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EFFECTIVENESS OF AN INQUIRY BASED
PROFESSIONAL DEVELOPMENT PROGRAM

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“Bismillah – With The Name of G-d”

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ABSTRACT

Pre-service and in-service teacher education programs are designed to disseminate large quantities of knowledge in a short period of time (Deng, 2004). However, they have been found to be ineffective with implementing teacher change (Deng, 2004). To increase the level of effective implementation, as measured by the ability of teachers to utilize what they have learned, designers of pre-service and in-service programs for teachers should include cognitively engaging activities (Cochran-Smith & Lytle, 1999). This study explored the relationship between student achievement and the level of teacher participation while attending an inquiry-based professional development program. Six teachers at a private school participated in the two year research-based professional development program aligned with inquiry-based concepts and mutual consultation practices. Effectiveness was measured by student performance. The results indicate that the teachers were not as cognitively engaged during the whole-group lectures. The participation level for all participating teachers increased during the collaborative sessions. Findings indicate a correlation between teachers' cognitive participation level and the implementation of concepts included in the professional development sessions within the classroom. In addition, students taught by teachers exhibiting a higher level of cognitive engagement during the professional development program demonstrated higher achievement scores, as measured by standardized tests. The findings of this study suggest teachers utilize more concepts acquired when they are

more cognitively engaged in the learning experience. Also, results suggest student achievement scores increase when teachers are more cognitively engaged while participating in professional development programs.

CHAPTER I

INTRODUCTION

Recent research has shown that the United States is ranked lower than many other developed countries in terms of the education of our children (Sala-i-Martin, 2009). In 2006, the Secretary of the U. S. Department of Education said, “We know that nothing helps a child learn as much as a great teacher. Great teachers are helping us reach our goal of having every child doing grade level work by 2014” (Spellings, 2006, p. 1). But how do we make great teachers? There are different perspectives on how to answer this question. This study examines the effectiveness of an inquiry based program on changing the level of teacher participation and improving student achievement.

Content Based Professional Development

In 2001, The Department of Education attempted to answer the question, how do we make good teachers and improve student performance by implementing The No Child Left Behind (NCLB) Act. The NCLB Act sought to increase the number of professional development programs available to teachers, and to improve teacher content knowledge (U. S. Department of Education, 2010). To accomplish this goal, The NCLB Act included provisions for assuring that all teachers had enough content knowledge to be deemed highly qualified.

In response to the accountability demands by the NCLB Act of 2001 for highly qualified teachers, members of state boards of education updated their teacher

certification and re-certification requirements (U. S. Department of Education, 2002), resulting in more than ninety percent of American teachers reporting they are highly qualified in their respective subject area as of 2005 (NECC, 2008). The U. S. Department of Education worked with a core group of educators to examine the professional development programs implemented by the states. In 2006, the team of investigators reported nine states had met the guidelines by establishing an acceptable professional development plan to improve each teacher's knowledge about his or her respective content area. The evaluators reported seventy-eight percent (thirty-nine states) of the professional development plans partially met the requirements. The remaining states did not meet the requirements (U. S. Department of Education, 2009).

Problems with Content Based Instruction

“The goal of professional development focusing on teachers is to improve student learning through enhanced student performance” (Sparks & Loucks-Horsley, 1989, p. 41). Despite the efforts of NCLB and those conducting the professional development programs to upgrade the qualifications of teachers across America, between 1998 and 2008, the average math and reading scores of students, ages 9, 13 and 17 have increased by less than 10%. Student scaled scores have not risen above 62% in math and 59% percent in reading respectfully (U. S. Department of Education, 2009).

Based on the above statistics addressing student achievement, the educational programs for teachers are failing to meet their goals. Clearly a new approach needs to be considered. Jackson (2010) concluded that in order to increase student performance, as measured by standardized test, teachers should learn to use models that facilitate a deeper

understanding of subject matter. A deeper understanding suggest more advanced learning, higher order thinking skills, or learning that occurs during cognitive engagement.

The current method of preparing and improving the ability of teachers to educate others usually includes disseminating or transmitting knowledge (Deng, 2004; Garet, 2001; Graham, 2000; Redden et al., 2007). Evaluating research addressing the quality of teacher development programs (pre-service and in-service programs) across the globe, Deng (2004) discovered teacher preparation and maintenance programs are not all the same. He stated that many of the pre-service programs are designed to teach theories and the application of the theories. Deng recognized theory helps teach educators about research based patterns and findings. However, he contends the programs fall short of helping the teachers learn how to implement the theories comfortably.

Studying the long term impact of professional development programs designed to teach or support theories, Herrera (2010) recognizes that educators are motivated to implement theories when they take ownership and/or authorship of the concepts supported by theories. Deng's (2004) review of literature suggests the need for educational programs (pre-service and in-service) to develop activities to increase the possibility of individualized instruction by having teachers to address the educational needs of the students.

Describing the characteristics of quality teachers who can individualize instruction, Cochran-Smith and Lytle (1999) propose three different levels of knowing: knowledge for practice, knowledge in practice, and knowledge of practice. They define

knowledge for practice as the end result of university-based content included in teacher education programs. This information is formal, reflecting a high volume of concepts conveyed via structured classroom practices (Cochran-Smith & Lytle, 1999).

The knowledge in practice skills and concepts reflect learning while doing, constructing concepts as the teacher engages in classroom practices. Cochran-Smith and Lytle (1999) explain teachers learn concepts required to practice teaching as they continuously reflect on their experiences in an effort to understand and improve their practice.

The knowledge of practice activities involve teachers using inquiry practices to examine the environment, student needs, curriculum needs and other factors to improve instructions (Darling-Hammond, 1998; Garet et al., 2001; Loucks-Horsley et al., 1998; Stalmeijer et al., 2009). Cochran-Smith and Lytle (1999) explain knowledge of practice as action research. Action research is defined as the procedure where teachers gather evidence from every aspect of the learning experience, analyze the evidence to inform, to improve the learning experience for each student, individually (Parsons & Brown, 2002). Thus, teachers are learning how to perfect their teaching skills as they personalize their instruction.

Considering the writings of Cochran-Smith and Lytle (1999), Deng (2004), and Herrera (2010) professional development programs may become more effective by helping teachers learn to be problem solvers who pursue solutions to the educational difficulties of students. Professional development programs that help teachers address the educational needs of their students may be more meaningful, by increasing teacher

by-in because the teacher takes a personal interest in using learned concepts to solve problems.

Federal funds earmarked to support the NCLB Act (2001) and other sources targeted to improve education has improved teachers' content knowledge without changing the teachers' ability to teach the learners (Barringer, 2009). In her article to principals and others who select and develop teacher education and professional training programs, Barringer states that educational programs for teachers and others have focused on what to teach, not on the process students use to acquire and learn concepts. Noting that new findings are underway in the area of neurological science, she recognizes the need for teachers to better understand the nature or the science of learning.

Neurological research suggests the more cognitive connections students make as they are learning, the more they learn to think about the 'what and why,' which may dictate how they perform task (Fiedler-Brand et al., 2009). The more dendrites connecting and firing, the more the students are able to analyze, synthesize and generalize concepts they encounter (Fiedler-Brand et al., 2009).

An example of an engaging teacher education and professional development program is an inquiry based model. Teacher inquiry and reflection increases the ability of teachers to go beyond book learning and use exploration and creativeness as they teach (Ball, 1998; Carroll, 1988). Barman (2002) defines inquiry learning as an active process, allowing learners to develop higher order thinking skills that help foster the development of investigative skills. Inquiry based instruction helps develop critical thinking in teachers and helps teachers engage in action research type behavior, which prompts

learning in the field (Darling-Hammond, 1998; Trotter, 2006). When teachers learn to use inquiry as part of problem solving, they may no longer use the text book as a novice cook may use a recipe book.

Inquiry learning involves the exploration of subtle complex concepts (Klein, 2003). Exploring learners are cognitively active, focused on the activities required to get the answer as they engage in the process of formulating the answer. When professional developers employ educational activities that focus on inquiry-based learning instead of answers, the program participants are cognitively active instead of passive learners.

Definition of Terms

Concepts used in this study may have multiple meanings, depending on their use. The following concepts are referenced throughout this writing: Shuraa Baynahum, dissemination of knowledge, inquiry, and Problem-Based Learning. Shuraa Baynahum is an Arabic concept which suggests members of a collective group provide concepts, knowledge, and/or ideas to an academic setting. The members of the group decipher the concepts and develop a set of principals grounded by known and understood principals and practices. In addition, members of the Shuraa group collectively agree upon actions to be made based on the collective discussion.

