

PROFESSIONAL DEVELOPMENT: USING APPRECIATIVE INQUIRY TO
UNDERSTAND THE PERSPECTIVES OF HIGH SCHOOL MATHEMATICS TEACHERS

by

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(Under the Direction of SALLY J. ZEPEDA)

ABSTRACT

This study examined the perspectives of high school teachers of mathematics related to professional development. Data were collected through interviewing high school mathematics teachers and the Appreciative Inquiry method was used to frame the study and to analyze data.

Through data analysis, several themes emerged related to what high school mathematics teachers felt made professional development beneficial to them. The themes were centered on professional development that was relevant, content specific, and the development of skills that could be easily implemented in the classroom. Major findings support that modeling, time for reflection; hands on activities, discussion, and collaboration were highly desirable. Furthermore, data pointed to the need for teachers to receive feedback and administrative support to implement lessons from professional development. The findings also found that there is a relationship between professional development and the self-efficacy of high school mathematics teachers with respect to having successful experiences and the relationship to positive attitudes about professional development. Overall, findings from this study could help district and school leaders provide the kind of professional development that high school mathematics teachers feel would help improve their teacher practice.

INDEX WORDS: Professional Development, Self-Efficacy, Appreciative Inquiry, High School Mathematics Teachers

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DEDICATION

This dissertation is dedicated to my family as I would have never been able to accomplish this without their never-ending love and support. To my mom and dad, Mario and Maria, who always instilled in me the importance of education, I thank you for your continued love and support throughout all my years and for continuously encouraging me to reach my goals. To my wife Pam, thank you for always being there for me, for doing whatever was needed to support me through this process, and for encouraging me to see this process all the way through even though there were several times where I did not feel like I could. To my wonderful and beautiful children, Analiese and Tanner, it is my hope that when you read this dissertation someday you will further understand how education can provide you the foundation you need to be successful, to go after your dreams and goals no matter how insurmountable they may seem initially, to know that your family will always be there to love and support you so that you never feel you have to do anything alone, and that anything you want to achieve is possible. I also want to thank my Lord and Savior for whom everything is possible and for whom I dedicate my life to serving.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
CHAPTER	
1 INTRODUCTION	1
Statement of the Problem.....	5
Purpose of the Study	6
Research Questions	7
Conceptual Framework.....	7
Overview of the Methods.....	8
Significance of the Study	9
Assumptions.....	10
Definition of Terms.....	11
Limitations of the Study.....	11
Organization of the Dissertation	12
2 REVIEW OF THE RELATED LITERATURE	13
Effective Professional Development.....	14
Math Professional Development.....	19
Adult Learning	27

Self Efficacy.....	30
3 RESEARCH DESIGN AND METHODOLOGY	36
Purpose of the Study.....	36
Research Design.....	37
Research Methods.....	39
Sampling	44
Data Collection Methods	46
Data Analysis	49
Participants and Research Site	57
4 FINDINGS AND DATA ANALYSIS	59
Overview of School District	60
Profile of Participating Schools	61
Profile of the Research Participants.....	62
Overview of the Findings.....	63
Findings.....	64
Summary	76
5 RECOMMENDATIONS, IMPLICATIONS, AND CONCLUSIONS.....	78
Themes.....	79
Recommendations and Implications.....	100
Conclusions.....	103
REFERENCES	105

LIST OF TABLES

	Page
Table 1.1: Research Questions.....	7
Table 3.1: Key Steps in Appreciative Inquiry Data Collection	46
Table 3.2: Data Collection and Organizing Considerations	49
Table 4.1: Participant Profiles.....	63

LIST OF FIGURES

	Page
Figure 3.1: Appreciative Inquiry “4D” Cycle.....#	#
Figure 3.2: Problem Solving vs Appreciative Inquiry#	#
Figure 3.3: Sample of Coding Process for Research Question 1#	#
Figure 3.4: Sample of Coding Process for Research Question 2.....#	#
Figure 3.5: Sample of Coding Process for Research Question 3.....#	#
Figure 3.6: Research Questions and Corresponding Themes#	#

CHAPTER 1

INTRODUCTION

In the broadest sense, the purpose of this appreciative inquiry study was to examine the relationship between professional development and self-efficacy. What types of professional development do teachers think best supports helping them to improve their teacher practice as well as their students' learning? In terms of the appreciative inquiry research tradition, what's "good" about professional development for teachers of mathematics? From the point of views of teachers, a key question can be examined through this study: How can professional development support teacher practice to increase teacher efficacy?

With accountability, many school districts are looking for ways to improve student achievement. School districts are continuously looking for ways to provide teachers with the support they need to help them improve their teaching practices. Teachers need to be equipped with the types of teaching strategies that will support students in becoming critical thinkers, a set of skills needed to meet the 21st century demands of higher education and the workforce. It is important that students are prepared to meet the demands of today's workforce as well as the educational environments that extend beyond K-12.

According to Chong and Kong (2012), "To prepare students with complex analytical skills to meet educational and work challenges of the 21st century, teachers must learn new ways of teaching that have a significant effect on student learning" (p. 263). If the expectation for schools is to produce students who possess the higher-order thinking skills necessary to be successful in the 21st century, then school systems must provide teachers with the training

necessary for them to possess higher-order thinking skills along with deep content knowledge (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). One avenue for teacher learning is through professional development.

Professional development has become an important component in education today because it provides a way for teachers to learn and to grow professionally (Darling-Hammond et al., 2009; Zepeda, 2015). Through learning and growing professionally, improvements in classroom practice occur, which hopefully results in increased student achievement as well (Darling-Hammond & Richardson, 2009). Professional development is important because, if done effectively, it may lead to increased student achievement which is what educators are held accountable for and ultimately strive to reach (Darling-Hammond & McLaughlin, 2011).

Professional development provides opportunities for teachers to improve their instructional practices and to deepen their content knowledge as they develop their teaching practices (Desimone, 2011). In deepening their content knowledge and improving their teaching practices, teachers will be able to provide a more productive and effective learning environment for their students. Knowing how students learn is also an important component of professional development. Professional development not only needs to help teachers deepen their content knowledge, but it also needs to help teachers understand the ways in which students learn the content (Guskey, Roy, & VonFrank, 2014).

Nationally, high school students are struggling in the area of mathematics. According to the National Council of Teachers of Mathematics (2014):

- The average mathematics score on the NAEP test for 17 year olds has essentially stayed the same since 1973;
- About 44% of the 2013 high school graduates were prepared for college level mathematics based on ACT and SAT scores;
- Only 16% of current high school seniors are proficient in mathematics according to data provided by the U.S. Department of Education. (p. 2)

This data illustrates that school and district administrators across the nation need to help support high school math teachers by providing them professional development that can positively change their teaching practices (Hord & Sommers, 2008).

In the state of Georgia, high school students are struggling as well in the area of mathematics. Based on data from the Georgia Department of Education (2015) out of approximately 376 high schools, only 2 had 80% or more of its students Meet or Exceed on the Math End-of-Course Test (EOCT). Approximately 366 of the 376 schools had 69% or less of its students Meet or Exceed on the Math EOCT with approximately 86% of the schools having 50% or less of their students Meeting or Exceeding on the Math EOCT (Georgia Department of Education, 2015). This data supports the need for growth of high school math teachers through targeted professional development.

Effective professional development in the field of mathematics embodies many of the same characteristics as effective professional development in general. In a study by Holmstrom (2010) on how to improve math instruction in a certain district in the state of Washington, he reflected on Elmore's (2002) view that effective professional development:

- Focuses on a well-articulated mission or purpose anchored in student learning
- Derives from analysis of student learning of specific content in a specific setting
- Focuses on specific issues of curriculum and pedagogy
- Connects with specific issues of instruction and student learning in the context of actual classrooms
- Embodies a clearly articulated theory or model of adult learning
- Develops, reinforces, and sustains group work
- Involves active participation of school leaders and staff
- Provides sustained focus over time and continuous improvement
- Provides models of effective practice
- Utilizes assessment and evaluation
- Provides timely feedback on teacher learning and practice. (p. 7)

Teachers of mathematics need professional development that embodies the above characteristics to support their professional growth while improving their teaching practices.

Professional development sessions need to provide teachers of mathematics with opportunities to collaborate with other math teachers, to analyze student's mathematical thinking, to reflect on the beliefs and ideas they have about teaching and learning, and to discuss the different instructional strategies that help to promote student learning (Akiba, 2012). In a study by Jacobs, Koellner, and Funderburk (2012) they reported that teachers who participated in professional development focused on mathematical content, classroom instructional strategies, and student learning as well as an opportunity to discuss issues related to teaching and learning, felt they had more of a direct impact on their student's learning. The concept of teachers feeling like they have a more direct impact on their student's learning is related to teacher efficacy.

Self-efficacy deals with one's perceptions or beliefs that they will be able to accomplish a certain task. Bandura (1982) defines self-efficacy as "a personal judgment of how well one can execute courses of action required to deal with prospective situations" (p. 122). Self-efficacy can play a role in one's willingness to learn as well as their ability to believe whether they can be effective or not. Self-efficacy beliefs can influence a person's thoughts and emotions in such a way as to affect their willingness to pursue certain goals, deal with adversity, as well as how much control certain events have on their lives (Tschannen-Moran, Hoy, & Hoy, 1998). Self-efficacy theory deals with the factors that determine one's beliefs and self-confidence to perform certain tasks successfully (Moriarty, 2014). In terms of teaching, self-efficacy may help to determine a teacher's willingness to grow professionally.

Self-efficacy can affect one's willingness to invest in their professional development which may ultimately impact student achievement (Moriarty, 2014). Achievement may be affected as a result of how well a teacher performs in the classroom which may be impacted by their self-efficacy. High self-efficacy can lead to a willingness to further pursue learning of

additional knowledge and skills as well as the ability to withstand adversity and failure which can lead to higher performance (Bandura, 1982). People with high self-efficacy tend to take responsibility for their actions as well as the consequences for those actions. They believe in themselves and their ability to find a way to better themselves by improving on their knowledge and skills. People with high self-efficacy find the reason for their failure and look for ways to improve whereas people with low self-efficacy attribute their own lack of ability as a reason for the failure and therefore have little confidence or belief that they can be successful (Moriarty, 2014).

Statement of the Problem

Darling-Hammond et al. (2009) agreed that effective professional development must include a focus on specific curricular content and added that the content must be aligned with school and district initiatives to support strong collaborative relationships among teachers. Research strongly suggests that effective professional development includes deepening teacher's content knowledge, allowing teachers to partake in relevant learning activities, to use relevant student data, work collaboratively, and time to participate in professional development activities (Darling-Hammond et al., 2009).

Math professional development is effective when it provides opportunities for teachers to study their student's problem solving abilities; understand and use mathematical principles and standards to design their instruction; engage in activities that result in a deeper understanding; use mathematical pedagogy that has been proven to impact teaching and learning and; to design and use authentic assessments (Bailey, 2010).

As a result of low standardized test scores, the high school math teacher has a very stressful work environment so it is important that they are supported with effective professional

development that can positively influence efficacy. There is research that supports a relationship between effective professional development, teacher efficacy, and student learning (Bruce, Esmonde, Ross, Dookie, & Beatty, 2010; Duran, Ballone-Duran, Haney, & Beltyukova, 2009; Parise & Spillane, 2010). It is important that teachers believe the strategies they are using will have an impact on their student's learning as well as the belief that they have the ability to implement effective teaching strategies after engaging in professional learning opportunities.

Purpose of the Study

The purpose of this study was to examine the relationship between professional development and self-efficacy. In doing this study, the hope was to provide teachers a voice in the kind of professional development they feel would best help to support their classroom instruction as well as their student's learning. Since the purpose of teacher professional development is to provide teachers with ways to improve their instructional practice, it only makes sense that the teachers should have a voice in the kind of professional development that they participate. However, there is a need for teachers of mathematics to be able to first reflect about what's right about professional development.

By allowing teacher voice and input, there may be a greater chance that teachers will engage in the kind of learning that leads to changes in their practices (Bass, 2012; Jurrow, 2009). Allowing teachers to provide input and giving them a sense of ownership in their professional growth could positively influence efficacy (Bandura, 1982; Guskey et al., 2014; Timperley, 2008). There is research that indicates that high self-efficacy can have a positive impact on student learning (Bruce et al., 2010; Duran et al., 2009; Moriarty, 2014; Parise & Spillane, 2010; Zambo & Zambo, 2008).

Research Questions

Given that the purpose of this study was to examine the relationship between professional development and self-efficacy, the Appreciative Inquiry (AI) method was used. AI uses a 4-D cycle model involving Discovery, Dream/Design, and Destiny that were used to construct the following research questions presented in Table 1.1.

Table 1.1 Research Questions

Appreciative Inquiry 4-D Model	Related Research Questions
Discovery-What is good about professional development	1. How do high school mathematics teachers describe their best professional development experiences?
Dream/Design-What would be the ideal professional development	2. How would high school mathematics teachers design professional development that would best support their teacher practice?
Destiny-What needs to be done to sustain the type of professional development described in the Dream/Design phase	3. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice?

Conceptual Framework

Appreciative Inquiry has been described as a philosophy that incorporates a 4-D process for the purpose of engaging people at some level within the organization to help produce a positive and effective change (Cooperrider, Whitney, & Stavros, 2008). In using Appreciative Inquiry, the researcher assumes that, within the organization, there are things being done well and, therefore, positive change can be brought about by focusing on these strengths (Cooperrider et al., 2008). Instead of trying to fix a problem, which can be looked at in a negative context, that is, there is something that is not working and therefore needs to be fixed, Appreciative Inquiry is used within a positive context where the change to be affected is a result of continuing

to build on the strengths of the organization. As a result of Appreciative Inquiry focusing on the participants' actual experiences as well as the positive attributes, participants usually feel a sense of commitment, confidence, and affirmation regarding the positive change that is possible (Clarke, Egan, Fletcher, & Ryan, 2006).

The purpose of this study was to examine the relationship between professional development and self-efficacy. Appreciative Inquiry was used to help focus the teachers on what they already believe is "good" or "effective" regarding the professional development they have participated in and how these areas of strength can be used to help improve future professional development for the purpose of positively influencing efficacy and hopefully helping to improve their instructional practices.

Overview of Methods

This study used a qualitative research design. Appreciative Inquiry through action research was the methodology used. High school math teachers were selected to represent a group of diverse math teachers that taught various high school math courses in a suburban school district with a diverse student population. The researcher developed interview questions and an accompanying interview guide which provided topics and subject areas for the researcher to explore and to probe further. The interview questions addressed thoughts and opinions regarding the professional development experience of the teachers. Questions focused on the following:

- what the participants perceived as effective professional development
- what aspects of the professional development they perceived to help support their teaching practice
- the aspects of the professional development that they perceived to positively influence their self-efficacy

- their perception of the impact that their changed teacher practices had on their student's learning
- their thoughts and beliefs on how to build on current effective professional development practices to help make future professional development as effective as possible.

Significance of the Study

It is the hope that this study will provide more research in the area of professional development especially with respect to high school teachers of mathematics. Most of the research in the areas of professional development and self-efficacy has been done at the elementary level (Bruce et al., 2010; Duran et al., 2009; Parise & Spillane, 2010; Posnanski, 2010). In doing this study, the intent was to draw attention to the importance of professional development for high school mathematics teachers. Based on my varied experiences as an educator, I feel that there are those who believe that high school teachers already have a deep knowledge of their content and therefore are not in need of much professional development. Sometimes, this is the thinking of some high school teachers. While most high school teachers do have a solid knowledge base in the content they teach, there is always room for them to gain a deeper understanding of their content as well as learn new instructional strategies. It is even more important for these teachers to learn what instructional strategies work best in delivering their content as well as meeting the learning needs of their students (Desimone, 2011).

The research in this study will hopefully add to the research base on self-efficacy and professional development specifically for teachers of mathematics. While this study will not measure self-efficacy, the intent is to further the research on the importance of self-efficacy in terms of the professional growth of teachers (Holzberger, Phillips, & Kunter, 2013; Tschannen-Moran et al., 1998; Zambo & Zambo, 2008). It is the hope that this evidence to build on the

existing research that shows there is a link between professional development, teacher practice, and student learning (Bruce et al., 2010; Duran et al., 2009; Guskey et al., 2014; Moriarty, 2014; Parise & Spillane, 2010; Timperley, 2008; Zambo & Zambo, 2008). The intent of this research is to help school and district leaders better understand what effective professional development is and to give teachers a voice in describing their “best” professional development. More specifically, for school and district leaders to better understand what teachers believe effective professional development is.

Assumptions

One of the assumptions of the researcher was that all the teachers participating in this study were qualified, high school math teachers currently teaching one or more courses in grades 9-12 in Mathematics. Another assumption of the researcher was that participants were regularly participating in professional development as prescribed by the school system in which they worked. Furthermore, it was assumed that the high school math teachers had a high level of professionalism and wanted to improve their teacher practice to help support student learning.

