Creating Social Learning Opportunities for Elementary Students with Dialogic Discussion

by

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ABSTRACT

It is critical for students to be provided with opportunities to learn in settings that foster their academic growth. It is equally important that schools endeavor to be a place where students' social and emotional needs are met as well. However, due to lack of funding, over-testing, inappropriate evaluation measures, and other persistent policy pressures, our public schools have often resorted to a focus on raising standardized test scores through direct instruction with an increasingly narrowed curriculum. As a result, schools have become places in which students, rather than being seen as valued future members of a productive society, are part of the bleak statistics that shine a spotlight on how our schools have failed to motivate and connect with the students of today. Consequently, many educators have come to believe they are not influential enough to make a significant difference, and have resigned themselves to accepting their current situation. The problem with this thinking is that it minimizes the purpose of the job we promised to do – to educate.

The innovation I implemented and describe in my dissertation can be characterized with one word – dialogue. Dialogue that occurs for the purpose of understanding and learning more about that which we do not know. In this innovation, I endeavored to demonstrate how social learning by way of dialogic discussion could not only support students' academic growth, but their social and emotional growth as well. Results from the data collected and analyzed in this study suggest social learning had a highly positive impact both on how students learned and how they viewed themselves as learners.

Education is one of the cornerstones of our country. Educational opportunities that help meet the academic and social-emotional needs of students should not be seen as a privilege but rather as a fundamental right for all students. Equally, the right to express one's thoughts, opinions and ideas is a foundational element in our democratic society. Failing to connect with our students and teach them how to exercise these rights in our classrooms is to fail ourselves as educators.

DEDICATION

I dedicate this work to my students. May your words inspire every teacher who reads your story.

ACKNOWLEDGMENTS

First, I would like to thank my committee for their words of wisdom helping me craft this dissertation. I would especially like to thank my chair Dr. Carl Hermanns. Thank you for time and endless support. Most of all, thank you for sharing your passion for equitable education for all students with me and for believing in this innovation.

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Third, to my other dearest friend Pam. Thank you for always reminding me how important it is to laugh and explore new things in life so that I can remember what it feels like to be young.

I must also give my appreciation to my principal who trusted me to embark on this journey with my students two years ago and for supporting my efforts as both a researcher and as a practitioner.

To my parents. Though they are both gone, they were there when I first decided to become a teacher and the pride they felt for the work I did with my students resides with me still. I hope I continue to make them proud.

Finally, I want to extend my deepest gratitude to my husband David. It is not often someone comes into your life and alters the course of it in the most prodigious way. David, your love and friendship are what has allowed me to be the person I am today. You are the foundation I rest my feet upon and why my accomplishments have been possible. Thank you for believing in me and giving me a reason to hope again. I love you.

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PREFACE

For as long as I can remember, my first sense of identity came from observing my father interact with people. Always able to bring a smile or laugh to anyone, my father emulated an understanding of people and how to make them feel seen and important. For many years, my father and I would visit the homeless on Christmas. We did not go to shelters, but into the city where they lived on the streets and under bridges trying to keep warm. We brought them muffins and hot coffee wishing them a happy holiday as we attempted to bring a moment of comfort to those we met. From these visits, I learned to be fearless in the face of poverty and humbled by the knowledge we are all within fate's unpredictable grasp.

My second sense of identity occurred when I embarked on my teaching career. Serving the needs of others as my father had always done was as natural for me as slipping on a familiar pair of shoes. I embraced my position as an inner-city school teacher working with impoverished children because I believed I was making a difference in their lives just as I had done on those many Christmas journeys with my father.

When I became a researcher, my sense of identity morphed once again. Starting my thirteenth year in education, I found myself at the precipice of a great personal and professional dilemma. In my preceding years, I had endeavored to promote social learning in my classroom. On our visits to the city, my father and I never observed the homeless living alone. They were always in small groups or within just a few feet from each other. I used to think they did this to stay safe. Now I believe this was their way of not feeling forgotten. So, it was I became tangled in a web of a new curriculum that demanded I follow a script and eradicate social learning between my students. Working

as a reading interventionist in one of the poorest school districts, I felt my joy and love for teaching beaten down every day by a policy that was indifferent to the needs of all my students. The silence that filled my classroom was deafening and I could see my students disappearing into themselves and I along with them. As an educator, I knew this was not the best way to teach students but I felt powerless to change it.

As fate would have it, in the midst of my professional turmoil my father died. Although I hope he knew I was there with him, I cannot say for certain that he did. The man who had always been quick with a joke, generous to friends, family and strangers alike could no longer speak. He could not tell me he loved me or guide me on what to do. He was relegated to a hospital bed and as his daughter I could only be with him through those final days preserving his dignity and helping him find peace.

After my father's death, I felt compelled to draw strength from his memory and enact a change in my life. Relinquishing my position as a reading interventionist for the upcoming school year I went back into the classroom. Now I have been able to fill my room once again with the noise of my students as they talk endlessly with one another about their learning. Sometimes I feel like I am standing in the middle of a fantastic storm of conversation and I am satisfied with the noise - I know my students are talking because they understand what they have to say matters.

My research on social learning is not an accident. I believe the need to socialize is woven into the fabric of the soul because it keeps us from disappearing into a cavernous mouth of isolated silence. The human heart and mind has much to say though not always the opportunity to do so. For various reasons, not every educational setting supports social learning, but I carry on with my work because I believe it to be both cathartic and

salient. I am certain this work makes a difference in the lives of my students just as my father and I believed we were making a difference every 25th of December.

The work of the researcher and educator is hard and even unrelenting at times, but I do not fear it. My father was a great man and the impression he has left on my life is profound. I am my father's daughter and the courage he taught me lives on.

Chapter One

Creating social learning opportunities for elementary students through dialogic discussion

National Context

Every year schools across the country require teachers to prepare students for high-stakes standardized assessments. Accountability for standardized test score results has steadily increased due to political reform policies such as *A Nation at Risk*, *NCLB* and *Race to the Top*. While educators and policy makers agree educational systems should seek to ensure students graduate competent in core subjects, the challenge of how to best serve and motivate today's increasingly diverse learners as well as learners with varied degrees of skill remains (Saravia-Shore, 1995). Research suggests that the prevalent use of standardized assessments can decrease student motivation, leading to higher student retention and dropout rates, and often affecting students from minority and economically disadvantaged backgrounds the most (Amrein, A., & Berliner, D., 2003). In order to support diverse learners and improve student motivation, it is necessary for schools to create learning environments that are steeped in the practice of teaching students core academic content in conjunction with skills that support their social and emotional development (Durlak,Weissberg, Shellinger, Dymnicki & Taylor, 2011). Studies have shown that failing to meet the social and emotional development of students can cause students to feel less connected to school and lead to negative effects on students' academic performance, behavior, and health (Durlak et al., 2011).

The role schools play in the social-emotional growth of students is important because teaching and learning is a social and emotional process (Zins, Weissberg, Wang,

& Walberg, 2004). According to Zins et al. (2004), social emotional learning encompasses developing self-awareness, self-management, empathy, cooperation, and taking another's' perspective. In order to provide students with opportunities in the classroom that will facilitate the development of their social-emotional skills, it is critical for teachers to engage students in social learning experiences that are rich with opportunities for students to collaboratively interact and share their thinking with one another through dialogic discussion (Bakhtin, 1981). Dialogic discussion is an essential component of social learning because it engages students in the process of making meaning by explaining one's thinking to others through a flexible and equitable exchange of ideas, leading to increased involvement, problem-solving, and understanding (Abbey, 2016; Alexander, 2005; Bakhtin, 1981; Scardamalia & Bereiter, 1989). Through carefully constructed social learning opportunities, students can grow in their ability to engage in discussion with others appropriately and constructively, while also developing their academic skills (Eccles et al., 1999; Masten et al., 1995).

The theory behind social learning can be traced to the work of Bandura (1971), who believed that learning is a cognitive process that takes place in a social context, and that people learn from one another through observation, imitation, and modeling. Additional research has established that social learning can have a powerful impact on students' motivation and academic achievement (Light & Littleton, 1999; Steinberg L., Dornbusch, S. M., & Brown, B. B., 1992; Wentzel, 1999). Since humans are social beings who develop knowledge through actively engaging with one another (Kop & Hill, 2008), when students are in situations where a shared task and goal is present, motivation for learning increases (Wentzel, 1999).

Providing students with social learning opportunities is also necessary for effectively preparing students to enter the 21st century workplace. To this end, models of teaching and learning that build a student's ability to collaborate, gain new knowledge and self-assess are closely linked to developing 21st century skills (Bransford, Brown, & Cocking, 1999). Providing students with collaborative learning opportunities through peer-to-peer interaction via dialogic discussion allows an individual to learn how to constructively respond to others and demonstrate a respect for diverse opinions (Bailin, Case, Coombs, & Daniels, 1999).

Additionally, social learning experiences are an important part of a students' academic success (Wentzel, 1999) because, among the other benefits described above, carefully constructed and sustained social interactions centered on dialogic discussion can provide children with opportunities to both explain and teach concepts to one another (Slavin, 1990; Webb & Farivar, 1994; Webb and Palinscar, 1996; Wetsch & Bivens, 1992). Palinscar & Herrenkohl (1999) found reciprocal teaching and learning among students was connected to significant cognitive gains because retention of information increases as an individual moves through the process of explanation (Webb, 1985). This process of reasoning through information also supports a student's critical thinking skills as they learn to think and talk about problems in an intentional way (Glaser, 1941).

Local Context

I worked in a large school district that served approximately 20,000 students in 12 K-5, four K-8 and four 6-8 schools. I taught in a K-5 school situated in a low/middle class area. The school served approximately 900 students. 100% of the student population was on the Free and Reduced Lunch Program and approximately 93% of the population

identified as Hispanic (Startclass, 2017). According to the U.S. Census (2010-2014), 40% of families were living below the poverty line. In their work on the effects of poverty on children in schools, Engle and Black (2008) found a child's ability to reap benefits from school played a distinct role in escaping poverty. The local context for this study involved a highly impoverished demographic with tremendous potential but facing significant challenges.

My district used a "walk to read model" whereby the lowest-performing students were placed in ability groups and traveled to an appropriate classroom for remedial reading instruction. These students were taught with a program that relied completely on direct instruction. The programs used by educators are of less importance than the manner in which they are taught, and while direct instruction and scripted programs may be one part of a student's academic experience, they should not be their only experience. For this reason, I sought to provide inclusive learning environments for all of my students by way of creating social learning opportunities during mathematics instruction. Social learning opportunities can occur when students are offered intentionally constructed opportunities to collaboratively interact with their peers and dialogue about their learning. Learning with and from one another, students can begin to engage in meaningful conversations that foster critical thinking skills as well as respect for diverse opinions, and these opportunities have the potential to effect students' educational experiences in profound ways.

My Innovation

High-stakes standardized tests have permeated the educational world for over thirty years. The accountability that stems from these assessments has encouraged the use

of direct instruction teaching practices that focus on the academic skills students need to learn while neglecting the social-emotional development students need in order to feel connected to their learning experience.

The imbalance of time that is spent in classrooms teaching rote skills and/or preparing students for high-stakes standardized testing through direct instruction versus providing opportunities for students to engage in social learning experiences is one of the challenges my innovation addressed. This innovation was also motivated by my belief that social learning opportunities are paramount for helping students find their place in the world – a chance to define themselves beyond the constrained borders of academia and visualize their hopes and dreams through dialogic exploration.

My innovation sought to create social learning opportunities for all students during mathematics instruction. As this was the only time during which none of my students were pulled out for alternative instruction, this innovation attempted to support both the academic and social-emotional development of all students. Through carefully constructed peer groups meant to foster dialogic discussion, this innovation aimed to build interpersonal skills, generate critical thinking, help build students' motivation for learning, and develop students' sense of self-efficacy. Finally, this innovation was an attempt to cultivate the skills students need for the 21st century workplace and it aspired to help students develop an understanding of the external world and how they are part of that world.