The English translation for Shuraa Baynahum that comes closest to the Arabic meaning is mutual consultation. Mutual refers to consent, reciprocal, no dominant leaders ("Mutual," 2009a). The final decision is based on consensus. That does not mean the majority rules. Consensus suggest that all sides are heard equally, providing the members of the discussion with the best possible outcome ("Mutual," 2009b).

Consultation reflects the behavior of dialogue, presenting concepts that are relevant to the idea being discussed and using what is presented to guide the decision. Consultation also suggests examining things from several angles (“Consultation,” 2009a, c). In English, consultants are considered to be experts knowledgeable about a specific topic (“Consultation,” 2008b). Therefore, consultation reflects open discussion being guided by those who know or the experts.

Dissemination of knowledge refers to the spreading of concepts for the purpose of giving out concepts to address curriculum needs. Dissemination reflects teaching of concepts, ideas without providing the students with an understanding of how the concepts are aligned with the ‘bigger picture,’ without showing the students how to employ the concepts within the real-world (Windschitl, 2002).

Windschitl (2002) suggests that educational pedagogy has to change from one of disseminating knowledge to creating opportunities for students and instructors to interact. He advocates for teachers to abandon the practice of teaching chapters and using skill sheets. Instead teachers must employ active modeling (i.e. think out-loud), coaching, guiding and/or advising. Teachers can employ prompts, probes, conceptual structures, technologies that help to select, organize and represent information being taught to students (Windschitl, 2002).

Inquiry Based Learning is defined as the development of problem solving skills, by learning how to collect and analyze data from the academic setting (NRC, 1996). As learners increase their ability to collect and analyze data, they learn how to connect hands

on, real world experiences to the theories and concepts learned. In addition, students learn higher order thinking skills (NRC, 1996).

Problem Based Learning (PBL) reflects a student centered academic program involving students learning as they work in small groups to collectively solve a problem (Sharma, 2009). PBL was used by medical schools to help their medical students learn how to incorporate theory into practice while working on case studies of real patients in the field (Norman & Schmidt, 1992). The BPD program evaluated for this study is designed along the PBL model. BPD is a teacher centered, professional development program designed to allow teachers to learn and improve their teaching skills by engaging in problem solving practices.

Research Questions

This study explores the effectiveness of the Bait Professional Development Program (BPD). BPD is an inquiry-based program designed to include research-based components of effective professional development programs. To examine effectiveness of BPD, the following research questions are examined:

1. What is the relationship between the level of teacher participation in BPD and use of inquiry-based practices?
2. What is the relationship between the level of teacher participation in BPD and the use of Shuraa Baynahum (mutual consultation) principals?
3. What is the relationship between the level of teacher participation in BPD and student achievement?

Teachers working at a small private school, Bait (a pseudonym) participated in an inquiry based professional development program. Qualitative and quantitative data collected during the two years of the Bait Professional Development Program (BPD) was used to examine the phenomena of teacher behavior and student achievement at Bait. Contents of the following review of literature help to establish a framework for exploring the outcome of BPD.

CHAPTER II

LITERATURE REVIEW

The focus of this study is to explore the effectiveness of BPD, an inquiry based professional development program. The current issues with pre-service and in-service educational programs are the overemphasized focus on content and the use of the behaviorist method to relay this content. While this study does not attempt to combat the importance of teaching content in such programs, it does address the need to focus more on pedagogy and to adopt a more hands-on method of conveying information. The premise of this study is that using an inquiry based, teacher development program leads to increased teacher participation, thereby increasing teacher growth and student performance.

Literature addressing the following topics help to provide support for this research: the nature of the current teacher (pre-service and in-service) development programs; suggested components of effective professional development programs to promote inquiry; components of effective professional development programs; description of inquiry-based learning; use of an inquiry based model; Shuraa Baynahum; and use of inquiry to develop expert teachers.

The Nature of Current Teacher Development Programs

In this age of convenience to support fast paced lifestyles, the current trend within the American culture, including the field of education is to streamline experiences and activities. Cochran-Smith and Lytle (1999) and Deng (2002) suggest developers of pre and in-service programs in education condense the desired behavioral objectives into a series of learning outcomes, focusing on the curriculum regardless of the characteristics of the students.

Evaluating the effects of a professional development program addressing grant writing for teachers, Lundin (2006) asked participants to identify problems encountered during the program that hindered them from grasping the skills. Completing short answer surveys, the teachers voiced the following: too much time was spent on lecturing to the whole-group, and not enough time spent addressing individual teacher concerns. The teachers voiced concerns that the program was too fast paced for them to grasp concepts because there was not enough time allowed for presenters to cover all of the needed concepts (Lundin, 2006).

Courses and/or workshops have been designed to convey specific concepts or develop specific skills regardless of the needs of the participants, regardless of their academic background and learning style. This approach allows the developers to save time, money and resources by presenting everything that has been included in the curriculum to the entire group of students – adults or children (Jacobson, 2002).

Jacobson (2002) completed case studies of elementary teachers, administrators and students who engaged in a technology program. She used teachers' and students'

interviews and classroom observations to complete the case studies. As a result of each case study, Jacobson maintains teachers and/or professional development providers should present the learners with multiple resources and allow the learners to engage in risk-taking inquiry based opportunities.

McCarthy (2007) suggests teacher education programs that are aligned with the behaviorist's paradigm focus on educating teachers to be responsive to a summary of concepts incorporated within curricula and/or administrative demands. The behaviorist's approach suggests as educators in pre-service and/or in-service programs present teachers with the correct stimuli, they will provide correct responses. Learning starts by an external ignition, external spark or stimulus (Skinner, 1958). The ignition is not determined by the needs of the student, but the needs of the curriculum, administrator and/or policy makers (McCarthy, 2006). The academic process continues as the learner uses the spark from the ignition to initiate a response. Innately, the learner reacts to the stimulus by performing the response. This act continues until the stimulus is changed by an external source (Skinner, 1958).

Behaviorists “. . . are interested in the effect of reinforcement, practice, and external motivation on a network of associated and learned behaviors,” (Fosnot, 1996, p. 8). In the classroom and/or professional development sessions, all learners are treated equally, with a focus on pushing the curriculum. Behaviorist based professional development programs are not meant to strengthen the participant on an individual level (Lundin, 2006). Because the focus is not on the individual, the effects of the program, as measured by student performance are reduced.

Richardson (2003) provides an example of a professional development design aligned with behaviorist's paradigm: the transmission model. She defines the transmission model as a group of specific stimuli that have been established for all teachers to experience, leading to specific responses in the classrooms. The transmission model includes the presentation of content, not taking into account prior knowledge, not sharing the design or implementation with all of the stakeholders and has little to no long-term support for those participating in the program (Richardson, 2003). The transmission model has students and/or recipients of the professional development engaging in repetitious activities as they are taught to retain what is being transmitted by the teacher.

Educators use the transition model to teach to all of the students, or participants at the same time. The behaviorist' paradigm aligns with the presentation of a concept or stimulus to elicit some form of change or response. Educators using the behaviorist's paradigm use lesson plans with specific predetermined strategies and assessments to develop sequential knowledge factors. Periodically, assessments are used to determine where the students fall on the education continuum (Bloom, 1956; Fosnot, 1996). Students are trained to respond to stimuli as teachers use specific tools to elicit the desired responses (pre-planned lessons). The transition model is used at each academic level: primary, elementary, secondary, post-secondary and post graduate/professional development programs (Loucks-Horsley & Matsumoto, 1999).

Perhaps by individualizing instruction, teachers can help reach students who have difficulties learning when transmitting knowledge. Explaining how teachers can help increase the number of scientists among marginal populations, Henry (2005) says "in a

one-size-fits-all approach to education, the differences between individuals are ignored or seen as barriers to be overcome. When these differences-sometimes disabilities, but sometimes just different learning styles- are nurtured rather than quashed, they can broaden the pool of potential scientists,” (p. 96). Henry contends educators should diversify their use of resources and methods similar to those employed when teaching exceptional learners with “physical or learning disabilities,” saying these practices are “proving to be good for all students,” (p. 96).