In 2008, the researcher entered into school administration as an assistant principal. During his tenure as an assistant principal, one of the areas of responsibility was curriculum and instruction. This responsibility involved working with teachers to help ensure they were providing the type of instruction needed to help improve student achievement. It became very clear to the researcher, that providing quality professional development was going to be a key in providing the type of support teachers needed to help them improve their instructional practice which would hopefully lead to improved student achievement.

Currently, the researcher serves in the role of principal and continues to see the importance of professional development. Moreover, the researcher believes it is the

responsibility of school and district leaders to provide the type of professional development that teacher's feel benefit them the most with regard to improving their teaching practice as well as their student's learning. It is the hope of this researcher that this study will provide school and district leaders with research that will help them better understand the type of professional development that teacher's value most and firmly believe will best help them improve their teaching practices as well as help to improve student achievement.

Definition of Terms

Key terms were defined to clarify meaning related to this study. The following terms and their definitions are offered to provide context and further understanding of the findings of this study.

1. Professional Development – Intentionally designed activities that are used to gain new knowledge about teaching and student learning (Akiba, 2012).

2. Self-Efficacy – According to Bandura (1982) it is a “personal judgment of how well one can execute courses of action required to deal with prospective situations” (p. 122).

3. Appreciative Inquiry - A philosophy that incorporates a 4-D process for the purpose of engaging people at some level, within some type of organization, to help produce a positive and effective change (Cooperrider, Whitney, & Stavros, 2008).

4. Mathematics Teacher – For purposes of this study, this is a high school math teacher in grades 9 through 12.

Limitations of the Study

One limitation to this study is in interviewing a small group of teachers. Because the sample size will be small, the evidence found will have to be carefully reviewed and analyzed and the results will not be generalized about teachers. Another limitation of the study is where

the data will be collected from. As a result of collecting data from a specific school district, the results may not be able to be used in school districts that do not have a similar make-up. For example, smaller or more rural systems may not be able to rely on the results from the study because it came from a system that is vastly different in terms of the make-up of the students, the community, and the school district as a whole.

Organization of the Dissertation

Chapter 1 includes the background of the study, statement of the problem, purpose of the study, research questions, conceptual framework, overview of the methods, significance of the study, assumptions, definition of key terms, and limitations of the study. Chapter 2 presents a review of the related literature on effective professional development, types of professional development, studies of professional development in schools, self-efficacy, and teacher efficacy. Chapter 3 lays out the research method and the overall scope of the study. Chapter 4 presents the data as well as analyses of individual interviews. Chapter 5 concludes with a summary of the study including implications for future research as well as implications for policy and practice.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

Professional development has become an important topic of interest for most school districts especially with respect to the high demands placed on teachers and administrators as a result of accountability measures. Providing professional development is one of the top initiatives for most school districts as noted by the millions of dollars spent on professional development for teachers each year (Fertig & Garland, 2012; Sawchuk, 2010). In an article in the *Washington Post* Layton (2015) noted that school districts spend an average of \$18,000 per teacher per year on professional development. The 50 largest school districts in the US spend an estimated \$8 billion per year on professional development. Layton (2015) refers to a statement made by Education Secretary Arne Duncan that the federal government spends \$2.5 billion a year on professional development. While school districts continue to focus on providing professional development for their teachers, the question remains as to whether the professional development being provided is effective or not? Much of the professional development provided in today's U.S. educational systems is not very effective and has shown to provide little or no noticeable changes in classroom practices or student learning (Darling-Hammond & McLaughlin, 2011). The professional development opportunities being offered by school districts are often workshops that are either isolated events or fragmented throughout the year leading to learning that has no consistency or continuity (Sanchez, 2012).

This study is important because it seeks to discover through an appreciative inquiry approach what mathematics teachers believe is needed for effective professional development.

The purpose of this study was to examine the relationship between professional development and self-efficacy. In doing so, the study was designed to answer the following questions:

1. How do high school mathematics teachers describe their best professional development experiences?
2. How would high school mathematics teachers design professional development that would best support their teacher practice?
3. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice?

To better understand the relationship between professional development and self-efficacy, this chapter examines effective professional development, math professional development, adult learning, and self-efficacy.

Effective Professional Development

The need for effective professional development is important in today's educational environment not only due to the increased accountability but also to help ensure that students are given opportunities to learn to the best of their ability. Providing professional growth opportunities for teachers is important if administrators expect them to provide their students with the best educational environment possible. Gabriel, Peiria-Day, and Allington (2011) recommend that to support the professional growth of teachers they need: purposeful and structured professional development opportunities, continuous support from teachers and administrators, and the ability to provide input as to the type of professional development opportunities being offered either individually or within teams. Research suggests the need for providing teachers with professional development that will be beneficial and meaningful to them. In other words, providing effective professional development so teachers can transfer to practice

what is learned in their classrooms to better support student learning. How do administrators provide effective professional development? What does the research say about what effective professional development is or looks like?

Morewood and Bean (2009) reported that for professional development to be effective:

- it needs to focus on the content that the teachers are teaching
- it needs to allow teachers to use authentic student data so they are better able to take their new knowledge and apply it in their teaching practice
- it needs to provide time for teachers to partake in professional development activities

Darling-Hammond et al. (2009) suggest that effective professional development must include a focus on specific curriculum content and add that professional development needs to align with school and district initiatives as well as help to support strong collaborative relationships among teachers. Core features of an effective professional development program must include: a focus on content and instructional strategies, provide active learning opportunities, and have coherence with respect to district and school initiatives (Every Child Succeeds Act, 2015; Quick, Holtzman, & Chaney, 2009).

The research seems to suggest that effective professional development includes deepening the teacher's content knowledge and allowing teachers to partake in relevant learning activities, use relevant student data, work collaboratively, and to participate in professional development activities. In a research study by Desimone, Porter, Garet, Yoon, and Birman (2002), they found professional development that focused on content knowledge, provided opportunities for relevant and active learning, and allowed for coherence with other learning activities, had been reported by teachers as having the most effect on increasing their knowledge and skills as well as improving their classroom practice. In an earlier study by Garet, Birman,

Beatrice, Porter, Andrew, Desimone, and Herman (1999), teachers reported that professional development that focused on improving content knowledge, was relevant, allowed the teachers to be active learners, and provided coherence with other learning activities helped to deepen their knowledge as well as enhance their classroom practice.

Professional development needs to provide an environment where teachers are actively involved in the learning process. Active learning involves providing teachers with engaging and meaningful activities during the professional development such as being able to review student work or data as well as receive feedback on their current teaching practices; allowing for coherence with other learning activities by providing activities that align with school and teacher goals as well as state standards and assessments; and focusing on content knowledge by providing activities that further deepen and enrich the existing content knowledge of the teachers within the particular subject or subjects that they teach (Desimone, 2011).

Active learning also allows the teacher to be a student which is important for the teacher to get the most out of the professional development opportunity. Just as students learn best by being active participants in the learning process, so do teachers. Darling-Hammond and McLaughlin reported (2011), “Teachers learn by doing, reading, and reflecting (just as students do); by collaborating with other teachers; by looking closely at students and their work; and by sharing what they see” (p. 83). The more teachers are actively involved in the learning process the more the teachers gain from the professional development experience.

Effective professional development needs to allow the teachers to fully participate in the professional development opportunities by allowing them to work with relevant student data and work as well in a collaborative learning environment. Teachers in one study supported the importance of engaging in meaningful activities by indicating in being able to look at actual

student data; they were better able to transfer their learning from the professional development experience back into classroom practice (Morewood & Bean, 2009).

Effective professional development programs allows teachers to struggle with learning new content and instructional strategies as well as how to implement what they have learned in their classrooms. Effective professional development helps to encourage teachers to accept the role of teacher and student and provides a collaborative environment where they can struggle with the learning through each of these roles (Darling-Hammond & McLaughlin, 2011). If professional development is to be effective and have positive influence on classroom practices, then teachers must be willing to participate in the professional development opportunities which they are more likely to do if they have input as to the type of professional development they participate in (Darling-Hammond & McLaughlin, 2011).

Professional development is needed to provide opportunities for teachers to deepen their content knowledge and further develop their teaching practices (Desimone, 2011). Professional development provides opportunities for teachers to improve their teaching practices by better understanding the; content knowledge they teach, instructional strategies used; and how their students learn best. Darling-Hammond and McLaughlin (1996) assert that professional development is a way of “deepening teachers understanding about the teaching and learning process and the students they teach” (p. 203). Professional development needs to provide teachers with opportunities that not only strengthen their content knowledge and provide them with new and improved instructional strategies, it is also important that the teachers understand how their students learn. Professional development not only needs to help teachers deepen their content knowledge, it also needs to help teachers understand the ways in which students learn that content (Guskey et al., 2014).

How do school and district administrators decide on what type of professional development is best or most effective? The answer may be in asking the teachers what they perceive as effective professional development. In 2010, Zhang did a study in China on what teachers perceived to be effective professional development. In the study, Zhang (2010) concluded that “training and improvement courses should aim to satisfy teacher’s needs to learn ...they should not simply be compulsorily and uniformly implemented without reference to the objects of training themselves – the teachers” (p. 286). It is important for school and district administrators to find out what type of professional development teachers feel is most beneficial to them so the professional development can be designed to provide opportunities for the teachers to learn things that will help improve their teaching practices.

If professional development is to help support and improve teacher professional growth, then it is important for teachers to have input as to the type of professional development that they perceive will be most beneficial to them. The research confirms that true change in classroom practices is largely dependent on the experience a teacher has with respect to the professional development opportunity that teachers participated in (Corcoran, Shields, & Zucker, 1998; Loucks-Horsley & Matsumoto, 1999). If improvements in classroom practice rely on teacher’s experiences in professional development, then understanding what teachers perceive as effective professional development is important (Lustick, 2011).

This study was important because it examined what teachers perceive as effective professional development and how that professional development influenced their teaching practices. It seems clear from the research that effective professional development focuses on student learning, provides multiple opportunities for teachers to collaborate, and allows teachers to be active participants in the professional development process, which should be ongoing

throughout the year (Darling-Hammond & Richardson, 2009). Now that we have looked at what effective professional development looks like, it is important to understand how the participants, the teachers, best learn. To do this, we need to look at the research regarding math professional development to see how to provide our mathematics teachers with effective professional development.

Math Professional Development

Professional development is important for teachers to be able to strengthen their teaching practices as well as better understand how their students learn. Mathematics teachers need professional development that will help to enhance their teacher practice as well as their student's learning. Teaching math can be a very difficult and complex process. It requires teachers to have a deep understanding of mathematical content knowledge as well as how student learning of mathematics develops through the different grade levels (Ball, Thames, & Phelps, 2008; Daro, Moesher, & Corcoran, 2011; Sztajn, Confrey, Wilson, & Edgington, 2012). Professional development for math teachers, while having many of the same characteristics of what makes professional development effective, needs to ensure that it focuses specifically on instructional strategies that will support student's learning of mathematics (Holmstrom, 2010). One such strategy is teaching mathematics by using referential, hands-on manipulative models as part of the math instruction (Holmstrom, 2010). By using such a strategy, students do not just memorize an algorithm rather they understand why they need to use to algorithm and are able to go back to the models at any time to help support their learning of new math content in the future by making connections to what they already know (Holmstrom, 2010).

The National Council of Teachers of Mathematics (2014) lists eight mathematics teaching practices that they consider to be essential in helping students gain a deep understanding of mathematical content:

establish mathematics goals to focus learning, implement tasks that promote reasoning and problem solving, use and connect mathematical representations, facilitate meaningful mathematical discourse, pose purposeful questions, build procedural fluency from conceptual understanding, support productive struggle in learning mathematics, and elicit and use evidence of student thinking. (p. 10)

Teachers of mathematics need to learn these types of specific mathematical teaching practices to help ensure they are providing the type of instruction that will best support their student's learning. The professional development that mathematics teachers receive not only needs to focus on strengthening their math content knowledge and provide them with specific mathematical teaching strategies, it also needs to help math teachers understand how students learn math best.

The learning of mathematics is an active process by which students build upon their prior mathematical background knowledge through personal experiences as well as working collaboratively and getting feedback from their peers and teachers (Bransford, Brown, & Cocking, 2000; Donovan & Bransford, 2005; Lester, 2007; Mayer, 2002; National Research Council, 2012). There are other conditions specific to the learning of mathematics that teachers of mathematics should understand. There are certain experiences that students should have within a math classroom. The National Council of Teachers of Mathematics (2014) suggests that students should have experiences that enable them to:

- engage with challenging tasks that involve active meaning making and support meaningful learning;
- connect new learning with prior knowledge and informal reasoning and, in the process address preconceptions and misconceptions;
- acquire conceptual knowledge as well as procedural knowledge, so that they can meaningfully organize their knowledge, acquire new knowledge, and transfer and apply knowledge to new situations;
- construct knowledge socially, through discourse, activity, and interaction related to meaningful problems;
- receive descriptive and timely feedback so that they can reflect on and revise their work, thinking, and understandings; and,
- develop metacognitive awareness of themselves as learners, thinkers, and problem solvers, and learn to monitor their learning and performance. (p. 9)

By applying these practices and providing the types of experiences, mathematics teachers help to ensure a learning environment that best supports the needs of their students. The professional development of math teachers needs to provide learning opportunities for teachers to enrich their math content knowledge; learn specific and effective math instructional strategies; and better understand how to provide the right types of experiences in their classrooms to best support their student's learning.

Research on Professional Development in Mathematics

Hartman (2013) did a study on coaching as a means of professional development for math teachers. The study took place in a small rural school where a former math teacher had become a math coach for the school and was used in a capacity to help the other math teachers,

all experienced with 10 or more years, grow professionally (Hartman, 2013). The math coach used four main methods in implementing the coaching professional development: “(1) direct correspondence techniques, (2) co-planning sessions with teachers, (3) co-teaching with receptive teachers, (4) providing professional development by incorporating the district approved problem solving strategy UPSC (Understand, Plan, Solve, and Check) into lesson planning” (Hartman, 2013, p. 60). With respect to pedagogy, the math coach intended to help teachers create and implement better assessments, incorporate more instructional strategies into their lessons to provide more depth to their teaching practice, and train teachers how to use UPSC (Hartman, 2013). The ultimate goal of the math coach was to model for the teachers how to plan and deliver lessons that relied less on memorization of algorithms and rote skills but more on conceptual inquiry (Hartman, 2013).

The focus for the math coach was to accomplish most of this in the classrooms as part of the co-teaching process and in the co-planning sessions. What was discovered in the study is that the success of this particular type of professional development relied heavily on the willingness or lack thereof of the teachers to allow the math coach to participate in these activities (Hartman, 2013). The ease of access into teacher’s classrooms and planning sessions by the math coach weighed heavily on the effectiveness of her coaching and the overall professional development of the teachers which is ultimately what this study focused on. Even though coaching, which is a job-embedded type of professional development, is considered to be a very effective way of implementing professional development, there can be a great barrier to success if the coach is not able to gain access into the teacher’s classrooms as well as their professional development groups which are most often held during common planning.

Although there was no intent to look at the teacher's self-efficacy as a result of this type of professional development, there was some evidence that this type of professional development did affect self-efficacy. The math coach felt it was important to provide opportunities where the teachers felt a sense of success in learning and implementing the new content and strategies provided through the coaching activities (Hartman, 2013). In doing so, the math coach felt like the teachers would be more confident and therefore more receptive to continuing to learn new content and related instructional strategies that would help improve their teacher practice (Hartman, 2013). Evidence of coaching related professional development having an effect on self-efficacy as well as a link between successfully completing challenging tasks and self-efficacy is supported by the research (Bandura, 1997; Darling-Hammond & Richardson, 2009).

Slavit and McDuffie (2013) did a study on the use of lesson study and video clubs as a means of professional development for experienced middle school math and science teachers. Lesson study can be described as a collaborative effort by teachers and other knowledgeable parties to help "(a) formulate goals for student learning and development; (b) meticulously plan a research lesson to enact these goals; (c) conduct the research lesson with one team member teaching and the other members gathering evidence on student learning; (d) debrief and discuss the research lesson; and (e) revise the lesson" (Slavit & McDuffie, 2013, p. 98). Video clubs is nothing more than a group of teachers, professional development group, using their common planning time to discuss and reflect on a video of a lesson from one or more of the teachers in the professional development group.

The teachers involved in the professional development found the reflection and discussions that occurred within the two types of learning activities helped them to understand potential student learning strategies which enabled them to further push their students to think

more deeply regarding the learning task at hand (Slavit & McDuffie, 2013). The study also found that as teachers learned new strategies, such as the use of manipulatives, and saw how they benefitted the students, the teachers were motivated to go and look for more resources on their own (Slavit & McDuffie, 2013). The main focus of the study was that professional development, especially when implemented in a collaborative nature, can lead to teachers wanting to further enhance their professional growth by going out and seeking resources to improve their teacher practice on their own.

Slavit and McDuffie (2013) described this type of professional development as teacher self-directed professional development. Effective collaborative professional development leading to sustained self-directed professional development was further supported by evidence in this study in the fact that change in teacher practice occurred even after the designated lesson study and video groups stopped meeting (Slavit & McDuffie, 2013). Professional development needs to be collaborative in nature, embedded into the workday, relevant, and allow for teacher discussion and reflection.

