH" to categorize the data by codes not yet looking to create themes at first. I did this by scrolling through the data sources clicking on key words or phrases. When I completed this phase, after days and days and hour and hours of coding, to look for interrelationship to construct themes, I then used axial-coding (Corbin & Strauss, 1998; Glaser & Strauss, 1967) to determine if new categories of themes could be related, combined, or constructed. At the end of this process, I used HyperRESEARCH to record the frequency of these codes. I used Microsoft Word and created a table to gather and organize all my codes and to compile them by similar concepts at first. Then I examined the table and was able to create themes that I constructed from all my qualitative data sources. An inventory of each qualitative data collection method with a description of the data source and the amount of content coded can be found in Table 7 that follows. A written description of how I analyzed my data, following the coding process described above, and the results, including themes that I created, is also reported.

Table 7

Qualitative Data Source Inventory

Data Source	Description	Content coded
Open-ended survey comments	Ten teachers responded to six open-ended comment sections on both the pre and post teacher survey after each construct. The survey consisted of six constructs and was completed anonymously.	12 typed pages
Reflective learning logs	Ten teachers responded to three learning logs with 11 questions and one comment section at the end. These logs were completed individually and anonymously.	36 typed pages
Audio recording transcriptions of lesson study debriefs	Three grade level PLCs debriefed after lesson study. They recorded their first and final debrief and I had them transcribed to maintain anonymity. The lesson study debrief that was done mid way through the innovation included the group of all ten teachers, the researcher, interventionist who facilitated lesson study, and two chairs visiting.	85 typed pages
Personal Field Notes	From the onset of my innovation in July until its completion on November 1st, I kept a handwritten journal of my experiences.	37 hand-written pages

Analysis of open-ended survey questions. The open-ended comment section was added to the teacher survey and administered to answer the following two research questions: 1) How and to what extent, will the process of lesson

study and the incorporation of critical thinking in lesson plans raise teachers' efficacy? 2) How and to what extent, will teachers at the school engage in the process of lesson study? For both the pre and post teacher survey, my directions asked the teachers to please take time to comment after each section labeled, "Additional comments." My intentions for adding these open-ended comment sections were to provide me with a more thorough understanding of how teachers perceived each construct in their own voices rather than depending solely on what was contained in closed-item responses. Adding an open-ended comment section after each construct also added qualitative data to my pre and post teacher survey that I used to support and expand my quantitative findings.

To analyze the open-ended items, I used Microsoft Word to type each teacher comment from each of the six constructs that were organized under each separate construct. I then read each teacher's statement and coded the comments to determine what overall themes arose, if any, for each individual construct. Additionally, themes that arose outside of my lenses (a grounded approach) were recorded as well. The results are described below.

Open-ended survey results. From my first construct on the pre survey, efficacy in student engagement, there were four written statements. One teacher wrote that they believed in order for students to be engaged, students must be motivated themselves to learn. Another teacher wrote that they were a "firm believer that every child can learn" and they do whatever it takes for all students to be successful. However, for the construct of student engagement on the post survey, there were many more written comments and I was able to construct one

theme, *motivation*. Regarding motivation, one teacher wrote, "Motivation to think critically and assert themselves (students) is challenging for a teacher, but it is valuable in order to foster creativity and learning for all. When you set high expectations and model motivation, creativity, and the value of learning it rubs off on your students, and at least allows them to think about achieving more and for better outcomes." Another teacher expressed that planning for critical thinking only works if students are, "motivated from within" to learn.

For the second construct, efficacy in instructional strategies, there were only three statements made on the pre and post survey and because of this I was not able to construct a theme. On the post survey, one teacher wrote, "Home environment and student motivation is also a factor to account for." Another teacher wrote, "If the student doesn't want to try and do well there is nothing a teacher can do." On a more optimistic note, one comment on the post survey for this construct read, "All kids are smart in *some* way; good teachers see this, great teachers find a way to develop this."

The third construct was efficacy in classroom management. There were only three comments made, and I was not able to construct a theme. On the post survey, however, the teachers made several comments, and I was able to construct two themes: *challenge* and *time*. The first theme was how challenging it was to support critical thinking instruction and to push "high" students with more difficult curriculum. Regarding challenge one teacher said, "After this (the innovation) I need to work on the wording to make more efficient critical thinking questions." Another echoed similar sentiment, "I think it is difficult to challenge

students ‘on the spot’ because teachers need to make sure the concept is completely grasped…prior to creating those questions.” A second theme was *time*. Time is defined as not having enough time to create critical thinking instruction. One comment made by the teacher sums up their thinking, “I wish we had more time to plan.”

The fourth construct dealt with teacher beliefs about lesson planning. On the pre survey, many teachers wrote comments, and I constructed one theme, *importance*. My teachers expressed an enthusiasm to plan for critical thinking as it was an important part of their lesson planning. “Huge!” is how one participating teacher expressed critical thinking lesson planning. On this construct, comments from the post survey were limited to only four statements; however, the same theme emerged, *importance*. The teachers continued to strongly believe critical thinking should be included in their curriculum. One teacher wrote that critical thinking should be taught to all students because it is, “Extremely important! Critical thinking is incredibly important for a student’s future,” and that teachers “must” infuse critical thinking into their lessons.

The fifth construct on my survey was teachers’ beliefs about their peers. There were only two teachers who commented on this construct on the pre survey, but I was able to construct one theme, *peers*. One teacher indicated that they “never planned with their peers, observed their peers teach nor had any peers observe them teach.” Another wrote that having peers to plan with is “key to improving their knowledge base.” The post survey comments for this construct had four statements from the teachers. I constructed two themes, *peers* and

collaboration. Four teachers revealed extremely positive beliefs about lesson study because of the opportunity to observe and plan with peers. The comments were: "Your peers are your second sets of eyes and your support for growing professionally… " and "This is my favorite part of lesson study!" and "Planning w/multiple minds is unbelievably valuable!! More is needed!" For the theme collaboration, one teacher wrote, "Collaboration among teams allows for a more cohesive united environment for teachers and students."

The final construct was teacher beliefs about critical thinking instruction. I was not able to construct a theme from the pre survey. On the post survey there were four teachers who wrote a comment and although the comments were limited, two themes emerged: *desire for more* and *raised efficacy*. Regarding desire for more, the teachers indicated they wanted, "more lesson study opportunities to plan for critical thinking…" In regards to raised efficacy one teacher indicated they felt more "confident" to plan for critical thinking. Another teacher wrote that after lesson study, she is even "better able to reach kids on a deeper level because she was now more aware of the types of questions that lead to critical thinking." Table 8 below displays themes I formed from my pre/post teacher survey.

Table 8

Themes From Teacher Pre/Post Open-Ended Survey Results by Construct

Construct	Theme/s Pre Survey	Theme/s Post Survey
Efficacy in Student Engagement	No theme	Motivation
Efficacy in Instructional Strategies	No theme	No theme
Efficacy in Classroom Management	No theme	Challenge and Time
Teacher Beliefs About Lesson Planning	Importance	Importance
Teacher Beliefs About Peers	Peers	Peers and Collaboration
Teacher Beliefs About Critical Thinking	No theme.	Desire for More and Raised Efficacy

Analysis of reflective learning logs. Teachers were asked to complete learning logs throughout the innovation to answer the following research questions: 1) How and to what extent, will teachers at the school engage in the process of lesson study? And, 2) How and to what extent, will the process of lesson study and incorporation of critical thinking in lesson plans raise teachers' efficacy? The teachers completed the learning logs prior to the start of the innovation in August, again midway through the innovation at the beginning of October, and their final reflective learning log entry in November when the innovation was completed. The first learning log took teachers about 15 minutes to complete. The mid and final learning log took longer, approximately 30

minutes for each teacher. Similar to the teacher survey, in order to maintain anonymity, teachers used the first two letters of their middle name and the year they graduated from high school in lieu of their names.

In order to prepare the reflective learning logs to begin coding, and prior to entering the data into HyperRESEARCH, I had to first organize the teacher responses by cutting and pasting each teacher entry by individual response and place it under each reflective learning log question. I did this for all of the learning log entries. When I completed this process I was then able to enter the document into Hyper Research to begin coding the learning logs using the system I described above for coding and constructing themes from my qualitative data. When I completed this task, all in all, I had tagged 465 key words or phrases from the three teacher logs. This equated to 44 initial codes. I then used Microsoft Word to create a table to list all the codes and frequency of the codes. Next, I examined the list and was able to combine similar codes. From these codes I was able to construct seven themes. Six of the seven themes exhibited positive results from the action research innovation. The results of my analysis of the reflective learning logs are described next.

Reflective learning logs results. My innovation was using the process of lesson study to infuse critical thinking into the curriculum. The theme that I constructed as the strongest was *confidence* (raised efficacy). There were four codes that I used to create the overall theme: confidence to check for understanding, confidence in applying critical thinking support, confidence in integrating critical thinking and resourcefulness to explain difficult content with

the total number of lines coded being 104. As a result of lesson study, the teachers felt confident and resourceful in applying and instructing critical thinking. One teacher enthusiastically wrote, “I feel more prepared to go on and move forward with continuous improvement.” Another teacher said, “I lie in bed at night and not being able to go to sleep because I think way more about my lessons now! It is really a good thing because I am able to dissect my lessons on a deeper level to look for opportunities to infuse critical thinking questions”.