This research project was designed to increase the ability of teachers to choose when to use instructional methods and resources aligned with the needs of the students, which may or may not include behaviorist’s instructional methods. For example, behaviorist methods invoke stimuli to elicit responses. A teacher, who utilizes inquiry to match the instructional methods and materials to the needs of each student, may choose to elicit a response. In a different example, Murray-Wilson (2009) completed a study where teachers used behavioral data to inform how and what they taught. In her study, thirty-four science teachers of six through eighth graders gathered data on their students to inform their instruction. The teachers gathered quantitative data on student performance from criterion referenced and standardized tests. They shared the data with their research partners. Collectively, they used inquiry-based activities to analyze the data and develop a plan of action for teaching the students. Some of the science teachers reported the data analysis from their students suggested the need to continue to use the behaviorists’ practices. Other teachers reported the need to change what they were doing to include more collaborative, student lead activities to help the students move forward.

Murray-Wilson found the teachers decided to use academic methods appropriate for matching the needs of individual students. The teachers made the choice to use this approach because it addresses a specific student or curricula needs, not out of habit. In addition, the learning of a skill does not stop with the acquisition of facts or knowledge (Bloom, 1956).

Why do teachers rely heavily on the behaviorist methodology? Teachers teach the way they were taught to teach by emulating their prior teachers (Pogrow, 1994; Richardson, 1996). Traditional professional development programs include lectures, workshops and dissemination of knowledge to teachers (Loucks-Horsley et al., 1998). Even though behaviorist based programs tend to be good at disseminating knowledge, researchers investigating the effectiveness of professional development programs have found they are not as effective at preparing teachers to transfer concepts into the work place, into their classroom.

As an example, Carpenter and colleagues (1989) compared two groups of teachers participating in a professional development program designed to help teachers improve math skills of their first grade students. One group of teachers (the control group) participated in a two hour workshop over the summer prior to the target school year. The teachers had not met their students and had no knowledge about the characteristics of their class at the time of the two hour workshop.

The second group of first grade teachers participated in a four week session, spanning over 20 hours a week. Carpenter and colleagues (1989) spent one and a half hours a day lecturing to the teachers. The remainder of the time, teachers engaged in

group activities and collaborative efforts as they integrated what was learned in the lectures with their prior knowledge about first graders and mathematics.

Carpenter and colleagues (1989) completed teacher and student observations throughout the school year following the professional development sessions. The teacher observations did not show any statistical difference between the amount of time each of the 40 teachers spent teaching each math concept. Also, there was no significant difference between the amount of time teachers provided individual time with students.

The observational findings also indicate students of teachers who participated in the four week long session spent more time working on math word problems and less time completing isolated computation problems. This group of teachers incorporated word problems into lessons which included “review, development and controlled practice” (Carpenter et al., 1989, p. 520). The teachers who participated in the two hour summer workshop were only observed giving their students word problems for math computation review. Comparing pre and post skill results for all children, Carpenter and colleagues indicated a significantly higher achievement level for the students of teachers who spent four weeks participating in the professional development sessions.

A second study by Garet and colleagues (2001) used survey results to evaluate the impact of professional development on the practice of 1,027 math and science teachers. Seventy-nine percent of teachers participated in “traditional types of activities, including 52% in in-district workshops, 15% in out-of-district workshops or conferences, 4% in college courses, and 8% in conferences” (p. 934). The researchers defined traditional professional development programs as “a structured approach to professional

development that occurs outside the teacher's own classroom. It generally involves a leader or leaders with special expertise and participants who attend sessions at scheduled times-often after school, on the weekend, or during the summer" (p. 920).

Twenty-five percent of the professional development activities conducted was reform sessions. Garet and colleagues (2001) defined reform sessions as sessions which "often take place during the regular school day. In fact, some reform activities, such as mentoring and coaching, take place, at least in part, during the process of classroom instruction or during scheduled teacher planning time" (p. 921).

Survey results indicate teachers participating in the professional development activities said time was the most important factor impacting effectiveness. Teachers' responses indicate the professional development sessions that lasted longer and occurred over a longer period of time were more effective. Time was considered important regardless if the teachers participated in the traditional or reform sessions (Garet and colleagues, 2001).

Examining the impact of the type of professional development session on conveying the information for teachers to understand, there was a degree of difference, favoring the reform sessions (Garet et al, 2001). Carpenter (1989), Garet (2001) and their colleagues did not connect the teacher comments to student performance or student achievement. Both studies referenced the teachers benefited from the non-traditional, reform and long-term sessions. As was stated earlier in Chapter I of this research, effectiveness is ultimately measured by the increase in student performance. It is good

that teachers are benefiting. However do those teachers' benefits affect student performance? The study by Garet and colleagues (2001) did not provide this evidence.

Critical Thinking Skills

Is it important for professional development to focus on students or on teachers? The ultimate goal of education is on the students because they eventually become part of the workforce as teachers and other professionals. Examining the qualifications of new entrants into the job market, Ward and Lee (2002) noted many potential hires were familiar with concepts and practices. However, these same potential hires did not know how to use these skills or concepts in the field.

Interviewing 305 management level workers at companies with more than twenty-five employees and 520 recent college graduates, Hart (2006) sought to determine what were the most meaningful skills required for a new hire. Seventy-three percent of management recognized new hires just out of college required critical thinking skills. Seventy-six of the management identified new hires lacked strong teamwork skills required to engage in group problem solving activities. In addition, Hart (2006) stated 67% of new college graduates preparing to enter the job-market felt their colleges had not adequately prepared them for applying skills and concepts to "real-world settings through internships and other hands-on experiences" (Hart, 2006, p. 9).

Several researchers have written about the complaints of college professors, who note that many students entering universities are not ready for college level math and science (Bruer, 1993; Nickerson, Perkins, & Smith, 1985). They also notice that students have difficulties writing at the university level. Specifically, researchers disclose the

inability of entering freshmen to participate in abstract thinking and an inadequate use of formal reasoning skills. Bruer (1993) contends students attending select universities were taught higher order thinking skills, suggesting only a specific group of students have learned and are able to use critical thinking skills. Ethically, this is a problem within the education arena. Bruer suggested that the focus of education should be to provide more people in the workforce with higher order thinking skills.

Considering the writings of Ettinger (1998), Bruer (1993), Darling Hammond (1999) and Nickerson (1985), there appears to be a push from various facets of society – workforce, universities, etc. – for the educational profession to adjust by preparing graduates to have the required skills necessary to engage in critical thinking activities. To facilitate the development of more critical thinking skills, teachers must adjust by modifying their approach to teaching, shifting from disseminators (behaviorist) to cognitive coaches (Garmston, 2005). Teachers who include behaviorist strategies within their instructional repertoire must also include other strategies to help with follow-through, such as transference to real-world activities. Inquiry-based instruction allows the teacher to make informed, data driven decision (Windschitl, 2002). Improving a teacher's ability to think, teaching educators how to teach children to think represents a shift in the academic focus from stimulus-response to facilitation, which helps students to develop inquiry-based thinking skills (Cary, 2002; Lortie, 1975).

Similar to the need to change the educational program for students, there is a need to change the way teachers are taught to teach students, helping to foster the development of higher order thinking skills. If educators are not prepared to teach students, they cannot

do a quality job (Pogrow, 1994). To increase student performance, as measured by standardized tests, which are used to measure the effectiveness of educational programs, teachers may need to learn to use models that facilitate the use of multiple instructional methods, tailored to the unique needs of students, increasing each student's ability to gain a deeper understanding of subject matter (Hart, 2006; Loucks et al., 1998; Murray-Wilson, 2009).

Considerations for Effective Pre and In-Service Programs

In the effort to meet the goal of increasing student performance, what must be done to help teachers learn how to identify student needs, to match those needs to the curricula and to select appropriate strategies? To address this question, the following topics were examined: knowledge of the participants as adult learners and strategies for teaching content and pedagogy that allow the participants to learn by doing.

Characteristics of Adult Learners

Pre-service and in-service program developers must have knowledge of their students: the adult learners. Biswalo (2001), a professor of a continuing adult education program compared the types of students attending universities in traditional and non-traditional programs. In addition, he compared the characteristics of the teacher programs that were identified as being effective. He identifies the adult learners as full time employees, between ages of 26-60, paying their own tuition and driven by the need to improve their own performance. In an effort to help build a literal picture of the needs of adult learners, Biswalo (2001) merged together ideas from Knowles (1984) and Rogers (1994). He contends that adult learners are individuals who learn from experiences that

connect to their knowledge-base and effective programs provide adult level challenges that match adult developmental levels. Biswalo (2001) further advocated for the inclusion of teachers in the design and implementation of the educational experiences.