Newmann, King, and Young (2000) did a study on the professional development of elementary school teachers, who taught at a school primarily consisting of low-socioeconomic, Latino students, in the areas of reading, writing, and mathematics. The professional development consisted of a select group of teachers, chosen by the administration, to participate in professional development activities that included; attending formal training conferences outside of the school; being observed by the trainers and receiving feedback during planning sessions; and meetings with school-based math and reading specialists for purposes of general discussion of instructional issues, modeling of the new math and reading instructional strategies, feedback from observed lessons, as well as discussion of peer observations (Newmann et al.,

2000). In addition to learning new instructional strategies, teachers had the opportunity to learn new subject matter content as well, especially in the area of math, and all aligned to the state standards, as well as were constantly reminded about the importance of high expectations for all students (Newmann et al., 2000).

As a result of this professional development, a new and improved collaborative work culture was formed at the school as teachers met more regularly in professional development teams during their planning times as well as teachers were provided opportunities to learn, observe, and discuss what student collaboration should look like in the classroom (Newmann et al., 2000). The ultimate goal of the study was to look at how professional development addresses school capacity. As Newmann et al. (2000) discuss, school capacity deals with; the knowledge, skills, and dispositions of teachers; professional communities, program coherence, school leadership, and technical resources.

What the study found is that this type of professional development, as reported by the teachers, had a positive impact on their knowledge and skills (Newmann et al., 2000). Teachers also reported how important it was for them to get feedback from their team members which supports the professional community aspect of school climate (Newmann et al., 2000). The study involved both traditional types of professional development such as attending of conferences outside of the school and reform types of professional development such as; team planning; observation and feedback; and modeling. Teachers reported in this study that the professional development they attended helped them in their teaching practice (Newmann, King, & Young, 2000). Traditional forms of professional development can be effective when combined with reform types of professional development. Depending on the particular needs of

the teachers and students, there may be a situation where a combination of the forms is needed to help ensure professional growth for teachers is taking place.

Levin and Rock (2003) did a study on using collaborative action research as a method of professional development in an elementary and primary school. The participants included pre-service teachers and their mentoring teachers (Levin & Rock, 2003). Levin and Rock (2003) describe collaborative action research as a process that entails:

(a) identifying an issue to be researched; (b) forming a strategic plan of action to resolve the issue; (c) collecting data in various forms to determine the effects of the action; (d) reflecting on the results of the action to make sense of the processes, problems, issues, and constraints that resulted from the action plan; and, finally, (e) creating action steps to be taken based on what was learned. (p. 136)

Collaborative action research can bring about teacher change as a result of the struggle the collaborative team goes through in researching new content and instructional strategies as well as them becoming active learners with respect to the processes of student learning and instructional practice (Levin & Rock, 2003).

The study found that the pre-service teachers learned the importance of focusing on student learning and how this focus helps the teacher to better understand the learning needs of the student from the student's perspective (Levin & Rock, 2003). They also reported the need for the right balance of acquiring deep content knowledge, thorough understanding of the curriculum, and the proper alignment of learning objectives to the curriculum standards (Levin & Rock, 2003). The pre-service teachers also learned the importance of engaging in continuous reflective practices as well as how professional growth is really the responsibility of the individual teacher (Levin & Rock, 2003).

Levin and Rick (2003) found that through mentoring teachers also learned something from professional development experiences. They reported that the collaborative research experience provided them new insights into the importance of focusing on student learning because it allows the teacher to better understand the student's perspective, their learning needs and abilities, as well as their progress and achievement (Levin & Rock, 2003). They also expressed how the inquiry nature of the collaborative action research professional development activity had a positive impact on their classroom instruction, the importance of feedback to students, their use of motivational strategies, as well as the importance of the teacher as a facilitator versus an instructor (Levin & Rock, 2003). The research and literature about adult learning and the characteristics of professional development are examined.

Adult Learning

Lieb (1991) describes the adult learner as one who is autonomous, self-directed, goal-oriented, relevancy-oriented, and practical. The adult learner is one who will take responsibility for their learning, has set goals as to what they want to gain from the learning experience, and needs to be able to know that what they are learning is practical and relevant to their life. Adult learners need to feel that their opinions are valued during the learning experience as well as need to be active participants in the learning process (Lieb, 1991). Adults learn best when they are self-directed; when new knowledge is built upon their pre-existing knowledge; when the learning is relevant to their life experience, needs, and goals; and when the theoretical knowledge is easily transferable to the practical context (Bransford et al., 2000, Knowles, Swanson, & Holton, 2011) When adults are in an environment that is comfortable to them both physically and psychologically, they are better able to think more critically about the subject matter they are

learning as well as how what they are learning may affect them personally and professionally (Moore, 2010).

While the adult learner is self-directed, there are some motivational factors that need to be considered and understood when working with adult learners. Adults are motivated by external and internal motivational factors. The external factors are things such as a better job or more pay and the internal factors are things such as self-esteem and better job satisfaction which are the ones that are most influential for the adult learner (Knowles et al., 2011). These motivational factors are important to consider when thinking about providing professional development for teachers. When designing professional development programs, school and district administrators need to make sure that the opportunities presented will allow teachers to learn something that will support their teaching practice. The notions of self-esteem and increased job satisfaction also relate to teacher efficacy which will be discussed later in this chapter.

As adults learn, they need to be able to feel like what they are learning provides them with more valid information than they already have to help them continue to make the most informed decision possible (Taylor, 2008). The process of replacing prior knowledge with new knowledge that leads to change in practice is referred to as transformational learning which comes from transformational learning theory. Transformational learning theory was discovered as research was being done on how adults learn best to help support teaching the adult learner in the higher educational setting. Adult learning theory and Transformational learning theory research became important in the K-12 educational setting as educators were trying to determine how best to support teachers through professional development.

Professional Development and Change

Although as adults, teachers want to be lifelong learners, they can be very resistant to change. As adults, teachers all have a set of past experiences that drives their needs and wants for new knowledge. A part of growing through professional development is change. Change is necessary for professional growth because if there are no changes in instructional practices, the likelihood of changes to support student learning or achievement diminishes. It is important therefore to recognize and understand the objectives and goals of the adult learner. The objectives are usually short term and usually associated with subject content mastery, attaining specific skills and strategies, or other objectives that are job-related whereas goals are more long-term and are associated with the overall goal of the adult to become a socially responsible lifelong learner (Mezirow, 1997). It is important to build relationships so as to better understand the needs, objectives, and goals of the adult learner. It is important to get to know our teachers as individuals so that we may better understand what their hopes, dreams, goals, and even their fears are and in doing so it is important for them to know us as authentic real human beings as well (Booth & Schwartz, 2012).

Professional Development and the Learning Environment

Creating the right learning environment is very important in ensuring that adult learning is occurring successfully. Learning occurs as a result of interaction between the learner and the environment so the richer the learning environment the tendency for more learning to take place exists (Knowles & Bradford, 1952). Creating a collaborative learning environment is important when working with adults. Adults come with vast experiences that are important to them and shape their learning. When working with adult learners, it is important to encourage them to share their knowledge, experiences, and perspectives with other adult learners within a group

setting (Booth & Schwartz, 2012). Teachers sharing their experiences during professional development session can take place in a large group or small group setting.

What is important is that an environment be created where the adult learners can become very proficient at learning from each other as well as helping each other to learn within groups that have to discuss and figure out problem situations (Mezirow, 1997). It is also important that the learning environment be one where teachers feel free to take risks. Part of the resistance to change that we discussed earlier is due to the fact that as adult learners, teachers are dealing with a disequilibrium that occurs when the new knowledge and skills they are learning is in conflict with their attitudes and beliefs regarding their past teacher practices. Therefore it is important for school leaders to create a culture where teachers feel supported to take risks (Zepeda, 2012).

Creating a collaborative learning environment is also important for teachers. Teachers have vast knowledge and experiences pertaining to their field that they value and want to share with their colleagues. As teachers share their experiences, they learn from their colleagues as well as learn information that can be practical and useful in their classrooms. Teachers that are involved in these types of interactive learning situations where they are able to discuss their teaching practices as well as problems dealing with classroom situations, found that they are better able to reflect, adapt, and grow as professionals (Trotter, 2006). Now that we know how adults learn best and how that relates to effective professional development, we want to look at the relationship between self-efficacy and professional development.

Self-Efficacy

Teachers participate in professional development to help deepen their content knowledge, improve their teaching practice, and improve their student's learning. These are lofty goals for professional development; however, if teachers do not believe the professional development they

participate in will accomplish these goals, then the outcomes will most likely be diminished. Therefore, along with changing teacher practice, deepening content knowledge, and improving student learning, changing teacher beliefs and attitudes are also important components of effective professional development (Guskey et al., 2014). If teachers' beliefs and attitudes do not change as a result of the professional development then chances are that this will translate to little or no change in classroom practice or student outcomes. How teachers feel the professional development will benefit them could play a significant role in determining whether the professional development will be effective or not.

Why do teachers participate in professional development? Sometimes participation is mandatory, but when it is optional, there needs to be a reason for the teacher to want to participate. According to Guskey (2002), "What attracts teachers to professional development is their belief that it will expand their knowledge and skills, contribute to their growth, and enhance their effectiveness with students" (p. 382). It is not the professional development itself that is necessarily most important but rather what happens as a result—deeper content knowledge, refined skills, etc.—of the professional development. As teachers begin to see that the knowledge and skills they gained from the professional development have resulted in changes in student learning, they then feel more effective as teachers (Timperley, 2008). Research shows that teachers who see changes in their student's learning, as a result of professional development, not only felt like they actually had some influence on their student's learning but also actually enjoyed teaching more as well (Guskey et al, 2014). Teacher's perception or belief the professional development will have a positive impact on their student's learning seems to be important. Therefore, understanding self-efficacy better may help to ensure that professional development is effective.

Self-efficacy deals with one's perceptions or beliefs that they will be able to accomplish a certain task. Bandura (1982) defines self-efficacy as "a personal judgment of how well one can execute courses of action required to deal with prospective situations" (p.122). Self-efficacy can play a role in one's willingness to learn as well as their ability to believe whether they can be effective or not. Self-efficacy beliefs can influence a person's thoughts and emotions in such a way as to affect their willingness to pursue certain goals, deal with adversity, as well as how much control certain events have on their lives (Tschannen-Moran et al., 1998). Self-efficacy theory deals with the factors that determine one's beliefs and self-confidence to perform certain tasks successfully (Moriarty, 2014). In terms of teaching, self-efficacy may help to determine a teacher's willingness to grow professionally. Self-efficacy can affect one's willingness to invest in their professional development which can in turn affect student achievement (Moriarty, 2014). Achievement is affected because self-efficacy may affect how well a teacher performs in the classroom.

High self-efficacy can lead to a willingness to further pursue learning of more knowledge and skills as well as the ability to withstand adversity and failure which can lead to higher performance (Bandura, 1982). People with high self-efficacy tend to take responsibility for their actions as well as the consequences for those actions. They believe in themselves and their ability to find a way to better themselves by improving on their knowledge and skills. People with high self-efficacy find the reason for their failure and look for ways to improve whereas people with low self-efficacy attribute their own lack of ability as a reason for the failure and therefore have little confidence or belief that they can be successful (Moriarty, 2014). How does self-efficacy relate to teacher efficacy?

Self-efficacy deals with a teacher's belief about their competence as a teacher (Tschannen-Moran et al., 1998). Self-efficacy, or teacher efficacy, not only has to do with teacher beliefs but with ones perceptions as well. Perception deals with one's confidence in one's ability. According to Tschannen-Moran et al. (1998), "self-efficacy has to do with one's perception of competence rather than actual level of competence" (p. 211). If the perception is that a particular act or performance is going to be successful, then one's self-efficacy is raised which helps to contribute to the fact that the act or performance will actually be successful (Tschannen-Moran et al., 1998). Understanding teacher's perception of what they are learning in professional development actually having a benefit on their teacher practice and student learning is important and related to self-efficacy.

Research about Self-Efficacy

Some research supports the fact that self-efficacy does not necessarily directly impact student learning. Holzberger et al. (2013) found that self-efficacy did not directly impact the quality of their teacher practice and vice versa. What the study did find is that although there is no direct impact between teacher efficacy and teacher practice, the development of teacher efficacy may play a role in the quality of instruction and vice versa. As teachers perceive that their quality of instruction is improving, through evidence of student learning, there is likelihood that their efficacy will be high and conversely when students do not benefit from teacher effort at learning a new skills, efficacy will be low. Why is self-efficacy important with respect to effective professional development?

First of all, there is research that supports a relationship between effective professional development, self-efficacy, and student learning (Bruce et al., 2010; Duran et al., 2009; Parise & Spillane, 2010; Zambo & Zambo, 2008). Self-efficacy is important when talking about

professional development and effective teaching practices because of the relationship between self-efficacy and perceived performance. Posnanski (2002) stated, “Self-efficacy refers to a person’s perception of their ability to perform a task and the belief that they have the skills to perform certain behaviors that produce desired outcomes” (p. 190). Teachers need to believe that the strategies they are using will have an impact on their student’s learning as well as the belief that they have the ability to effectively implement the teaching strategy. Effective professional development needs to provide teachers with effective teaching strategies along with supporting the teachers in implementing those teaching strategies.

Self-efficacy is also important regarding how teachers will work with respect to new knowledge gained from professional development. Zambo and Zambo (2008) found, “Teachers with a strong sense of individual efficacy tend to spend more time planning, designing, and organizing what they teach” (p. 159.) It is important that as leaders we provide teachers with the type of professional development that will provide them the support they need to motivate them to want to learn and implement what they are learning. A study on the relationship between professional development and self-efficacy is therefore important as it may lead to results that will help educational leaders develop more effective professional development for their teachers.

With accountability, school and district leaders are looking for ways to improve student achievement. One way is to improve the instruction that occurs within the classroom. To improve classroom instruction, teachers need to grow professionally by learning new, improved, research-based instructional strategies, understanding their content in more depth, and better understanding the different ways that their students learn best. Teachers grow professionally through effective professional development. For mathematics teachers, not only does the professional development need to have the characteristics of effective professional development,

but it also needs to ensure the teachers are learning instructional strategies that are specific to the teaching and learning of mathematics.

The purpose of this study was to examine the relationship between professional development and self-efficacy. This chapter examined the research about professional development, math professional development, adult learning, and self-efficacy. The research helped to frame the study to be able to examine the relationship between professional development and self-efficacy through answering the research questions.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Trying to gain and to understand the perspectives of teachers requires a research design that allows them the opportunity to share insights about their experiences with professional development. The research design used provided teachers the opportunity to reflect and share insights so that findings can possibly support professional development that is more meaningful for teachers of mathematics. This study used the Appreciative Inquiry method as a means to frame its research design and the methodology to collect and to analyze data.

Appreciative Inquiry focuses on looking at what is good about an organization or a particular context of the organization and enhancing these positive qualities for improvement. The Appreciative Inquiry method seeks information from those within the organization as those are the people most knowledgeable about the organization. Appreciative Inquiry encourages improvement of organizations by having them look within themselves through a flexible framework that is designed to meet the specific needs of what is being studied (Carter 2006). The Appreciative Inquiry method allows for collaboration between the researcher and participants in looking for a way to improve on some aspect of the organization creating a greater potential to achieve improvement on existing effective practices (Carter 2006).

Purpose of the Study

The purpose of this study was to examine the relationship between professional development and self-efficacy. In studying professional development and self-efficacy, the

Appreciative Inquiry (AI) method was used. AI uses a 4-D cycle model involving Discovery, Dream, Design, and Destiny that were used to construct the following research questions:

1. How do high school mathematics teachers describe their best professional development experiences?
2. How would high school mathematics teachers design professional development that would best support their teacher practice?
3. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice?

The purpose of this study was to examine the relationship between professional development and self-efficacy. The intent of the study is to provide teachers a voice in the kind of professional development they feel would best help to support their classroom instruction as well as their student's learning.

Research Design

This study uses qualitative measures of research versus quantitative measures. A qualitative research approach fits this study best because the intent is to look at teacher's perspectives of professional development and their self-efficacy. What types of professional development do teachers perceive influence their self-efficacy? Qualitative research helps to answer the question of "what" (Wertz, Charmaz, McMullen, Josselson, Anderson, & McSpadden, 2011). Trying to find the "what" is more in depth than it may seem. According to Wertz et al. (2011), "Knowing what something is entails a conceptualization of the matter under investigation as a whole, and how the whole is similar to and different from other things" (p.2). Qualitative research helps the researcher better understand what something is by understanding it in the context of all of its parts. The study examined how teachers perceive professional

development supports or does not support their instructional practice as well as their student's learning. Moreover, this study aimed to dig deeper to examine if and how these perceptions about the quality of professional development in its relationships to their self-efficacy. What type of professional development do teachers perceive supports their teacher practice and their student's learning? Qualitative research helped the researcher to examine what teachers' perceptions about professional development and whether it influenced their efficacy with professional development.