The second highest theme I constructed was *critical thinking*. There were three overall codes that I collapsed to construct this theme: critical thinking integration, critical thinking learning, and critical thinking for lifelong learning. I found instances of critical thinking 79 times. The teachers felt strongly about their students being taught critical thinking instruction. “It should be expected of all teachers to apply this [critical thinking] so that the students can become young adults ready to solve world problems in the workforce” was one quote captured from a teacher while another affirmed this by stating, “This [critical thinking] is a life skill that all students should be equipped with for ultimate success.”

The third theme I constructed was *comfort with collaborating*. I used three codes to construct this theme: comfort level with collaborating with their peers, comfort having peers observe, and lesson study supports collaboration to improve lessons. I collectively marked these codes 64 times. The teachers expressed their comfort in collaborating with their peers to improve lesson planning and critical thinking instruction. There were several comments from teachers regarding this theme. One teacher wrote, “I feel it is a great learning process as a teacher to

have the opportunity to plan collaboratively and observe them putting the lesson into practice. This lesson study has been a great experience so far." Another teacher added, "I feel comfortable collaborating with my team and the opportunity to observe others is beneficial…"

The fourth theme that came from the data was *student potential*. There were three codes I used to construct this theme: high expectations for student learning, posing questions to promote discourse and believing in student's potential. I coded the lines/phrases of the learning logs 48 times. Two comments generated by the teachers to capture the gist of this theme included one stating, "Kids don't always see things the way you want them to and that is okay. We need to be open as teachers." And other summarizes this theme by writing, "I believe all students should and can learn how to think critically because they need to be problem solvers in this world."

The fifth theme I constructed was *reflection*. The two codes I used to create this theme was reflecting on student responses and reflecting on student behaviors to inform their lesson planning. I coded this theme 39 times. Teachers indicated that it was the first time they reflected on student behaviors to enhance their lesson plans. The teachers stated that when reflecting on the lessons after an observation, they could better understand how to support student learning as one wrote, "As a PLC we were able to reflect…on student conversations that helped us realize where the gaps were and when we could dig deeper."

The sixth theme that I constructed from the learning logs was *growth*. The two codes that I used to create this theme were lesson study was positive and

lesson study helps teachers develop professionally. I constructed this theme from the two codes that I marked 27 times. The teachers indicated that lesson study was a preferred mode of professional development. One wrote, "I like this [lesson study] better than sitting in a boring meeting. I am actually able to do what I am passionate about and having the extra time to work with my team is wonderful." Another teacher solidified this by stating, "I think that the process of lesson study is a great way to grow and learn as a professional."

The final theme that I constructed from two codes was *time*. The two codes were: not enough time to plan and not enough time in instructional day for critical thinking. The teachers, although very positive during the innovation, felt that there is not enough time to plan for and teach critical thinking in the already packed instructional day. "It takes so much time to plan for this type of questioning!" was one comment from a teacher. An additional comment that expressed the issue regarding not enough time for planning was "…adults also need time and space to reflect and refine." In conclusion, from the learning logs there were three codes that were minor, lesson plans, versatility, and observation concerns. Table 9 depicts the seven overall major themes that I reported from the analysis of the reflective learning logs and codes I used to create the themes and the number of lines/phrases I marked for each.

Table 9

Seven Themes Constructed and Codes From Reflective Learning Logs

Theme	Codes	Total Number of Lines/Phrases Coded
Critical Thinking	Critical thinking integration Critical thinking learning Critical thinking for life long learning	79
Time	Not enough time to plan Not enough time in instructional day for CT	37
Reflection	Reflection on student behavior to plan Reflection of student responses	39
Confidence (Raised Efficacy)	Confidence to check for understanding Confidence in applying critical thinking support Confidence in integrating critical thinking Resourcefulness to explain difficult content	104
Student Potential	High expectations for student learning Posing questions to promote discourse Believing in student's potential	48
Growth	Lesson study as professional development Lesson study is positive change	27
Comfort with Collaboration	Comfort having peers observe Lesson Study supports collaboration Planning with peer helps to improve	64

Note: Learning Logs were completed pre, midway, and post innovation period July 2011-November 2011.

Analysis of lesson study transcriptions. I recorded, via audio, lesson study debrief sessions to answer the following research questions: 1) How and to what extent, will teachers at the school engage in the process of lesson study? 2) How and to what extent, will lesson study help teachers write effective lessons that incorporate critical thinking? and 3) How and to what extent. will the process of lesson study and incorporation of critical thinking in lesson plans raise teachers' efficacy? The purpose of lesson study was for teachers to plan a lesson collaboratively, observe the lesson, debrief after the observation to enhance the lesson, and then re-teach the revised lesson. Each of the participating teachers had a chance to teach a lesson with their peers observing to gather feedback and then re-teach the lesson. I asked teachers to use a tape recorder to record their lesson debriefs because I felt it was important to capture their dialogues during the lesson study debriefs.

I analyzed three lesson study debriefs. The first lesson study debrief recording consisted of the entire lesson study participants in late August 2011. It was not anonymous, and I attended and facilitated the discussion. The second debriefs occurred after the first round of lesson study from late August to early September. The lesson study debrief consisted of the three grade level PLCs debriefing separately. Similar to the teacher survey and learning logs, the second and third lesson study debriefs were audio recorded and given to the school secretary to maintain anonymity. The school secretary transcribed the lesson debriefs and sent them to me on a Microsoft Word document without identifying individual teacher names. The final lesson study debrief recorded consisted of

vertical Professional Learning Communities (PLCs) that consisted of a fourth, fifth, and sixth-grade teachers who completed a cycle of lesson study together. This was recorded in late October after the last lesson study cycle was completed.

To analyze the transcriptions, I created a text file and entered them into HyperRESEARCH to begin coding them. To begin with I used the same codes as the learning logs and then added new codes as applicable. At the end of the coding process, I had marked 244 key words or phrases from the audio transcriptions. This equated to 44 initial codes. I then used Microsoft Word to create a table to list all the codes and their frequency. From this table I examined my 44 initial codes and then cut and pasted the codes to combine those that were similar. From this, 16 total codes were uncovered. From these codes I constructed seven themes. The results from these lesson study debriefs via transcriptions are discussed below.

Transcription results. Six out of the seven themes found portrayed positive results about my innovation—using lesson study to infuse critical thinking into the curriculum. The first theme I uncovered from the lesson debriefs was *reflection*. The two codes I used to create this theme were reflections on student responses and reflection on behaviors to inform lesson planning. During the teachers' conversations, as they were enhancing their lessons, the teachers mentioned 15 times they had to change something in their lesson based on reflecting on student discourse. A sample of this discussion from one of the grade level teams regarding reflection on student behavior was "I think they are holding back and that's why the high kids dominate and do the whole work and the low

kids just sit there, but maybe even if the work isn't gonna be exceeding maybe at least they'll give the low kids a chance to think, and speak and work…"

The second theme I formed from the lesson study debriefs was *confidence*. The teachers became confident and resourceful in applying critical thinking and higher-level instructional strategies into their lessons. This included planning difficult content and answering challenging questions from their students. As I read through the transcripts, I noted 27 times that teachers exhibited these attributes. During a grade level team debrief, this comment demonstrates growth with confidence as they shared ideas to enhance their lesson, "Yeah. It would just be interesting because I know that they were all looking on each other's whiteboards. They were all seeing what each other had, you know what I mean…But part of that is good though. Cause they are like evaluating their thinking and others and that's pretty high-level evaluation, so…I think tomorrow we should consider this when we teach our lesson plan…" Another sample from the words of the teachers was, "I'm more observant of their responses now than I was before. Because before I just kind of imposed the questions you hope that you know your smart kid would answer and the rest of the kids would pick up after…"

A third theme I constructed was: *student potential/high expectations*. The codes I used to construct this theme were: teachers believed in the potential of their students, confidence in applying rigorous, high-level instruction and using good questions to promote discourse. I noted that my teachers discussed this notion ten times throughout the lesson debriefing sessions. One teacher shared, "I

never knew this kid was so smart…I just thought because he was a bad writer, there was no way he was strong in any other area. I never would have known otherwise. He rocked in math. Now I know I can expect more from him and he can do it…I just need to believe in him and support him."

The fourth theme I constructed from reading and reviewing the lesson debrief transcriptions was *lesson study as professional development*. The codes I used to create this theme were lesson study helped my teachers develop professionally and lesson study brings about positive change. I coded this 30 times. "You need to get up and do a cheer for professional development, go lesson study!" was one excited teacher's reaction to lesson study when sharing with their peers. Another teacher expressed her feelings about lesson study by stating,

> I think it's been really amazing to get to see my team teach. I'm the only one who hasn't had a chance to teach yet so I'm the one who's got to watch twice and we're in our own world so much. We close our door, we're with our kids, and we're doing our own lessons. For the most part we plan by ourselves. We check in with each other but especially you know in sixth-grade we do our own thing. Umm and when the kids are with my counterparts I'm not, I'm teaching so I never get to see what they're doing. It has been a lot of fun to go in and see how they reach kids differently than I do. You hear feedback from the kids about teachers because we all share kids and I never really understood what the kids where talking about and getting to see ___ and ___ teach I understand now

> what the kids mean about how different I do it, how different they do it. Like just getting to see that style. The way little things, the way they get attention, the way they engage them, the way they set things up. It's so neat because we never get to come out of that bubble of our own classroom and walk in and to see our own kids in another class is amazing and just to kind of watch it. I think that might be my most enjoyable part so far. You never get to see each other teach and I'm on an amazing team and I get to see two awesome women teach, you know.