Biswalo (2001) also identifies the adult learner as having prior knowledge, beliefs and ideas that affect his or her learning experience. Biswalo suggests knowledge of the background of the adult learners' beliefs, experiences and knowledge base can help the designers and implementers of teacher education programs create meaningful learning experiences. He suggests meaningful experiences increase the long-term effect of the educational programs by helping the adult student retain and use what they encounter.

Examining the findings of others, Knowles (1984) summarized the behavior of the adult learner into four categories:

- 1) Adults have a tendency to be self-directed, knowing what they want and how they plan to acquire it.

- 2) Adults, through experiences, build a reservoir of prior knowledge that they continue to develop as they learn more skills and information.

- 3) Adult learners have a larger knowledge base than younger students. Having a larger knowledge-base, related to the topic can be an asset because the adult has more in his or her reservoir.

- 4) Adult learners can be self-motivated by internal factors. External motivators only last for a short while (Knowles, 1984).

Considering that contents of their knowledge base may lead them to believe there is no need to change, they may be less likely to accept or be a part of change. Adults,

similar to children require meaningful instruction which is connected to the learner's life. The adult learners appear to have an interest in engaging in tasks leading to the resolution of meaningful concerns. Meaningful concerns are those related to family and work (Knowles, 1984).

Calderon (1997) sought to help improve the ability of teachers of Latino students. She developed the Teachers' Learning Communities Program. The program allows teachers to work collaboratively as they coach each other, reflecting on their activities. Calderon designed the program to help teachers develop new knowledge and beliefs about students, teaching and their own learning. To accomplish this, she had teachers use ethnographies about real classrooms as teaching tools. The teachers discussed the problems of each ethnographic case and used problem solving skills to project solutions. In addition, Calderon noted that the teachers who participated in the group problem solving activities improved in the areas of "self-analysis, negotiation, and problem solving. The ethnographies create a cycle of observation and analysis of concrete teaching tasks, reflection, readjustments, and a search for new knowledge" (p. 5). She found that the participants were able to reflect on their behavior, their colleagues' behaviors as reflected in the ethnographies. The teachers used the ethnographies to critique each other. The critiques included an open (collaborative) discussion, helping teachers self-analyze their practices and learn from their experiences as they reflected.

To add to Knowles' summary about adult learners, Calderon (1997) used the findings from teacher self-analysis to identify three necessary characteristics of teachers, who represent one type of adult learner. She reported that adult learners are well

prepared for the responsibility of doing work; recognize the diversity of their classes, and have the ability to engage in collaborative group work as they recognize the uniqueness of others. She advocated for designers of professional developers to use the above characteristics when choosing the methods and content of teacher education programs (Calderon, 1997).

Agreeing with Knowles' suggestions, Boulmetis (2000), the president of the American Association for Adult and Continuing Education identifies several needs of adult learners: to control the learning process, to see the practicality of the learning process, meaningfulness – foreseeing the relevance of knowledge and or skills being acquired, to test what is being learned by application in real world situations, to collaborate with peers, and to work at their developmental level (Boulmetis, 2000).

Finally, Biswalo (2001) advocated for a system-approach to address teacher needs. A system-approach uses suggestions for sequencing content and instructional activities from several philosophers, researchers and/or theorists in an effort to design an effective educational program. The design of the program incorporates the characteristics of adult learners and the desired outcome of the program, allowing a cyclical interaction between all of the components (Biswalo, 2001). During the cyclical process, the program developer selects program outcomes, incorporates various methodologies, various resources and the unique characteristics of the participants to create the learning environment and the academic activities to match the individuals in the educational program (Biswalo, 2001). The systems approach is dynamic, varying from program to

program, as dictated by the needs and characteristics of the learners, future and current teachers.

Effects of Prior Experiences on Adult Learners

Considering the unique features of the adult learner, one must take into account their prior knowledge. Research suggests teachers will emulate teachers from their past when selecting strategies, methods for instructing students (Sofa, 2003). Based on what teachers' experience prior to attending pre-service or in-service programs, many teachers understand the role of educators as one who pours small skills into the minds of the learner, sowing concepts as one would sow seeds within the minds of the students (Willson, 2006). To assign a proper solution to professional development programs, not only do the methods being taught need to be assessed but also the needs and characteristics of those who are being taught.

Pre-Service Teachers Shifting to In-Service Teachers

When learning how to teach children, pre-service teachers learn about the characteristics of children and examine the various research-based strategies found to work with children (Deng, 2004). Graham and Thomley (2000) indicate student teachers say they are not ready to teach in the classroom after completing the pre-service programs. Their research findings show student teachers shared a need to have other activities to help them understand concepts and ideas after completing pre-service coursework. Evaluating the reflective surveys of newly graduated pre-service teachers, Roulston and colleagues (2005) found that teachers voiced a need for more field experience to help them understand what and how to teach. The surveys indicate the new

in-service teachers reported that less than 50% of individuals who recently completed a pre-service program felt they were prepared to teach. More than 50% of the teachers indicated they received content area knowledge and could write out lesson plans. However, analyzing the results of the survey indicates less than 50% could make decisions about what, how and when to teach specific skills (Roulson et al, 2005).

Gellert (2007) says new teachers continue to learn new concepts and beliefs about what to teach as they engage in teaching experiences in the field. Darling-Hammond (2009) contends pre-service teachers should be exposed to master teachers who can model effective teaching practices for the pre-service teachers. Deng (2004) contends most pre-service programs are not aligned with the constructivist paradigm. He suggests that educational programs should allow pre-service teachers to learn by exploring. He addresses the need to extend theory based instruction to help pre-service teachers to help them learn to implement educational theories within the actual classroom.

Deng (2004) suggests pre-service teachers should learn to choose what and when to use specific concepts. He proposes that pre-service programs should include more practical application of theories introduced in the foundation courses, i.e., Philosophy and History of Education courses. He contends the structure of the foundation classes should allow the pre-service teachers to engage in theory driven field experiences. Deng (2004) emphasizes the need to allow pre-service teachers to learn enough about theories to not believe that anyone theory is more than that 'a theory,' which helps the pre-service teacher learn to use theories to address specific concepts.

Helping the Novice Teachers

Newly graduated teachers or novice teachers need to have assistance getting started. Examining programs designed to help new teachers transition into the classroom revealed several results. Brewster and Railsback (2001) evaluated several programs designed to help the new teacher. They discovered several components of mentoring programs that appear to be working. Specifically, Brewster and Railsback included the need for new teachers to reflect on their practice to understand not just what to teach but how to teach. They noted the need for teachers to collaborate with expert, seasoned teachers, not just receive information from them. In addition, Brewster and Railsback included the fact that mentor teachers should be able to spend ample time with the new teachers, as dictated by the new teacher's needs, not by some pre-determined time frame.

Examining the role of principals in attracting and holding on to new teachers, Watkins (2005) addressed three methods of increasing collaboration between novice and veteran teachers. He mentioned individualized mentoring (as needed by the novice); action research as a method of having teachers critically examine the dynamics of the classroom in an effort to solve concerns of the novice teacher; and study groups within the school setting to allow the novice teacher to take a reflective look at their practice with the help of the mentors and others within the school setting.

Weasmer and Woods (2000) identify the need for professional developers to listen to the voice of the novice teacher when planning and implementing professional development programs designed to help teachers. They noted the enthusiastic nature of the new teacher, bringing with them key skills and new understanding of teaching.

Weasmer and Woods noted the importance of giving new, novice teachers an opportunity to present what they know to the veteran faculty. Majority of the programs designed to help novice teacher's transition into seasoned, veteran teachers have the veteran teacher modeling, guiding everything for the novice. Very few help the novice teacher collaborate with the veteran, allowing for the give and take between the novice and the expert (Brewster & Railsback, 2001; Johnson, 2004; NEA, 2000; Watkins, 2005; Weasmer & Woods, 2000).

Examining the opinion of principals on effective transition, induction programs for new teachers, Merkel (2009) found elementary school principals from rural and urban settings found mentoring (modeling) programs were more effective than other programs frequently used to help new teachers transition into the classroom. Andrews and colleagues (2006) examined the opinion of classroom teachers, who noted that collaboration and networking with other individuals was more effective than mentoring or any other transition program. The new classroom teachers wanted opportunities to collaborate.