Over the course of ten weeks, students were placed in carefully constructed peer inquiry groups. In these groups, students learned how to participate in dialogic discussion with their peers during math. I hypothesized that students would learn to accept diverse

opinions while sharing their own viewpoints with their peers, engage in critical thinking to solve complex mathematics problems, analyze data to measure their growth and proficiency in the math skills they were learning, and through this analysis and their collaborative work with their peers, develop an increased sense of self-efficacy as capable and successful learners.

While the high-stakes standardized testing of today focuses on evaluating a student's performance in the classroom, the future will judge our students by their contributions to society. A student's ability to think critically, act collaboratively, and listen proactively to the ideas of others while also asserting their own ideas will determine their path far beyond a standardized test score. Assessment has a place in the educational field. We must hold our students and ourselves to some measure of accountability. Problems arise however when we fail to measure *all* aspects of what is important for a student's future and when we cease to be advocates who champion the rights of our students' voices to be heard. When we provide students with social learning opportunities, we are offering them an opportunity to reach beyond the limited scope of high-stakes standardized assessments into a future full of limitless possibilities.

The research questions this innovation sought to answer were:

RQ 1: How and to what extent do peer inquiry teams support the development of dialogic discussion among fourth grade students?

RQ 2: To what extent does dialogic discussion generate critical thinking among fourth grade students?

RQ 3: How does dialogic discussion within peer inquiry teams develop self-efficacy among fourth grade students?

RQ 4: To what extent is participation in the peer inquiry teams associated with a change in math fluency skills?

In the following chapter I will discuss the literature that supported this innovation.

Chapter Two

Supporting Theoretical Perspectives and Research

Social Constructivist Theory

One of the trademarks of direct instruction is the role of the teacher. In a direct instruction model, the teacher assumes total control of the lesson content and pacing, directing students on what they will learn and how, with students often working on their own. While this model can be effective when teaching basic facts, there is no evidence direct instruction supports students' higher-order thinking skills, including reasoning and problem solving (Peterson & Walberg, 1979).

From a socio-cultural viewpoint, learning and development does not take place in isolation but rather in social and cultural contexts (Palinscar, 1998). Echoing this perspective, social constructivists regard the context in which teaching and learning occurs to be paramount to learning itself (Palinscar, 1998).

Vygotsky. The basic tenant of social constructivist theory is that learning takes place during social interaction. One of the most prominent and influential individuals to support social constructivist theory was Lev Vygotsky (1978). Vygotsky (1978) reasoned that the mental functioning of an individual is not affected merely by being around others, but by the intentions of those interactions. Vygotsky believed (1978) social interactions contribute to the development of an individual's higher order thinking skills – something he called the "genetic law of development" (Valsiner 1987, p. 67). According to Vygotsky (1978), when an individual participates in social activities involving joint efforts, that individual becomes more aware of the effects of working with others and the new strategies they are learning in the process. As individuals continue on

in their learning, these newly acquired skills can then be applied to help them solve new problems and tasks.

Vygotsky (1978) also believed individuals have two learning levels: actual and potential. The actual level is the level at which an individual can perform a task independently. For the potential level, Vygotsky (1978) coined the term "zone of proximal development" (ZPD). At the potential level, an individual requires support from another. By way of support from another, the learner can move beyond the potential level into an actual level at which they are able to work independently. For this reason, Vygotsky (1978) argued for the importance of creating social learning opportunities for individuals. Other socio- cultural theorists have elaborated Vygotsky's (1978) work and described ZPD as being socially interactive (Chang-Wells & Wells, 1993) and as something that involves learners participating in a community of practice (Rogoff, 1994).

Social Learning Theory

Social learning theory provides an explanation of how people learn from one another through observation, imitation, and modeling. According to Albert Bandura (1971), individuals are able to direct their own behaviors, understand how those behaviors will affect future experiences and, as such, use that information to determine future actions. However, Bandura believed that an individual's behaviors are influenced by the social cues of others, because behavior is largely learned through observation before performance. In a social learning framework, behavior reinforcements can serve to inform, incentivize and enhance the capabilities of an individual's behavior. Bandura (1971) stated that an individual's behavior could be influenced by the way they believed

they would earn approval but that the reinforcement would have little impact unless the individual believed it would meet their needs.

Social learning theory (Bandura, 1971) has four foundational processes. The first process is attentional. In this process, an individual learns by intentionally attending to a behavior being modeled. The manner of behavior being attended to can have a high degree of impact on the individual observing the behavior. Additionally, while some attentional processes might yield negative consequences, some forms of modeling do not need incentivizing because of the positive intrinsic rewards they offer.

The second process is retention. Unless an individual has a memory of observing a behavior, they cannot be influenced by it. Bandura (1971) wrote that for long-term retention of information to occur, verbal coding is important. He reasoned that most cognitive process are verbal in nature and therefore verbal coding can support retention of information more effectively than visual cues. Bandura defined verbal coding as an individual's ability to describe what they had observed. He found that individuals who were able to describe an observed behavior were more successful in emulating that behavior (Bandura, Grusec, & Menlove, 1966).

The third process it motoric reproduction, which is concerned with the manner in which individuals can replicate an observed behavior with their own motor functions. Bandura (1971) stated that most daily learning occurs through a series of self-adjustments based on feedback of their visible actions. The last process is reinforcement and motivation. In this process Bandura (1971) argued newly acquired learning might not transfer into observable action if the individual does not receive positive feedback

regarding their efforts. In other words, positive incentives lead to observable actions of what has been learned.

Dialogic Discourse

Dialogue is not simple talk. Dialogue is the process of making meaning and deriving meaning through reciprocal conversation with others (Abbey, 2016). From a social-cultural standpoint, explaining one's thinking to another individual is what leads to deeper understanding and meaning (Scardamalia & Bereiter, 1989).

In his theoretical works on dialogism, Mikhail Bakhtin (1981) claimed dialogue produced change through the interactions that occur when individuals engage in making meaning with each other. He considered words to be utterances that form meaning through the relationships between the speaker and the listener (1986). In dialogic discourse, Bakhtin (1981) maintained three characteristics were present: power relations between the individuals were seen as flexible and interchanging; questions were open-ended to incite an authentic conversation; and individuals collaborated in the co-construction of knowledge.

The equitable exchange of ideas is a cyclical process. Alexander (2001) believed "dialogue teaching" to be a reciprocal way to exchange ideas in the search of deeper thinking and understanding. According to the work of Bereiter and Scardamalia (2004) "dialogic literacy" is discourse that occurs for the purpose of generating new knowledge and understanding for the benefit of society. Dialogue creates opportunities for individuals to be problem-solving thinkers. Progressive organizations are concerned with the development of new ideas, not exposition and argument (Alexander, 2005). In the classroom, dialogue has also contributed to an increase in involvement among struggling

students. Dialogic discourse was found to be a vehicle for students to show competence without having to compete against their more dominant peers (Alexander, 2005).

Nesari (2015) extends Bakhtin's theory to pedagogy directly. In what he terms "dialogic education," Nesari situates the teacher as a facilitator in the process of learning, during which "the teacher shares his or her authority with the students; the voices of the students are heard and their opinions are valuable" (p. 642). The teacher supports dialogic discussion in which the students practice "exploratory talk" and "thinking reasonably." There is not one right pre-determined answer; all voices are valued as part of the process of learning. Dialogic education is in stark contrast to the monologic classroom, in which the teacher is the possessor of all knowledge and the final word on learning (Nesari, 2015).

Critical Thinking

The idea of critical thinking arose 2, 500 years ago with Socrates, who argued the knowledge individuals believed they possessed was merely rhetoric. Socrates developed a method for seeking evidence, analyzing concepts, reasoning through careful examination, and outlining implications for what a person said and did. He called his method "Socratic Questioning" (Paul, R., Elder, L., Bartell, T., 1997).

Over time, the concept of critical thinking has evolved further. In a pivotal study on critical thinking in education, Edward Glaser (1941) outlined three tenants of critical thinking: having an intentional attitude for thinking about problems in a thoughtful way, an understanding of the methods for questioning and reasoning, and possession of skills for using those methods. Glaser posited that an individual must be able to display persistence in questioning assumed knowledge and working through a given task, and

must know how to see a problem and solve that problem by gathering information. Glaser (1941) also believed an individual should know how to use language for the purpose of interpreting data, evaluating the evidence to look for the existence or non-existence of logical relationships between what known and what is assumed, and to draw conclusions on the basis of the experience.

Self-Efficacy Theory

According to Bandura (1977), self-efficacy theory describes the level to which an individual believes they can accomplish a task. This belief determines the amount of effort he/she is willing to exert on that task. Bandura argued that self-efficacy affects effort and persistence, and when an individual has a high-degree of self-efficacy, they are more likely to attempt complex tasks. On the other hand, when an individual possesses a negative self-perception they could become preoccupied with themselves as a way of detaching from the task, and would tend to avoid tasks they believe are beyond their abilities because they perceive these tasks as threatening. Bandura found that one way people's efforts could be affected was through indirect experiences. When an individual with low efficacy observed another individual perform a task where no negative consequence was connected to the outcome of that task, the individual with low self-efficacy felt more motivated to apply some degree of effort toward the same task. Bandura also found that people could be encouraged into changing their mindset regarding their capability to cope with previously challenging situations through verbal persuasion. He argued that verbal persuasion found in social interactions was a means to helping individuals take on difficult situations. He reasoned when an individual is socially persuaded and provided appropriate tools, that individual was more likely to

extend effort toward accomplishing a previously daunting task, believing they now had the capability to do so. Bandura (1986) also discovered once a fixed sense of efficacy was established, failure at tasks had little or no negative impact on some individuals.

Contributing to the work done by Bandura on self-efficacy, Schunk (1991) outlined interventions that could be applied for the purpose of increasing self-efficacy. He believed individuals not only acquire self-efficacy through their own experiences, but also through social comparisons. He reasoned that individuals came to believe in their ability to perform tasks by observing others perform that same task. Schunk (1991) further described the differences between higher- and lower- skilled individuals with respect to self-efficacy. Some highly skilled individuals did not possess high self-efficacy levels and therefore did not believe in the possibility of a positive outcome from their actions. Alternatively, individuals who initially had low levels of self-efficacy but felt adequately supported, came to believe a positive outcome was possible as they worked through a task. In this way, Schunk (1991) found efficacy appraisal was an inferential process as individuals considered the level of difficulty of a task, the amount of effort and assistance needed, and their perceptions about their abilities to successfully complete the task.

Bandura and Schunk (1981) both discussed the importance of goal setting as a means to improve self-efficacy. Goal setting helps an individual focus on the task at hand and decide on the amount of effort to exert towards reaching that goal. Goals can indirectly affect behavior by helping an individual persist at a task over time (Locke and Latham, 1990). This is particularly true of something Schunk (1991) called proximal goals. These types of short-term goals allow an individual an opportunity to measure their

efficacy in short increments, and can lead to a higher degree of self-efficacy as the individual is able to observe their success over time.

Conclusion

The theories outlined in the chapter informed the design of my innovation. The central focus of the innovation was to better understand how, and/or the extent to which, dialogic discussion, critical thinking, and self-efficacy were developed among my fourth grade students through socially constructed learning opportunities that I called peer inquiry teams. In the following chapter I will provide an overview of the research design for my innovation.