The fifth theme I constructed from the lesson debriefs was *lesson study and collaboration*. The four codes I used to construct this theme were comfort having peers observe, lesson study and collaboration, lesson study values peer feedback to improve lessons, and planning with peer helps to improve. The frequency for these codes was 24. The voice of one teacher summarizes this theme perfectly, "I really liked being able to have two extra people in there who aren't watching me but are watching my students because that helps me as a teacher."

The sixth theme I constructed was *awareness of critical thinking*. Lesson study brought about a new awareness about critical thinking to the teachers. I coded this 7 times. In order to understand this theme, the following dialogue from a participating teacher speaks to awareness regarding critical thinking,

> I think it's a journey. I mean I think that looking at critically thinking, I think I can look back at my past and so I guess I did it there, I did it there but I didn't know I was doing it. It's like a natural thing but I think as you

> bring it to our forefront the attention. It's that the key is going to be is you can try to script and you can try to implement critically thinking into a lesson but the special part is where you can recognize in the middle of the lesson when a kid says something or does something and you go from there…

The final theme I constructed was *the challenge of critical thinking*. The two codes I used to construct this theme were planning for critical thinking is difficult and challenging. This theme was the only *negative* theme that I constructed. Teachers felt that infusing critical thinking into the curriculum was challenging and not as easy as they thought it was going to be when the study initially commenced. One teacher shared about the challenges of infusing critical thinking into the curriculum by stating,

> A huge mountain to climb and then basically how to plan for our real lessons in real life or trying to do this for every lesson and I mean I'm like it's just so overwhelming and then it's not just us it's like ok, these kids they're not getting it anywhere else. Is it worth our time even trying it now? I mean it just seem like it's such a great idea but realistically are we going to be able to apply it to everything you know.

Another teacher echoes this sentiment by saying,

> …it's the other part of looking at a lesson and trying to anticipate what the kids are going to say, where is it going to go, how to put it in there. The 'in the moment critically thinking' this kid says something and guiding that teachable moment that's the easy part. As a teacher you're used to

doing that. You're used to getting them to dig deeper on a subject, if the moment lends itself to that. The hard part for me is the planning part of it.

Table 10 below displays the seven themes, the codes that constructed them, and the frequency of the codes.

Table 10

Seven Themes Constructed and Codes From Audio Recordings of the Lesson Study Debriefs

Theme	Codes	Total Number of Lines/Phrases Coded
Awareness of Critical Thinking	New awareness of critical thinking	7
Challenge of Critical Thinking	Difficult to plan for critical thinking Challenging to plan for critical thinking	12
Reflection	Reflection on student behavior to plan Reflection of student responses	15
Confidence	Confidence to check for understanding. Confidence in applying critical thinking support Confidence in integrating critical thinking Resourcefulness to explain difficult content	12
Student Potential/High Expectations	Application of rigorous/ higher level instruction Writing good questions to promote discourse Believing in student's potential	25
Lesson Study as Professional Development	Lesson study as professional development Lesson study is positive change	30
Lesson Study and Collaboration	Comfort having peers observe Lesson Study supports collaboration Value peer feedback to improve lessons Planning with peer helps to improve	24

Note: Three debriefs recorded in August-September and late October 2011

Analysis of personal field notes. Personal field notes were written throughout my innovation to answer the following research question: How will leading the process of lesson study change me as an instructional leader? I used a journal to write down notes during my entire innovation. In the end, I had written 37 pages of notes. I began writing at the end of July 2011 after I met with my lesson study participants and introduced my plan for implementing the lesson study innovation and after they took the pre survey. As my action research cycle came to life during the fall of 2011, I continued to write in my journal to capture my thoughts about how the innovation was going during early release days when the teachers were planning together or when I was working with them on infusing critical thinking into their lessons. I also used the journal to brainstorm ideas to use while I was leading the innovation, quotes from what I heard teachers saying during discussions and also when I noticed teachers moving through the phases of Vygotsky Space. Additionally, I noted events and feelings throughout the entire innovation until the last day of my innovation in November when I administered the post survey.

Field notes results. Results from my field notes revealed that there was an overall positive feeling throughout the lesson study innovation, but that it was not as "simple" to infuse critical thinking into the curriculum as my teachers believed it to be at the onset of the innovation and through to its conclusion. My notes also indicated that there was frustration that occurred in the Professional Learning Communities (PLCs) that were not captured during the analysis of any other data collection measures. As a school leader, tracking how teachers traveled

through their lesson study journey provided me with insight into how I changed as an instructional leader simultaneously.

In July, during our first meeting, the feelings that I captured were that teachers generally believed that infusing critical thinking was going to be easy as they felt they were doing this already. But after the first critical thinking workshop, prior to their first lesson study session, I noted that teachers were confused to what critical thinking actually entailed, although they did feel it should be taught. Part of the workshop on infusing critical thinking through lesson study was coming up with a collaborative working definition of what critical thinking consisted of. This discussion drew many questions and many attempts at answers. I noted that I was not surprised this was a struggle because my previous action research cycles displayed similar characteristics.

In August, prior to the first day of school and two weeks after school started (but before the first lesson study cycle), my facilitator and I met with the lesson study teachers. We asked them to examine and discuss the rubrics they created to use to collect data during lesson study to measure student behaviors. During this meeting there was a feeling of "optimism" that I indicated on my field notes. One sixth-grade teacher commented: "Why, again, are we the only grade levels getting this PD (professional development) and all this stuff, I feel guilty." I also captured in my notes that there was also a sense that my teachers were feeling "challenged" and they were not sure if what they were doing made sense because they were trying to predict how their students were going to respond to the critical thinking lessons.

After the first lesson study cycles in late August and early September, I noted excitement about the opportunity to observe their collaboratively planned lesson and the time I gave them to debrief and re teach their lesson. I took note of the depth of thinking and discussions the teachers were having as they shared their experiences. I captured my feelings of personal excitement. However, I also noted that teachers were definitely struggling with how to instruct in a "better" manner because their students were not responding to the critical thinking questions. The teachers over and over again referred to their mode of instruction as being, "too direct." One teacher additionally commented, "I'm still trying to grasp all of this in my head, how am I supposed to grade how someone thinks?" I also noted that teachers appreciated knowing that they collectively felt as if they were struggling as another commented, "I really appreciated her saying, I'm struggling on how to see this." One grade level PLC member asked to see me privately and individually expressed concerns about the level of participation from one of their team members. That evening I wrote that I was "concerned and frustrated" and that I intended to monitor this.

In September and October, my teachers continued to collaborate and share. The feelings of confusion changed to more of a feeling of confidence. Teachers started to comment that they were growing professionally, and they preferred lesson study to going to the early release traditional in-service days. I also noted that the two teachers who at the inception of lesson study were feeling "lost" were engaged in conversation and were providing rich feedback and insight during discussions. One comment from a teacher that I noticed was growing

professionally remarked, “Now as I focus on critical thinking, I am thinking about myself, [as a learner] you are constantly changing and evaluating yourself.” At the end of the innovation, I knew I had grown as a leader. In reflections from my field notes, I recognized that rather than being at the forefront of the discussions with my teachers and always having to share my opinions, I became a better listener of my teachers. I let them struggle to find out the answers to their questions. I also learned that professional development of my teachers does not come always come from outside sources, but rather it comes from a group of teachers who are willing to persevere in order to take ownership of their own learning.

In Chapter Five, using the results I described in this chapter, I present my assertions in response to my four research questions. I demonstrate how I used triangulation of my quantitative and qualitative data collection methods to portray a more complete description of my results and explain the process I used to better achieve validity in answering my research questions.

Chapter 5 Findings

In this chapter I used the results from Chapter Four to present the assertions I made to answer my four research questions. I triangulated my data collections using the QUAN-QUAL model (Creswell & Clark, 2007) to interpret my results. Gay et al. (2009) define triangulation of the data as "a process of using multiple methods, data collection strategies, and data sources to obtain a more complete picture of what is being studied and to cross-check information" (p.377). In the chapter, I demonstrate how I triangulated my data in order to increase credibility and validity.

To further explain how I arrived at my assertions, in addition to using my data results from the previous chapter, I will connect my findings to my theoretical lenses: Vygotsky Space and Bandura's theory of efficacy (as described in Chapter Two). Throughout my innovation I referred to these two lenses to design, measure, and determine the effectiveness of my innovation. Based on my theoretical lenses and the data results described in Chapter Four, I constructed the following assertions:

- As a result of my innovation, the teachers came to believe they developed the skills, confidence, and knowledge needed to infuse critical thinking into the curriculum.
- As a result of my innovation, the teachers believe planning for critical thinking learning is important for students to be successful for lifelong learning.