The Constructivist's Theory

Constructing knowledge gained during an educational experience. Members of the learning experience cognitively build their knowledge base by merging together prior knowledge with new concepts they developed during the educational experience (Bruner, 1990). Students learn to use data, concepts and other bits and pieces of information from the learning experience to construct meaning (Vygotsky 1978). Based on what one learns, meaning acquired from the acquisition of new knowledge helps the individual

learn to change the way they view and/or respond to new situations (Gellert, 2007; Harnard, 1982; Maher & Alston, 1990; Pajares, 1992; Simon & Schifter, 1991).

Constructivists focus on helping learners understand concepts and procedures, not dissemination of information (Kearsley, 1994, 1999). Understanding or learning why something happens, or why patterns reveal themselves, requires active cognitive engagement (Markley, 2009). The constructivist construct promotes ‘active’ cognitive learning (Slavin, 1994). Learning occurs as the learner uses cognitive engagement to awaken his or her mind during educational experiences (Wagner, 1998). Through social and other forms of engagement during the educational experience, each learner contributes to understanding as each member actively or cognitively processes knowledge (Doyle, 1997).

The constructivist paradigm purports educational programs should provide opportunities for individuals to learn by creating an environment conducive to learning, focusing on the why (Bruner, 1966; Vygotsky, 1978), not just content material or the what. Cognitive constructivists contend that environmental data is information used to develop understanding by exposure to experiences and reflective processing of stimuli (Ausubel, 1968; Bruner, 1990; Piaget, 1972).

Examining the role of constructivism during professional development programs designed for physicians, Mann (2004) recognized that professional development aligned with the constructivist paradigm helps the participants develop analytical and reflective skills used to “build knowledge” (p. 28). Analytical and reflective processing leads to change in behavior (Harnard, 1982).

Roberts (2010) interviewed six teachers participating in an inquiry-based professional development program for secondary education science teachers. The inquiry-based program allowed the teachers to work in collaborative groups as they addressed the content of the professional development program. The teacher interviews revealed the collaborative discussions allowed them to reflect on their practice, helping the teachers understand how their beliefs and practices are connected. She reported the teachers identified the methods employed in the collaborative sessions as teacher/participant centered because they were able to use their personal experiences and the experiences of other teacher participants to gain an understanding of how to teach science (Roberts, 2010). The constructivist paradigm frames inquiry learning. Construction of knowledge, of meaning occurs as one takes pieces from multiple sources to cognitively construct an image or picture of a concept. Inquiry involves the use of concepts to develop meaning. In order to acquire the correct concepts, the inquirer has to know how to discover what is known and not known. He or she must learn how to lay all of the pieces on the table and examine the relative pieces and discard the others. Once the inquirer has decided on what is relevant, they can then decide what else is needed to complete the inquiry. The search for what is needed, leads the inquirer to gather information from other sources, such as individuals. Throughout the inquiry process, the inquirer is constructing meaning of what is and what is not pertinent to one understanding the concept. In order to learn to use inquiry skills when teaching, teachers should engage in professional development activities that are also framed by constructivism (Dutro et al., 2002).

Constructivism Framing Teacher Education Programs

The constructivist's paradigm suggests learners gain knowledge, understanding and insight by way of merging together "what they already know and believe and the phenomena or ideas with which they come into contact" (Richardson, 1997, p. 3). Cognitively, the learner organizes, sifts, and analyzes new knowledge while applying the new to prior knowledge. The mental or cognitive process "results in a transformation of the knowledge base" (McCarthy, 2007, p. 22). An individual merges thoughts together cognitively as the learner engages in structuring new ideas. Fosnot (1989) says learning via constructivists' practices is an ongoing "process of invention rather than a mechanical process of accumulation" (p. 20). Based on Fosnot (1989), McCarthy (2007) and Richardson (1997) understandings, teacher education programs aligned with the constructivist's paradigm allow participants to construct understandings or knowledge as they cognitively process new concepts based on the learning conditions and the participants' prior knowledge.

Teacher Education Aligned With the Constructivist's Theory

Teacher education programs aligned with the constructivist's paradigm include designs and activities that allow the teachers to reflect on what they know and how the new information and ideas are connected or related to each other (McCarthy, 2007). Reflections allow the reflectors to become aware of their personal beliefs, prior knowledge and current needs. McCarthy saw reflective results as "opportunities for professional growth" (p. 32).

In an effort to evaluate what participants gained from reflective professional development programs, McCarthy (2007) completed a qualitative evaluation of reflective data of eight female graduate students enrolled in a speech-language practicum. She gathered student reflections completed over the one year long practicum; collected observational data as the students engaged in practicum activities; and had the graduate students complete exit interviews at the end of the practicum. The exit interviews allowed McCarthy gather self-awareness and self-evaluation data from each graduate participant, explaining what each student understood about her cognitive development.

Data revealed the graduate students became more aware of the factors that impact their use of speech language theories and skills. In addition, McCarthy (2007) revealed that, “lesson plans were examined with regard to verifications that modifications to practice actually took place, the participants of this study articulated that to develop a good lesson plan, they needed to know their client as a person” (p. 177). Specifically, the students wrote lesson plans that correctly included modifications to address the needs of a mock case study, as presented by the practitioner. However the graduate students also recognized the need to know more about their client, the student, who needed speech-language support in order to accurately write lesson plans to address the students’ needs. She suggests the participating graduate students recognized their need to have more information in an effort to correctly service their clients. Their reflections revealed knowledge of what they did know and what they needed.

Penuel and colleagues (2007) surveyed 454 in-service teachers, who had recently participated in inquiry based professional development activities. The survey questions

focused on what parts of the multifaceted inquiry based program was most effective helping teachers learn new information. The participating teachers recognized the most meaningful part of the professional development was the collection of data from students and the use of data to determine what to do for students, what to do, and what to do when selecting instructional strategies and resources for writing lesson plans. Penuel and colleagues contend “professional development that focuses on inquiry may have made teachers much more likely to report data, even if they did not feel any more prepared to implement student inquiry” (p. 951). In other words, engaging in inquiry based professional development programs that allow teachers to gather data on students and use the data to determine what and how to teach students was found to help the participating teachers to report and gather data on students. The inquiry based professional development program helped the teachers become more sensitive to the needs of students as exhibited by data collected during the learning experience. The participants during the pre-service (McCarthy, 2007) and in-service (Penuel et al., 2007) appear to be aware of what they have learned and also aware of the fact that they need more. Each participant appears to have been able to do some level of self-diagnosis.

McCarthy (2007) suggests “to enhance meta-cognition in the areas of analysis, synthesis, and evaluation, instructional strategies must be designed in which students take an active role in analyzing, synthesizing and evaluating their own learning” (p. 26).

Analysis, synthesis and evaluation all reflect higher order thinking skills (Bloom, 1956).

During metacognition, individuals evaluate what they know and how they know it. It is during metacognition, learners recognize what they know and what they do not

know (Brown, 2009). Once an individual is aware of what they know and do not know, they can seek out information or practices that will help them learn what they need.

Using metacognition during professional development allows the learner to guide their actions by focusing on the areas of their weaknesses (Gardner & Wissick, 2000).

Therefore, constructivists' programs allow students, adults or children to learn cognitive skills, such as cognitive reflections that allow them to continuously process concepts, continuing to learn even after the initial educational experience. Cognitive learning reflects cognitive engagement.

Cognitive Participation

How does one measure the level of cognitive engagement? Considering the American cliché: "Actions speak louder than words," how should a teachers' actions be measured during a professional development program to determine if their cognitive actions reflect growth? How should professional developers measure teacher behavior to determine how cognitively active they are during the professional development program? Markley and colleagues (2009) sought to examine the relationship between what science teachers' believed to be their practices after completing a professional development program and the reality of what they carried forward in the classroom.

The researchers randomly selected 12 professors who had participated in a professional development program designed to help the professors implement student centered instructions, including but not limited to: student centered lessons; construction of knowledge; and the demonstration of an awareness to the knowledge of the characteristics affecting meaningful student learning. After participating in the

professional development program, the researchers interviewed the science professors to determine what they identified as their approach to educating their students. The professors' interviews indicated they believed their instruction was student centered. The professors believed they were implementing student centered lessons addressing the intentions of the professional development program.