The theoretical or conceptual approach that will be used is the Appreciative Inquiry method. Appreciative Inquiry is based upon the assumption that there are things that work well within an organization and it is best to use these things as a foundation for change (Cooperrider, Whitney, Stavros, 2008). According to Cooperrider et al. (2008):

Inviting people to participate in dialogues and share stories about their past and present achievements ... unexplored potentials, innovations, strengths ... opportunities ... high-point moments, lived values, traditions, core and distinctive competencies ... and visions of valued and possible futures can identify a positive core. (p. 3)

Focusing on the positive core provides a foundation for change to begin. Appreciative Inquiry allowed the researcher to focus the teachers on what they already believe was "good" or "effective" regarding the professional development they have participated in and how these areas of strength could be used to help improve future professional development for the purpose of bringing about positive change in their teacher practice (Cooperrider et al., 2008).

The study used only qualitative measures which should add to what seems to be a very small body of research in the area of qualitative studies on professional development and self-efficacy using methods related to Appreciative Inquiry.

Research Methods

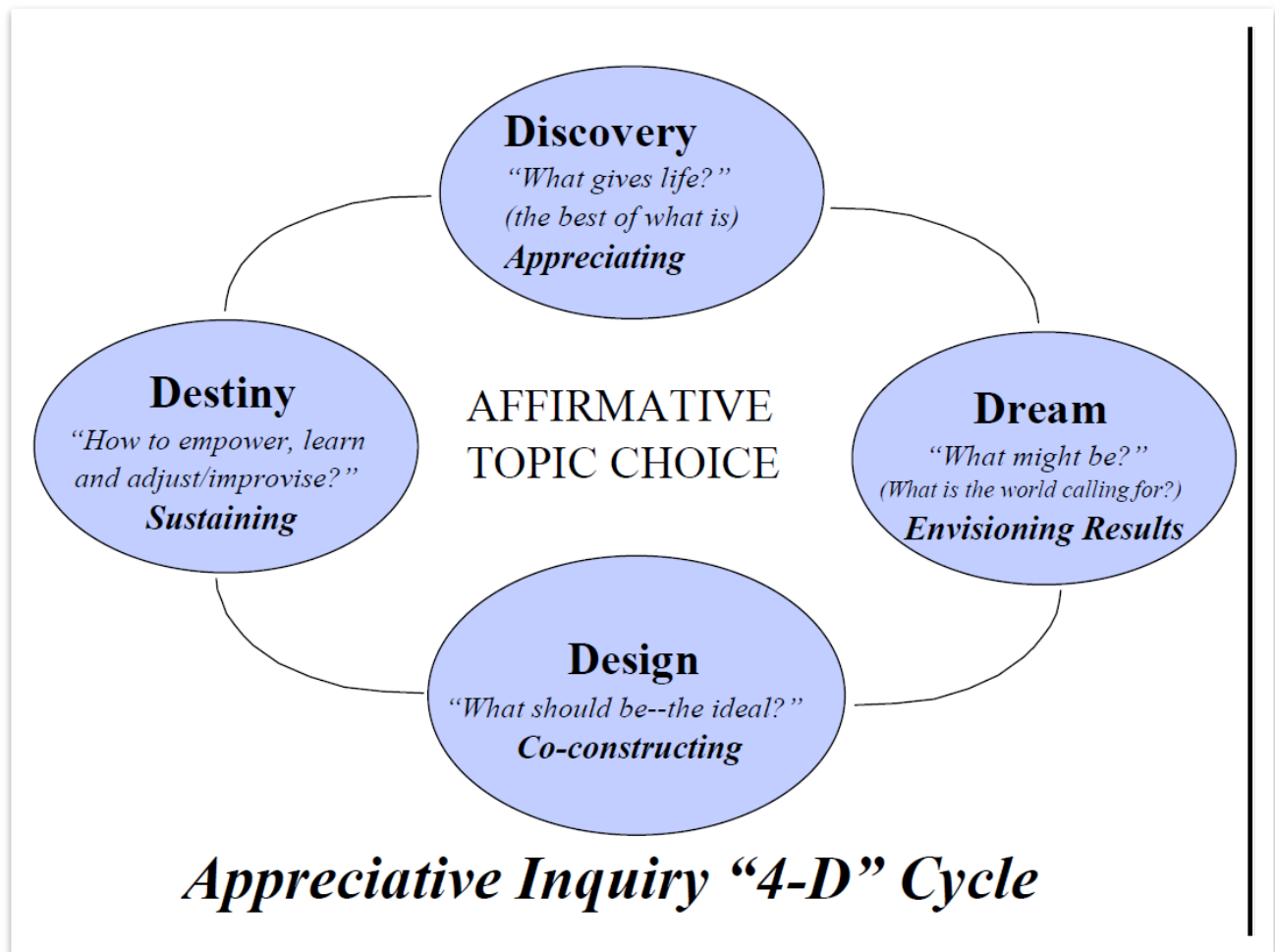
Appreciative Inquiry methods were used in this study. Appreciative Inquiry has been described in many ways. Cooperrider and Whitney (2001) described Appreciative Inquiry as: *a paradigm of conscious evolution geared for the realities of the new century* (Hubbard, 1998); a methodology that takes the idea of the *social construction* of reality to its positive extreme—especially with its emphasis on metaphor and narrative, relational ways of knowing, on language, and on its potential as a source of generative theory (Gergen, 1994); the most important advances in *action research* in the past decade (Bushe, 1995); the offspring and “heir” to Maslow’s vision of a *positive social science* (Chin, 1998; Curran, 1991); a powerful second generation *OD practice* (French & Bell, 1995; Porras, 1991; Mirvis, 1988/89); a model of a much needed *participatory science*, a “new yoga of inquiry” (Harman, 1990); a radically affirmative approach to change which completely lets go of problem-based management and in so doing vitally transforms strategic planning, survey methods, culture change, merger integration methods, approaches to TQM, measurement systems, sociotechnical systems, etc. (White, 1996); and lastly, a OD’s *philosopher’s stone*. (Head & Sorenson et. al., 1996). (pp. 2-3, emphasis in the original)

Appreciative Inquiry is described as a philosophy that incorporates a 4-D process for the purpose of engaging people at some level, within some type of organization, to help produce a positive and effective change (Cooperrider et al., 2008). In using Appreciative Inquiry, the researcher assumes that, within the organization, there are things being done well and, therefore, positive change can be brought about by focusing on these strengths (Cooperrider et al., 2008). Instead of trying to fix a problem, which can be looked at in a negative context, assuming there is

something that is not working and therefore needs to be fixed, Appreciative Inquiry is used within a positive context where the change to be affected is a result of continuing to build on the strengths of the organization. As a result of Appreciative Inquiry focusing on the participants' actual experiences as well as the positive, the participants usually feel a sense of commitment, confidence, and affirmation regarding the positive change that could take place (Clarke et al., 2006).

Appreciative Inquiry involves using a 4-D process to help understand and build on the positive things that are already occurring within an organization. The 4-D process consists of: *Discovery* which is "appreciating and valuing," *Dream* which is "envisioning," *Design* which is "co-constructing the future," and *Destiny* which is "learning, empowering, and improvising to sustain the future" (Cooperrider et al., 2008, p.5). Through this 4-D process, the researcher works in cooperation with the participants, who are involved with the organization at some level, to reflect on the strengths of the organization to help make a positive impact on the social structure of the organization. An illustration of the 4-D process is shown in Figure 3.1.

Figure 3.1. Appreciative Inquiry “4D” Cycle



Cooperrider & Whitney, 2001, p. 28

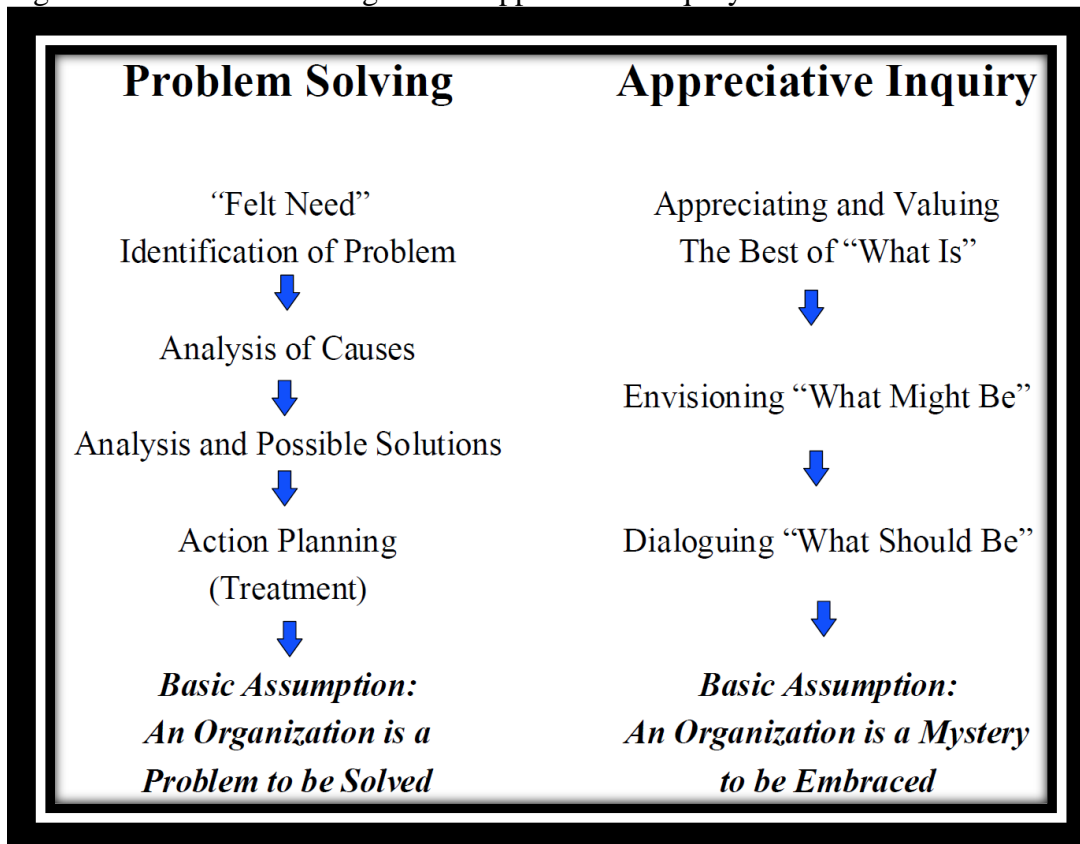
Appreciative Inquiry is different than most problem-solving type qualitative research methods. Instead of assuming that there is a problem and then trying to solve it which can become negative in context, Appreciative Inquiry looks at what the organization is already doing well and tries to build on those strengths so true, positive, transformational change can take place within the organization. Cooperrider and Whitney (2008) stated:

The task of improvement traditionally involves removing deficits by (1) identifying the key problems or deficiencies, (2) analyzing the causes, (3) analyzing solutions, and (4)

developing an action plan. In contrast, the underlying assumption of Appreciative Inquiry is that an organization is a solution to be embraced rather than a problem to be solved” (p. 5).

Appreciative Inquiry looks at organizational change as something that can be constructed by reflecting on the strengths of an organization and building on those strengths rather than trying to fix all of the areas of improvement within an organization. The former takes on a positive context and looks at the people within the organization as the key factors in making the positive change where the latter can take on a negative context and looks at experts from outside the organization trying to fix the issues. Figure 3.2 illustrates the contrast between more traditional problem-solving qualitative research methods and Appreciative Inquiry:

Figure 3.2. Problem Solving versus Appreciative Inquiry



Cooperrider & Whitney, 2001, p. 27.

Appreciative Inquiry has been used to study professional development. In a study by Clarke et al., (2006), they used Appreciative Inquiry to better understand professional development through the use of creating case studies of teacher practices in the area of Science. They told the participants in the research their schools were specifically chosen because of the great things that they were already doing in terms of science instruction (Clarke et al., 2006). The researchers feel like Appreciative Inquiry is a great option of trying to affect positive change within the organizational structure of a school because the inquiry process involves finding out where the organization wants to be based on good things that have occurred in the past, therefore, there is a greater chance of successful positive change in the future since all of the inquiry is grounded on real life experiences which have already proven to be successful (Clarke, et al., 2006).

Appreciative Inquiry has been observed and described in many different ways. From a practitioner's point of view, Appreciative Inquiry is defined as:

...the cooperative co-evolutionary search for the best in people, their organization, and the world around them. It involves the discovery of what gives "life" to a living system when it is most effective, alive, and constructively capable in economic, ecological, and human terms. AI involves the art and practice of asking questions that strengthen a system's capacity to apprehend, anticipate, and heighten the positive potential. The inquiry is mobilized through the crafting of the "unconditional positive question," often involving hundreds or thousands of people. AI interventions focus on the speed of imagination and innovation instead of negative, critical, and spiraling diagnoses commonly used in organizations. The discovery, dream, design, and destiny model

links the energy of the positive core to changes never thought possible (Cooperrider et al., 2008, p. 3).

Appreciative Inquiry looks deep inside an organization to try and best understand how it functions to help bring about positive change. Appreciative Inquiry is a research methodology used to analyze and to learn about organizations by discovering and understanding the social arrangements and processes of the organization to help foster new and positive innovations (Cooperrider et al., 2008). Appreciative Inquiry can be thought of as a “search for knowledge” as well as “a theory of collective action designed to evolve the vision and will of a group, an organization, or a society as a whole” (Cooperrider et al., 2008, p.3). Appreciative Inquiry looks to solve the organizations problems by involving those in the solution that know the organization the best, the people within the organization.

By using Appreciative Inquiry, the hope was to gain a better understanding of what teachers believe is effective professional development by looking at it through their experiences. Appreciative Inquiry allowed the researcher to focus teachers on what they already believe is good or effective regarding the professional development they have participated in and how these areas of strength can be used to help improve future professional development for the purpose of bringing about positive changes in their teacher practices.

Sampling

In selecting participants for this study, it was important to choose a sample that would provide the rich and in-depth data needed to answer the research questions, which is a process known as purposeful sampling (DiCicco-Bloom & Crabtree, 2006). Purposeful sampling strategies are used to better understand the experiences of individuals or groups or to further develop theories or concepts (Devers & Frankel, 2000). Purposeful sampling was the method

used to select the sample of interview participants because it provided the best opportunity to get the type of data needed to make the study beneficial. DiCicco-Bloom and Crabtree (2006) found, “The purpose of the qualitative research interview is to contribute to a body of knowledge that is conceptual and theoretical and is based on the meanings that life experiences hold for the interviewees” (p. 317). In determining the sample of interview participants, it was important that the data obtained would add to the already existing body of research on professional development and self-efficacy.

The participants in this study included six high school math teachers. The high school level was chosen because most of the research in the area of professional development and self-efficacy has been done at the elementary level. One reason for choosing math is that it is still one of the subject areas that fall in the area of needs improvement with respect to student achievement, especially at the high school level, as evidenced by the most recent CCRPI scores across the state of Georgia (Georgia Department of Education, 2015). The intent here is to provide information through the research that will help high school administrators provide their math teachers with more effective professional development in hopes of ultimately improving high school math student achievement. The researcher has a teaching background in mathematics and was able to support conceptual understandings of what the teachers shared. Moreover, this background served as an entrée point at the research sites of the teachers who participated in this study.

Data Collection Methods

Data collection, using Appreciative Inquiry, can be done by interviews, participant observation, focus groups, or any combination of the three. Cooperrider et al. (2008) discuss the steps in helping to collect data using Appreciative Inquiry as illustrated in Table 3.1.

Table 3.1 Key Steps in Appreciative Inquiry Data Collection

<ol style="list-style-type: none">1. Identify stakeholders2. Craft an engaging appreciative question3. Develop the appreciative interview guide4. Collect and organize the data. <p>-How will the findings be used?</p> <p>-How will the findings be recorded?</p> <p>-How will the team's data be compiled?</p> <p>-How will the data be reported?</p> <p>-Who will be responsible for collecting and organizing the data?</p> <ol style="list-style-type: none">5. Decide how and when interviews will be conducted and who will conduct them.6. Conduct interviews7. Make sense of inquiry data.
--

Cooperrider et al. (2008, p. 105)

The stakeholders were a group of nine high school mathematics teachers. The interview guide was constructed using the three research questions which were designed using the Appreciative Inquiry 4-D process. Data were collected using interviews.

Interviews

Interviews were used to collect data. In studying teacher perspectives of effective professional development and its influence on their self-efficacy, interviewing would be the best data collection method to use as Patton (2002) states: “The purpose of interviewing, then, is to allow us to enter into the other person’s perspective” (p. 341). Interviewing provided another way to allow participants to share their experiences regarding the professional development they have been involved in. Through interviewing, a goal is to obtain information as to how teachers perceive their professional development has been effective as well as how the professional development has influenced their self-efficacy.