- Lesson study was a beneficial means to professional development for the teachers. Being involved in lesson study teachers came to value peer feedback. Lesson study also helped them look at student engagement. Teachers also used student behaviors to enhance instructional practices.
- Teachers who participated in my innovation, although having an overall positive experience, believe that infusing critical thinking is challenging and time is an issue: time for lesson study and time to teach critical thinking during an already full instructional day.
- As an educational leader, I believe lesson study has great potential for the professional development of teachers. It promotes focused and meaningful discourse and allows for teachers to take ownership of their own professional development. As a result of implementing the innovation, I also believe more passionately than ever that curriculum and instruction for students should include critical thinking as a norm rather than a supplemental add-on to be implemented when time permits.

Research Question 1

How and to what extent, will teachers at the school engage in the process of lesson study? Data shows the teachers viewed lesson study as positively and grew professionally from the onset of my innovation to its conclusion.

The data sources I mixed to answer this question were my pre/post closed survey (quantitative data), the open-ended survey questions, reflective learning logs and audio recording of lesson study debrief sessions (qualitative data). Additionally, I referred to my personal field notes because they added the

observations I captured that were not evident with other data sources. My innovation was to infuse critical thinking into the curriculum by using lesson study. Lesson study is a professional development process of teachers working together to plan lessons, observe the student behaviors during the lesson, debrief to improve the lesson, and then re-teach the lesson. The effect size calculations of 1.42 showed that my innovation had a large impact on teachers' beliefs about infusing critical thinking into the curriculum. It also showed that after the innovation there was a medium effect size of 0.65 when it came to lesson planning and a small effect size, 0.29 for peer support. The quantitative results from my post survey also showed that lesson study was a positive learning experience as teachers showed growth in the confidence of infusing critical thinking from pre to post the innovation along with their collaboration with their peers as being beneficial.

The qualitative data also showed how my teachers engaged in the process of lesson study. Moreover, it solidified what Likert-items on my survey revealed. Both of the themes *confidence (raised efficacy)* and *growth* I constructed from the learning logs and audio transcriptions of the lesson study debriefs overwhelmingly showed the growth in confidence my teachers gained as they engaged in the innovation. Both data methods also displayed that teachers viewed the process of lesson study as a positive form of professional growth. Midway through my innovation, not all teachers understood they were engaged in professional development. After the innovation, the learning logs and audio transcriptions revealed that the teachers believed lesson study was a valuable form

of professional development. Themes from the qualitative data sources also showed that teachers valued peer feedback and collaboration as well as believing that critical thinking is essential for students' lifelong learning. To me this shows much professional growth.

Conversely, the data from my all my qualitative methods, including my personal field notes, indicated that, although the teachers viewed the innovation positively, it was also a challenge to them in two ways. First, they were shocked by the students' lack of understanding and found it challenging to understand how to infuse critical thinking into the curriculum and this caused frustration. My field notes indicated that teachers found it challenging to plan for and engage students in critical thinking. During the initial observations, teachers discussed their surprise regarding students not understanding how to think critically. I wrote that my teachers were not planning for critical thinking appropriately. I ended up bringing an expert in midway through lesson study to help support my teachers with this roadblock. From the open-ended survey responses, one theme I constructed from the teachers was that even though they felt confident about what they were doing, they still felt it was a challenge to infuse critical thinking. The second challenge I noted from the teachers was the "time" factor. All my qualitative measures indicated teachers believed there was not enough time in the day to plan for critical thinking and even if there was, they questioned how they could fit critical thinking into the curriculum with the time they had to spend teaching district curriculum. Overall, however, teachers overwhelmingly believed critical thinking should be taught.

Research Question 2

How and to what extent, will lesson study help teachers write effective lessons that incorporate critical thinking? As a result of my innovation, the data I collected indicated teachers significantly improved in the writing of effective lessons that incorporate critical thinking

In order to support the answer to this question I mixed the results from two data sources, the first was the scored lesson plans, my quantitative measure, and the second was the transcriptions from the teacher debriefs I recorded, my qualitative measure. The lesson plan scores given by the assistant principal and myself, over time, grew from August to November 2011. In August we both scored the teachers' lesson planning as an average of 2.5, *approaching* and planning for student engagement as 3.0, *meeting*. In November, our average score for lesson planning rose to 3.8, *exceeds* and 4.5 for planning for student engagement, also *exceeds.* According to the data I collected from the lesson debriefs my teachers also showed gains in lesson planning for critical thinking. I constructed three themes that answer the question, to what extent does lesson study support teachers planning for lessons that infuse critical thinking? The three themes, collectively coded 52 times, were confidence in planning for highly level questioning, confidence in planning for critical thinking, and learning to use student behaviors to inform their lesson planning.

Although my data showed my teachers became better equipped to plan effective lessons to teach critical thinking, both quantitative and qualitative data collection measures indicated that lesson planning to infuse critical thinking was

not easy. There was an implementation dip (Fullan, 2001) that showed up on the lesson plans midway through my innovation. The average score for lesson planning was 2.0 *approaching* and 2.25 for engagement. This was a concern. The transcriptions from my lesson study debriefs also showed similar results. I constructed one theme, *challenging*, coded 12 times, that demonstrated teachers believed planning for critical thinking was difficult.

Research Question 3

How and to what extent, will the process of lesson study and incorporation of critical thinking in lesson plans raise teachers' efficacy? According to the data I collected, lesson study significantly raised the efficacy of my fourth, fifth and sixth-grade teachers.

I used four data sources to answer this research question. The first data source was a quantitative measure, my closed-ended pre/post teacher survey. The three qualitative measures I used were the open-ended pre/post survey responses, transcriptions from lesson study debriefs, and learning log entries. According to the descriptive statistics from my pre/post survey, teacher efficacy was strong for all three constructs on efficacy: student engagement, instructional strategies and classroom management with mean scores all over 3.50, "a great deal." Furthermore, the effect sizes from all three constructs, after implementing my innovation, were all above 0.80, indicating a large effect size. Efficacy in student engagement had an effect size of 1.01; efficacy in instructional strategies had an effect size of 0.84 and efficacy in classroom management had an effect size of 1.38.

The qualitative measures I analyzed additionally confirmed what my quantitative data results indicated for an increase in teacher efficacy. First, the open-ended items from the post survey exhibited one theme that was constructed after my innovation (that was not there on the pre survey open-ended responses) to support my quantitative findings, Raised Efficacy. Teachers believed they could motivate and instill confidence in their students. Additionally, analysis from the lesson study debriefs and the learning log entries strongly supported the notion that my innovation improved teacher efficacy. The themes I constructed from both were *confidence and raised efficacy*. Teachers felt they were resourceful and could motivate students to encourage critical thinking as a result of participating in my innovation. I coded this from both sources collectively 189 times. On the other hand, although teacher efficacy increased as a result of my innovation, after analyzing both the open-ended survey and lesson debriefs, one theme from both was *challenging*. Teachers noted that it was challenging to teach and integrate critical thinking skills.

Research Question 4

How will leading the process of lesson study change me as an instructional leader? According to the experiences I encountered during the implementation of my innovation, leading the process of lesson study to infuse critical thinking into the curriculum, I grew professionally in several ways. First, I learned that any type of educational change takes continuous monitoring and is challenging. I learned that I did not always have to lead discussions and offer suggestions, as my teachers could lead and manage their own thinking, dialogue and professional

development needs. Finally, I learned that lesson study is a promising form of professional development that I can use with all teachers to help them write lessons that support students' ability to learn to think critically or improve student learning in general.

Chapter 6 Conclusions

As a principal and action researcher, three things were important to me as I designed my innovation: critical thinking, professional development, and teacher efficacy. My original intention two years ago was to infuse critical thinking into the curriculum so my students would do well on state tests. I wanted the students at my school to be better prepared for the difficult portions of the state assessments I believed required high levels of thinking. The teachers at my school felt the same way. We all wanted more students to earn "exceeds" on the state test so we could earn an excelling label for our school. So in 2010 two middle school teachers and I met for a semester and researched and collaboratively planned lessons we thought would encourage critical thinking. As a practitioner researcher I collected data on our actions and learned that, despite the good intentions and hard work we all had done, the students at my school were not being challenged to think critically. It was also at that point I became aware of my passion to provide my students an environment that encouraged them to be critical thinkers, not for a score on a state test, but to prepare them for their futures as adults. I knew critical thinking would be essential for their lifelong success.

Discussion

Because of what I learned from my previous action research cycles, I changed my focus from students to preparing my teachers to plan for critical thinking and this focus became my dissertation work. I focused on critical thinking and brought in lesson study as a means to give teachers the time and

space to infuse critical thinking into their lessons. I used lesson study because my teachers were seasoned in Professional Learning Communities. They planned and shared ideas, so the concept of lesson study had the potential to elevate my teachers to the next level of professional development. Lesson study appeared rich with future possibilities.

As Chapter Two described, lesson study is a form of professional development that is the primary professional development used in Japan to support their teachers. The teachers plan, but rather than just plan and teach in isolation, they collaborate. Teachers develop one lesson plan, observe each other teach the lesson, debrief about the strengths and areas of refinement needed based on how students reacted during the lesson, then they re-teach the lesson. The objective of lesson study is to observe student engagement to improve the lesson through reflection and dialogue regarding best instructional practices (Caskey & Lenski, 2010; Lewis, 2002; Schmoker, 2009). With the known successes of lesson study in Japan, the potential to apply this technique to my school was promising. The teachers at my school were also ready for this next step in their professional development. With lesson study's potential impact on students learning to think critically, we were ready to embark on this opportunity to prepare teachers to infuse critical thinking into their lessons. In order to apply this practice, I created a timeline, methods to collect data, and specific steps needed to implement lesson study over the course of a semester.