To determine if the professors' beliefs were actually carried forward into the classroom, Markley and colleagues (2009) used the M-SCOPS observational instrument to evaluate the effectiveness of the professional development program to impact classroom practices. The Mathematics Science Classroom Observation Profile System (M-SCOP) observational instrument was designed to examine the practices of elementary and secondary education teachers (Stuessy, 2001). Designed by Stuessy (2006) used by Markley and colleagues (2009) M-SCOP includes six levels of engagement or participation of adults to demonstrate cognitive engagement. The six levels of participation include: attend, replication, rearrangement, transformation, connection and generation of new or modified activities. Markley and colleagues identify that the first two levels, attend and rearrangement are highly teacher or professor oriented behaviors. The highest level is completely student oriented.

Markley and colleagues (2009) report the professors believed they were implementing student centered lessons. However, based on observations of undergraduate students in the classroom of the 12 professors participating in the study, all of the professors engaged in practices that were teacher centered, not student centered.

The professors' image of their behavior did not demonstrate their practice as measured by the behavior of the students.

A review of literature addressing the connection between the measured effectiveness of teacher behavior as demonstrated by participating teachers during professional development programs. The M-SCOPS was designed to measure the impact of the teachers' behavior on student behavior. Markley and colleagues (2009) report the reliability of M-SCOPS was established by using video tapes to compare the results of the observation profile to teacher and student behavior during science classes. Based on this, M-SCOPS' activity levels were used to evaluate teacher participation observed for this study.

Learning by Doing

Constructivists explain learning as a dynamic process (Fosnot, 1996). Based on biological and social psychology, academic construction involves constant evaluation, probing, supporting and refuting concepts as more and more knowledge is obtained. Truth is relative, based on the cognitive structure of the individual (von Glasersfeld, 1996). Each individual develops a cognitive framework to filter and/or file concepts based on cognitive restructuring and cognitive adaptations (von Glasersfeld, 1996). Constructing knowledge has been attributed to those who are experts in different professions.

Developing Expert Teachers

Larkin (1989) suggests experts are individuals who are able to take prior knowledge and build new knowledge upon it (Larkin, 1989). Experts use their knowledge base to determine what to focus on, receive, organize, interpret, store, retrieve, and use from the environment. The ability to be selective increases the capacity of the expert to remember, reason and problem solve (Bruer, 1993).

When experts work, they develop mental patterns, schema to help govern their cognitive behavior needed to process new information (Piaget, 1971). Experts see the bigger picture revealing how all of the pieces of the picture fit together. They can transfer information from one situation to another (Bruer, 1993). As experts transfer acquired knowledge to new phenomena, they are able to connect together different stimuli, signs from the environment (in the form of concepts, ideas, subject areas etc.). When an expert faces a challenge, they pull from their reservoir of knowledge and skills those concepts and skills needed to solve the problem. If they are truly experts, they are able to pull from more than one specific field, one academic discipline and use whatever tidbits they need (Bruer, 1993).

Do experts use inquiry? Bruer (1993) suggests experts must be able to dissect the problem, recognize what is needed, pull what is needed from the cognitive reservoir, collaborate with others, utilize the correct sources (or at least have a clue as to where to start searching) analyze all information in light of the original problem and synthesize concepts in order to arrive at a solution. A true expert reflects on what was done. When

an expert reflects, if they use metacognitive skills, they are able to add to their schema the required process and bits of information to be retrieved later, as needed (Bruer, 1993).

Experts possess critical thinking skills, allowing them to acquire what they do not already know. An expert is able to apply skills from prior experiences and build upon them when faced with new concepts and/or concerns (Bruer, 1993). The expert has developed a schema that is used to sift new concepts through. They are able to channel unknown information, dissecting and categorizing it as they sift. They are able to begin to connect the new to the old. Once they have dissected and categorized the new, they are able to recognize, cognitively what is missing. Experts use resources available to acquire new information to resolve what is missing (Bruer, 1993). Based on the above, one becomes an expert by using information to develop a framework for sifting new knowledge. To gather and process new information, experts use inquiry.

Effective Professional Development Programs for Teachers

Literature is inundated with research findings demonstrating the effectiveness of professional development programs. Many say the designers of professional development programs should include several components, being versatile. Based on the literature reviewed for this study, several components appear to be common: flexibility; collaboration; reflectiveness; guided inquiry; design aligned with the needs of the participants and the curriculum; and inquiry.

Flexibility

To individualize pre and in-service programs, Riley (1994) says program designers and implementers use multiple methods. The various methods should be available to the professional development presenter to implement if the participants require the use of the method. Riley (1994), the former Secretary of Education under President Clinton contends professional development programs should help the individuals and groups, designed to cover several disciplines, include in-depth and long-term projects, and include the current educational practices. In addition, effective professional development programs are versatile and aligned with needs of curriculum, teacher and schools (Riley, 1994).

An example of a program with a lot of flexibility is the individually guided model. This program allows individuals to be in-tuned with their strengths, weaknesses and needs. The individual monitors their activities and their progress. One of the major strengths of this program is its meaningfulness. The program allows the participant to identify the need, plan out how to solve the need, learn and assess their progress (Tillotson, 2000).

Examining 70 reviews addressing effective components of teacher development programs, this researcher found there were ten different components listed. Comparing the various works completed by researchers, none of the components received more than thirty-three percent of the researchers' approval. This helps to uphold the suggestion that professional development programs should include multiple methods, or flexibility. Based on the studies reviewed, three of the seventy researchers suggested flexibility.

Feedback

The observation/assessment model of professional development can be tailored to the specific needs of an individual teacher and offers immediate feedback.

Administrators using this type of model observe teachers engaging in the education process; provide them with feedback on the things that they need to improve upon (Sparks & Loucks-Horsley, 1989). After the teachers/learners receive feedback, they are allowed to perform the task again. The administrators evaluate the teachers on their performance, again providing immediate feedback if needed. Providing the immediate, individualized feedback allowed the teachers to benefit personally from the experience, thus increasing effectiveness.

Collaboration

Of the literature reviewed addressing effective development programs for this research project, researchers indicate that teachers report that collaborative efforts with each other and with those having more expertise in specific areas have been very effective (Biswalo, 2001, 2003; Loucks-Horsley & Matsumoto, 1999; Richardson, 2003; Riley, 1994; Wagner, 1998). Nineteen percent of the reviews encouraged teacher development programs include opportunities for participants to collaborate.

Collaboration involves the active contribution of all players as they participate in the “direct interaction between at least two co-equal parties voluntarily engaged in shared decision making as they work toward a common goal” (Friend & Cook 2007, p. 7). Collaboration does not consider one member of the dialogue or interaction to be a subordinate. Each member of the group has something to give and receive.

Collaboration requires that each member of the collaborative group engages in the process of exchanging ideas. The collaborative efforts benefit the collective, usually not one individual. To help encourage the participation of the stakeholders in the process of developing something the collective can benefit from, it is important to have the members of the group be a part of the collaborate team. Riley (1994) suggests partnerships be developed within and without schools to facilitate the development of appropriate programs.

For example, Dutro and colleagues (2002) encourages administrators and teachers to collaborate by using multiple references. Using a three-year grant, Dutro and colleagues implemented a professional development program that sought to help teachers become better prepared to implement a literacy program. They designed the program to include teachers from the on-set. The teachers began by first looking at the literacy standards presented as part of the reform effort. They cross-referenced the new standards with what they already knew about teaching literacy, bringing forth and constructing upon prior knowledge. The inquiry model allows the participants to be reflective as they develop and use problem solving critical thinking skills (Mebane & Galassi, 2003; Tillotson, 2000).

Reflection

When collaborating, teachers can build from each other's knowledge and/or absence of knowledge. Part of the process of building new skills includes reflecting on what is known and unknown. Based on eighteen of the seventy reviews on effective professional development programs, twenty-six percent of the reviewers suggest

participants have an opportunity to reflect. To increase each participants understanding of what they have learned and why the new knowledge was important, researchers suggest that teachers should connect to their: professional needs, their development, and knowledge-base (Biswalo, 2001; Loucks-Horsley & Matsumoto, 1999).

In an effort to find patterns or cognitive connections reflections help the participants examine, interpret and analyze academic experiences. Freidberg (1995) says reflections are a “quest for meaning, a meta-cognitive search to give context to disparate bits of information” (p. 25). The participants reflect by comparing prior understandings and experiences with new understandings and experiences (Gillis, 2001). The learner requires prior knowledge to construct concepts upon.