Chapter Three

Methods

Introduction

In chapter 1, I outlined how research and my own teaching experience indicate that there is a lack of time for students to engage in social learning opportunities during which students can collaboratively engage in structured and supported dialogue and inquiry to solve problems and construct understanding. Instead, the pressures of high-stakes testing have tended to create teacher-dominated environments in many classrooms permeated by monologic methodologies. My innovation sought to create dialogic learning opportunities for my fourth-grade students during the math block through the implementation of peer inquiry teams. The peer inquiry teams engaged in dialogic discussion and collaborative problem solving in order to develop their critical thinking skills and sense of self-efficacy.

My research questions for this innovation are:

RQ 1: How and to what extent do peer inquiry teams support the development of dialogic discussion among fourth grade students?

RQ 2: To what extent does dialogic discussion generate critical thinking among fourth grade students?

RQ 3: How does dialogic discussion within peer inquiry teams develop self-efficacy among fourth grade students?

RQ 4: To what extent is participation in the peer inquiry teams associated with a change in math fluency skills?

Setting and Participants

The setting for my innovation was the K-5 school where I was teaching. The school is located in a large school district in a rural area of Phoenix. Approximately 900 students attended the school and 100% were on the Free and Reduced Lunch Program. Approximately 93% of the student population identified as Hispanic. My innovation used a convenience sample comprised of my fourth-grade students. Of the 25 students in my innovation, 14 looped with me from the previous school year.

Role of the Researcher

I was both the researcher and the classroom teacher in this innovation. I have been teaching for 15 years in the elementary classroom. Three of those years I taught English as a Second Language (ESL) to students in Berlin, Germany and for the past 12 years I have taught in Title I schools across Colorado and Arizona. Most of my teaching experience lies with third and fourth grade students and I also worked with third grade students as a reading interventionist for three years prior to returning to the classroom this past year.

Procedures

Prior to the start of this innovation, I spent time at the very beginning of the school year building my classroom community. One of the ways I did this was by requiring each of my students to participate in show and tell. One student each day would bring something to share with the class with the expectation they had to explain why they chose to share that item. After the presentation, they would be allowed to take up to five questions from the class. The was done for the purpose of starting the process of dialogic discussion between my students. Over the years I have discovered show and tell to be an

extremely powerful way to bring my students together. Students have brought in items ranging from a favorite toy to a picture of a loved one who had passed. Many of these presentations have taken on a very cathartic feeling as students share their most personal feelings. Observing the reactions of the other students, I have seen empathy, kindness and genuine interest. These exchanges have made me aware of the deep reach children can have into another child's heart by dialoging and listening to each other.

I also concentrated on building my classroom community by structuring daily team-building activities. I found this to be extremely invaluable when I conducted my first innovation involving peer inquiry teams the previous year. I spent one month presenting a daily activity for my students to engage in. This was done for the purpose of helping them get to know one another and so I could observe how they interacted with their peers. I found these activities from various internet resources and they included whole class to small group, indoor and outdoor activities, and they ranged from five to 30 minutes in length. These activities gave me a helpful snapshot into how students accepted defeat, listened to others, engaged in respectful dialogue, responded to diverse opinions, showed encouragement to others and handled leadership opportunities. These activities were not for the purpose of understanding my students' academic skills, but rather their social and emotional skills. Although I also used measures to help me understand my students' math proficiency skills when considering my peer inquiry teams, I considered these team building activities extremely important for helping me understand the level of social and emotional proficiency my students possessed as well.

The innovation itself was conducted over ten weeks. During that time, my participants engaged in peer inquiry teams during the mathematics instructional time five

days a week. The students I taught the previous year had had an opportunity to engage in peer inquiry teams, so at the start of this innovation I purposefully assigned those students to inquiry teams with students who had not been with me the year previous. Students were placed into peer inquiry teams based on several factors. First, I used math fact fluency data (MCOMP) collected prior to the start of this innovation to construct teams of students with varying degrees of math skill levels. Second, my own observations regarding classroom behavior was also used to construct groups. Finally, the students were allowed to choose two peers they wanted to work with and one peer they did not. The purpose of this was to offer the students an opportunity to express which peers they felt would best support their academic growth and behavioral needs. These procedures allowed me an opportunity to collect academic and behavioral data to construct inquiry teams that would best optimize student learning. The peer inquiry teams used the district adopted mathematics curriculum for the purpose of learning fourth grade mathematics skills. Students worked in teams to solve the complex math word problems and algorithms embedded in the curriculum.

Peer inquiry teams monitored how their math skills were developing by completing exit tickets after each lesson and also by graphing the scores from their weekly math fluency assessment (MCOMP). Students also completed field notes (see Appendix A). These notes were completed as a team, allowing each student to reflect on how they were contributing to the success and growth of their inquiry team. Additionally, each student completed his/her own monthly reflection journal (see Appendix B). The questions in the journal were tailored to allow students to reflect on the impact that being part of an inquiry team had on their sense of self-efficacy. The personal narratives I

collected at the end of this innovation were used to determine how students felt peer inquiry teams had supported their learning goals and the impact peer inquiry teams had had on their feelings of self-efficacy.

In summation, I anticipated this innovation would provide my fourth-grade students with an opportunity to build their critical thinking skills through dialogic discussion in an inquiry team and potentially increase their sense of self-efficacy in mathematics.

At the onset of this innovation l pre-selected a single peer inquiry team to video-record. Video-recording occurred on random days whenever students took an end-of-lesson assessment. These assessments required students to work in groups independent of teacher support and provided optimal opportunities for capturing the dialogue that occurred between the students. The group I recorded was purposefully selected to best answer each of my research questions, given the participants had an extremely wide range of both social and academic skills. Each video was transcribed using the GMR Transcription Service and I coded the transcriptions using a deductive coding method, with initial theory-driven coding categories. The purpose of recording this group was to observe how and to what extent over time dialogic discussion generated critical thinking skills and how those skills impacted the fourth-grade students' sense of self-efficacy. The timeline for this innovation is shown in Table 1.

Table 1

Innovation timeline

Week 1: October 16th	• Students begin working in their assigned mathematics group • MCOMP assessment given and used for goal setting • Weekly team field notes completed • First two video recordings completed (October 16th and 20th)
Week 2: October 23rd	• Students continue working in their assigned mathematics group • MCOMP assessment given and used for goal setting
Week 3: October 30th	• Students continue working in their assigned mathematics group • MCOMP assessment given and used for goal setting • Weekly team field notes completed • Individual monthly student reflection journal completed • Third video recording completed (November 3rd)
Week 4: November 6th	• Students continue working in their assigned mathematics group • MCOMP assessment given and used for goal setting • Weekly team field notes completed • Fourth video recording completed • (November 8th)

Week 5: November 13th	• Students continue working in their assigned mathematics group • MCOMP assessment given and used for goal setting
Week 6: November 20th • Thanksgiving holiday-2 day week	• Students continue working in their assigned mathematics group
Week 7: November 27th	• Students continue working in their assigned mathematics group • MCOMP assessment given and used for goal setting • Weekly team field notes completed
Week 8: December 4th	• Students continue working in their assigned mathematics group • MCOMP assessment given and used for goal setting • Weekly team field notes completed • Individual monthly student reflection journal completed
Week 9: December 11th	• Students finish working in their assigned mathematics group • Final MCOMP assessment given and used to determine if goals have been met • Weekly team field notes completed • Fifth and final video recording (December 15th) • Second monthly student reflection journal completed
Week 10: December 18th	• Individual Final Reflection Journal completed

	• Final focus group interview conducted (December 20th)

Methodology

As the researcher, I adhered to a participatory action research design model. Herr and Anderson (2005) concluded that action research should never be done to a participant, but rather a researcher should seek to work in tandem with the participant. As the researcher, I intended to provide support for students to visibly see how their work in peer inquiry teams was impacting their math skills and sense of self-efficacy. Dialoguing with teams about the effectiveness of their work together, helping students set individual goals for math fluency, and engaging in problem-solving strategies with students are some of the ways I sought to work with my participants.

I chose to use a mixed methods design (Creswell, 2005) in my study for the purpose of providing insight about the relationship between student perceptions (qualitative data) and the results from students' MCOMP test scores (quantitative data). More specifically, I wanted to better understand how the dialogic discussion students engaged in during their inquiry team work impacted the development of their critical thinking skills. Further, I wanted to examine how the students' monitoring of their weekly MCOMP test scores along with their inquiry team experience overall had impacted their sense of self-efficacy.

Measures

MCOMP. My school used the Math Computation (MCOMP) as the universal screener to monitor students' progress on math fluency. This eight-minute assessment

measures students' fluency skills in the areas of addition, subtraction, multiplication, division, fractions and adding and subtracting with decimals in the equation. Students may elect to answer any problem they choose without loss of points. More rigorous questions are assigned a higher point value. The assessments become progressively more challenging to mirror the skills students are learning during math instruction and the score students needed to "pass" went up every four weeks.

The MCOMP was first administered at the beginning of the school year and every week thereafter during the innovation to monitor the students' math fluency progress. A post MCOMP assessment was given at the conclusion of the innovation. Pre- and post-assessment data was analyzed at the conclusion of this innovation to help determine to what extent peer inquiry teams had impacted the students' math fluency skills. The students had access to their weekly MCOMP scores for the purpose of goal setting and critically thinking about how the work they were doing in their inquiry teams was impacting their ability to reach their goals.

Throughout this innovation, several qualitative measures were also used for the purpose of answering my research questions.

Team Field Notes. The students took field notes as a team, using a template I provided (see Appendix A). Teams took field notes during weeks one, three, four, six and eight of the innovation. The teams also set goals for the following week. The purpose of these field notes was to offer students an opportunity to consider the effectiveness of their dialogue and efforts to support one another's goals. I provided written as well as verbal feedback to the teams, and occasionally met with each team about the feedback prior to the start of the new week. The feedback and meetings took place for the purpose of

guiding the students to reflect on the strengths they noted and to also think more critically about the goals they set and why they had chosen those goals.

Student Reflection Journal. The students also completed two individual reflection journals. One was completed during week three and the other during week nine of the innovation. The purpose of the journal was to allow individuals an opportunity to examine how they were meeting their stated learning goals. Specifically, students examined their math test scores and/or exit tickets and reflected if they were meeting their goals, why/why not, what they felt they could do to either reach or maintain their growth goals and how they believed their inquiry team could support their goals. As with the student field notes, I provided a template for the students to use (see Appendix B).

Video-Recording. I video-recorded one pre-selected group of students during the inquiry team time for the purpose of analyzing how and to what extent the inquiry team experience developed dialogic discussion, critical thinking skills and self-efficacy among the participants. Recordings took place during weeks one, three, four and nine of the innovation. A final focus group interview was conducted on the 10th week (see Appendix D). These recordings were transcribed using the GMR transcription service.

Final Reflection Journal. The students completed a final reflection journal on week 10 of the innovation. The reflection journal allowed students an opportunity to reflect on their recent experiences in their peer inquiry team and create end-of-year goals for themselves. Students were further asked to consider how continuing to work in peer inquiry teams might help them reach those goals. I provided a template to guide the content and structure of the narrative (see Appendix C).

Final Team Focus Group Interview. At the conclusion of the innovation I interviewed the four students I had been video-recording during the math time. I created questions to help answer my three research questions. Each student responded to each question and at the conclusion of the interview, each student was offered the opportunity to add additional comments (see Appendix D).

Data Analysis

To answer RQ 1: *How and to what extent do peer inquiry teams support the development of dialogic discussion among fourth grade students*, several qualitative measures were used.

First, I video-record a pre-selected group of students during the peer inquiry team time in order to examine how the students communicated with one another and how their communication changed over time. I transcribed and deductively coded the conversations of the students using the characteristics Bakhtin (1981) described as comprising dialogic discussion: power relations between the individuals are seen as flexible and interchanging; questions are open-ended to incite an authentic conversation; and individuals collaborate in the co-construction of knowledge.