Given the characteristics of lesson study, I used my theoretical lenses; Vygotsky Space and efficacy to understand the effects of lesson study and

measure its success. As I worked with the teachers I saw them begin in Stage I of Vygotsky Space, which is Appropriation. When they learned about the innovation, the teachers were excited about the idea of lesson study; they were also confused about the expectations and how to plan for critical thinking. As my innovation began, I watched and collected data on how the teachers moved from this initial, shallow, and confused understanding of critical thinking and lesson study to Stage II Transformation. During this stage, the teachers found their personal teaching style, shared ideas and asked questions in order to make sense of critical thinking, and developed professionally as a team.

After 12 weeks of working together, my teachers wanted additional time so they could do an additional round of lesson study using a different content area to implement critical thinking. My teachers had taken what they learned and began thinking about ways to extend their new knowledge. They began moving to Vygotsky's stage III Publication. With the new knowledge taken from their prior lesson study session, the team utilized the method to implement critical thinking into their social studies lessons. During the debriefs, it was obvious, as I noted in my journal, that they were more productive with their planning, taking half the time from the first time they created a lesson plan. Even their debrief sessions exhibited improved examples of how their students were thinking critically. As the aforementioned quantitative lesson plan data analysis displays, the teachers developed and improved their scores in student engagement and overall lesson planning significantly. Not only did the teachers improve their numeric scores,

these teachers were confident and united in achieving critical thinking in their classrooms.

By the conclusion of my innovation, my teachers were at Stage IV Conventionalization, as they were exploring ways that they might continue lesson study to infuse critical thinking into their lessons for the next semester. Two grade levels sent letters to the Superintendent asking for time with him to share how much they learned from lesson study. They hoped their newfound knowledge would help convince the district to continue this approach to professional development in the future. They also brainstormed ideas of how to continue lesson observations without utilizing substitute teachers at the school site. The data analyzed from both my quantitative and qualitative data indicated that as a result of my innovation, teachers believed strongly that critical thinking should be integrated into their lessons and lesson study was a positive, preferred method of professional development.

My second lens, efficacy, was not only a frame but what I hoped to influence. Although it was challenging to them, my data revealed that the teachers did gain efficacy. Initial attempts at infusing critical thinking during the first lesson study observation were ineffective. Two examples of this came from the teachers who asked, "Our questioning was surface level…did you guys catch that?" And, "We are not asking questions that promote critical thinking…" However, as the weeks of lesson study passed, teachers' efficacy increased. As I explained in Chapter 4, the effect size for all three efficacy constructs—student engagement, instructional strategies and classroom management—was large as

indicated by the calculations from Cohen's *d*. It was rewarding to know this was a result of my innovation.

I was pleased that overall the teachers gained efficacy, but when I teased apart the data interesting findings were made. Data from the pre survey showed the teachers believed they only had somewhat of an influence on instructional strategies and classroom management. After my innovation, the data showed that the teachers changed their perceptions and believed they had a great deal of influence on instructional strategies and classroom management. This surprised me. Seasoned teachers, one might think, would have high efficacy on these constructs because these are the things in their classrooms over which they have direct control.

Unintended effect. Out of the three grade levels that participated in lesson study, one grade level was departmentalized, meaning the teachers teach one content area to all the students. Because of the experiences that arose from the discourse from this departmentalized team, my fifth-grade teachers were impressed. They approached me with a plan to become departmentalized the following school year so they could focus on one content area. Collectively, the fifth-grade teachers shared that if they focused on one content to plan for they could get "really good at it", similar to their sixth-grade peers.

Implications for Practice

"Desire for more" and "raised efficacy" were two themes that emerged from my data analysis. Teachers wanted more time to plan for critical thinking using lesson study, and they were confident in their abilities to infuse critical

thinking into their lessons. Critical thinking instruction to meet the demands of the new national common core standards and assessments is at the forefront of school improvement conversations nationally, and it was apparent my teachers valued implementing critical thinking into their lessons as well. I believe that if teachers are going to be equipped to meet the demands of this rigorous curriculum, school districts are going to have to change how they traditionally provide professional development to teachers.

Concerns for principals wanting to implement lesson study

Substitute teachers. Substitute teachers cost money and are a necessary resource to allow teachers to participate in lesson study. Midway through my innovation, I received a phone call from my Superintendent regarding the cost of substitutes. I had not even considered the substitute budget during my implementation of lesson study. In October he said my school had depleted almost half my budget for substitutes. When I returned to the school, I created a schedule to decrease the amount of substitutes by 50% and asked the teachers to plan and observe the lessons for half a day, rather than the entire day. The teachers felt rushed, but said it was manageable. If I were to continue lesson study, I would explore creating a special schedule that would allow for less dependency on substitutes.

Concept of lesson study. Although lesson study is gaining attention nationally, lesson study is non-traditional staff development. If a school site wanted to participate in lesson study, they must gain the approval of the school district. I had permission to do my action research for one semester. The school

district would have to collaborate and allow schools to use lesson study as their choice for professional development. Unless the district fully understands the potential of lesson study, this will continue to be a challenge.

Limitations of My Study

The results of this study overall were valid; however, there were limitations. These limitations included the amount of time I was able to implement my innovation and collect data, the limited number of participants, and my role as principal (Mills, 2007).

Time. Time was a factor because we engaged in lesson study for 17 weeks and my data collection was limited to this time. The teachers all had an opportunity to complete at least one cycle of lesson study. Because there were ten teachers and the study was for one semester, only a few teachers had an opportunity to try another cycle of lesson study. Even though the results of these cycles were positive, time to do more cycles of lesson study would have afforded me an opportunity to collect more data.

Participants. I had a small number of participants. Only the 10 fourth, fifth and sixth-grade teachers participated in my study. My school was a K-8 school with nine grade level teams with a total of 40 teachers. My innovation made an impact on the participating teachers who volunteered to be part of the study. In order to know if my innovation would make an impact school-wide, with different teachers, with more teachers, or perhaps in different districts in different states, a similar study would have to be implemented there.

My position. As their principal, I always ran the risk teachers were giving me answers they thought I desired. Even though teachers were assured their names would not be used, they still may have hesitated to be truly honest or open. I recognized that they viewed me as a supervisor and evaluator and my position might have influenced the results of my study.

Future Implications

As I explained in the beginning chapters of this dissertation, the research is clear; traditional staff development where teachers go to listen to an expert feed them information almost never reaches the classroom level (Fullan, 1993; Guskey, 2000). Because of this, district leaders are searching for best practices for professional development. In fact, this past January 2012 at the national Title I conference in Seattle, Washington, lesson study was presented as a promising means of professional development to meet school improvement initiatives. Two of the principals from the district where I formally worked as a school principal and the district I implemented my innovation, attended the lesson study session at the conference. They asked me to share highlights from my study, specifically, "How did you make this work?" Furthermore, they have asked me if I could assemble a group of lesson study teachers who participated in my innovation to meet with their teacher-leaders to provide an overview and a frank discussion about lesson study and its benefits. Once the mystery of lesson study is revealed, educational leaders can feel confident in utilizing lesson study to aid in the professional development of their teachers.

What is Next?

Currently in my new role as a new assistant superintendent, I oversee curriculum, development and implementation of the common core. I see lesson study as a viable option and the next step for the district's professional development plan to support teachers. The common core standards are challenging. However, in the few weeks I have worked in the district, I have noted that it has a strong background in teachers working together in Professional Learning Communities district-wide. PLCs are a necessary foundation that must be in place prior to implementing the principles of lesson study. I have been in these PLC grade level meetings and listened to the team planning and discourse regarding the standards. With the strong foundation of PLCs in my current district, lesson study seems like a natural progression towards the teachers' development. With my experience and knowledge in lesson study, I believe this method is achievable in my current role.

Educational leadership. In my new leadership role at the district level, it is imperative to use what I have learned as a result of my innovation. I plan on exploring lesson study as a future means to support the professional growth of the teachers in my new school district. I have learned that lesson study empowers teachers to become their own professional developers and in essence, lifelong learners. I also learned through my innovation that lesson study empowers teachers to support and challenge each other and is a means to increased efficacy to prepare lessons that encourage students to think critically. This new learning, I believe, will help me lead our district administrators and teachers through the

implementation of the new era of common core curriculum and the national assessments that are approaching.

Closing Thoughts

In all the ten years that I had been a school principal, implementing an action research study was the first time that I maintained focus on one initiative with a group of teachers, without interruption for an entire semester. In the time I facilitated lesson study, I watched teachers grow in a myriad of ways, but the most rewarding was listening to their discourse while they were trying to figure "it all out." I recognized that as a principal, all those years, I never had opportunities to focus and listen to my teachers collectively dialogue and discuss how they think about their lesson planning and their content. Up until then, I was only able to execute the fragmented system of traditional teacher evaluation. I observed, evaluated and held conferences with teachers twice a year. Any discussions I had with them were not necessarily connected to their goals for elevating student learning and never included group discussion and critique concerning best practices. With lesson study, I learned how valuable the discussions and thinking that lead up to the lesson plans are. I now have a deep appreciation of how smart my teachers are (I always knew this, but now I have first-hand research) and how much time and thought they put into their work. They have high expectations for themselves and each other. Understanding the brilliance teachers bring to the table and how hard they work is something I will always cherish and employ in the future to promote positive educational change.