Posner (1989) contends that reflection with no experience leads to “unworkable ... superficial outcomes.” Chitpin and Simon (2009) used post interviews 15 pre-service teachers after they completed reflective exit portfolios as part of the final assessment of a teacher preparation program. The pre-service teachers reported difficulties when writing reflections because they were unfamiliar with the process of evaluating their own growth. The pre-service teachers expressed a desire to have the facilitators help them through the process of developing their reflections and analyzing the contents of the portfolios. Many of the teachers expressed difficulties connecting course objectives with the context of the assignments used for the portfolios and their expectations of what they would experience in their future classrooms.

Their study also recognized the pre-service teachers were attempting to connect their learning experiences in the university with what they perceived to be the context of

their teaching environment. In addition, the pre-service teachers said writing reflections helped them think, for the first time more about the world they were about to face and how to connect their university experience with the real world. In addition, Chitpin and Simon (2009) concluded pre-service teachers identify their reflections helped to identify pre conceived assumptions which may or may not be in line with their future experiences as educators. Based on the results of their study of the experience of pre-service teachers completing reflective exit portfolios, Chitpin and Simon (2009) suggest educational programs fostering change must be based on three major principles: reflections, patience, and support for the learners.

Evans and Mohr (1999) discovered learners reflect on their needs and progress as they engage in educational experiences to address the needs. Reflections help individuals as they attempted to merge together what they know and identify topics to discover or learn to increase their knowledge. During reflections, learners are able to connect to their strengths and weaknesses as they examine their actions within a safe environment of the professional development setting (Glaze, 2002).

In addition, learners use the links or patterns contrived during reflections to gain to develop new concepts and/or ways of implementing concepts already learned. By engaging in reflective practices, learners develop and practice analytical and reasoning skills, which according to Colaresi (1997) should allow the learner to be more effective in their profession. Evaluating the performance of a high school theatre teacher, Colaresi reported that reflective behavior appeared to increase the teacher's ability to problem solve. She also suggested the teacher became more of an expert at resolving issues due to

the formulation of cognitive structures as the teacher reflected on her students, the curriculum and the educational experiences. Thus, she suggests learners deliberately make decisions to use certain methods, tools, etc. to hone in on the right approach to meeting the needs of the student. Deliberate, purposeful acts by the learner require more cognitive thoughts and processing. As a result, the learner is interested in the act because they are active in attempting to address the academic challenges of the situation. Therefore the learner sees meaning or purpose behind the activity. Meaningful activities help to foster the development of opportunities for the participants to construct knowledge and reflect on their own growth and development (Magestro & Stanford-Blair, 2000; Tillotson, 2000).

Using reflection as part of a teacher development program, allows the participants to reflect on what they did and why. Addressing reflective teachers, Dewey (1933) contends that reflective work helped teachers shift from following impulsive routines to actions guided by inquiry (Dewey, 1933). Learning by doing is not enough. To get the facilitators/catalyst prepared to do their job of using individual needs and characteristics to develop and implement lessons, pre-service and in-service teacher developers must provide educators with opportunities to understand and reflect on multiple theories, learning perspectives and focal points (Roberts, 1980; Schwab, 1973).

After increasing what teachers understand about theories, etc., professional developers can improve the teacher's ability to develop inquiry-based skills needed to become facilitators by helping teachers use their understanding of the theories to make decisions. Thus, professional development programs designed to facilitate critical

thinking skills in teachers should include collaborative and reflective activities for teachers (Raines & Shadlow, 1995).

Including Participants in the Design of PD Programs

Of the 70 pieces used for the current study, only 13 researchers included the opinions of teachers in the design of teacher education programs (Biswalo, 2001; Darling-Hammond, 1998, 1999; Dutton et al., 2002; Lee, 2001; Loucks-Horsley & Matsumoto, 1999; Richardson, 2003).

Richardson (2003) recommends designers of professional development program should consider including participants in their designs. The concepts that she proposes would allow for the individual needs and characteristics of the teachers to be included in with the design and implementation of the program, making the learning experience personal, individual and thus meaningful.

In an effort to establish a template for designers of professional development programs, Magestro and Stanford-Blair (2000) established meaningfulness as a key component. To help develop a more meaningful experience they suggest the inclusion of significant skills and user-friendly low-threat hands on activities. The development/improvement model of professional development, by Magestro and Stanford-Blair incorporates the experiences of teachers in the field. The program begins with the identity of a problem needing to be solved by the community (school, district etc.). By acquiring new knowledge, the participants formulate solutions. Assessments are consistently made and used to monitor the effectiveness of the solution. If needed, the participants may re-implement the program or parts of the program to address any part

that may have not been completely resolved. The strength of this model is the ability of participants to guide and monitor their own development as they work with others.

Because the experts (those who are actually in the trenches) are working, the problem and solution are more meaningful (Magestro & Stanford-Blair, 2000).

Guidance

Only nine of the 70 works reviewed (13%) included guidance as a key component of effective professional development programs. Guidance represents suggestions for how to investigate pertinent issues by dissecting specific needs of the curriculum, students and teachers. Examining the ability of middle school teachers to utilize a student-centered approach to teaching, Oakes and colleagues (2000) found teachers used superficial skills when attempting to use new instructional strategies. They suggest teachers need assistance from seasoned teachers on how to analyze and use the results of the analyses to develop meaningful, effective lessons.

Because many teachers do not know how students construct knowledge, they are not able to use constructivism as a viable teaching tool (Windschitl, 2002). Teachers require mentors, who can guide them along the way as they learn to teach students how to construct knowledge.

As part of an inquiry-based professional development program, teachers should not be left to guess how to inquire on their own. The teachers can learn how to inquire if the professional development activities include opportunities for inquiry (Windschitl, 2002). Based on the opinion of Klein, (2003), Tillotson (2000), Westling (2005) and Wood (2001), individuals engaging in inquiry activities should be facilitated – guided by

one who knows the desired end results and/or the process to acquire the end results.

Gerver (2003) defines guided discovery as the specific framework that motivates, identifies the components of the problem, and provides probing questions that guide the investigation. Probing questions are identified as questions that require the questionee to think, use cognitive skills to make judgment calls, establish opinions and vocalize values (Patton, 2002).

As a process to help direct the learning activities, the guided discovery method provides a framework for the individual. It is possible for students to develop the wrong theory when they are not guided towards obtaining the correct one. Gerver (2003) suggests that teachers should guide the students even during the reflection period, helping them establish definite patterns as they define the propositions being studied. Facilitators can do this by using probing questions, creating a framework, fine-tuning the definition, and conceptualizing. In addition, he suggests that facilitators help students identify and support their biases as a way to refute and/or support their prior beliefs. As students construct concepts, he suggests that students build practical theory upon their prior and current beliefs (Gerver, 2003).

Inquiry-Based

The inquiry model allows teachers to initiate the actions. Inquiry based professional development programs allow teachers to use current knowledge and practices to resolve real-life problems. This allows teachers to learn and/or perfect their problem solving skills (Darling-Hammond, 1999; McCarthy, 2007; Richardson, 2003). By including opportunities for teachers to engage in problem solving, there is the

opportunity for teachers to improve their higher order thinking skills. To help foster the development and use of higher order thinking skills, she recommends the implementation of inquiry based professional development programs (Richardson, 2003). Critical thinking skills are developed as efforts are made to evaluate and re-evaluate the problem in an effort to solve the problems.

Nurturing occurs as the individuals work with an expert problem solver, who helps by providing guidance, assistance and possibly resources for developing solutions to problems. The National Research Council (2000) identifies the following key components of an inquiry-based educational program:

1. Beginning with some form of investigation to figure out what and/or why.
2. Collection of data, evidence used to evaluate and explanation of what and/or why.
3. Use of data and resources collected by the inquirer to explain patterns to address the purpose of the investigation.
4. Use of knowledge gained by self and others to analyze the explanation and alternative explanations to explain the patterns discovered.
5. Reflections to re-evaluate the analysis to reassure the outcome of the analysis.
6. Communicate and justify outcome of analysis, which usually represents an understanding of new concepts.

For teachers to facilitate cognitive activities – active learning by students – they should provide educational experiences that match the unique characteristics of students. To help teachers develop these skills, an inquiry-based professional development

program design should provide them with skills needed to assess the needs and learning styles of students, discuss findings, identify desired skills to teach, and isolate appropriate strategies. In addition, the inquiry-based professional development program should help teachers compare research based theories, strategies and make changes based on what they know about their students. By utilizing critical thinking activities, teachers working within this cognitive structure are educational catalyst.