I also conducted a final team focus group interview with the same students I video-taped throughout this innovation. Using the dialogic discussion characteristics described above, I transcribed and coded the responses to look for how the students' described if/how their interactions with their peers had changed over time, and also how the students described their role during discussion with their peers.

Team field notes were collected four times throughout this innovation. Students were asked to describe how they had helped one another in their peer inquiry team. These

responses were deductively coded to look for emerging patterns around dialogic discussion as defined by Bakhtin (1981).

I also collected student reflection journals. These were collected twice over the course of this innovation. Students were asked how they thought their peer inquiry team was helping them reach their goals. Responses that related to dialogic discussion were deductively coded under one of the three characteristics described by Bakhtin.

Finally, I examined the final reflection. As with all of the other measures mentioned, I looked for emerging patterns pertaining to dialogic discussion within the students' responses regarding how they believed their peer inquiry team had helped them grow throughout this innovation.

To answer RQ 2: *To what extent does dialogic discussion generate critical thinking among fourth grade students*, several qualitative measures were used. For each measure, I deductively coded how the students applied critical thinking by using three tenants of critical thinking outlined by Glaser (1941): using language for the purpose of interpreting the data, using language to express what contributed to those results, and drawing conclusions on the basis of the experience.

First, I used the video recordings from the group of students I recorded, as well as their final focus group interview. I deductively coded the transcriptions of their discussions as described above, looking for emerging themes in the data related to critical thinking.

For the team notes, I coded student responses to understand the extent to which the students used critical thinking to determine how they believed they had helped each other, what goals they had for the following week, and why they chose those goals.

The student reflection journals were completed in tandem with data analysis. Each student was required to examine his/her own MCOMP scores from the month and reflect on if/how their peer inquiry team was supporting their growth in math. Further, students were asked to describe how they felt about their data and why. All of these responses were deductively coded using the critical thinking characteristics defined by Glaser (1941).

Lastly, the final reflection journals required students to reflect on the ways they felt they had improved on their math skills. Questions included an opportunity for students to reflect on their individual efforts as well as on the efforts they gave while in their peer inquiry teams. These responses were deductively coded to look for emerging patterns of critical thinking.

To answer RQ 3: *How does dialogic discussion within peer inquiry teams develop self-efficacy among fourth grade students*, four qualitative measures were used.

I used data from the video recordings, final focus group interview, student reflection journals, and the final reflection journals to examine how the students' feelings of self-efficacy developed and/or were impacted over time as a result of the peer inquiry team process. To create coding categories for the data, I looked to the attributes of self-efficacy as defined by Bandura (1977) which include: impact of goal setting toward observable success over time, impact of goal setting toward accomplishing a task, belief in ability to accomplish a task by observing others, individual belief in ability to accomplish a task, and amount of effort given on a complex task.

The video transcripts and final focus group interview data provided an in-depth look into the perceptions students had pertaining to self-efficacy as defined by Bandura

(1977). Similarly, to reveal emerging patterns indicating self-efficacy in the student reflection journals, student responses describing their feelings regarding their math data and goals and how they believed they could continue to grow were coded according to Bandura's self-efficacy attributes.

The final reflection journal asked students to state how they had improved on their weekly math assessments and how their team had helped them grow. These responses were also coded and categorized using the attributes outlined by Bandura (1977).

To answer RQ 4, *To what extent is participation in the peer inquiry teams associated with a change in math fluency skills,* I used the district's MCOMP assessment. I examined the pre- and post-assessment scores of each student to determine the extent to which the students increased their proficiency scores. I also calculated the total percentage of students who scored "intensive", "strategic" or "benchmark" between the pre- and post-assessment.

Threats and Challenges to Validity

One threat to validity in this innovation was mobility. My school is located in a highly transient neighborhood. This innovation saw four of the participants move before the conclusion of the innovation. I also acquired three new students during the course of this innovation. These events required I adjust some of the peer inquiry teams during the innovation and may have altered some the outcomes in those groups.

Another challenge for this innovation was absenteeism. Absenteeism among participants occurred regularly throughout the innovation and ranged from between one to six consecutive school days. Reasons for absenteeism included illness, death of a

family member, and suspension. This may have skewed the overall effectiveness of my innovation because participants missed instruction that was important for their learning growth and goals and their absence also meant peer inquiry groups had to work without all team members present. Absenteeism also affected the number of video recordings I was able to conduct, as some members of the group were absent on more than one occasion during this innovation.

My position as the teacher and researcher in this innovation presented an additional challenge. My students may have been influenced by my presence throughout this innovation and subsequently worked together in ways they might not otherwise with an outside individual.

Finally, a variety of social learning opportunities took place throughout the school day in my classroom in addition to the peer inquiry team activities. For the purpose of this innovation however, I researched the participants' experiences only during the math block time. This could lead to the inference that the social learning which took place during math time was not the only mitigating factor when connecting my findings to my conclusions.

In the next chapter, I will discuss my findings from this innovation.

Chapter 4

Results

In this chapter I report on the mixed-methods findings from this action research study, organized by research question.

RQ1: How and to what extent do peer inquiry teams support the development of dialogic discussion among fourth grade students? Several qualitative measures were used to answer this research question: video-taping, a final focus group interview, team field notes, student reflection journals, and final reflection journals. I organized the data from these measures by coding the students' conversations under three characteristics Bakhtin (1981) described as comprising dialogic discussion: *individuals collaborate in the co-construction of knowledge*; *questions are open-ended to incite an authentic conversation*; and *power relations between the individuals are seen as flexible and interchanging*.

Individuals collaborate in the co-construction of knowledge. The findings from the various reflection journals showed a high level of collaboration between peer inquiry team members by way of sharing ideas with one another and working together to construct meaning. One student wrote, "Sometimes when we work together we help share and when we do our skills in math we always share ideas and that helps me." Another student commented, "I think we work good together by talking and sharing answers to each other." In connection to sharing ideas, student responses showed an understanding about how collaboration helped them make meaning of the work. As one student said, "We catch each other's mistakes" while another wrote, "We check and correct our work together." Some teams, however, did report having challenges with dialogic discussion.

"We don't give feedback" shared one team member, and another said, "We need to let everyone share their ideas."

Questions and responses are open-ended to incite an authentic conversation.

Students demonstrated that they engaged in dialogue not just to find the "correct" answer, but rather to come to *an* answer by exploring multiple possibilities through authentic conversation. For example, one student told her peer team that "We need to explain our work in *words* not just numbers." "Our skill of talking is going good when we talk about our ideas." Further, to support students' skill in dialogic discussion, I taught students how to begin their dialogic discussions with sentence stems designed to elicit open dialogue. "I agree with you because… I disagree with you because…". These were heard regularly in the peer inquiry discussions as students engaged in increasingly authentic conversations focused on facts and evidence.

Power relations between the individuals are seen as flexible and interchanging. For this characteristic, I looked for evidence of students being able to engage effectively in equitable conversation with one another, without having single team members dominating the discussion. A number of student responses address this characteristic. For example, with regard to effectiveness, the student reflection responses showed a large number of students with a positive perception on the dialogic discussion happening in their peer inquiry team. According to students, "When we communicate we hear each other's ideas". "We let others talk when we have discussion about math". Finally, "We are getting a little better each day in communication". However, sometimes power struggles did occur between team members. One student stated, "Not everybody knows the answer to a problem and not everybody talks as much as we need too because

we need to share our thoughts". Another student remarked, "We do not talk to each other" and "Not everyone is talking and everyone needs to talk", wrote another student.

The video-taping of one of the teams also allowed me to examine the power relations that existed between students on a peer inquiry team more specifically. As explained in Chapter 3, one team of four students was video-taped on five separate occasions during this innovation. The first analysis of the transcriptions focused on the number of times each student in the team made a remark. I did not note whether these remarks were a suggestion, comment or benign utterance. I only sought to determine if a pattern of dominance by any member of the team existed. The first two video tapes were dominated by one student who determined nearly every decision for the team. The third video tape saw a more equitable exchange of dialogic discussion among the group members. The fourth video once again saw the same dominant student take over the lead of the conversation while the fifth video once more saw an equitable dialogic discussion between the group members.

I next coded the transcripts from each video-taping to determine which student took the lead regarding how the team should proceeded with completing the task at hand. Specifically, I wanted to note if the power relations changed among the group members as the math tasks changed over the course of this innovation and if a pattern of a dominant individual emerged. Findings showed that the same dominant student led three out of five discussions, stating what he felt the team should do first to complete the task. Two different students began the discussion on two separate tapings and the fourth student did not lead any of the discussions. Findings also showed there was little discussion among the group members once the initial idea had been given. Although the

group members engaged in dialogic discussion during the course of working together, little objection was raised regarding how to begin the task.

Finally, in order to determine how and to what extent dialogic discourse affected the power relations among the individuals in the peer inquiry team, I compared the video transcripts from the beginning of the innovation to those at the end of the innovation. Within the group, two of the members were proficient/highly proficient in math and the other two students had a middle to low proficiency in math. Student A had been a self-selected mute for most of his life and was only starting to become comfortable speaking in front of others. Student B was a proficient ELL (English Language Learner) and student C was ADHD identified but not on medication. Finally, student D possessed strong dialogic skills but struggled to accept diverse opinions.

The first video was, in fact, the second recording of the group, as the first recording functioned more as a test of the equipment. In the second video, I had asked the students to consider how they would not only solve a given math problem, but explain their work as well. In this exchange, I observed student A struggling to engage in dialogue with the group. Student D begins the conversation, "So, we've – we've got to explain the work. We should do-explaining the work." He then looks at student A and asks, "What do you think we should do explaining our work?" Student A sits for nearly 20 seconds as does not reply, but sits silently staring at the desk. Student D then asks student C "Do you have an idea?" Student C replies, "I think – I think we should do the area and perimeter." Student D responds, "But the teacher said we need to explain the work. So we can do that for the next one, but not this one. Do you have any other ideas?" Student C did not. Student B started to share his idea until student D interrupted, stating

he had already found the answer to one of the problems. After this initial exchange between the team members they went on to complete the work with student D directing most of the conversation.

The final video was taped seven weeks later on the second to last week of the innovation. In this video, I had informed the students they would be working to solve two problems. They would have two minutes to decide which of the two problems the team should work on first and why, as one problem was more difficult than the other. Student D began the conversation. "I think what we should do is do these first (pointed to easier problem) and if we get done early we can do extra credit." Without prompting this time, student A responded, "What I think we should do is, um, this one (pointed to more difficult problem) and then because we can – we can, this is more easier so it's gonna take us a little bit of time. So, I think we should do this first." Student B replied, "I think we should do this one first (indicated easier problem) because, um, if you guys, like you guys get stuck on the multiplication, you guys can know this." The conversation continued with student C agreeing that the easier problem should be done first. Unexpectedly, student A questioned why student C wanted to do the easier problem first. Student C replied, "Because, um, me and you don't know that much. So, I think we should do this one first because we know this." Student A responded "No. I said I think, no, I said we should do this (pointed to harder problem) because this is kind of harder than this, because it's uh-easy so it takes less time." Throughout this exchange, student D took on the role of a silent observer rather than a director of the conversation as had been observed in the previous video. Ultimately students B, C and D decided the team should do the harder problem last and student A conceded to the will of the group.

Findings from these videos show how the power relationships between the students in this peer inquiry team evolved from a single dominant individual to a dialogic exchange between all members. Findings also support the theories outlined in chapter 2 regarding self-efficacy. As the students in this study began to feel more self-efficacious, they grew in their dialogic skills. This dialogic growth contributed not only to each student's individual academic growth, but to the social and academic growth of the entire team.

Summary of data analysis and results for RQ1. The findings for this RQ indicated that students in the peer inquiry teams were largely able to successfully engage in dialogic discussion for the purpose of sharing and deriving meaning from the work they were doing. The findings pertaining to the power relations within peer inquiry teams however, showed students had notable challenges with engaging in equitable discussions.