REFERENCES

Amrein-Beardsley, A. (2008). Methodological concerns about the education value-added analysis system (EVASS). *Ed Researcher, 57*(2), 65-67.

Anderson, L.W., & Krathwohl, D.R. (2001). *A taxonomy for learning, teaching and assessing: a revision of Bloom's taxonomy of educational objectives*. New York, NY: Longman.

Anyon, J. (1980). Social class and the hidden curriculum of work. *Journal of Education*, 162 (1).

Appel, G., Leong, M., Mangan, M.T., Mitchell, M., & Stepanek, J. (2007). *Leading lesson study: A practical approach for teachers and facilitators*. Thousand Oaks, CA: Corwin Press.

Apple, M.W. (2004). *Ideology and curriculum*. New York, NY: Routledge & Paul.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W.H. Freeman and Company.

Blackburn, B.R. (2008). *Rigor is NOT a four-letter word.* Larchmont, NY: Eye on Education.

Bloom B.S. (1956). *Taxonomy of educational objectives: The cognitive domain.* New York, NY: David McKay Co Inc.

Brown, S., & Wiburg, K. (2007). *Lesson study communities: Increasing achievement with diverse students.* Thousand Oaks, : CA: Corwin Press.

Burger, E. (2011). *Lecture on common core*. Presented at the Math Common Core Symposium. Scottsdale, Arizona.

Caskey, S.J., & Lenski, M.M. (2010). Using the lesson study approach to plan for student learning. *Educational Psychology Reader, 1*, 441-450.

CBS News. (2010, September 10). *Lessons from Japan* [News segment]. Reading, Writing, and Reform. Retrieved from http://www.cbsnews.com/video/watch/?id=6912924n

Commander, N.E., & Smith, B.D. (2010). Learning logs: A tool for cognitive monitoring. *Journal of Adolescent and Adult Learning, 39*, 446-453.

Cooke, J. (2005, March/April). A comparison of Japanese and American education systems part 2. *The Oregon Mathematics Teacher*, 7-9.

Christensen, L.B., & Johnson, B. (2008). *Educational research: Quantitative, qualitative, and mixed approaches*(3rd ed.). Thousand Oaks, CA: Sage Publishing, Inc.

Cochran-Smith, M. & Power, C. (2010). New directions for teacher preparation: Ten trends spell out where preparation is heading. *Educational Leadership, 67*(8), 6-13.

Coe, R. (2002, September 12-14). *It's the effect size, stupid: What effect size is and why it is important.* Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, England. Retrieved January 6, 2012 from http://www.leeds.ac.uk/educol/documents/00002182.htm.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112* (1), 155-157.

Creswell, J.W., & Plano Clark, V.C. (2007). *Designing and conducting mixed-methods research*. Thousand Oaks, CA: Sage Publishing Inc.

Cronbach, L.S. (1951). Coefficient alpha and the internal structure of tests. *Psychometrica*, *16*, 297-334.

Cuban, L. (1993). *How teachers taught: Constancy and change in American classrooms 1890-1990*. New York, NY: Teachers College Press

Daniels, H. (2001). *Vygotsky and pedagogy*. New York, NY: Routledge.

Darling-Hammond, L. (2011, March 23). U.S. vs highest-achieving nations in education. *The Washington Post.* Retrieved from http://www.washingtonpost.com/blogs/answer-sheet/post/darling-hammond-us-vs-highest-achieving-nations-in-education/2011/03/22/ABkNeaCB_blog.html

Darling-Hammond, L., & Bransford, J. (Eds.). (2005). *Preparing teachers for a changing world, what teachers should learn and be able to do*. San Francisco, CA: John Wiley and Sons, Inc.

Dembo, M.H. & Gibson S. (1985). Teachers' sense of efficacy: An important factor in school improvement. *Elementary School Journal*, 86(2), 173-184.

Dewey, J. (1944). *Democracy and education: An introduction to the philosophy of education.* New York, NY: The Free Press.

Dufour, R. & Eaker, R. (1998). *Professional learning communities at work: Best practices for enhancing student achievement.* Bloomington, IN: National Educational Service.

Duncan, A. (2010, October 17). *Beyond the bubble tests: The next generation of assessments*. Secretary Arne Duncan's Remarks to State Leaders at Achieve's American Diploma Project Leadership Team Meeting. Retrieved from http://www.ed.gov/news/speeches/beyond-bubble-tests-next-generation-assessments-secretary-arne-duncans-remarks-state-l

Duncan, A. (2011, January 3). School reform's next text. *The Washington Post*, A15.

Elder, L. (2007). *Defining critical thinking.* Foundation for Critical Thinking. Retrieved from http://www.criticalthinking.org/pages/defining-critical-thinking/766

Elder, L. (2010, November 25). *Achieving critical mass*. Retrieved from http://www.timeshighereducation.co.uk/story

Foucault, M. (1979). *Discipline and punish: The birth of the prisons*. New York, NY: Random House Inc.

Fraenkel, J.R., & Wallen, N.E. (2006). *How to design and evaluate research in education* (6th ed.). New York, NY: McGraw-Hill Companies, Inc.

Freire, P. (1970). *Pedagogy of the oppressed*. New York, NY: The Continuum International Publishing Group Inc.

Fullan, M. (1993). *Change forces: Probing the depths of educational reform*. Bristol, PA: Falmer Press.

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

Gallucci, C., DeVoogt, M., Van Lare, I.H., Yoon, B., & Boatright,B. (2010). Instructional coaching: Building theory about the role and organizational support for professional learning. *American Educational Research Journal*, *47*(4), 919-963.

Gay, L.R., Mills, G.E., & Airasian, P.W. (2009). *Educational research: Competencies for analysis and applications*. Cranbury, NJ: Pearson.

Glaser, B.G., & Strauss, A.C. (1967). *The discovery of grounded theory: Strategies from qualitative research*. Chicago, IL: Aldrine Publishing Company.

Glaser, E.M. (1941). *An experiment in the development of critical thinking.* New York, NY: Teacher's College, Columbia University.

Goddard, R.D., Hoy W.K., & Woolfolk Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal*, 37(2), 479-507.

Gore, A. (2007). *The assault on reason*. New York, NY: The Penguin Press.

Guskey, T.R. (2000). *Evaluating professional development*. Thousand Oaks, CA: Corwin Press.

Gutek, G.L. (1991). *An historical introduction to American education* (2nd ed.). Prospect Heights, IL: Waveland Press, Inc.

Hargreaves, A., Earl, L., Moore, S., & Manning, S. (2001). *Learning to change: Teaching beyond subjects and standards*. San Francisco, CA: Jossey-Bass, Inc.

Hargreaves, A., & Fink, D. (2006). *Sustainable leadership*. San Francisco, CA: Jossey-Bass, Inc.

Hattie, J.A.C. (2002). *Teachers make a difference. Influences on student learning.* Retrieved from http://www.arts.auckland.ac.nz/education/staff

Hinchey, P.H. (2008). *Action research primer*. New York, NY: Peter Lang Publishing Inc.

Hoy, W.K., & Woolfolk, A.E., (1993). Teachers' sense of efficacy and the organizational health of schools. *Elementary School Journal*, 93, 355-372.

Hoy, W.K. & Woolfolk, A.E. (2009). Teachers' sense of efficacy scale [short form]. Retrieved from http://people.ehe.osu.edu/ahoy/files/2009/02/teacher-efficacy-10.pdf

Hunter, M., & Russell, D. (2006). Planning for effective instruction: Lesson design. In B. Marlow and A.S. Canestrari (Eds.), *Educational psychology in context: Readings for future teachers* Thousand Oaks, CA: Sage.

Jacobs, H.H. (2010). *Curriculum 21: Essential education for a changing world*. Alexandria, VA: ASCD.

Johnson, B., & Christensen, L. (2012). *Educational research: Quantitative, qualitative, and mixed approaches* (4th ed.). Thousand Oaks, CA: Sage Publications, Inc.

Kincheloe, J.L., & Weil, D. (Eds.). (2004). *Critical thinking and learning: An encyclopedia for parents and teachers*. Westport, CT: Greenwood Press.

Knipe, C., & Speck, M. (2005). *Why can't we get it right? Designing high-quality professional development for standard-based schools* (3rd ed.). Thousand Oaks, CA: Corwin Press.

Kuhn, D. (2005). *Education for thinking*. Cambridge, MA: Harvard University Press.

Kuhn, D. (2007). How to produce a high-achieving child. *Phi Delta Kappan, 88*(10), 756-763.

Lave, J., & Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. New York, NY: Cambridge University Press.

Lemov, D. (2010). *Teach like a champion.* San Francisco, CA: Jossey-Bass.

Lewis, C. (2002). *Lesson study: How can it build system-wide improvement?* Retrieved from http://www.lessonresearch.net

Lewis, C. (2008). *Lesson study: A handbook of teacher-led instructional change*. Philadelphia, PA: Mid-Atlantic Eisenhower Regional Consortium for Mathematics and Science Educational Research for Better Schools.