As Dilley (2004) from Siedman (1998) stated:

Interviewing provides access to the context of people’s behavior and thereby provides a way for researchers to understand the meaning of that behavior. A basic assumption in using in-depth interviewing research is that the meaning people make of their experience affects the way they carry out the experience.... Interviewing allows us to put behavior in context and provides access to understanding their actions. (p. 4)

Interviewing provided an environment for participants to share their professional development experiences.

In collecting the data, it was important to understand the behavior of the participants with respect to their attitudes, beliefs, and perspectives of the professional development experiences they have encountered. As Rubin and Rubin (2012) stated: “Qualitative interviewing is a way of finding out what others feel and think about their worlds” (p. 1). Interviewing provided a way to understand better what teachers feel are effective professional development experiences by encouraging them to share their professional development experiences.

Creating a good relationship between the interviewer and interviewee is a very important part of the interview data collection method. A good relationship between the interviewer and interviewee helps to make the sampling process more effective as well as helps to provide credibility to the research (Devers & Frankel, 2000). As Rubin and Rubin (2012) stated, ‘interviewing involves a relationship between the interviewer and the interviewee that impose obligations on both sides’ (p.2). It is important for the interviewer to build a positive rapport with the interviewing participants. In building this rapport, the interviewer is helping to build a safe environment where the interviewee is able to share their innermost feelings regarding the particular experience that is being discussed. The researcher having a background as a high school mathematics teacher should help to build a positive and safe environment during the interview process.

As the interviewer creates this environment, the hope is that the interviewee will begin to trust and support that any information shared will be used strictly for the benefit of research and not be used to affect them negatively in any way. Qualitative research best contributes to the meaning of a human experience by connecting the many truths that are provided through the interview process (DiCicco-Bloom & Crabtree, 2006). The researcher, being an employee of the district the participants work in, should be able to create an environment that the participants feel their involvement will help to positively impact their professional growth.

The interviews took place at two high schools in the district the researcher works in providing easy access to the site. In choosing this site, there should not be any issues regarding getting permission to interview the participants both in the focus group and in the one-on-one interviews. In choosing this site, it should be easier to gain access to more participants should

the original participant sample prove to not provide the sufficient data needed to answer the research questions.

Data Analysis

The researcher used the Appreciative Inquiry method to analyze the data and was guided by the techniques listed in the table below.

Table 3.2 Data Collection and Organizing Considerations

Methods of data collection	Interviews
	Participant observations
	Focus groups
Agents of data collection	Outside party
	Core team or steering committee
	Everyone-the interview chain
Information that is meaningful to collect	Best quotes and wishes
	Best stories and practices
	Exemplars
	Illustrations of the positive core
The AI Report	Rich narratives
	Exemplary stories
	Description of the positive core
	Multi-media presentations

Cooperrider et al., 2008, p. 111

Using the information in Table 3.2 as a frame of reference, the type of meaningful information that was looked for from the data included great quotes and wishes regarding current effective professional development practices as well as practices that will help make future professional developments effective in terms of better supporting teacher practice and student learning. The best stories of effective professional development practices were looked for in the data. Exemplars with regard to professional development from a teacher's perspective will be looked for in the data. In summary, the researcher will be looking for what is currently positive about professional development and how that can help to create more effective professional development in the future from a teacher's perspective.

In Table 3.2, under the Data Collection Methods section, step seven discusses making sense of the inquiry data. So what is sense-making? Cooperrider et al. (2008) describe this best when they state:

Sense-making is an umbrella term used to explain how people make sense of conversations and events based on their experiences in the world. Sense-making is making sense of the themes and patterns discovered in the interviews, lifting up meaningful metaphors and stories that give momentum to organizational success. As it relates to Appreciative Inquiry, one asks, what is the best way to capture and transform the stories from the interviews in order to be able to understand the positive core of the organization? What does one want to learn more about? (p. 116)

Appreciative Inquiry looks at what is positive about an organization and how can this be used to make an organizational change that will help the organization grow in a positive direction.

Coding

In the initial analysis of the data, codes were developed. More specifically, the method of line-by-line coding which “entails coding each fragment of the data” was used (Wertz et al., 2011, p. 172). When conducting line-by-line coding, the researcher looked for what was really happening in the data and then trying to label it in short, active terms (Wertz et al., 2011). In doing line-by-line coding, major phrases or quotes that help to best express answers to the research questions were looked for. The figures below show how the researcher developed codes from each research question.

Figure 3.3 Sample of the Coding Process for Research Question 1

Research Question	Codes	Themes
1. How do high school mathematics teachers describe their best professional development experiences?	My best professional development would be one where I feel like I received enough information that I could immediately take it back to the class and use a lot.	Theme 1
	I think the best content or context would be information that directly relates to my own subject and content	Theme 2
	I feel like that has been effective information that we could implement in the class. I think it has to be something that can practically be implemented	Theme 3
	I think it's probably more effective when it is with a small group	Theme 4
	Show me how it works. particularly in a math classroom -- show me how that works in a high school math setting. We actually did it right there in the training	Theme 5
	I mean there's got to be time, a lot for self-reflection	Theme 6

Figure 3.4 Sample of the Coding Process for Research Question 2

Research Question	Codes	Themes
1. How would high school mathematics teachers design professional development that would best support their teacher practice?	I'm going to have you do the activity just like the students would do the activity, that way you see the way they're going to do it and see it and think about it and, you know, then you can discuss the pros and the cons of it	Theme 1
	The opportunity for the teachers themselves that are in the training to talk to each other about how they might do that.	Theme 2
	Everyone who signed in I would follow up to say, "Hey, do you think that, you know, the professional development worked for you; was it something that you could use? Have you used it? If so, how did it work? If you did and it didn't work, what happened? Is there anything that I can do to come and help support?"	Theme 3

Figure 3.5 Sample of the Coding Process for Research Question 3

Research Question	Codes	Themes
1. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice?	I'm always searching on the Internet or Pinterest and different ideas and different ways to probe, you know, come up with different graphic organizers and different ways especially when it's a concept that I know that -- you know, there's certain topics students always have difficult time with	Theme 1
	I would like to go around and sit in a couple of teachers' classes. I would like to sit in there and see what makes it good that maybe I can bring some ideas back to my classroom	Theme 2
	it's just being in the classroom and just watching what's happening, trying stuff out, going back to the drawing board and seeing what else might work	Theme 3

The researcher then used these codes to develop themes.

Themes are ways of beginning to make sense of the data by looking at commonalities between codes. According to Braun and Clarke (2006), "Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within the data. It minimally organizes and describes your data set in (rich) detail" (p. 79). Another way to look at creating themes is by taking concepts and putting them into categories. Categories are created by looking at the similarities and differences between the concepts and grouping conceptually similar concepts together (Strauss & Corbin, 1998). Corbin and Straus (2006) also call this "Constant

Comparisons” (p. 73). When doing constant comparisons, the researcher begins to look for similarities and differences among each of the incidents and as incidents are identified to have conceptual similarities, they are then grouped together and given a higher-level descriptor such as a theme (Corbin & Strauss, 2006). Using constant comparisons in analyzing the data is crucial as it allows the researcher to further disseminate the incidents into more specific conceptually similar groups allowing the researcher to better identify specific properties and dimensions of the grouped incidents (Corbin & Strauss, 2006). It is important to note that not all concepts become categories (Strauss & Corbin, 1998).

Creating themes from codes helps to put the data in a format where the researcher is able to start making interpretations or inquiries based on the themes that are being identified. Creating themes from codes provides a more in-depth analysis of the data and allows the researcher to better understand and interpret the data for whatever purposes the researcher sees fit. For this study, the themes will be used to provide information that will help to explain what teachers believe is effective professional development and how the professional development influences their teacher efficacy. The figure on the following page shows the themes that were developed for each research question as well as self-efficacy.

Figure 3.6 Research Questions and Corresponding Themes

Research Questions	Corresponding Themes
1. How do high school mathematics teachers describe their best professional development experiences?	Relevance
	Content Specific
	Easily Implemented
	Small Group
	Modeling
	Time for Reflection
2. How would high school mathematics teachers design professional development that would best support their teacher practice?	Hands-on
	Discussion and Reflection
	Feedback and Support
3. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice?	Finding Resources from Online, professional organizations, etc.
	Learning from Others
	Learning from Experience
	Self-Efficacy
	Successful Experience
	Teacher Attitude
	Student Attitude

Trustworthiness and Reliability

In helping to ensure that the study is credible it is important to answer the research questions as well as choose the correct and most effective sample. The sample chosen will provide the most reliable data needed to answer the research questions as a result of the participants working in the same county as the researcher as well as the researcher having a high school math background. Having such a connection will help to build trustworthiness between the researcher and the interview participants. By establishing trustworthiness between the researcher and the interview

participants, rich and in depth data related to the participants' professional development experiences should be obtained.

The intent of the study will also help with trustworthiness as the participants will come to understand that the research from the study will hopefully help ensure more effective professional development in the future. By getting the participants to describe their professional development experiences as in depth and honestly as possible, the data produced should be the rich, quality data needed to answer the research questions. Knowing this study is being conducted to help produce more effective professional development for teachers in the future, the interview participants should feel comfortable enough to share in-depth experiences regarding their professional development experiences.

Another way to help ensure that this study will be credible is by using theory triangulation. Theory triangulation uses multiple theoretical perspectives to better understand the different assumptions and premises that affect one's interpretation of data (Patton, 2002). The intent of this study is to provide a variety of theoretical perspectives on professional development and self-efficacy to better understand the different assumptions that have been made as a result of such research. The researcher will then try and show how the data produced from the study is not only related to this previous research but how it adds value to the research on professional development and self-efficacy by providing new insights. Peer review will also be used as a process of helping to ensure the study is credible. As several professional colleagues, who have knowledge in the areas of professional development or self-efficacy or both, critique the research data, they can provide the researcher with research-based evidence as to the credibility or lack thereof with respect to the data analysis. Using these critiques, adjustments to the data analysis

can be made to help ensure the data produced from the study is as reliable and credible as possible.

Participants and Research Site

The participants in this study were nine math teachers from two different high schools within a school district that is located in a rural town nestled about 45 minutes from a major city. The district serves about 19,500 students with 18 elementary schools, 5 middle schools, 3 high schools and two schools of choice. The school district serves a very diverse population regarding both ethnicity and socio-economic status. The high schools are very representative of the school district that they are located within. Gaining access to the high schools was not an issue since the researcher works in the same school district.

The two high schools chosen for this study were Asher High School and Nike High School (both pseudonyms). Asher High School served approximately 1964 students and Nike High School served 2359 students during the time of the study. The ethnographic makeup of Nike High School is predominately African American while Asher High School is more similar to the district ethnographic makeup. The free and reduced lunch rate at Nike High School was 73.42% while at Asher High School it was 63.85%. The number of students that passed the Coordinate Algebra and Analytic Geometry/Mathematics II End of Course tests at Asher High School was about 7-10% higher on each test than Nike High School. While there are some differences between the two high schools, there were numerous commonalities related to their perspectives on professional development and its influence on self-efficacy.

The nine teachers that participated in the study ranged in years of teaching experience from 3 year to 27 years of experience. The participants taught in each of the grade levels represented in the high schools, 9-12, and there were a wide range of courses taught from 9th

grade Algebra I and Coordinate Algebra to 12th grade Pre-Calculus. Of the 9 participants, 6 were female and 3 were male. Of the 9 participants 7 were white and 2 were African American which is not a true representation of the overall gender and racial makeup of each of the math departments which is close to 50/50.

CHAPTER 4

FINDINGS AND DATA ANALYSIS

The purpose of this study was to examine the relationship between professional development and self-efficacy. The intent of the study was to provide teachers a voice in the kind of professional development they feel would best help support their classroom instruction as well as their student's learning. In studying professional development and self-efficacy, the Appreciative Inquiry (AI) method was used. AI uses a 4-D cycle model involving Discovery, Dream, Design, and Destiny that were used to construct the following research questions:

1. How do high school mathematics teachers describe their best professional development experiences? (Discovery)
2. How would high school mathematics teachers design professional development that would best support their teacher practice? (Dream/Design)
3. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice? (Destiny)

Nine high school mathematics teachers were interviewed for this study. All nine teachers were interviewed once and the interviews ranged from 60 to 75 minutes each. The interviews were conducted in the privacy of the participant's classrooms. The classroom provided the most comfortable, convenient, and private setting for the interviews. The interviews were transcribed verbatim. The researcher listened to the audio recordings of the interviews while following the transcriptions to ensure accuracy as well as listen for voice inflections, pauses, and other physical or verbal cues.

The nine high school mathematics teachers were selected through purposeful sampling procedures based on their interest in professional development and their willingness to be interviewed. Of the 9 research participants, 6 were female and 3 were male. Data were analyzed using the Appreciative Inquiry method (Cooperrider et al., 2008). Based on the work of Cooperrider et al. (2008), the researcher looked for great quotes and wishes along with best stories and practices while analyzing the data. Data collection and analysis occurred in the fall of 2015 and during the winter of 2016. In all, 253 pages of interview data was generated through the transcription process and used for the purposes of analysis.

This chapter is divided into six sections. The chapter begins with an overview of the school district along with a profile of the two high schools in which the participants worked. The next section provides the characteristics of the nine high school mathematics teachers that participated in the study. The third section presents findings from the first research question: how do high school mathematics teachers describe their best professional development experiences? The fourth and fifth sections present findings from the second and third research questions respectively: how would high school mathematics teachers design professional development that would best support their teacher practice; how will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice? The chapter concludes with a summary.

Overview of School District

The National County School District (a pseudonym) is located in a medium-sized city with 105,473 residents according to 2015 Census data. The ethnographic makeup of National County is 50 % White (non-Hispanic), 43% African American, 4.9% Hispanic or Latino, 1.1% Asian, and 1% other (American Indian, Alaska Native, Native Hawaiian, Other Pacific Islander) according to 2014 Census data. Eighty-three percent of the population over the age of 25 has a

high school diploma while 19.4% of the population over the age of 25 has a Bachelor's degree or higher. The median household income is \$49,208, and 19.4% of the population lives in poverty.

The National County School District serves just over 19,500 students in 23 schools (13 elementary, 5 middle, 3 high, a K-8 Theme school, and a Career Academy). According to publicschoolreview.com, the ethnographic makeup of the school system is as follows: 52% African American, 36% White (non-Hispanic), 6% Hispanic, and 6% other (American Indian/Alaska Native and Native Hawaiian/Other Pacific Islander). The Free and Reduced Lunch rate is 69.29% and the average Mobility rate is 23.14%. According to the Georgia Department of Education, 2015, the Four-Year Graduation Rate was 81.5%. The number of students that met or exceeded on the 2014 Coordinate Algebra End of Course test was 38% and the number of students that met or exceeded on the 2014 Analytic Geometry/Mathematics II End of Course test was 34.7% (Georgia Department of Education, 2015). In 2013, those scores respectively were 24.7% and 65.9% (Georgia Department of Education, 2015). The data suggests that students in this school district are struggling in the area of high school mathematics. A study about the professional development of high school math teachers is relevant as research suggests that professional development can influence student learning (Blank & De Les Alas, 2009; Bruce et al., 2010).

Profile of Participating Schools

Two high schools were chosen for this study due to administrator support and willingness of teachers to participate. Asher High School and Nike High School (both pseudonyms) are large high schools with 9-12th grade student populations. Asher High School served approximately 1964 students and Nike High School served 2359 students during the time of the study. The ethnographic makeup of Nike High School is predominately African American while Asher High School is more similar to the district ethnographic makeup. The free and reduced

lunch rate at Nike High School was 73.42% while at Asher High School it was 63.85%. The number of students that passed the Coordinate Algebra and Analytic Geometry/Mathematics II End of Course tests at Asher High School was about 7-10% higher on each test than Nike High School. While there are some differences between the two high schools, there were numerous commonalities related to their perspectives on professional development and its influence on self-efficacy.

Profile of the Research Participants

Purposeful sampling was used to select the participants in this study. Purposeful sampling strategies are used to better understand the experiences of individuals or groups or to further develop theories or concepts (Devers & Frankel, 2000). The researcher presented information about the study and requests to participate in the study at a mathematics department meeting at each of the high schools. Out of the 15 math teachers at Asher High School, 4 agreed to participate in the study and out of 17 math teachers at Nike High School, 5 agreed to participate. Teacher participants varied in gender, race, number of years of teaching experience, as well as grade levels and subjects currently taught.

The range of years of teaching experience of the participants ranged from 3 year to 27 years. The participants taught in all of the grade levels represented in the high schools, 9-12, and there were a wide range of courses taught from 9th grade Algebra I and Coordinate Algebra to 12th grade Pre-Calculus. Of the 9 participants, 6 were male and 3 were female. Of the 9 participants 7 were white and 2 were African American which is not a true representation of the overall gender and racial makeup of each of the math departments which is close to 50/50. However, these participants did provide very rich and meaningful data regarding the professional

development experiences of the high school math teachers in this county. A summary of participant profiles is provided in Table 4.1.