RQ2: To what extent does dialogic discussion generate critical thinking among fourth grade students? Several qualitative measures were used to answer this research question: video, final focus group interview, team field notes, final reflection journal and student reflection journals. I organized the data from these measures by coding the students' responses under three specific characteristics described by Glaser (1941): *use language for the purpose of interpreting data; use language to express what contributed to those results;* and *draw conclusions on the basis of the experience.*

Use language for the purpose of interpreting data. In the student reflection and final reflection journals, students were asked to reflect on how they had improved on their weekly math tests and how their peer inquiry team had helped them grow. The reflection journals were created using "kid-friendly" language. For this reason, the term

"math team" was used over "peer-inquiry team" on all reflection journals. Student responses detailed specific computational skills they felt they had improved on by way of applying the strategies I had taught over the course of this innovation. One student wrote, "I met my learning goals by improving my skills with my teammates on doing long division with multiples of ten and partial products. Me and my team are working good together in the skill of multiplying two digits times four digits by using an area model." Another student said, "I feel happy about the progress I have made because I tried my best on what I already learned like long division and multiplication".

In the final focus group interview, students were asked to describe in their own words how they did on their final MCOMP assessment. All of the students reported feeling good about their assessment results because their post-assessment score was higher than their pre-assessment score.

Use language to express what contributed to those results. Responses from students regarding their data results also included how their peer inquiry team had supported their growth through dialogic discourse. One student said, "My math team helped me grow as a scholarly student by helping me in communication when I'm having a hard day they help me". Another student said, "My math team helped me by communicating better and checking my work. By communicating with me, helping me when I'm stuck on a problem and always helping each other".

In the final focus group interview, students were also asked to describe if working with others as a team had helped them on their final assessment. One student stated, "I think we encourage each other to try to get a good grade…we're trying to reach our goals, all of us". A second student said, "I think we work together good because if

somebody made a mistake we help them". "It helped me by, like, getting encouraged by others and them telling me do my best and try your hardest" and the fourth student shared, "…every time I'm stuck on a problem and they help me with it".

Draw conclusions on the basis of the experience. A large amount of data from the various qualitative measures addressed this characteristic. Reflection journal questions were in the form of both present and future tense. One question asked students to reflect on how well their peer inquiry team was working together. The team was also asked to set a team growth goal for the following week. The final question asked students to reflect on their work as an individual and then to set an individual growth goal. Student responses to the team question indicated an awareness of challenges that were occurring, and described the conclusions they were making to address them. One team wrote, "We did not finish our task and we want to change that". Another team stated, "We need to work faster so we don't get a low grade". The individual responses indicated students were also drawing positive conclusions between their growth and their time with a peer inquiry team. Once student wrote, "I can continue to grow by doing my work with other people and it is the work that needs to be getting done to reach our goals". "I can continue to grow by helping each other more and when we help each other we are stronger than paper". "I can continue to grow by giving help to others when they need it" wrote another student. "I can get better by helping my team then they can help me back" and "I can continue to grow by working well with my team"

Summary of data analysis and results for RQ2. Qualitative data was collected to answer RQ2: To what extent does dialogic discussion generate critical thinking among fourth grade students? This data was used to code student response for the characteristics

described by Glaser (1941): *Use language for the purpose of interpreting data; use language to express what contributed to those results;* and *draw conclusions on the basis of the experience.* Findings showed students in this innovation were able to articulate the specific math computational skills they had grown in by way of examining their pre and post MCOMP assessment scores. Students also wrote about the support they felt they had received from their peer inquiry team during the teams' dialogic discussions. The result of these discussions not only appeared to have improved students' math skills, it also created an awareness among the students regarding how communication had affected their self-perceptions about their mathematical abilities. Students were also able to recognize the challenges their team faced and create a growth goal for the purpose of addressing those challenges. Further, students' growth goals were not limited to becoming more proficient with their math skills, but included seeking ways to improve their skills as a productive member of a peer inquiry team.

RQ3: How does dialogic discussion within peer inquiry teams develop self-efficacy among fourth grade students? Several qualitative measures were used to answer this research question; video-taping, final focus group interview, final reflection journal and student reflection journals. Students' responses were organized and coded under five specific characteristics from Bandura's (1977) work on self-efficacy: *individual belief in ability to accomplish a task; belief in ability to accomplish a task by observing others; amount of effort given on a complex task; impact of goal setting toward accomplishing a task;* and *impact of goal setting toward observable success over time.*

Individual belief in ability to accomplish a task. In other words, students can express how they perceive themselves as able to complete a task successfully. I coded the

students' responses pertaining to this characteristic from the student reflection journals and the final reflection journal. On the student reflection journal students were asked to reflect on the results of their weekly MCOMP assessments. Specifically, students were asked to describe how they had met their learning goals on the test. One student replied, "I met my goal by skipping problems then I go back to them". Another student said, "by working hard" and another wrote, "How I met my math goal is taking my time on my work". For the final reflection journal students were asked to reflect on their post-MCOMP results and describe how they had improved. One student response read, "I improved on my math test…by focusing on my tests not getting distracted writing carefully and not cheating." Another student replied, "By doing my best not to get distracted if I get distracted I might give up". "I am helping myself on my math work by keeping up, staying on task and not playing", said another student and finally, "I am focusing more on my work and asking a lot more questions".

Belief in ability to accomplish a task by observing others. Unlike the first characteristic involving intrinsic reflection on the part of the student, this second characteristic focused on how students come to believe they are able to accomplish a task by observing what others around them do. Data from all four qualitative instruments were used to code student responses that related to this characteristic (student reflections, video transcriptions, field notes and final journals). Students were asked to reflect on the skills they helped each other with in their peer inquiry teams, how working together helped grow their math skills and how growing their math skills helped them reach their goals. Student responses included: "My math team is helping me reach my goals by showing me what to do" and "My team helps me show my work". In one of the video transcriptions a

member of the peer inquiry team noted, “If we would have put “this” we would have been wrong. [redacted] caught our mistake”.

Amount of effort given on a complex task. This characteristic examined how students’ self-efficacy levels were affected by how difficult they perceived a task to be. To analyze this characteristic, I coded the team field notes and the video tape transcriptions.

On the team field notes, students were provided with guiding sentence stems to help them identify challenges the team was having and what they needed to do to overcome that challenge. Students used their daily assessments, called “exit tickets”, to help them analyze how effectively they were working as a peer inquiry team. During this innovation, most of the math instruction centered on division. The degree of difficulty between each lesson increased from the start of this innovation to its conclusion. I looked for patterns in the students’ responses to determine how the difficulty level of the math work had impacted the students’ feelings of self-efficacy as they worked through varying degrees of complex math problems. Upon receiving the field notes, I would provide written feedback to the team and, in some cases, I would meet with teams to discuss the challenges they were having. Results from the coding showed that students identified creating effective dialogic discussion, not completing math tasks, as the primary challenge their team was having. Specifically, teams were struggling with communication between their peers and with team members who were not fully engaged in the discussion. One team wrote, “Not everybody in the team is talking”. Another team wrote, “A challenge we are having is finishing our work in math”. A third team wrote, “A challenge we are having as a team is communication…to communicate more often”.

Finally, another team wrote, “A challenge we are having as a team is that our math team is goofing off sometimes”. Initial responses from teams revolved mainly around what the challenge was, so my responses to teams often asked them to reflect on why they believed they were having these challenges so they could create an effective plan for addressing those challenges heading into the new week. By the final team field notes, students were able to independently articulate in greater detail what their challenges were, what their goals were to address those challenges and why those goals were important to them. One team said, “Our team’s math goals are to get better on the skill of division because sometimes we don’t know the answer. We chose these goals because sometimes we don’t know the division and it takes a bit of time to find the answer”. Another team stated, “Our team’s math goals for next week are to not freak out because sometimes we freak out then we don’t get the work done. Our team chose these goals so we do better next week on our exit ticket”. Finally, “Our team’s math goals for next week are to pass every exit ticket with extra credit and have the highest score in everything by never giving up in class. Our team chose these goals because we want to be the scholars we are because we are gifted”.

The video-tape transcriptions were coded so I could look for patterns within the responses from the students. The students were asked to describe how the team had communicated with each other to solve challenging math problems. One student noted that the dominant student usually started the conversation “like always”. When I asked the student to explain what they meant by “like always” he said, “Like I go second because, like, well, that’s what we do because me and (redacted) don’t talk mostly all the time”. I asked why they don’t talk and the student replied, “Um, well, sometimes we

don't know the answer and we get really confused". The second student talked about how the team does all of the work together and checks each other's work, the third student stated two of the team members did not share their ideas often enough. He said "…if they don't share their ideas then we don't know what they think". The fourth student had a very different perspective and claimed he was the one leading the conversation because he always had the first idea.

Impact of goal setting toward accomplishing a task. In other words, how does goal setting impact how students perceive whether or not they accomplished a task? In order to analyze this characteristic, I coded the student reflection journals and the team field notes for the purpose of examining the impact of individual goal setting and goals set by peer inquiry teams.

Throughout this innovation, students tracked their weekly MCOMP assessment scores by filling out individual charts indicating the number of points they had received on the previous week's assessment. Each month, I informed the students of their goals using the pass/fail criteria set by the district. Students then set their goals on growth and/or proficiency. Given that several students had scored below proficient on the pre-MCOMP assessment, a growth goal was given as a way to help struggling students create measurable short-term goals. As students tracked their progress, they could determine if they were passing and growing, not passing but growing, passing but not growing or not passing and not growing. Further, I taught my students to think of these assessments as a game rather than a test. I wanted to help my students develop a mindset that allowed them to feel a greater sense of control over the assessment rather than feeling overwhelmed by it.

In order to examine the impact of individual goal setting toward accomplishing a task, I analyzed the student reflection journals, which students completed during weeks three and eight of this innovation. In their reflection journals, students described if they had met their learning goals on their assessment and identified how they felt about their learning goals and why. Students were then asked to identify how they could continue to grow. One student wrote, "I feel happy and sad about my learning goals because I am passing but sometimes not growing. I think I can continue to grow by getting practice on everything". Another student said, "I feel worried about my learning goals because I am passing but not growing. I can grow by doing long division and keep on being here every day so I could learn more". "This month I feel good about my learning goals because team work is going very well. Our skill of talking is going good when we talk about our work. I can continue to grow by paying more attention to my work and not waste time". Finally, "This month I feel good about my learning goals because I am grateful for my team encouraging me".

The team field notes were used to determine the impact of team goal setting toward accomplishing a task. On week's one, three, four and seven teams met to determine how they had supported one another, to set goals for the following week and to define why they had chosen those goals. I provided either written and/or verbal feedback to teams as needed to provide guidance regarding the task they wanted to accomplish, the goals they set toward accomplishing that task, and how they intended to meet their goals. Responses from teams in week one were very undefined. By week seven, students were able to more clearly define their goals and for what purpose. Some student responses included; "Our math team's goals for next week are to give more feedback because we

need to get better at giving feedback". "Our math team's goals for next week are to work a little bit faster because sometimes we don't finish and we get a low grade". "Our math team's goals for next week are to pay attention because sometimes we don't pay attention to what the teacher does and we fail". "Our math team's goals are to learn more math skills so we can grow better because we want to be more scholarly in math". "Our math team's goals for next week are to listen to each other's thoughts by taking turns and sharing." "Our skill for next week is to be more faster and stay on green because we want to be more scholarly and successful so in our game we pass and grow to be number one".