Lewis, C.C., & Perry, R.R. (2008). What is successful adaptation of lesson study in the US? *Journal of Educational Change 10(4), 365-391.* doi: 10.1007/s10833-008-9069-7

Marzano, R., Pickering, D., & Pollack, J. (2001). *Classroom instruction that works*. Alexandria, VA: ASCD

Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis*. Thousand Oaks, CA: Sage Publishing Inc.

Mills, G.E. (2007). *Action research: A guide for the teacher researcher* (3rd ed.). Upper Saddle River, NJ: Merrill.

Moll, L.C. (1990). *Vygotsky and education.* New York, NY: Cambridge University Press.

Moll, L.C. (Ed.). (2003). *Vygotsky and education: Instructional implications and applications of sociohistorical psychology*. New York, NY: Cambridge University Press.

Moore, R., & Berry, B. (2010). The teachers of 2030: The key to changing the teaching profession. *Educational Leadership, 67*(8), 36-40.

National Association of Elementary School Principals, (NAESP). (2010). Leading Learning Communities. Alexandria, VA: author.

No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 §1425 (2002).

Paul, R. (2009). *Intellectual foundations: The key missing piece in school restructuring.* Foundation for Critical Thinking. Retrieved from http://www.criticalthinking.org/pages/intellectual-foundations-the-key-missing-piece-in-school-restructuring/500

Ravitch, D. (2011, March/April). Ready for change. *Principal*, 26-27.

Rock, T.C., & Wilson, C. (2005). Improving teaching through lesson study. *Teacher Education Quarterly*,*32*(1), 77-92.

Schlechty, P. (2009). *Leading for learning: How to transform schools into learning organizations*. San Francisco, CA: Jossey-Bass.

Schmoker, M. (2006). *Results now: How we can achieve unprecedented improvements in teaching and learning*. Alexandria, VA: ASCD.

Schmoker, M. (2011). *Focus: Elevation the essentials to radically improve student learning*. Alexandria, VA: ASCD.

Siribaddana, P. (2010, July 20). Adult learning: Overview of instruments used in reflective practice. *Helium.* Retrieved from http://www.helium.com/items/1897020-adult-learning-overview-of-instruments-used-in-reflective-practice

Stevenson, H., & Stigler, J.W. (1992). *The learning gap.* New York, NY: Simon & Schuster.

Stigler, J.W., & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*. New York, NY: Free Press.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques for developing grounded theory* (2nd. ed). Thousand Oaks, CA: Sage Publishing.

Stringer, E.T. (2007). *Action research* (3rd ed.). Thousand Oaks, CA: Sage Publishing.

Stronge, J.H., & Tucker, P.D. (2003). *Handbook on teacher evaluation: Assessing and improving practice*. Larchmont, NY: Eye on Education.

Sytsma, S.E. (2006). It's about time: Productive pedagogies and professional learning communities. *International Electronic Journal for Leadership in Learning 10*(12). Retrieved from http://www.ucalgary.ca/iejll/vol10/sytsma2

Thompson, B. (1996). AERA editorial policies regarding statistical significance testing: Three suggested reforms. *Educational Researcher, 25*(2), 26-30. doi: 10.3102/0013189X025002026

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education 17*(7), 783-805.

Vygotsky, L.S. (1978). Mind and society: The development of higher mental processes, Cambridge, MA: Harvard University Press.

Wang-Iverson, P., & Yoshida, M. (2005). *Building our understanding of lesson study.* Philadelphia, PA: Research for Better Schools.

Wheatley, M. (2004). Is the pace of life hindering our ability to manage? *Management Today* (published by the Australia Institute of Management).

The White House. (n.d.). *Education: America's Reinvestment and Recovery Act*. Retrieved from http://www.whitehouse.gov/issues/education

Wiggins, G. (2011). *A diploma worth having*. Alexandria, VA: ASCD.

Yoshida, M. (1999). *Lesson study: A case of a Japanese approach to improving instruction through school-based teacher development* (Unpublished doctoral dissertation).The University of Chicago, Chicago, IL.

APPENDIX A

PARTICIPANT INFORMATION AND CONSENT LETTER

July, 2011

Dear Participants:

I am a graduate student under the direction of Dr. Debby Zambo, Associate Professor in the College of Education at Arizona State University. I am conducting a research study to support the infusion of critical thinking into the curriculum using lesson study as a means to support teachers' professional growth.

I am inviting your participation in "lesson study", which will involve meeting one full work day in August during continuing teacher week and two early release days a month during the Fall semester of 2011. This is a total of eight early release Wednesdays that will require about two to three hours of work time. You will not be asked to stay beyond your typical professional day during these early release days. This study will involve professional development of critical thinking learning and instruction, planning lessons in a grade level professional learning community, and observing each other teach the collaboratively planned lesson. Participating teachers in the study will revise lessons based on student behavior and learning as evidenced by their peer observations. Your participation in this study is voluntary. You must be 18 or older in order to participate. **If you choose not to participate or to withdraw from the study at any time, there will not be a penalty and it will not affect your participation in district or school professional development.** You have the right not to answer any question, and to stop participation at any time. There are no known risks from taking part in this study, but in any research, there is some possibility that you may be subject to risks that have not yet been identified. The benefits of your participation in this research study includes professional development that provides time to work with your peers to improve lessons, and an opportunity to help others learn how teachers think and act in lesson study groups. As always, for any professional development in our district, you can earn up to 24 recertification points for your participation.

All information obtained in this study will be confidential. I will be collecting data in the form of: pre and post survey, reflective learning logs and two of the district's teacher evaluation rubrics, instructional planning and student engagement. I would also like to audiotape your lesson planning and debrief sessions for transcription; however, if you do not want to be recorded, you have the right to ask not to be recorded at anytime. You can also change your mind once the recording starts, just let me know.

All data collection measures will be analyzed and described in my final dissertation, will be kept confidential, as anonymity will be maintained. No identifying information will be gathered. I will not know who you are when I collect data. Additionally, our school name will not be identified in my final dissertation study. The audiotapes will be stored in a secured cabinet in my school office. The tapes will be destroyed on June 1, 2012 at the conclusion of my study.

If you have any questions concerning the research study, please contact the research team at:

Dr. Debby Zambo, Principal Investigator
4701 W. Thunderbird Ave
Glendale, AZ 85306-4908
623-543-6334

Leonor (LeeAnn) Aguilar Lawlor, Co-Investigator
3947 N. 146th Drive
Goodyear, AZ 85395
623-764-4530

If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, you can contact the Chair of Human Subjects Institutional Review Board, through the ASU Research Compliance Office, at 480-965-6788. Please let me know if you want to be part of the study.

APPENDIX B

EVALUATION RUBRICS

Rubric for Instructional Planning Documentation

The teacher designs and plans instruction that develops students' abilities to meet Arizona's Academic Standards and District Assessments.

Instructional Planning Documentation Rubric Score 5 Exceeds Standards

	O	P
a1		0
a2		0
a3		0
b1		0
b2		0
c		0

a. Based on alignment to State Standards and consistent and effective use of assessment data, daily written lesson plans are sequential, easy to follow, and consistently include...
1. Measurable objectives that align to weekly/unit objectives and/or Enduring Understandings at the correct level using an aligned assessment that demonstrates progress toward the standard.
2. Essential sub-objectives that include an aligned assessment for each and the materials/resources needed.
3. Specific modifications and/or accommodations that differentiate for identified subgroups when appropriate

b. Long-range lesson plans such as curriculum maps, pacing guides, etc. effectively and systematically include...
1.Grade-level and content-area standards for the year that are sequenced into quarters and/or units with notations of what has been learned
2. An adjusted timeline for standards that require reteaching, extending, and other remaining standards

c. The lesson planning is sequenced and clearly aligned to the Student Academic Progress Records in an easy to follow format.

Instructional Planning Documentation Rubric Score 3 Proficient in Standards

	O	P
a1		0
a2		0
a3		0
b1		0
b2		0

a. Based on alignment to State Standards and effective use of assessment data, daily written lesson plans are sequential, easy to follow, and include...
1. Measurable objectives at the correct level using an aligned assessment that demonstrates progress toward the standard.
2. Essential* sub-objectives and materials/resources needed
3. General modifications and/or accommodations

b. Long-range lesson plans, such as curriculum maps or pacing guides, consistently includes
1. Notations of standards that have been learned
2. A sequenced timeline of standards that remains to be taught

Instructional Planning Documentation Rubric Score 2 Approaching Standards

	O	P
a1		0
a2		0
a3		0
b1		0
b2		0

a. Based on alignment to State Standards and assessment data, daily written lesson plans are somewhat consistent and at times effectively include...
1. Measurable objectives at the correct level using an aligned assessment that demonstrates progress toward the standard.
2. Essential sub-objectives and materials/resources needed.
3. General modifications and/or accommodations.

b. Long-range lesson plans are somewhat consistent and/or at times effectively include...
1. Standards that have been taught.
2. A sequence of standards to be taught.

Instructional Planning Documentation Rubric Score 1 Developing

	O	P
a1		0
a2		0
a3		0
b1		0
b2		0

a. Based on alignment to State Standards, daily written lesson plans are attempted but may not effectively include...
1. Measurable objectives at the correct level using an aligned assessment that demonstrates progress toward the standard.
2. Essential sub-objectives and materials/resources needed.
3. General modifications and/or accommodations.

b. Long-range lesson plans are attempted but only occasionally include...
1. Standards that have been taught.
2. Standards to be taught.