Table 4.1 Participant Profiles

Teacher Participant	Gender	Race	Years of Teaching Experience	Grade Level Currently Taught	Subject(s) Currently Taught	Highest Degree Achieved	School Assignment
Ms. Bear	Female	African American	15	9 th	Coordinate Algebra	Master's	Asher High School
Ms. Black	Female	White	15	12 th	Pre-Calculus	Specialist	Nike High School
Ms. Haskins	Female	African American	8	10 th	Analytic Geometry/ Mathematics II	Bachelor's	Asher High School
Mr. Johnson	Male	White	3	11 th	Advanced Algebra & Algebra II	Master's	Nike High School
Ms. March	Female	White	25	9, 10, 12	Coordinate Algebra & Analytic Geometry/Math II & Algebra II	Master's	Asher High School
Ms. Sand	Female	White	15	10 & 11	Analytic Geometry/ Math II & Pre- Calculus	Master's	Nike High School
Ms. Short	Female	White	27	9 & 10	Algebra I and Analytic Geometry/ Math II	Specialist	Nike High School
Mr. Waters	Male	White	10	12	Pre-Calculus	Bachelor's	Nike High School
Mr. Wishbone	Male	White	3	12	Pre-Calculus	Master's	Asher High School

As the table illustrates, the participants ranged from relatively new teachers to veteran teachers. The participants taught a variety of mathematical courses as well as grade levels. The participants varied in the highest degrees achieved. The table seems to indicate a good sampling of participants.

Overview of Findings

The findings were organized by the order of the research questions. Presentation of the data in this way was important because of the use of the Appreciative Inquiry method. The Appreciative Inquiry method uses a 4-D model in acquiring and analyzing data (Cooperrider et

al., 2008). The research questions were developed using the Appreciative Inquiry 4-D model of Discovery, Dream, Design, and Destiny. Therefore, it made sense to analyze the data with respect to each question which represented each cycle of the model and to present the data in the same manner. The data are presented in the following manner based on the order of the research questions:

1. How do high school mathematics teachers describe their best professional development experiences? (Discovery)
2. How would high school mathematics teachers design professional development that would best support their teacher practice? (Dream/Design)
3. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice? (Destiny)

Findings

Research Question (Discovery): How do high school mathematics teachers describe their best professional development experiences?

The first research question was designed around the Discovery phase of the Appreciative Inquiry 4-D model (Cooperrider et al., 2008). In the Discovery phase, participants should be “appreciating and valuing” what is already good about professional development.

Professional Development Needs to be Useful

“My best professional development would be one where I feel like I received enough information that I could immediately take it back to the class and use a lot,” stated Ms. Bear. The best professional development experiences excite teachers because they felt like they learned something that they can implement in their classrooms. Ms. March explained it this way, “So, I

think, those are the best ones where you come away from it feeling like I got some great ideas and I'm eager to go try them out now with my students.”

For the participants, taking something back to the classroom meant that the professional development session not only focused on mathematics but also on the specific content area they were teaching. Ms. Haskins described a professional development experience that she appreciated and valued because it was “catered to our content group.” The professional development session was geared toward geometry teachers and everything was geared around the geometry standards. “So it was very tailored-made to our content area” added Ms. Haskins. This was supported by statements made by the other participants such as; “I think the best content or context would be information that directly relates to my own subject and content” and “I would say because it was geared towards the subject I teach at the level that I teach.” So for high school mathematics teachers, not only do the professional development sessions need to be about mathematics but the sessions also need to be very specific with regard to the math content areas the teacher is teaching at the time. Ms. Black amplified the need for professional development to be relevant and she shared:

So a best would be that my time was utilized where I learned something that I feel I go back and use with my students, immediately. For me it was easy to set up and it didn't take much for the students to understand what they had to do.

The best professional development experiences provided the participants with something that they could take back to their classrooms and easily implement. What was learned in the professional development needed to be easily transferred from theory into practice or that they were able to create something in the professional development that they could take back and use in their classroom. Ms. Sand describes it this way:

So walk away with a tangible — something I can walk away with, not just an idea in my head, in all your free time make this happen; it'll work great, but walk away with an already completed product of you can try this; it's already set up to work.

So walking away from the professional development experience with something that they could take back to their classrooms and easily implement, especially if it was something tangible, like a product or a program, versus something non-tangible, like an idea or a theoretical strategy, was very important for the participants in terms of the professional development experience being of value to them.

Give Us Something Tangible

The opportunity to learn something or to create something that can be easily implemented in the classroom is something that the participants stated they valued and appreciated in a professional development experience. They also discussed the importance of actually seeing how the product could be used in the classroom. It was important to see the actual product being implemented successfully within the classroom environment. Ms. Sand describes: “I think modeling, getting to see something instead of just somebody telling me, this will work; you should try this. Show me how it works, particularly in a math classroom -- show me how that works in a high school math setting.” The participants valued a professional development experience where they could actually see what they were learning could be easily implemented in their own classroom and would benefit the students that they teach.

The participants discussed how they benefited from professional development experiences that provided opportunities to work in small groups. They felt working in smaller groups was of much more benefit and value to them than just sitting or even working in a large group setting. Mr. Wishbone described it as “more effective when it is with a small group,” and

“It needs to be, I think, smaller, where people can discuss about ideas.” The discussion regarding the importance of being in a smaller group setting where ideas can be discussed leads to the last area that the participants indicated they value and appreciate from a professional development experience, and that is time for reflection.

Time for Reflection

The participants noted that time for reflection was important in a professional development experience whether that reflection time was with colleagues or just time for self-reflection. Ms. Short states: “I need time to really process it to say, okay, how am I going to make this work for me? I think the self-reflection should accompany that.” Ms. March described the importance of having time to reflect with your colleagues during the professional development experience. “I think it’s the interaction with other teachers during that time, as long as there’s an opportunity to talk to other teachers who are actually right there with you.” So whether the participants had an opportunity to actually create something tangible or just see an idea or strategy in action, it is important for them to have time to discuss with their colleagues or have time by themselves to reflect on how the product created or strategies learned would work in their classroom.

Research Question (Dream/Design): How would high school mathematics teachers design professional development that would best support their teacher practice?

The second research question was designed around the Dream and Design phases of the Appreciative Inquiry 4-D model. The Dream phase is about “envisioning,” and the Design phase is about “co-constructing” the future. This research question provided the participants an opportunity to discuss what they felt a professional development experience should include by explaining how they would design a professional development session.

Hand- On Learning

One thing the participants felt professional development sessions needed was some type of hand-on learning. “Something hands on, something where they have to move, they have to touch; they have to build,” stated Ms. Bear, and Ms. Black added, “... not only just getting the information but also maybe sitting and creating.” These statements support the fact that the participants feel very strongly about the professional development experience providing an opportunity for the teachers to be able to develop something that they can take back and use in their classroom. Ms. March added, “...have them as they’re learning it be able to go ahead and develop it for their classes.”

Discussion and Reflection

The participants felt it was important to include time for discussion and reflection during the professional development session. The discussion time would allow for the teachers in the professional development session to talk about how they would implement in their classroom whatever it is they are learning about or creating. “That opportunity for the teachers themselves that are in the training to talk to each other about how they might do that,” stated Ms. March, and “I think it’s just easier when we’re working together and we can discuss things and stop and say how would this work for you in your classroom,” added Mr. Johnson. Not only was it important for the teachers to have time to talk to each other about how what they are learning would work for them and their students, it was also important to allow time for the teachers to share any new ideas they have that may be helpful to their colleagues. Mr. Waters states: “... having them sit and discuss and think about and maybe even, you know, sketch out an idea and then, you know, sharing that idea with everybody else.” The participants stated that they would include time for discussion in their professional development session further supports how they value a

professional development experience that provides teachers an opportunity to be in a small group setting and to discuss and to reflect on what they learned and how this would be applicable to their classroom.

Support and Feedback

The last thing the participants discussed as being important in developing a professional development session is making sure the teachers felt they were supported once the professional development session ended. The participants felt the teachers needed to know that they had support as they went back to their classrooms to implement what they learned or created from the professional development session. Ms. Byrd states:

...some type of follow up from the professional development, like, say, for example, I say, well, e-mail me how so-and-so worked in your classroom or I can e-mail and say, have you have you gotten a chance to do ... if you have, do you mind providing me with some feedback as to how it worked in your classroom.

Ms. Byrd went on to add that getting support is not something that occurs with most professional development experiences, “So, I guess, it’s the follow-up piece that we usually don’t get when we have professional development. You go one day and then, okay, go ahead and use it in your room.” Providing support to teachers after the professional development experience allows the teachers to better implement what they learned or created in their classrooms, which as Ms. Byrd added, “usually does not occur with most professional development experiences.”

Research Question (Destiny): How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice?

The last research question pertains to the Destiny phase of the Appreciative Inquiry 4-D model. The Destiny phase is about learning, empowering, and improvising to sustain the future

(Cooperrider et al., 2008). The researcher used the last question to find out what teachers would do to help sustain their professional growth. It was interesting to note that the participants did not talk about formal professional development, like attending professional development sessions; rather, they talked about informal professional development.

Searching for Resources

One way the participants discussed they would continue to grow professionally by looking for resources that would help their teaching practices. This can be done by reading publications from professional organizations or using different online resources like Facebook, Twitter, and Pinterest. Ms. Bear stated, “What came to mind is some of the professional organizations like the NCTM. I get the weekly newsletter. I get the *Mathematics Journal* mailed to my home,” She went on to note, “Facebook, they have some nice articles on there about education and there are a lot of professional groups being developed through Facebook and they show you different articles.” Ms. Short discussed how she uses the Internet to help her grow professionally:

I’m always searching on the Internet or Pinterest and different ideas and different ways to probe, come up with different ways especially when it’s a concept that I know that—you know—there are certain topics students always have difficult time with. It’s like, What’s something else that I can do to help them with that.

Looking for resources via online or professional literature was one way the participants currently and would continue to further their professional development.

Learning from Others

The participants also talked about the importance of learning from their colleagues as a way to grow professionally. Learning from their colleagues did not need to occur in a formal

professional development setting. The participants discussed how this can occur in informal settings as well. Ms. Haskins states, “I would like to go around and sit in a couple of teachers’ classes. I would like to sit in there and see what makes it good that maybe I can bring some ideas back to my classroom.” Ms. Short added:

I think some of us need to step outside of our classroom and see what else others are doing or have done or what’s worked for them and realize that, yeah, there’s some other ways you can do some things that could be just as effective or even more effective.

It was interesting to note that the participants felt they could learn from experienced teachers as well as less veteran teachers, “I definitely value the wisdom of veteran teachers,” stated Mr. Johnson. “I think we more experienced teachers, too, learn from the new teachers who are coming out of college and saying now they’re doing it this way,” added Ms. Hoskins. The participants felt that they can learn and grow professionally from their colleagues, both veteran and new teachers, and this learning can occur informally through classroom visits and conversations.

Learning from Experience

Professional growth can occur by learning from colleagues as well as learning from one’s experiences. The participants discussed how they grow professionally from the experiences that occur in their classrooms. Mr. Wishbone discussed how he learns everyday by just observing what goes on in his classroom. Mr. Waters added, “It’s just being in the classroom and just watching what’s happening, trying stuff out, going back to the drawing board and seeing what else might work.” Learning from one’s experiences does require some critical reflection on feedback that has been received. Mr. Johnson stated:

Maybe a big one is to always listen when people tell you something after observing my class or some critical self-reflection in thinking about what occurs in the classroom on a daily basis, ...continue having those conversations that are honest about where I struggle as an educator, in what way am I going to grow today and then be reflective, maybe just five minutes at the end of the day.

It is interesting to note how this reflection piece continues to be mentioned in all the different phases of professional development that was discussed with the participants. This would seem to indicate that high school mathematics teachers feel it is very important for a professional development experience to allow time for the teachers to be able to reflect on the professional development experience.

Self-Efficacy

There was not a specific research question used to find out what the participants thought about self-efficacy. However, data were collected on self-efficacy by asking extending questions in the interviews with respect to how the professional development the participants were discussing influenced their self-efficacy.

Success in the Classroom

Participants discussed how they would feel good coming out of a professional development if they felt confident that what they learned would be useful in their classroom. When asked if professional development could influence her self-efficacy, Ms. Bear responded, "I guess it can if I feel like it's useful to me. I guess it can if I can see this working and happening in my classroom with my students." It was important that whatever was learned in the professional development was applicable to the specific math content area that the teacher

was teaching. Whatever was learned in the professional development also needed to add value to the teachers' current practice. Ms. Sand stated in response to the question:

Yes, certainly, positively, if the teacher feels it's more beneficial than their current practice. I guess maybe visualizing the benefits. If I can see, again, in my classroom, in my high school math classroom, how that really could be beneficial.

When what is learned or developed in the professional development works in the classroom, a teacher will tend to believe the professional development experience positively influenced their teacher practice. The participants added it was important to see how what they were learning could be used in their classrooms. Ms. Sand explained further:

Well, if I walk away having experienced success right there in the professional development as with walking away with a product, something in hand, that I can use, well that boosts me right then or if I walk away having learned well how to use this process that I was just taught how to use, because I saw it, I experienced it, I think either way I would feel encouraged.

Ms. Brown added, "It just gives you enough confidence, like oh, this actually will work. I like this, let me try this."

Teacher Attitude

The participants discussed how teacher attitude can influence a teacher's self-efficacy with respect to professional development. The participants discussed how having the right attitude about the professional development can influence how beneficial the professional development will be with respect to their teacher practice. Mr. Johnson shared:

I would say the very first thing for me, personally, is just having the right attitude about it, and I think that's true no matter what you're learning or trying to learn like you can't

be closed-minded about it. You have to go in knowing that you're going to learn something.

Mr. Waters added, "I know with me, personally, it's trying to stay positive," and Mr. Wishbone also added, "Always giving something a try you know, give it the benefit of the doubt." The teachers also discussed the importance of teachers being able to self-reflect. Having the right attitude to self-reflect on the professional development, more specifically, why what was learned in the professional development is not working in the classroom, is important with respect to how the professional development can influence a teacher's self-efficacy. Ms. Short said:

Maybe the self-reflection isn't there to truly see why didn't it work or that — you know, instead of just saying, okay, that didn't work so I'm not going to do it again instead of, okay, what could I do that would make it work or that could make it better if it's something that's worked.

Ms. Short added:

I may at least reflect on my teaching if nothing else in looking at, you know, what's not working or deciding, you know I like this idea, like can I use it, how would I use it; would it work ... you know I always look back at myself and apply it to how would I use that.

As the participants noted, a teacher's willingness to self-reflect is important in determining the type of influence that professional development can have on a teacher's self-efficacy.

Student Attitude

While the attitude of the teacher is important with respect to the influence professional development can have on teacher self-efficacy, according to the participants, student attitude can play an important role as well. The participants noted that the attitudes of students can influence

their teacher self-efficacy. While student attitude may not be related to professional development, it was mentioned enough in the interview responses that I felt it was important to be addressed when discussing what influences teacher self-efficacy. What a student says or does can influence a teacher's self-efficacy according to the participants. Mr. Johnson shared, "There are some students that really, you know, they hurt your efficacy then there are some that really, they can say one thing and it just makes your whole day." Mr. Waters added:

Just knowing that, you know, at the end of the day, you know, the student telling me, hey, Mr. Waters, I learned more from you than I learned from any other math teacher is all that matters to me.

In further discussing student attitude, the participants did talk about how knowing that the students learned because they were able to do something now that they were not able to do before, also influenced their teacher self-efficacy. Ms. Sand stated, "I guess I would feel effective if class ran smoothly, for the most part, followed by increased performance at the end." Mr. Johnson goes on to add, "...and as far as self-efficacy, I think, you know, when you see that kid that had no clue at the beginning to be able to work those problems, that's powerful, too." There may be a connection to professional development when talking about how a student's attitude changes as they are able to learn something. As noted by the participants, having a student perform a mathematical task that they could not do before influences their teacher self-efficacy and this ability to learn a new task may be a result of a new teacher practice implemented from a professional development session.

Student attitude may be related to professional development and both might possibly influence a teacher's self-efficacy. The high school mathematics teachers noted how student attitude can influence how effective they feel as teachers. They even mentioned, in discussing

topics for an ideal professional development, how they would like to see more professional development on classroom management and student motivation. While learning about new ideas, strategies, and products related to high school mathematics is important, the teachers felt knowing how to manage a classroom and understanding how to motivate students to want to learn mathematics were also important to the professional growth of a high school mathematics teacher.

Summary

This chapter discussed professional development as well as the influence professional development has on teacher self-efficacy, with respect to the four phases of the Appreciative Inquiry 4-D model. In the Discovery phase, the participants discussed the importance of a professional development providing them with; something they could take back to the classroom and use right away, something that was related specifically to the math content area they currently teach, something tangible that could easily be easily implemented into their teacher practice, an opportunity to work in small groups with their math colleagues, an opportunity to see in the professional development session how the idea or product works in the classroom, and an opportunity to reflect with their math colleagues with respect to the idea or product that was presented and how that would work in their classrooms.