Impact of goal setting toward observable success over time. For this characteristic, the focus was specifically on improvement of self-efficacy over time when measurable goals are put in place. The final reflection journal and final focus group interview were used to analyze this fifth characteristic. The final reflection journal was given after the post-MCOMP assessment. Prior to the post-assessment, students were made aware what score they would need to be considered "passing" (as measured by the district). After the assessment was scored, students were able to determine if they had passed and how much they had grown by comparing their pre-assessment and post-assessment scores. Students were then asked to reflect on their findings by defining how they had improved, describing how they felt about their progress and why, and stating how their math team had supported their growth. Student responses were extremely positive, since every student in this innovation showed measurable growth. Twenty-three students passed the post-MCOMP assessment, up from 12 in the pre-assessment. Further, the pre-MCOMP assessment showed four students with a failing "intensive" score. On

the post-assessment, no student received a failing "intensive" score. The growth from the pre and post MCOMP assessments was exceptional and the impact of these results was reflected in the students' responses. "I feel amazed about the progress I have made on my math test because I got a 59 on my math game…my math team helped me grow as a scholarly student by helping me by my skip counting and my multiplication and understand my division a little bit more". "I feel happy about the progress I have made on my math test because on the test we all show that we work hard so we can do better". "I feel happy about the progress I have made on my math game because my work shows that, and my math team helped me so much that they make me stronger and stronger". "I feel happy about the progress I have made on my math test because I went from 25 to 59 and grew a lot on my math test". Finally, "I feel so happy about the progress I have made on my math test because I got 100% on my game and I tried my best…my math team they helped me communicate better, stay on task, and to not give up because we are better than we think we are".

For the final focus group interview I asked each of the four students how they had done on their post-MCOMP assessment and how their work as team had helped them. Student one was the only member of the group who had not "passed" because he did not score high enough to be considered "benchmark" per the district criteria. However, student one had grown out of a "failing/intensive" status to an "average/strategic" status. When I asked him how he felt about his test, he stated he felt he did kind of good because if he had gone lower he would not have done good. Student two said he felt good with his grade though he admitted he felt he might have done better if he had not rushed. Student three said he felt good because he had scored 100% on the test and student four said "I

feel proud of myself because I grew a lot". He went on to state he knew he had grown by 25 points from the fall to the winter. When asked how working together had impacted their test, student one stated he thought they had all encouraged each other to try and get good grades. He also said they were working hard for the class because everyone was trying to reach their goals. Student two said they had worked hard to help each other fix mistakes and student three said he thought everyone encouraged each other and had encouraged him to do his best and try his hardest. Student four said whenever he was stuck on a problem his team had been there to help him with it.

Summary of data analysis and results for RQ3. Qualitative data was collected to answer RQ3: How does dialogic discussion within peer inquiry teams develop self-efficacy among fourth grade students? This data was used to code student response for the characteristics described by Bandura (1977): *Belief in ability to accomplish a task, belief in ability to accomplish a task by observing others, amount of effort given on a complex task, impact of goal setting toward accomplishing a task and impact of goal setting toward observable success over time.* Findings from the data showed students' sense of self efficacy was directly impacted by two primary factors: the ability to track success over time through measurable goals, and access to a support system that promotes sustainable growth. Student responses indicated a belief that their growth goals were supported in the dialogic discussions that took place during the peer inquiry time. Further, the confidence students gained during the team time began to transfer during each MCOMP assessment. As students grew in their math fact fluency skills, their sense of self-efficacy also grew. Additionally, the progress students made on each assessment was clearly visible to the students as they tracked and measured their own growth and

proficiency. Over time, this cyclical process resulted in students recognizing the impact dialogic discussion during team time had on not only their feeling of self-efficacy, but on their math skills as well.

RQ 4: To what extent is participation in the peer inquiry teams associated with a change in math fluency skills? Quantitative data was collected throughout this intervention to determine the extent to which participation in the peer inquiry teams impacted students' math fluency skills. A universal screener already used by my district was selected as the quantitative measure in order to situate the findings in a measure that is directly relevant to teachers' and students' everyday practice, and would therefore be interpreted as useful and valid by teachers and administrators.

MCOMP (Math Computation Screener)

As described in chapter three, the MCOMP assessment was administered at the beginning of the school year and again at the end of this innovation. Participants also took weekly MCOMP assessments throughout the innovation as a means for the students to monitor their own proficiency and growth. In total, the participants took 12 practice assessments between the pre and post assessments.

The scoring cut points for these assessments was pre-determined by the district. The district requires teachers to administer the MCOMP at the beginning of each month to see the range of scores that determine if a student is severely below grade level ("intensive"), moderately below grade level ("strategic") or at grade level ("benchmark"). Additionally, teachers can see the rate of growth a student would need in order to surpass or sustain their classification. For example, a student with a "benchmark" classification in October, might fall to "strategic" in November if they failed to grow by the expected

number of points on their assessment. For my innovation, I felt it was extremely important to guide my students in their own awareness of their weekly assessment results. Growing on assessments became as important to the participants as passing was. In this way, the work the participants did in their peer inquiry teams also became more important, as the participants grew in their understanding of how the math team time supported the skills they needed to work on for their weekly MCOMP assessments.

Table 2 shows the pre- and post-innovation MCOMP scores for the participants in this innovation.

Table 2

Student classification on MCOMP assessment results by class (n = 25)

Test Classification	MCOMP Pre-Test n (%)	MCOMP Post-Test n (%)
Intensive (severely below grade level)	4 (16%)	0 (0%)
Strategic (moderately below grade level)	9 (36%)	2 (8%)
Benchmark (at grade level)	12 (48%)	23 (92%)

Per district scoring standards, the percentage of students who were considered to be intensive (severely below grade level) on the pre-MCOMP assessment was 16%. This equated to four students out of 25. The percentage of students who were considered to be strategic (moderately below grade level) on the pre-MCOMP assessment was 36%. This equated to nine students. The percentage of students considered to be benchmark (at grade level) on the pre-MCOMP assessment was 48%. This equated to 12 students.

Following the innovation, all 25 students took a post-MCOMP assessment. Per district scoring standards the percentage of students who were considered to be intensive on the post-MCOMP assessment was 0%. The percentage of students who were considered to be strategic on the post-MCOMP assessment was 8%. This equated to two students. The percentage of students considered to be benchmark on the pre-MCOMP assessment was 92%. This equated to 23 students.

Growth between the pre and post MCOMP assessments for each student was also measured (see Table 3).

Table 3

Individual student classification on MCOMP assessments (n=25)

Student	Pre-MCOMP Classification	Post-MCOMP Classification
Student 8	Intensive	Strategic
Student 12	Intensive	Strategic
Student 21	Intensive	Benchmark
Student 23	Intensive	Benchmark
Student 3	Strategic	Benchmark
Student 4	Strategic	Benchmark
Student 5	Strategic	Benchmark
Student 6	Strategic	Benchmark
Student 13	Strategic	Benchmark
Student 14	Strategic	Benchmark
Student 15	Strategic	Benchmark

Student 16	Strategic	Benchmark
Student 25	Strategic	Benchmark
Student 1	Benchmark	Benchmark
Student 2	Benchmark	Benchmark
Student 7	Benchmark	Benchmark
Student 9	Benchmark	Benchmark
Student 10	Benchmark	Benchmark
Student 11	Benchmark	Benchmark
Student 17	Benchmark	Benchmark
Student 18	Benchmark	Benchmark
Student 19	Benchmark	Benchmark
Student 20	Benchmark	Benchmark
Student 22	Benchmark	Benchmark
Student 24	Benchmark	Benchmark

Students 8 and 12 grew from intensive to strategic and students 21 and 23 grew from intensive to benchmark. Students 3-6, 13-16 and 25 grew from strategic to benchmark. The remaining students maintained benchmark, with three students earning a score of 100% on the post-MCOMP assessment.

Summary of data analysis and results for RQ4. Quantitative data was collected to answer RQ4: To what extent is participation in the peer inquiry teams associated with a change in math fluency skills? The MCOMP assessment was used as the measure for

this research question. As illustrated in Tables 2 and 3, the data indicate substantial growth in the participants' math fluency skills.

The implications of the findings found in both the qualitative and quantitative data is discussed in chapter five.

CHAPTER 5

DISCUSSION

In Chapter 5, I discuss my findings and offer some explanations for the results presented in Chapter 4, as well as a reflection on this innovation. Before concluding, I state what implications I believe this innovation brings to bear for professional practice and for future research.

Discussion of Results

Having worked with the majority of my students the year prior, I was afforded a unique perspective into my innovation before it began. The lessons I learned about constructing peer inquiry teams served to help me tell a more effective story in this study. I believe the value of the results is not found so much in the results themselves, but rather in the words of my students. This is a reminder that our students have things to say that deserve to be heard. The following discussion attempts to provide a perspective on the literature and theories connected to this innovation while also respecting the experiences of the students who participated in this innovation.

Dialogic Discussion

In Chapter 1, emphasized the importance of providing students with opportunities to engage in social learning as a means to support the development of their social and emotional skills. As outlined in Chapter 2, Bakhtin's (1981) theory of dialogic discussion was a foundational element in the design of this innovation for supporting the students' social learning experiences. The results pertaining to dialogic discussion were outlined in chapter four and are discussed in this chapter.

The first characteristic of dialogic discussion described by Bakhtin (1981) was individuals collaborating in the co-construction of knowledge. The results from the qualitative measures collected in this study demonstrated the students had a high level of willingness to engage in an exchange of ideas. Over the course of the innovation, students developed an acute awareness of how working together to share ideas promoted a greater degree of success on assignments.

Another finding in the data showed students also understood what a lack of collaboration looked like. Students were forthcoming in their assessments of how their team either was or was not collaborating and how that impacted the results on their assignments. Further, students stated their intent to make efforts to improve the quality of discussion within their team. What struck me most over the course of this innovation was not how important exchanging ideas became to the students, but rather how the absence of dialogue affected them. In the final focus group interview, I asked the students what, if anything, would they change about the peer inquiry teams. All of them, regardless of their skill level, said they would like not to have to work alone. They understood that sometimes working alone is necessary (i.e. on a test) but they all said working alone is much harder, and especially when you don't know what to do.

The second characteristic Bakhtin (1981) described was open-ended questions and responses to incite an authentic conversation. In other words, students do not engage in dialogue for the purpose of finding a "correct" answer, but rather come to an answer through multiple perspectives and possibilities found through the discussion. During the course of this innovation, I was bound to follow the curriculum pacing guide. Most of the math work taught during this innovation did not lend itself to providing students with a

great deal of practice with open ended questions (i.e. word problems) but rather basic algorithms. For this reason, one of the primary ways I supported students with this characteristic came in the form of sentence starters. Providing my students with ways to start a conversation that allowed them to state if they agreed or disagreed with another student's idea and explain why, not only provided a platform for starting a conversation but also set up the opportunity for students to take on one another's ideas without fear of criticism. The results of this innovation show students were able to navigate through complex conversation with a higher degree of efficacy when provided a tool (such as a sentence starter) for beginning and sustaining that conversation. In this case, these sentence starters gave every student the opportunity to engage in dialogic discussion and feel capable of expressing their ideas to their peer inquiry group. The start-up of peer inquiry teams is challenging, but I feel sustaining it can be a far greater challenge. It is important to provide ongoing dialogic tools that help students evolve in their dialogic skills. These sentence starters were an extremely helpful tool throughout this innovation.

The final characteristic Bakhtin (1981) described was flexible and interchanging power relations. The most challenging aspect of this innovation was creating and sustaining peer inquiry teams that supported an equitable exchange of dialogue between the students. One factor that cannot be overlooked is the varied degree of experience the students in this study had had working with others prior to the implementation of the innovation. Since many of the students had looped with me from the previous grade, they had a working knowledge of peer inquiry teams. However, those experiences had contained challenges that carried over into this study. Additionally, most of the students who were new to my class this year had little to no experience working in teams. One of

the greatest challenges for educators who seek to create social learning opportunities in the classroom is understanding the difference between "group work" and "social learning." While teachers may employ group work time in their classroom, this often occurs by randomly assigning students to groups for the sole purpose of completing a solitary task. There are typically no specific expectations that students will engage in equitable dialogic discussion. This can leave academically struggling students outside of the conversation, resigned to accept the decisions of their more capable peers about how to complete the task. Students who have a strong academic foundation may learn from these more one-sided experiences; they do not need to take the ideas of others or accept diverse opinions.