Instructional Planning Documentation Rubric Score 0 Unsatisfactory

	O	P
a1		0
a2		0
a3		0
b1		0
b2		0

a. Daily written lesson plans are incomplete or do not reference State Standards and do not include...
1. Measurable objectives at the correct level using an aligned assessment that demonstrates progress toward the standard.
2. Essential sub-objectives and materials/resources needed.
3. General modifications and/or accommodations.

b. Long-range lesson plans are missing and do not include...
1. Standards that have been taught.
2. Standards to be taught.

Rubric for Student Engagement

The teacher implements and manages instruction that develops students' abilities to meet Arizona's Academic Content Standards.

	O	P	Student Engagement Rubric Score 5 Exceeds Standards
			Throughout the lesson, the teacher purposefully and systematically...
a1		0	a. Elicits student-to-teacher and teacher-to-student interaction through implementation of questioning strategies and activities that effectively...
a2		0	1. Increase the retention, application, and extension of content by constructing/scaffolding meaningful connections and experiences. 2. Move students to higher levels of thinking and performance in a planned and deliberate manner.
b		0	b. Elicits student-to-student interaction/discussion to reinforce application of key vocabulary, new content and/or concepts.
			Throughout the lesson, all students* effectively...
c		0	c. Participate in learning processes that develop proficiency with the objective and each sub-objective.

	O	P	Student Engagement Rubric Score 3 Proficient in Standards
			Throughout the lesson, the teacher consistently...
a1		0	a. Elicits student-to-teacher and teacher-to-student interaction through implementation of questioning strategies and activities that effectively...
a2		0	1. Increase retention and application of the content. 2. Move students to think and apply.
b		0	b. Elicits student-to-student interaction/discussion to reinforce key vocabulary, new content and/or concepts.
			All students* effectively...
c		0	c. Participate in learning processes that develop proficiency with the objective.

	O	P	Student Engagement Rubric Score 2 Approaching Standards
			The teacher sometimes...
a1		0	a. Elicits student-to-teacher and teacher-to-student interaction through questioning strategies and activities that effectively...
a2		0	1. Increases retention and application of the content. 2. Moves students to apply and think.
b		0	b. Elicits student-to-student interaction/discussion but may not effectively reinforce key vocabulary, new content and/or concepts.
			Most students effectively...
c		0	c. Participate in learning processes that develop proficiency with the objective.

	O	P	Student Engagement Rubric Score 1 Developing
			The teacher attempts, but does not effectively...
a1		0	a. Elicit student-to-teacher and teacher-to-student interaction through questioning strategies and activities that...
a2		0	1. Increase retention and application of the content. 2. Move students to apply and think.
b		0	b. Elicit student to student interaction/discussion.
			A few students effectively...
c		0	c. Participate in learning processes

	O	P	Student Engagement Rubric Score 0 Unsatisfactory
			The teacher does not...
a		0	a. Elicit student-to-teacher and teacher-to-student interaction that is applicable to making decisions on student performance.
b		0	b. Elicit student-to-student interaction/discussion.
			Students do not effectively...
c		0	c. Participate in learning processes.

APPENDIX C

TEACHER'S SENSE OF EFFICACY

AND CRITICAL THINKING SCALE

Date:
Directions: This questionnaire is designed to help me gain a better understanding of teacher beliefs about lesson planning, working with teacher peers and critical thinking instruction and learning. Please indicate your opinions about each of the statements below by **circling** the answer that best applies to you. Please also take time to **write comments after each section**. Your answers are confidential, but will be very important in my data collection process.

Thank you,
LeeAnn☺

Section 1- Efficacy in Student Engagement:

1. How much can you do to get through to the most difficult students?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

2. How much can you do to help your students think critically?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

3. How much can you do to get students to believe they can do well in schoolwork?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

4. How much can you do to help your students' value learning?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

5. How much can you do to foster student creativity?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

6. How much can you use a variety of assessment strategies?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

Additional comments:

Section 2- Efficacy in Instructional Strategies:

7. How much can you gauge student comprehension of what you have taught?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

8. How much can you do to improve the understanding of a student who is failing?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

9. How much can you do to adjust your lessons to the proper level for individual students?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

Additional comments:

Section 3- Efficacy in Classroom Management:

10. How much can you do to motivate students who show low interest in schoolwork?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

11. How well can you respond to difficult questions from your students?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

12. To what extent can you craft good questions for your students?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

13. To what extent can you provide an alternative explanation or example when students are confused?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

14. How well can you implement alternative strategies in your classroom?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

15. How well can you provide appropriate challenges for very capable students?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

Additional comments:

Section 4- Teacher Beliefs about Lesson Planning

16. To what extent do you believe good lesson planning improves your teaching?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

17. To what extent do you believe reflecting on your lessons based on student response is beneficial?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

18. To what extent do you believe reflecting on your lessons based on student behavior is beneficial?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

19. To what extent do you believe infusing critical thinking into your curriculum is important for student learning?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

20. To what extent do you believe infusing critical thinking into your curriculum is important for students' future as adults?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

Additional comments:

Section 5-Teacher Beliefs about Peers

21. To what extent do you believe changing your lessons based on peer feedback helps you improve?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

22. To what extent do you believe planning with your peers helps you improve?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

23. To what extent do you believe watching your peers teach helps you improve?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

24. To what extent do you believe teachers watching you teach helps you improve?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

Additional comments:

Section 6- Teacher Beliefs about Critical Thinking

25. To what extent do you believe critical thinking should be integrated into the curriculum you teach?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

26. To what extent do you believe you are confident about integrating critical thinking into your curriculum?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

27. To what extent do you believe opportunities for critical thinking teaching and learning are available to you?

4	3	2	1
A Great Deal	Somewhat Influence	Very Little	Not At All

Additional comments:

Demographic Information:

27. I am: Female Male

28. My years of teaching experience starting in August 2011:
First Year 2-4 Years 5-10 Years 11 and Up

29. My age range:
21-25 26-30 31-35 36-40 41-45 46 and Up

Adapted from Hoy, W.K. & Woolfolk, A.E. (1993). Teachers' sense of efficacy scale and the organizational health of schools. *The Elementary School Journal 93*, 356-372. Retrieved from http://people.ehe.osu.edu/ahoy/files/2009/02/teacher-efficacy-10.pdf

Permission to use granted (see Appendix E).

LeeAnn Aguilar Lawlor, doctoral student at Arizona State University, created additional questions on the survey to fit the specific needs of her dissertation.

APPENDIX D

PILOT ALPHA CRONBACH

N= 5 Construct	Item #'s	Cronbach Alpha
Efficacy in Student Engagement	1,2,4,6,9,12	0.821
Efficacy in Instructional Strategies	7,10,11	0.811
Efficacy in Classroom Management	3,5,8,13,15,16	0.899
Belief's about Lesson Plans	19,20,21,22	0.136
Belief about Peer Support	17,18,23	0.672
Belief/ Amount of Critical Thinking Instruction	24,25	0.500
Total	25	0.867

APPENDIX E

INSTITUTIONAL REVIEW BOARD APPROVAL

ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

To:	Debby Zambo 4701 West
From:	Mark Roosa, Chair Soc Beh IRB
Date:	06/21/2011
Committee Action:	**Exemption Granted**
IRB Action Date:	06/21/2011
IRB Protocol #:	1106006550
Study Title:	Using Lesson Study to Help Intermediate Teachers Encourage Critical Thinking,

Develop Professionally, and Gain Efficacy

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(1) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

Pendergast
ELEMENTARY SCHOOL DISTRICT

Inspiring Excellence and Achievement

June 3, 2011

Arizona State University
Office of Research Integrity and Assurance
660 S. Mill Avenue, Suite 315
Tempe, AZ 85287-6111

To Whom It May Concern:

I have reviewed the consent form provided to me by Ms. Leonor Aguilar Lawlor in order to conduct her research study during the Fall semester of 2011. The research study is to support the infusion of critical thinking into the curriculum using lesson study as a means to support teachers' professional growth. I approve of the study.

With Regards,

Ronald W. Richards

Ron Richards
Superintendent

3802 N. 91st Avenue • Phoenix, AZ • (623)772-2200 • www.pesd92.org

APPENDIX F

PERMISSION TO USE INSTRUMENT

THE OHIO STATE UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN ECOLOGY

ANITA WOOLFOLK HOY, PH.D.

PROFESSOR
PSYCHOLOGICAL STUDIES IN EDUCATION

Dear

You have my permission to use the *Teachers' Sense of Efficacy Scale* in your research. A copy of both the long and short forms of the instrument as well as scoring instructions can be found at:

http://www.coe.ohio-state.edu/ahoy/researchinstruments.htm

Best wishes in your work,

Anita Woolfolk Hoy

Anita Woolfolk Hoy, Ph.D.
Professor

COLLEGE OF EDUCATION
29 WEST WOODRUFF AVENUE
COLUMBUS, OHIO 43210-1177

WWW.COE.OHIO-STATE.EDU/AHOY

PHONE 614-292-3774
FAX 614-292-7900
HOY.17@OSU.EDU