In the Dream/Design phase, the participants discussed the things they would include in a professional development experience that they were in charge of designing and implementing. The components of a professional development experience they felt were most important are; providing the participants of the professional development with a hands-on learning experience, providing the participants of the professional development experience time to discuss and reflect with their colleagues, and providing continuing support to the participants after the professional

development experience as well as getting feedback from the participants as to the value of the professional development experience.

In the Destiny phase, the participants discussed the types of things they would do to further enhance their future professional development. The participants discussed; finding resources online or through professional literature, learning from their colleagues, and learning from their experiences. Once the 4-D model of Appreciative Inquiry was used to find out more about how teachers perceive their current, ideal, and future professional development experiences, the discussion focused on the relationship between professional development and teacher self-efficacy.

In looking at the relationship between professional development and teacher self-efficacy, the participants were asked questions regarding directly if professional development influenced their teacher self-efficacy and if so, how, as well as indirectly by finding out if and how professional development influenced their teacher practice. The next chapter further discusses the findings in the context of prior research while providing themes to each of the areas discussed in this chapter as well as discussing the researcher's conclusions, implications, and recommendations.

CHAPTER 5

RECOMMENDATIONS, IMPLICATIONS, and CONCLUSIONS

The purpose of this study was to examine the relationship between professional development and self-efficacy. In doing this study, the hope was to provide teachers a voice in the kind of professional development they feel would best help to support their classroom instruction as well as their student's learning. Since the purpose of teacher professional development is to provide teachers with ways to improve their instructional practice, it only makes sense that the teachers should have a voice in the kind of professional development that they participate. However, there is a need for teachers of mathematics to be able to first reflect about what's right about professional development.

Using the AI 4-D cycle model involving Discovery, Dream, Design, and Destiny, the following research questions guided this study:

1. How do high school mathematics teachers describe their best professional development experiences?
2. How would high school mathematics teachers design professional development that would best support their teacher practice?
3. How will high school mathematics teachers continuously engage themselves in professional development that will best support their teacher practice?

This chapter examines the themes that evolved after analyzing the data from this study. Next, the conclusions based on the research and the results of the data analysis are presented.

Implications and recommendations for further research are offered followed by a summary of the study.

Themes

What is Good about Professional Development?

Research question one looked at the Discovery phase of the Appreciative Inquiry 4-D model. In this phase, the researcher was trying to find out what the participants felt was good about professional development. The researcher wanted to know what occurred in the professional development experiences that the participants felt were some of the best they attended. The first theme that emerged from the Discovery phase was relevance.

Relevance

The research suggests that adults learn best when they are self-directed; when new knowledge is built upon their pre-existing knowledge; when the learning is relevant to their life experience, needs, and goals; and when the theoretical knowledge is easily transferable to the practical context (Bransford et al., 2000, Knowles et al., 2011). We know that adults seek learning experiences that provide them with knowledge and skills that are applicable to their real world teaching experiences (Zepeda, 2012). The participants in the study, based on the data, seemed to agree that the best or most effective professional development experiences were those that provided them with something that was relevant to them with respect to their classroom practice. Ms. May stated:

To me the most effective ones and the most interesting ones are the ones where I can come away from it feeling like it's something I can actually use. It was effective in the sense that it gave us information that was directly applicable to our class.

Ms. Hoskins supported this by stating the following with regards to her best professional development experience, “That one was, actually, like one of the first ones that everything that we went through was useful, that was really the first one that I felt that everything was applicable to me, to what I was doing” Other participants went on to share similar thoughts with respect to the importance of professional development experiences providing something relevant or applicable as illustrated by Ms. Brown’s thought , “Applicable to what you are teaching,” and similarly Ms. Sand added, “... and I thought, oh, there’s an example of something that I could use.”

While the professional development experience needs to provide teachers with ideas, strategies, or some kind of product, it also needs to add to their existing knowledge base. Ms. Short shared:

I know I’m going to be getting something different, something that I haven’t used before, you know, because it’s like I know how to teach the material, you know. I do that all day but, you know, okay, so I have students struggling from time to time I need more, what can I do to help them and, you know, always trying something different that, you know, can help make that even better the next time or the next year.

The research supports what Ms. Short shared about the need for the professional development experience to provide something new, something different that can be used in the classroom to help her students. According to Guskey (2002), “What attracts teachers to professional development is their belief that it will expand their knowledge and skills, contribute to their growth, and enhance their effectiveness with students” (p. 382). It is important for adults to know that they will be attaining new knowledge that will be beneficial to them. As adults learn, they need to be able to feel like what they are learning provides them with more valid

information than they already have to help them continue to make the most informed decisions possible (Taylor, 2008). The data and the research suggest that good professional development, the kind that teachers feel is beneficial, provides something that is relevant and applicable to them and their teacher practice as well as provides them something that will add to their knowledge base so they can use it for the benefit of their students.

Content Specific

The second theme that emerged from the data with respect to the Discovery phase was professional development experiences need to be content specific. The participants discussed the importance of whatever they are learning in the professional development needs to be applicable to the content they are teaching at the time. Ms. May stated, “I think the best content or context would be information that directly relates to my own subject and content” and Mr. Johnson and Ms. Sand added respectively, “First, it is super specific to my content of my classroom” and “there were some specific examples geared to math...specifically how I can use it in my high school math class.”

The research suggests that effective professional development is focused on the content that is applicable to the teachers participating in the professional development. Darling-Hammond et al. (2009) suggests that effective professional development must include a focus on specific curriculum content and added that professional development needs to align with school and district initiatives as well as help to support strong collaborative relationships among teachers. Sometimes professional development experiences provide a great new idea or strategy, but it may not work for a high school math teacher as Ms. Short extolled, “I can see that working in a 4th grade classroom or I can see that working in a social studies class, but I don’t see how I can make it work.”

Therefore, it is important for professional development in mathematics to be focused on the specific subject or subject levels of the attending teachers. Professional development for math teachers, while having a lot of the same characteristics of what makes professional development effective, needs to ensure that it focuses specifically on instructional strategies that will support student's learning of mathematics (Holmstrom, 2010). The data supports this research, and Ms. Brown shared:

I went to this professional development, all about AP calculus, and I was like wow, I didn't even know this was out there and they gave me all kinds of resources and ways and projects and everything and that was good for me.

When Ms. Short was asked what made a particular professional development experience she was discussing so beneficial she remarked, "because it was geared towards the subject I teach at the level that I teach."

Easily Implemented

The participants discussed the importance of the ideas, strategies, or products discussed or created in the professional development experience be easily implemented back in the classroom. Ms. May stated, "I feel like it has been effective information if we can implement it in the class. I think it has to be something that can practically be implemented" and Ms. Bear went on to add, "It was easy to set up and it didn't take much for the students to understand what they had to do." Ms. Hoskins noted how a successful professional development experience for her would provide something that could be easily implemented in the classroom and she could see the benefit of it in her classroom. She summarized, "It is something that I can bring into the classroom with me and then use it to help see one of those lightbulbs go off, that would be a successful professional development."

The participants also discussed how creating something in the professional development experience can help to implement what is being learned back to the classroom. For Ms. Sand, the ideal professional development would provide an opportunity to create a finished product that could be used in the classroom. For Ms. Short, it was important to create something and that it would work for her students as she states:

There's some sort of product or something that you can take with you that you could always take back to the classroom immediately to start using, and I think that it's presented at least on a level that you can make it work in your classroom at your level on your subject.

The research that discusses the importance of a professional development experience providing something that is relevant and applicable to the teachers attending, indirectly supports this need for high school math teachers (Garet et al., 2001; Hartman, 2013; Morewood & Bean, 2009).

Modeling

The Modeling theme that emerged from the data analysis expands on the other themes that have been presented. The participants discussed the importance of seeing how the idea, strategy, or product being discussed in the professional development experience would work in the classroom. Ms. Sand discussed the importance of seeing how it would work with respect to the content that she is teaching by stating:

Show me how it works, particularly in a math classroom. Show me how that works in a high school math setting. We actually did it right there in the training and that's when I thought, "Oh, I could use this."

Past studies have indicated that professional development opportunities are most effective in influencing teacher practice when such opportunities focus on teaching practices and student

learning in the context of actual classrooms (Darling-Hammond & Richardson, 2009; Elmore, 2002; Hartman, 2013; Loucks-Horsley & Matsumoto, 1999;)

The participants further shared, “I would probably need to see a teacher actually using it in front of me” and “show me how it will work but show me how this can apply to higher level math.” The research and data support the importance of a professional development experience including some type of modeling so that the attending teachers can see how what is being learned or created can be used in the high school math class that they teach (Jacobs et al., 2012; Lester, 2007; Mayer, 2002).

Time for Reflection

The last theme that emerged from the data analysis in the Discovery phase was the importance of having an opportunity to self-reflect. Mr. Johnson discussed the importance of reflection time within a professional development experience by stating:

I mean there’s got to be time, a lot for self-reflection, and I would say from the very beginning the expectation is set that we are going to reflect on our practice in professional development, and so as far as being self-reflective and self-critical, that is just super important for us as teachers to just take time to sit back and say, “This is what’s proven to be effective and here are concrete steps to move in that direction.”

Darling-Hammond and Richardson (2009) suggest using a professional development model that asks teachers to examine their practice, identify areas that need improvement, and then learn about, try out, and reflect on new methods and techniques with colleagues. Mr. Johnson discussed, self-reflection is an important component for the professional development of teachers. Darling-Hammond and McLaughlin (2011) reported, “Teachers learn by doing, reading, and reflecting (just as students do); by collaborating with other teachers; by looking

closely at students and their work; and by sharing what they see” (p. 83). The research supports the fact that self-reflection is important for the professional growth of teachers and needs to be a part of teachers professional development experiences.

Self-reflection provides an opportunity for math teachers to critically think about what they learned during the professional development experience and how this can benefit their classroom practice. Self-reflection can also be used to think objectively about the implementation of what was learned or created in the professional development experience to the classroom. Ms. Short added, “Just really a self-reflection in terms of why didn’t it work; is it the activity itself, is it just the classroom atmosphere.” Reflecting with colleagues can also be beneficial in a professional development experience as Ms. Haskins describes regarding one of her best professional development sessions, “Getting feedback from colleagues was helpful.” The idea of self-reflection will be further expanded on in the discussion of the Dream/Design phase.

The Discovery phase of the Appreciative Inquiry 4-D model was designed to find out what the high school mathematics teachers “appreciated and valued” about their professional development experiences (Cooperrider et al., 2008). They were asked to discuss their best professional experience or experiences and why they were effective or beneficial. Five themes emerged from the data analysis; relevance, content specific, ease of implementation, modeling, and time for reflection. The data showed how the participants felt these were important components of an effective or beneficial professional development experience and there is research to support the data. The next section examines the themes that emerged from the Dream/Design phase of the Appreciative Inquiry 4-D model that was used in the study.

What Would an Ideal Professional Development Look Like?

The second research question looked at the Dream/Design phase of the Appreciative Inquiry 4-D model. In this phase, the researcher was trying to find out what the participants felt would be the best or ideal professional development experience. This question provided the participants an opportunity to design their own professional development experience. The researcher wanted to know what would be included in a professional development experience that the participants felt would truly benefit them as high school mathematics teachers. The first theme that emerged from the Dream/Design phase was active learning-hands on.

Active Learning-Hands-On

The participants felt it was important that teachers in a professional development experience be active participants in the learning process. The teachers in the professional development experience need to be doing something or creating something rather than just sitting and receiving information. Research suggests that core features of an effective professional development program must include: a focus on content and instructional strategies, provide active learning opportunities, and have coherence with respect to district and school initiatives (Every Child Succeeds Act, 2015; Quick, Holtzman, & Chaney, 2009). In discussing how they would design an ideal professional development experience, the participants supported this research by discussing how the experience needed to provide the teachers an opportunity to do something hands-on. Mr. Wishbone stated, “I would think that the teachers participate and actually do the game and then they would see just how fun it is” and Ms. Short added, “Some time to create the particular activity or something that you can do to help engage the students.”

With respect to adult learning, adult learners need to feel that their opinions are valued during the learning experience as well as need to be active participants in the learning process (Lieb, 1991). The professional development experience needs to provide a hands-on experience that allows the teachers to better understand how what they are doing is going to work in their classroom. Ms. March stated, “Would have the participants actually prepare something for their classroom. Would have the participants working on something that directly applies to what they are teaching.” The more the hands-on experience replicates the classroom experience, the more beneficial the professional development experience will be for the teachers (Darling-Hammond & McLaughlin 2011). Mr. Waters shared stating:

I’m going to have you do the activity just like the students would do the activity, that way you see the way they’re going to do it and see it and think about it and, you know, then you can discuss the pros and the cons of it.

An ideal professional development experience that would be most beneficial to high school mathematics teachers needs to allow the teachers to participate actively in the learning by providing a hands-on activity that replicates what would occur in the classroom with some time to discuss with their colleagues what worked and what did not. An opportunity for teachers to discuss and collaborate with their colleagues during a professional development experience was very important and it is the next theme that emerged from the Dream/Design phase.

Discussion and Collaboration

It is important for adults to have an opportunity to discuss and collaborate with other adults during a learning experience. When working with adult learners, it is important to encourage them to share their knowledge, experiences, and perspectives with other adult learners within a group setting (Booth & Schwartz, 2012). Professional development experiences need to

provide opportunities for teachers to discuss and to collaborate with their colleagues about what they are learning in the professional development. The research suggests this is especially important for professional development experiences that involve teachers of mathematics. Professional development sessions need to provide teachers of mathematics with opportunities to collaborate with other math teachers, to analyze student's mathematical thinking, to reflect on the beliefs and ideas they have about teaching and learning, and to discuss the different instructional strategies that help to promote student learning (Akiba, 2012). The participants noted the importance of teacher discussion and collaboration as Ms. March stated, "I think it is probably best that the facilitator starts out providing information and then shifts to letting the teachers discuss or explore how that is going to work." Ms. Haskins added, "... then we'll have time to talk and have, you know, suggestions on what to do."

Allowing time for discussion and collaboration during a professional development experience provides an opportunity for teachers to talk about how the learning experience may influence their classroom practice. Ms. Byrd stated:

They would have conversation. I would want them to be talking about what they like about it, what they don't like about it, something that I would change or something that I would add so that type of conversation. How could this help me? This won't help me.

Any conversation on the topic that I'm speaking of would be good to me.

This time for discussion and collaboration provides an opportunity for the teachers to discuss the learning experience and share ideas with each other. Mr. Johnson stated,

I honestly would like the participants to be doing most of the talking, that's where the ideas are hashed out and developed and so like it's the goal of the facilitator to keep that going, that's why you ask questions and keep probing.

Discussion and collaboration provide the teachers with an opportunity to talk about the learning experience and share ideas with each other as to how this would help them in the classroom or what could be done to help make it work in the classroom.

Providing time for discussion and collaboration during a professional development experience can help influence what occurs in the classroom after the professional development according to research. Jacobs et al. (2012) reported that teachers who participated in professional development focused on mathematical content, classroom instructional strategies, and student learning as well as provided them with an opportunity to discuss issues related to teaching and learning, felt they had more of a direct impact on their student's learning. Morewood and Bean (2009) go on to add when teachers are given the ability to collaborate with their peers, they feel it influences their instruction and makes the professional development more effective. The final theme that emerged from the Dream/Design phase was feedback and support.

Feedback and Support

According to the participants, feedback was an important component of any professional development experience they would design. According to Ms. Hoskins, "So I think feedback is important and that it occurs right afterwards instead of waiting up to the end." Providing immediate feedback gives the teachers the support they need to better transfer the professional development experience into their classroom.

The research of Koellner, Schneider, Roberts, Jacobs, and Borko (2008) asserts that as teachers engage in cycles of feedback and reflection it supports their long-term, continual growth. Ms. Byrd further underscored the importance of feedback and support when she shared:

Everyone who signed in I would follow up to say, “Hey, do you think that the professional development worked for you? Was it something that you could use?” Have you used it? If so, how did it work? If you did and it didn’t work, what happened? Is there anything that I can do to come and help support?

It is important that teachers receive feedback regarding their professional development experience. They need to be able to share what has worked and what has not worked with respect to implementing what they learned in the professional development experience to their classroom. This feedback provides teachers support in the transfer of the professional development experience to their classroom. This support is important and needs to be continuous so that the professional development experience is not just a one-time thing but something that occurs throughout the year.

The Dream/Design phase of the Appreciative Inquiry 4-D model was designed to find out how high school mathematics teachers “envisioned” and ideal professional development experience and how this would be “co-constructed” for future references (Cooperrider et al., 2008). They were asked to discuss how they would design a professional development experience that would be effective or beneficial. Three themes emerged from the data analysis; active learning/hand-on, discussion and feedback, and feedback and support. The data illustrated how the participants felt these were important components of an effective or beneficial professional development experience and there is research to support the data. It seems clear from the research that effective professional development focuses on student learning, provides multiple opportunities for teachers to collaborate, and allows teachers to be active participants in the professional development process, which should be ongoing throughout the year (Darling-

Hammond & Richardson, 2009). The next section examines the themes that emerged from the Destiny phase of the Appreciative Inquiry 4-D model that was used in the study.