When dialogic opportunities are not equally distributed, more proficient students are likely to come up with the answers, while less proficient students are left to simply accept the views of others. Students may, therefore, come to understand the main objective of group work as being to seek out set answers in pursuit of completing an assignment. How the distribution of power relations occurs among students during social leaning was evident in the exchanges that took place between the students I video-taped. At the start of this innovation, one member of the group had a clear intent of directing the conversation and decision-making process while another student struggled to express his own thoughts and ideas to the group. Over the course of this innovation, the more dominant student learned how to become more accepting of the diverse opinions of others while the student who initially struggled to engage in any form of dialogic discussion learned how to articulate his ideas with more authority. Without a social learning opportunity, these two students may never have come to understand the dialogic

and academic strengths within themselves and/or within others. As I discussed in chapters 1 and 2, social learning opportunities support not only students' critical thinking skills but also student motivation and subsequent self-efficacy. This was evidenced by how and to what extent each of the students I video-taped during my innovation was able to engage in dialogue, raise questions, and respect the opinions of one another by the end of this innovation.

In order to construct the most effective peer inquiry teams possible, it is important that students are purposefully placed in peer inquiry teams that contain multi-tiered academic levels. This type of leveling, met with extensive teacher support and modeling, coveys a message to students they are all expected to engage in the exchange of ideas and information. As I stated in Chapter 1, this way of learning not only supports students' academic progress, it builds 21st century skills students need to help them become productive members of society. Social learning opportunities also provide students with sustainable skills that transfer as they move into new peer inquiry teams. As students learn how to engage in equitable dialogic conversation with their peers, they come to accept diverse opinions, state their own ideas with a greater degree of confidence, and recognize the positive outcomes that germinate from their work with others. These factors are internalized by students and continue in each future peer inquiry team they engage with.

Of course, one of the main challenges with both team work and social learning is how to support communication skills among students. In both my initial action research cycle, as well as in this study, I realized ongoing modeling and support would be needed

if equitable dialogue between my students was to occur. I discovered there were very few times when I did not need to actively monitor and assist students in their conversations.

First, the degree of difficulty of the math work drove much of how students communicated. The more challenging the work, the more academically skilled students tended to want to take over the conversation while less academically skilled students felt unsure of how to proceed. This led to a struggle with equitable dialogue between every team member. This challenge was another reason why it was extremely important that I show my students how to engage in conversation using the sentence starters and understand the objective was not to be the one with the right answer, but rather to let all voices be heard.

Second, at the start of this innovation I asked my students to write, on an index card, two students they wanted like to work with and why, and one person they did not want to work with and why. I did this to demonstrate I wanted to hear from them as I constructed my peer inquiry teams, rather than just using their test scores as the criterion for grouping. Most students in the innovation requested not to work with a small number of students who had trouble with behavior (mostly playing around and not working) and/or students who tended not to complete homework assignments. Since the students in the innovation understood being in an inquiry team meant everyone was responsible for doing the work and working together respectfully, these requests were understandable. They also identified students who tended to try and tell others what to do as peers they did not want to work with. Interestingly, as the peer inquiry teams progressed, I noticed students became much less tolerant of others who believed they knew the answers and did not want to engage in equitable dialogue. Students also identified students they *did*

want to work with because they had had successful interactions with that person on previous inquiry teams. Struggling students were especially aware of their peers who had helped them grow in their math skills and subsequently viewed that individual as a reliable source of support.

Summary of Dialogic Discussion Results. In Chapter 1, I outlined the reasons why dialogic discussion is foundational for social learning. When students have opportunities to engage in dialogic discussion, they also develop the social-emotional skills necessary for engaging with others appropriately and constructively while articulating their own point of view. This study showed students had a strong desire to collaborate and share ideas with one another. They recognized how collaboration with others could lead to successful outcomes and increased feelings of self-efficacy. Even more powerful though, was how all of the students came to recognize the utter aloneness of isolation. Throughout the innovation, my students found they felt seen and heard when working with others and even in those times when they did have to work alone, they learned to be strong because they knew they were still surrounded by caring peers. While this study also outlined challenges that arose during the peer inquiry time regarding how students were able to engage in equitable dialogue, I believe these results serve to demonstrate how important is it for educators to build students' dialogic skills. If we are to help our students become productive members of a 21st century society, we must foster opportunities for them to learn how to understand another person's perspective, show empathy, collaborate and gain new understandings. Some educators may feel it is simpler to be a director of knowledge to students who sit dutifully in single desk rows. I would argue our job is not to do what it simple, but rather to be bold and have the courage to

chart new territories that not only help our students grow academically, but humanely as well.

Critical Thinking

In chapter two, I discussed the theoretical work of Glaser (1941) as it related to critical thinking. The characteristics of critical thinking outlined by Glaser (1941) and used in this study were: using language to interpret the data; using language to express what contributed to results; and drawing conclusions on the basis of the experience. It should be noted that some of the characteristics Glaser (1941) identified toward building one's critical thinking skills were not used in this study, as the math skills and assessments used did not lend themselves to certain characteristics as described by Glaser (1941). In Chapter 1, I drew connections between social learning and critical thinking skills by discussing the literature that supports how students' critical thinking skills are formed by way of reciprocal teaching and learning among students. How students used language to interpret data was discussed in chapter four in relation to self-efficacy. This is also true of how students drew conclusion on the basis of their experience.

In the innovation, quantitative and qualitative measures were used to help students interpret their data and make connections to the results and their experiences in their peer inquiry teams. One primary tool used for the purpose of helping students interpret their data was the weekly MCOMP assessment. Results from these assessments were charted by the students for the purpose of examining growth and proficiency. With this quantitative measure, students could identify specific skills they were working on in their peer inquiry teams and how their working knowledge of those skills was transferring on to their weekly MCOMP assessment. In this way, the weekly assessments became

extremely powerful tools as students learned to monitor their own growth and set new goals to work on in their peer inquiry time.

In order to help students think even more critically about their data, the students completed both team and individual journals throughout the innovation. These journals were used for the purpose of asking students to reflect on their team and individual data results, and to draw conclusions between those results and the work done in their peer inquiry teams. An interesting finding in this study was how extremely proficient all of students became in their math skills (as measured by MCOMP) despite the challenges with dialogic discussion that they noted had occurred in their peer inquiry teams. While teams did struggle throughout the innovation with equitable discussion, the overall effect of sharing ideas and learning from one another was extremely impactful on the growth of their mathematical skills. Further, while the coding of the students' reflection journals did not demonstrate they considered their social skills to have been impacted significantly by way of working with others, the coding did show students clearly felt the time spent in their peer inquiry team had a positive impact on their math skills. Coding also demonstrated that students drew positive conclusions between their increased math scores and feeling a higher degree of self-efficacy as a result.

Summary of Critical Thinking Results. Arguably, the findings in this area of my study were less robust than those for dialogic discussion and self-efficacy. However, I find them to be noteworthy. The innovation aimed to provide students with opportunities to critically think about their data using more than a test score. Students were given intentional tools to use for the purpose of drawing connections between their assessment results and their peer inquiry time. Not only did this help teach students how to recognize

the support of their team members, it also sent a powerful message to every student that each of them was a valuable member of the larger learning community. Asking my students to tell me, and others, what their experiences meant to them and why, created an environment focused on learning rather than test taking. This study suggests that no numerical value can be assigned to accurately reflect how a student critically thinks. If we truly want to know what conclusions our students draw from their experiences and how they are interpreting their own data, we have to create ways for them to tell us, while demonstrating a willingness to listen.

Self-Efficacy

One of the major aims of my innovation was to bring to the forefront how students feel about themselves as learners. In Chapter 1, I make the argument that standardized testing has created an educational vacuum, swallowing up opportunities for dialogic discussion and critical thinking in classrooms. I also argue it is having a detrimental effect on students' levels of connectedness and feelings of self-efficacy. In Chapter 2, I outlined the theoretical works of Bandura (1977) and his findings on the correlations between effort and self-efficacy. Five characteristics from Bandura's (1977) work related to self-efficacy were outlined in Chapter 4 to help understand and describe the results. These findings are discussed in this chapter.

The first characteristic Bandura (1977) described was belief in one's ability to accomplish a task. It cannot be stated enough that many of our lowest performing students have likely spent a large part of their academic experience perceiving themselves as incapable. Though well intentioned, pull-out programs, direct instructional methods, and standardized assessments have beaten down struggling students relentlessly. My

innovation aimed to change the mindset of every student, especially students struggling in math, by intentionally engaging the students in dialogic discussion within a peer inquiry team, in order to improve how students perceives themselves as productive members of the learning environment.

As I deductively coded the journals of my students, the first notable observation was the extreme positivity that radiated off the page. Since all of the students had been tracking their own data throughout the innovation, each was fully aware of the progress they were making. On the final assessment, every student grew and no student failed. Not only did students journal about their results, they also described what contributed to those results. It was in these answers that I was able to identify how students' belief in their ability to accomplish a task had changed over time. Student responses showed they felt more capable to try and solve complex problems, persevere through a challenging assessment and take time to think problems through more. This stemmed from the work students had done in their peer inquiry teams and the positive academic and social-emotional growth that had manifested from that experience. I was even able to witness this change in my students each week as they took the MCOMP assessment. Students went from unable and/or unwilling to engage in the test because they did not know what to do, to tackling each problem without fear or hesitation. They believed in themselves so completely that the idea they would not do well or grow at least a little was no longer part of our learning environment.

The second characteristic defined by Bandura (1977) was belief in ability to accomplish a task by observing others. While the first characteristic provides a window into how the individual perceives themselves as a result of his/her own behaviors, this

characteristic defines how their self-perception was influenced by others. Since the main objective of my study was to examine how social learning impacts a learning environment, I used several measures to help me determine the results of this characteristic. The results of the deductive coding all indicated students had a definite understanding of how their peer inquiry team had helped them. What was interesting was how some students identified how their team had helped them grow in their math skills while others stated their team had helped them grow most in their social skills. For example, one student wrote how their math team helped them with their division skills, while another student wrote that their team helped them with their communication skills. The findings would suggest students can identify which skills they need support with, why, if they feel they are getting that support and what that means to them as a learner. It also shows a willingness on the part of students to learn how to grow socially and emotionally with others, and as I mentioned in Chapter 1, this is a vital skill for students to learn as they embark into the world.

The third characteristic Bandura (1977) described was the amount of effort given on a complex task. This characteristic examined how students' self-efficacy levels were affected by how difficult they perceived a task to be. In Chapter 1, I argue for the use of social learning as a way to engage students of different skills levels. The literature I include in my argument outlines the need for engaging students in their learning as a way to help them feel connected to the learning process. When students, especially struggling students, perceive a task as beyond their capabilities they will often disengage and avoid the task rather than risk making an attempt to navigate through the task and fail. However, Bandura (1986) also discovered that once a fixed sense of efficacy was

established, failure at tasks had little or no negative impact on some individuals. For this reason, the findings pertaining to this characteristic have far-reaching implications for future educators. Team field notes allowed students to identify how they were performing on daily assessments and also how they were performing as a team. The degree of difficulty on the math work had an impact on how the team felt they were working together and performing successfully on the assessments. As time went on, the notes showed students becoming more aware of how their work together was impacting their math skills and how effectively they were able to navigate through even those most challenging lessons. Among struggling students, I observed how their self-efficacy grew through the peer inquiry time. No longer did these students have the fixed mindset that they could not do the work. Instead, they understood that with support and hard work, they could tackle even the most challenging task and feel successful in their efforts. The video tape transcriptions revealed that struggling students possessed an awareness of their shortcomings. They did not view themselves to be like the other students who could, seemingly, complete math problems with no challenges. The students in this innovation were honest about their confusion and how that confusion made them feel unsure about what to say during the peer inquiry time. However, they recognized how working with others helped them learn more efficiently and how team work was what helped them find their voice. Struggling students have much to say and much to offer, but they speak a different language. We can only learn that language if we work together to understand it. I believe the results of this study show that all students can engage in purposeful work on complex tasks if appropriate and sustainable support is given and intentional care is made to prevent any student from being left behind to fend for themselves.