What will future professional development look like for you as a high school mathematics teacher?

The third research question looked at the Destiny phase of the Appreciative Inquiry 4-D model. In this phase, the researcher was trying to find out what the participants would do to further pursue professional development. This question provided the participants an opportunity to discuss what they would do to continue to seek out professional development that would benefit them as high school mathematics teachers. The researcher wanted to know what they would do to improve as high school mathematics teachers. The first theme that emerged from the Destiny phase was searching for resources.

Searching for Resources

When asked how they would continue to engage themselves in professional development, the participants discussed how they would continue to look for resources that they could use to help influence their classroom practice. These resources could come from formal professional development experiences, they could come from online resources, or they could come from educational publications and organizations. Ms. March stated that she would find resources “through individual professional development, what can I find online. Maybe I didn’t like the way this was presented in the book so I look and see what else is out there.”

Looking for resources online, through educational publications, or through professional organizations provides high school mathematics teachers an opportunity to see what their colleagues are doing on a national level. Ms. Byrd shared:

I see the different seminars that are being held through these organizations so if I wanted to attend it’s possible for me to see what someone in the same content area in another

state is doing by giving me an opportunity to speak with different teachers from other states.

The internet, professional literature, and professional organizations provides resources for high school mathematics teachers by allowing them to see, on a national level, what is working for their colleagues and how it may work in their classroom. As Ms. Brown discussed it provides an opportunity to see what our colleagues in other states are doing and see if what they are doing might work in our classrooms.

Teachers sometimes get caught up with what is going on in their own classroom and can become frustrated when things are not going well. Looking for resources online, through professional literature, and through professional organizations provides an opportunity for teachers to look outside of their classroom for ways to improve on what is going on inside their classroom. Ms. Short elaborated:

I think some of us need to step outside of your classroom and see what else others are doing or have done or what's worked for them and realize that, yeah, there's some other ways you can do some things that could be just as effective or even more effective.

The participants noted the importance of learning from colleagues which is the next theme that emerged from the Destiny phase.

Learning from Colleagues

Learning from colleagues on a national level through online resources, professional literature, and resources from professional organizations is important as noted by the participants. The participants shared that learning from colleagues at a local level is also important as it provides an opportunity to discuss with colleagues what may be working in their classrooms and how that might be implemented in another high school mathematics classroom.

Ms. Short stated, “Yeah, collaborating with others and to see what works for them and just, you know, see what others have done, yeah, definitely that is helpful.” Ms. Sand went on to add, “I guess some of that would be asking questions, maybe to a more experienced teacher, just asking somebody nearby who is experienced like the teacher right next door to me this year.”

Learning from other high school mathematics teachers by discussing successful classroom practice experiences is a way the participants noted would provide future professional development for them. Learning from other high school mathematics teachers by observing their classroom practice is another way to further professional development. Ms. Haskins stated, “I would like to go around and sit in a couple of teachers’ classes. I would like to sit in there and see what makes it good that maybe I can bring some ideas back to my classroom.” Learning from others through observation or discussion is a way the participants noted they would continue to further their professional development. Research supports the importance of teachers learning from one another as a way to grow professionally. Research shows that establishing long-term conditions that allow teachers to learn continuously from one another within schools is among the most effective ways to support teacher development (Heck, Banilower, Weiss, & Rosenberg, 2008).

A connection can be made between learning from others and having modeling occur in a professional development experience as well as providing opportunities for teachers to discuss and collaborate with their colleagues. When modeling occurs in a professional development experience, teachers are learning from others by observing how an idea or product is a successful classroom practice. When discussion and collaboration occurs, teachers are learning from others by hearing ideas or products that have been successful in a colleagues’ classroom practice. The final theme that emerged from the Destiny phase was learning from experience.

Learning from Experience

The participants noted that being able to learn from what goes on in one's classroom on a daily basis can provide high school mathematics teachers an opportunity to further their professional development. This can be done by taking time to think about what occurred in the classroom in terms of what worked and what did not. Mr. Johnson stated:

Just say this is what I did well; this is what I didn't do well, the well thing, this is how I'm going to keep making that successful, the not so good thing, this is what I can change to make that more successful.

Learning from experience by understanding what is going well and what is not going well with respect to classroom practice can also be done by getting feedback from some type of observation. When getting feedback from an observation, it is important to take the feedback objectively to be able to grow and learn from it. Ms. Sand shared, "... even if your initial reaction is to become defensive and go off and think I don't do that or I do that think, okay, there's always something I can learn, that I can take away from this."

Learning from experience is connected to being reflective about one's practice. Being able to critically reflect on one's classroom practice is important to the learning process of adults. Critical reflection is a process by which we look deeply as to why we performed a certain action. Critical reflection helps the adult learner struggle with the concept that new information is challenging their prior beliefs and whether or not to change these prior beliefs based on the given information (Bass, 2012). There may even be reason to assume that learning cannot take place without critical reflection (Bass, 2012). The data supports the importance of learning from experience through reflection and Mr. Johnson's sentiments support this notion, "I need to

continue having those conversations that are honest about, you know, where I struggle as an educator, in what way am I going to grow today and then be reflective at the end of the day."

Gabriel et al. (2011) recommend that to support the professional growth of teachers they need: purposeful and structured professional development opportunities, continuous support from teachers and administrators, and the ability to provide input as to the type of professional development opportunities being offered either individually or within teams. Based on what the participants shared, high school mathematics teachers would choose to further their professional development by: continuing to look for resources online, through professional literature, and through professional organizations; learning from others through discussion or observation; and by learning from experience through critical reflection or feedback from some type of observation. High school mathematics teachers can receive support from teachers and administrators through these different ways of continual professional development. The next section discusses the relationship between professional development the self-efficacy of teachers.

Relationship between Professional Development and Self-Efficacy

The purpose of this study was to examine the relationship between professional development and self-efficacy. While the researcher did not have a research question regarding the relationship between professional development and self-efficacy, the researcher examined this relationship by discussing professional development and teacher practice. The research questions led to discussion of various aspects of professional development and within those discussions, the researcher attempted to find out how the professional development experiences influenced teacher practice. In discussing professional development and teacher practice, the researcher was able to gather data on the high school mathematics teacher's perception of the

relationship between teacher self-efficacy and professional development. The first theme that emerged from the analysis of this data was successful experience.

Successful Experience

The research confirms that true change in classroom practices is largely dependent on the experience a teacher has with respect to the professional development opportunity that teachers participated in (Corcoran et al., 1998; Loucks-Horsley & Matsumoto, 1999). In discussing whether professional development can influence teacher practice, Ms. Byrd stated, “I guess it can if I feel like it’s useful to me, if I am interested in it, if I can see this working and happening in my classroom with my students.” Self-efficacy can be evident here because it deals with one’s belief how a particular event can affect their performance. Self-efficacy theory deals with the factors that determine one’s beliefs and self-confidence to perform certain tasks successfully (Moriarty, 2014). With respect to teachers, their self-efficacy can be influenced by professional development if they believe the professional development experience can benefit them in their classroom.

Tschannen-Moran et al. (1998) found that self-efficacy beliefs can influence a person’s thoughts and emotions in such a way as to affect their willingness to pursue certain goals, deal with adversity, as well as how much control certain events have on their lives.

In terms of teaching, a teacher would be more willing to try and implement something learned from a professional development experience if the teacher felt what they were learning was beneficial to them in the classroom. As Ms. Sand stated when asked if professional development could influence her teacher practice, “Yes, certainly, positively, if I can see, again, in my classroom, in my high school math classroom, how it really could be beneficial, then I’ll make the effort to learn it, try it, implement it.”

Achieving some kind of success in the professional development is important with respect to a mathematics teacher feeling like they had a successful learning experience. In a study done by Hartman (2013) dealing with math coaches providing professional development to mathematics teachers, the math coaches found it was important to provide opportunities where the teachers felt a sense of success in learning and implementing the new content and strategies provided through the coaching activities. In doing so, the math coach felt like the teachers would be more confident and therefore more receptive to continuing to learn new content and related instructional strategies that would help improve their teacher practice (Hartman, 2013). The data supported this as Ms. Sand stated, “ Well, if I walk away having experienced success right there in the professional development well that boosts me right then” and Ms. Black added, “...it just gives you enough confidence, like this actually will work, I like this, let me try this.”

Teacher Attitude

The participants discussed how they felt their attitude affected whether the professional development experience could influence their teacher practice or not. Mr. Johnson stated, “ I would say the very first thing for me, personally, is just having the right attitude about it” and Mr. Waters added, “I know with me, personally, it’s trying to stay positive.” If teachers go into the professional development experience with a positive attitude, chances are they will learn something from the experience and bring it back into their classroom.

The participants also discussed how wanting to be at the professional development experience is related to teacher attitude. As Ms. Short stated:

I guess you have to have some sort of buy-in that you want to be there, it’s not just, you know, you need to go sit in on this professional development and it’s not something

you're at all interested in or it's not related to you. I guess in that sense, teacher attitude would fall under that.

Allowing teachers to provide input into the type of professional development they want to experience is important in providing the right attitude that can lead to a successful learning experience. As Ms. Black stated:

If we could choose and not be told, here, go to this or that training...if you could choose; you would have that option and that control, this is what I feel like I'm lacking in, let me go to this session.

Research support this as Darling-Hammond and McLaughlin (2011) found in their study that professional development can be effective and have a positive influence on classroom practices when teachers are willing to participate in the professional development opportunities which is more likely to happen if they have input as to the type of professional development they participate in. Allowing teachers to provide input and giving them a sense of ownership in their professional growth could positively influence their teacher efficacy and lead to best teacher practices (Bandura, 1982; Guskey et al., 2014; Timperley, 2008).

Student Attitude

The participants discussed how their student's attitude influences how they feel about themselves as teachers. The participants discussed how student motivation can influence how successful they feel as a teacher. As Ms. Hoskins stated, "I want them to want it, I want you to want it for you, take some pride in what you're doing and realize that this is a reflection of you." Ms. Black added, "What I've noticed in my students is motivation is low. They're not motivated, so how do you make it important to them." Being able to motivate students to want to learn mathematics is important for mathematics teachers in helping them feel successful.

Seeing change in the classroom is important to a mathematics teacher feeling effective. As teachers begin to see that the knowledge and skills they gained from the professional development have resulted in changes in student learning, they then feel more effective as teachers (Timperley, 2008). The data supports this research as Ms. Sand stated, “I guess I would feel effective if I saw increased performance at the end.” When mathematics teachers see a positive difference in student performance, as a class or as individual students, it can influence their teacher self-efficacy. Mr. Johnson shared, “As far as self-efficacy, I think when you see that kid that had no clue at the beginning to be able to work those problems, that’s powerful.” Ms. Hoskins added, “The improvement is everything.” When teachers observe a positive change in student performance, they feel more successful because they felt like they had a positive influence on their students. Research shows that teachers who see changes in their student’s learning, as a result of professional development, not only felt like they actually had some influence on their student’s learning but actually enjoyed teaching more as well (Guskey et al, 2014).

The student’s attitude toward the teacher can influence their teacher self-efficacy. Knowing the student appreciates the teacher can influence how successful a teacher can feel. Mr. Waters said, “The student telling me, hey, Mr. Waters, I learned more from you than I learned from any other math teacher, is all that matters to me.” Mr. Johnson added:

For me would probably be just to hear ways that I am being effective like you’re a good teacher; you’re my kind of teacher or you did a good job and I’m glad you’re my teacher... they can say one thing and it just makes your whole day...

Student attitude in terms of what they say and what they do influences how a teacher feels about themselves with respect to being a successful teacher.

Based on the data, teacher self-efficacy can be influenced by successful implementation, teacher attitude, and student attitude. For mathematics teachers, it is important that what they learn from the professional development can be used effectively in their classroom. This means that what they learn in the professional development is relevant to their content and can be easily transferred to their classroom practice. The participants noted that teacher attitude can influence teacher self-efficacy. If the teacher has a positive attitude regarding the professional development, then there is a better chance that what is learned will be more successfully transferred into classroom practice. If the mathematics teacher can see a positive difference in student performance by using what they learned from the professional development, then the mathematics teacher will feel more effective as a teacher. The data supports a relationship between effective professional development, teacher efficacy, and student learning and so does the research (Bruce et al., 2010; Duran et al., 2009; Parise & Spillane, 2010). The next section will discuss what the researcher concluded about the study based on the data and research.

Recommendations and Implications

There are a few recommendations that can be derived from this study. The recommendations are for future practice in K-12 schools and for future research. For the field of practice, the following recommendations are offered:

- Just ask the teachers what they want
- Provide them time and opportunity for professional development
- Provide support, make professional development a continuous process

It is important that teachers have input into the type of professional development experiences they have. Based on the findings, the participants knew what they needed for professional development experiences to benefit them. Therefore, it is important for district and school

administrators to listen to teachers to find out what they need to help them grow professionally. The research supports this as well. By allowing teacher voice and input, there may be a greater chance that teachers will engage in the kind of learning that leads to changes in their practices (Bass, 2012; Jurrow, 2009). If professional development is to be effective and have positive influence on classroom practices, then teachers must be willing to participate in the professional development opportunities which they are more likely to do if they have input as to the type of professional development they participate in (Darling-Hammond & McLaughlin, 2011).

Based on the findings of this study, another recommendation for the field of practice is for teachers to be given time and opportunity for professional development. While not directly related to any of the research questions, the researcher found through the study that teachers felt that time was a factor with regard to professional development. They suggested that often professional development occurs during periods of the day, such as during planning or after school and that these times are not the best for teachers. For the teachers in this study, they found professional development as an intrusion especially if the professional development was not relevant to them. School and district administrators need to understand this so that they can plan professional learning days into the school calendar. The findings suggested that teachers feel it is important to learn from their colleagues, so administrators need to seek ways to provide teachers opportunities to observe lessons as well as time for discussion and reflection at the end of the observation.

Based on the findings of this study, another recommendation for the field of practice is that teachers need support so that professional development is an ongoing process. Professional development often consists of attending a session and then being left to figure out how to take what was learned in the session and put it into practice. Most likely, what was learned never gets

put into practice because of difficulty in the implementation process. Teachers need support in taking what was learned from the professional development experience and putting it into practice in their classroom. This support can be providing teachers with time to plan, providing them feedback from an observation, allowing them to observe a colleague use the strategy, etc. Professional development needs to be an ongoing process rather than a one-time experience and this is accomplished by providing teachers the support they need to take what they learned from the professional development experience and implement it into their classroom practice. The research supports this as Darling-Hammond and Richardson (2009) found that professional development should be ongoing throughout the year if it is to be effective.

The findings from this study offer future research to the study of professional development. The researcher recommends future research in the following areas:

- More districts and participants
- Use of different research techniques
- Wider range of content and grade levels

Further research could be done in districts that are similar and different to National County in the area of teacher's perspectives of professional development. In doing further research in other districts, the researcher recommends that more participants be used to help prevent data saturation from occurring too quickly. This study was a qualitative study using the Appreciative Inquiry method of data collection and analysis. Further studies could be quantitative in nature or use mixed-method approaches while using other data analysis techniques. The researcher also recommends that further studies include teachers in other content areas such as English-Language Arts, Science, Social Studies, and non-academic areas as well as to include teachers in all range of grade levels in the preK-12 spectrum.

There are a few implications regarding the findings of this study. One implication is that the data came to saturation quickly. The researcher interviewed nine high school mathematics teachers from two different schools and each interview lasted approximately 45-60 minutes. During the data analysis, the researcher realized quickly that the responses to the questions were very similar in nature. These mathematics teachers tended to be very logical and concise in their thinking. As a result, the responses tended to be very concise and similar in nature leading to saturation very quickly.

Another implication of the study is that the data cannot be generalized to teachers in different districts, grade levels, and content areas. This study was conducted using high school mathematics teachers from two high schools within one county. Further research would need to be done in different counties to include teachers of different content areas and grade levels to see if the findings from this study could be generalized to include all teachers. .

Another implication of this study was using the Appreciative Inquiry method of choice. Using the Appreciative Inquiry method did not provide an opportunity to ask a direct question regarding the relationship between professional development and self-efficacy of teachers, although the researcher was able to extract data and provide some findings in this area. The researcher would recommend that further research be done on the relationship between professional development and the self-efficacy of teachers using different research techniques to help support or dispute the findings from this study.

Conclusions

The findings from this study suggest that teachers have very basic needs related to professional development. They need and want to be able to give input as to the type of professional development they participate. They need and want opportunities to observe,

discuss, and reflect with colleagues, and they need continuous support from administration. The findings from this study suggest that teachers want and need opportunities to collaborate with colleagues to help them grow professionally. The research supports these findings with regard to effective professional development as well as the relationship between professional development and the self-efficacy of teachers (Bandura, 1982; Bass, 2012; Darling-Hammond & Richardson, 2009; Gabriel et al., (2011); Guskey et al., 2014; Jurrow, 2009; & Timperley, 2008).

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