The manner in which goal setting impacts how students perceive their ability to accomplish a task was the fourth characteristic Bandura (1977) described. Goal setting was used heavily throughout my innovation, as I am a firm believer in the power of visible learning (Hattie, 2008). Over the past 15 years of my teaching experience I have come to witness how students are much more incentivized to perform well when they can see their growth. As I mentioned in Chapter 2, visible goals align with the type of goal setting outlined by Schunk (1991). He found that creating short-terms goals lead to a higher probability of the increase in self-efficacy. I would add that when combining short-terms goal setting with specific support systems, students can further observe their success over time. The use of bar graphs was the preferred method for tracking growth on the weekly MCOMP assessments. This graphing tool allowed students to easily see if they were growing and also if they were meeting their proficiency goal. After students filled out their graph, they were asked to mark their place on a class data graph. Students were assigned a number that was written on a dot sticker. This was then placed on the graph to indicate if they were passing and growing, passing but not growing, not passing but growing or not passing and not growing. An interesting phenomenon occurred the first time my class charted their scores. Students who were performing well were applauded for their good work. Students who did not perform well were *also* applauded and that applause was met with "Good job, nice try." As time went on, this quickly became every student's response. As a result of this positive praise, I noticed students who were struggling became much less self-conscious of themselves and their math abilities and instead became more determined to do better the next time. Moreover, these students felt supported and connected through the experience rather than judged. For

excelling students, this process reinforced their need to continue to grow and pass and even find new ways to challenge themselves. Shortly after the innovation concluded, I started a challenge for my high performing fourth grade students – pass three exams with 100% and join the "Fifth Grade Club." In this club, they learned fifth grade skills and took the fifth grade MCOMP. Not only did this engage them in a very unique challenge, it sent the message that I believed in them and was dedicated to help support their continued growth.

Student journal responses also reflected students' feelings of self-efficacy by way of goal setting. They reflected on where they were at with their goals, and why and how their team was supporting them. This type of analysis provided students a lens with which to view how the work they were doing and what they were accomplishing did not arise from an "every man for himself" mentality. The students' responses showed they truly did understand how the work they were doing in their teams was having a positive effect on their math scores. Throughout this innovation, I discovered that the power of goal setting lies not in the *act* of goal setting but the dialogic opportunities provided to students in the space between assessments about their goals. If students are to embrace the idea of goal setting as a means to improve their self-efficacy, they must believe they are in an environment that supports the discussion of goals. Goal setting should not be a "pie in the sky" idea. Goal setting should be woven into the daily conversations about why growth matters and how we can all help each other succeed.

The fifth and final characteristic Bandura (1977) described was the impact of goal setting toward observable success over time. For this characteristic, I wanted to observe how helping students set measurable goals impacted their feelings of self-efficacy over

time. The MCOMP assessment was the primary tool used to measure this characteristic. The students in the innovation took this assessment in their grade and were familiar with how to measure if they were passing and/or growing. Further, I used this assessment as a team challenge for my class. Since every fourth-grade class had to take this assessment each month, I challenged my class to have the highest number of students passing by mid-year and again at the end of the year. This kind of goal setting provided a long-term goal for the entire class to work together to achieve. Working toward a common goal by way of considering how one's actions impact a larger group is part of the 21st century skills building this innovation sought to accomplish.

The final reflection journal and final focus interview were also used to examine how goal setting affected students' perceived success over time. Students were asked to compare their beginning of the year scores to their December scores, describe their progress, and explain how their peer inquiry team had helped them. I wanted to give students an opportunity to describe their own efforts, but I also wanted to know how they viewed the connection between their assessment scores and the work they had done with their team. Understanding how the help of others impacts their life is an important part of a student's learning how to value another person. Recognizing they are not an island unto themselves with only their needs to consider helps a student learn the purpose of teamwork and how they are part of that team. I have said many times to my students that no one cares how smart they are – they care how you treat others. Some of my most skilled students struggled with working with others during the innovation. It was not a matter that they did not want to help, they did not know *how* to help. They simply did not always understand how to pass on what they knew to others. Conversely, some of my

most struggling students had their most successful moments with their MCOMP due, in part, because of their peer inquiry team experience. There is a distinct difference between proficiency and growth. The majority of my struggling students do not receive high marks for proficiency on fourth grade standards as measured on a standardized assessment. On the MCOMP though, they could see visible learning and feel a sense of pride that many of them have never known. In my classroom, growth is the single most important thing because it signals our awareness that we are all wisdom seekers working together to find the better part of ourselves every day.

Summary of Self-Efficacy Results. Of all the findings in my study, the immense impact a student's sense of self-efficacy can have on their learning was the most eye-opening. Further, it cannot be emphasized enough that without dialogic discussion, the perceptions my students had about themselves as learners would never have been known to me, thus rendering me helpless to change their perceived reality. Numerous studies have shown that students, especially those from low socio-economic status, are becoming increasingly unmotivated to learn. I believe the findings from this study demonstrate that a higher degree of motivation among all students is possible when attention is given to students' feelings of self-efficacy. Moreover, an increase in academic achievement is also possible when time and attention are given to supporting students' self-efficacy. School can be an environment that either helps or hurts students' perceptions of who they are as individual people and as scholars. Instead of marginalizing what our students' self-perceptions are, this innovation demonstrates that when we take the time to support students' social and emotional needs, their feeling of self-efficacy and academic proficiency can profoundly increase.

Quantitative Results

Finally, the MCOMP data collected in this study is the culmination of the efforts of my students. At the time this data was collected, one student was identified as having a learning disability in math. Shortly after the conclusion of the innovation, two additional students were identified. Additionally, during the innovation two students went through an extremely challenging time with behavior resulting in significant time spent out of the classroom. In spite of these circumstances and the many other challenges this study faced with student retention and attendance, the students who participated in the innovation thrived. The MCOMP data results do not merely show growth in test scores, they show growth in the mindset of every single student in this study. A mindset that no longer reflected a state of learned helplessness, but one of learned helpfulness.

Implications for Future Research

This study has made the argument that social learning is not only beneficial for students' academic and social-emotional growth, it is necessary if we want to prepare our students to be productive members of a 21st century society. Further, this study also argues against the practice of isolating students in direct instruction and pull-out models because of the negative implications this can have, especially for our most struggling students, on their feelings of self-efficacy.

Future research in this area may enhance our understanding in ways to help our struggling students learn more effectively. Longitudinal-comparative studies that examine how students in direct instruction only models perform compared to those in a social learning setting could provide insight into how students' critical thinking and self-efficacy skills are developed. Social learning models for reading may also be useful to

determine how and to what extent social learning can support various reading skills for students.

Additional studies that measure the proficiency levels on standardized assessments among students in a direct instruction only model and those in a social learning setting could also shed light on how students learn best to critically think and persevere though the complex tasks often seen on standardized assessments.

Finally, a focus group study could be established for the purpose of learning the various aspects that contribute to how students come to feel either connected or disconnected to school by way of social connectedness. I believe this could be especially important in high schools as a preventative measure against teen suicides and drop-out rates.

Implications for Future Practice

This action research study was designed with the intention of providing students an opportunity to engage in dialogic discussion for the purpose of improving math skills and supporting their social and emotional growth. Educators face an uphill battle every day when it comes to finding ways to engage students with multiple skill levels and varying degrees of social-emotional competency. The pressures of standardized testing, evaluation measures, pull-out programs and direct instruction methods have created impasses that are difficult for both teachers and students alike to cross.

When I first decided to embark on this work, it stemmed from my own experiences working as a reading interventionist using a scripted program. I realized this was not the kind of teaching I wanted to do and it was not the kind of learning I wanted for my students. When I returned to the classroom full time, I was determined to pilot an

innovation that would prove dialogic education is not only possible, but can yield positive results. After my pilot year, my students finished first among my six-member grade level team with the most number of students at benchmark on the final MCOMP. Moreover, my class was the only one to finish above the state average in math on the AZMerit Mathematics Assessment. At the start of this year, I also learned one of my students received a score of 100% on the state math assessment. He was the only third grade student to accomplish this extraordinary feat. If anyone were to ask me what I did to achieve those results I would give two answers: one, I incorporated social learning during my math time; and two, it was my students who did all the work. As a teacher, I can facilitate learning, but I cannot dictate effort. What my students did, they did because they believed they were smart enough to do it and because they knew they were worth more as a learner than not to give it their best.

This year, I have given great effort to learn new and more effective ways to create peer inquiry teams for the purpose of supporting dialogic discussion and my students' social and emotional growth. As an educator of 15 years, I can truthfully say that delivering content is far easier for me than promoting social learning because I believe this work to be so salient that I want it to be perfect. As I have discovered though, dialogic discussion among students is fraught with challenges that have sometimes felt unsolvable. I have persevered however by being reflective and willing to admit when an idea did not yield the results I had hoped. I have learned to be flexible, open to change and unwavering in my belief I am doing what is best for my students.

What I would say to any educator is this: what do you want your legacy to be? Long after I am gone and my students have grown up and forgotten every academic

lesson I taught them, what I hope they will remember is a time in their life when they felt hope and valued. Hope that they could reach any dream they had, and valued for who they were. It is my deepest wish teachers everywhere will read this paper and have the courage to start a dialogic discussion in their classrooms. To go outside the box and find ways to support their students' social and emotional growth. To have faith in the process and not give up when things get tough or others don't recognize the importance of your work. This paper was not just for my students, but for every educator who ever felt limited by a system that, despite its efforts, sometimes fails to put the needs of *all* of our students first. Be courageous, innovate and be the teacher you always wanted to be. Most of all, show every child they are more than a number and that they *are* deserving of a future of limitless possibilities.

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APPENDIX A

TEAM FIELD NOTES

Team Field Notes

Team Name _____

Date _____

1. This week we helped each other with the following math skills…
2. We helped each other by…
3. My team's math goals for next week are…
4. Our team chose these goals because…
5. A challenge we are having as a team is…
6. What we need to help us overcome that challenge is…

APPENDIX B

STUDENT REFLECTION JOURNAL

Student Reflection Journal

Name _____

Date _____

1. I met my learning goals this month on my weekly math test and/or my weekly exit ticket in the following ways…

2. Here is how I think my math team is helping me reach my goals…

3. This month I feel _____ about my learning goals because…

4. I think I can continue to grow by…

APPENDIX C

FINAL REFLECTION JOURNAL

Final Reflection Journal

Name _____

Date _____

1. I am _____ on my math tests…

2. I improved on my weekly math test in the following ways…

3. I feel _____ about the progress I have made on my math test because…

4. My math team helped ne grow as a scholarly student in these ways…

APPENDIX D

FINAL TEAM FOCUS GROUP INTERVIEW

Final Team Focus Group Interview

1. Describe how your team communicated with each other when solving problems.
2. Describe how your team helped each other work through challenging math problems.
3. Describe how each of you did on your final math test.
4. Describe if you think working with others helped you achieve your goals on your test. In what ways?
5. Describe your greatest challenge working as a team.
6. How do you think working in teams could be better?