Inquiry orientated instruction encourages “teacher as learner” (Raines & Shadlow, 1995, p. 271). Using their understand and participating in guided activities designed by the professional developer related to discussing and making decisions on what to use and what not to use for teaching current students, the teachers are able to develop cognitive structures for analyzing the needs of their students. After analyzing, with the help of the collective, teachers participating in an inquiry-based professional development program should be able to select appropriate strategies to better facilitate learning.

Teachers use inquiry skills for analyzing information gathered to project what changes are needed and how best to make the changes. Inquiry skills help to tailor make the findings and/or outcomes to match unique needs of the students and/or teachers. Teachers engaging in this form of learning use prior knowledge and new data to develop a strategic plan of action. Approximately 33% of the 70 literatures on effective programs reviewed considered inquiry to be important.

What is Next?

The use of an inquiry based professional development program includes the concepts aligned with effective professional development programs. There is no one strategy or program that works best for teaching all students or participants. There is no one method of instructing teachers that works for all teachers (Lieberman, 1995). Using one particular type of professional development program is not going to address all of the needs of a teacher, the educational program, the school district and most of all the children. Several researchers agree on some of the basic components of a quality professional development program (Darling-Hammond, 1999; Lieberman, 1995; Richardson, 2003). Generally programs must include: connection of new concepts to prior knowledge and or skills; opportunity to investigate; collaboration; connection to real-world experiences and conditions; establishment of clear and elevated goals; and motivated students due to a match between their interest and strengths.

Table 1 is an attempt to summarize the general findings of literature reviewed for this study addressing effective professional development programs. Based on information from literature used to generate Table 1, it appears that there is no single component that is present in all effective programs.

Table 1

Summary of Effective Professional Development Program Components

Researcher	Year	Meaningful	Autonomy	Inquiry	Follow Up	Collaboration	Timeless	Guidance	Flexible	Reflective
Biswalo	2001	1	1	1		1			1	1
Cary	2002					1				
Chitpin & Simon	2000									
Cochran-Smith & Lytle	1999									1
Colaresi	1997									1
Darling-Hammond	1998, 1999	1	2	2	1	1				
Deng	2004						1			
Dutro et al.	2002	1	1							
Evans & Mohr	1999									1
Friend & Cook	2007					1				
Garmston	2005									1
Gerver	2003							1		
Gillis	2001									1
Glaze	2002									1
Klein	2003							1		
Lee	2001	1	1					1		
Lieberman	1995		1		1	1	1			
Little & Houston	2003			1						
Lortie	1995								1	
Loucks-Horsley & Matsumoto	1999	1	1	1	1	1				1
McCarthy	2007			1						
Mabane & Galassi	2000						1			

Researcher	Year	Meaningful	Autonomy	Inquiry	Follow Up	Collaboration	Timeless	Guidance	Flexible	Reflective
Magestro & Stanford-Blair	2000		1							
Mann	2004									1
NRC	2000			1						
Oakes et al.	2000							1		
Patton	2002							1		
Penuel et al	2007			1						
Posner	1989									1
Raines & Shadlow	1995									1
Richardson	2003		1	1	1	1				
Riley	1994	1			1	1	1		1	
Roberts	1980									1
Roulston et al.	2005				1					1
Schwab	1973									1
Shepardson et al	2002	1								
Stalmeijer	2009			1						
Tillotson	2000					1		1	1	
Wagner	1998					1				
Westling	2005							1		
Windschilt	2002							1		
Wood	2001							1		

Each of the reports referenced in Table 1, above reflect professional development models that have both their unique strengths and weaknesses. There is no one-size-fits-all model or academic method. However, innovators should consider including in the design of teacher development programs some key components that help to improve the effectiveness of the programs. To summarize, the key components, according to literature of an effective professional development plan are; programs that are school-wide, long-term, have follow-up activities built in, foster agreement among participants on goals and vision, motivates change or adaptations of the activities of the participants, are reflective, allow for regular feedback to participants and the ability to match or impact change of the participants belief system.

Effectiveness Leads to Change

Examining the effectiveness of educational reform efforts designed to improve pre-service and in-service educational efforts for more than 10 years, Riley (2002) contends educational reform efforts can be halted if the educational program does not adequately prepare the teachers for the changes needed to implement the program. In other words, ineffective pre-service and professional development programs will stunt the forward motion of innovative programs designed to bring about change. Again, effectiveness is measured by follow-through, or level of implementation of the objectives of the program within the classroom. The level of implementation is measured by the impact on student achievement.

Edwards (2000) contends that a teacher can change what is in their minds after they experience a cognitive shift. She notes that cognitive shifts begin when there is a merger between the new concept and the learner's current knowledge base, belief systems, context of skills to be learned and full awareness of the learner's ability to implement a new program and the knowledge of how and when to implement the program (Edwards, 2000; Richardson, 2003).

Changing from teachers who focus on teaching skills within specific chapters (disseminators) to those who teach concepts to individual students (coaches), teachers must change their focus or approach to teaching (Cohen, 1988). Learning implies a change in behavior. Richardson (2003) suggests that teachers can change when the experimental ideas used to help students engage in activities do not violate the teacher's particular need for control by giving students a voice; matching the teacher's beliefs about teaching and learning; and helping the teacher respond to system-determined demands for such outcomes as high test scores. If these concepts agree with the teacher's cognitive framework, the teachers are able to internalize and absorb new ideas into the teachers' cognitive data bank.

. . . Since teachers change all the time, a strategy here would be to determine the ways in which they make their decisions to change and provide input and help when they do so. The second task is to help make teachers see the usefulness of a collective approach to some change-related decisions and actions . . . effective way of working within this naturalistic model of change. It is called inquiry approach. . . programs designed to help teachers examine and improve their teaching of reading and the language arts. It is grounded in a constructivist theory of learning, and this affects the process (Richardson, 2003, p. 403).

Thus, the need of professional development programs targeting a change in teacher behavior must include an opportunity for teachers to see the value in the program, how will they benefit specifically from the program.

Inquiry Learning Can Help Improve Student Learning

Barman (2002) identifies two forms of inquiry learning; scientific inquiry and student inquiry. Scientific inquiry is the method used by scientist to study the world, and to theorize methods to explain their findings. Student inquiry fosters learning as students inquire to learn by investigating. He contends students acquire knowledge by questioning and investigating the concepts presented as part of examining by researching the components of their inquiries (Barman, 2002). This research project sought to examine the process of developing investigative skills needed to use a scientific inquiry approach when teaching. Any individual that gathers information from resources, the environment etc. and then uses the information to process new knowledge, skills, and concepts is engaged in inquiry learning.

Inquiry by Using Shuraa Baynahum

Surveying the opinion of teachers across the nation regarding the effectiveness of professional development programs, Parsad and colleagues (2001) identified that 45% of teachers, who found professional development programs successful, collaborated with others. Of those who collaborated, 62% collaborated once a week, 23% collaborated twice a month, and 15% collaborated once a month. The results of the survey suggest teachers view collaboration as a key component of an effective professional development

program. Even though many respondents recognized that they did collaborate, only 65% of those who collaborated participated in collaborative activities scheduled by the school. Close to 40% of the teachers had to do their own planning and/or structuring in order to get an opportunity to collaborate (Parsad, 2001). Collaboration benefits the participants of a professional development program if they are provided opportunities to address specific concerns and or problems (Mercer & Mercer, 2005). Parsad's (2001) survey results indicate that teachers identify collaboration as a key component of professional development programs.

Shuraa Baynahum – Mutual Consultation

Based on the results of the above survey, the teachers surveyed did engage in collaboration. However, Parsad's (2001) results indicate collaboration should be planned and not haphazard. Professional development programs should have collaboration built in, allowing for social construction of concepts. Reviewing Vygotsky's (1978) position, learning occurs as individuals share information by way of collaboration, learning from open dialogue and consultation. In the religion of Islam every major decision must be made by mutual consultation, from the Arabic – Shuraa Baynahum. Translated into English, the literal definition of Shuraa refers to extracting honey from hives (Omar, 2005). Examining Shuraa figuratively, the Arabic root for Shuraa, Sharaha means to open, enlarge, expand, uncover, disclose, explain or interpret (Omar, 2005).

Honey is a sweet product prepared by bees for food. Bees rely on honey for food regardless of the environmental conditions (summer or winter). The sweet trait of honey

is analogous with the palatable characteristics of knowledge that comes easily and makes other concepts clearer. Honey is defined as pure, not being affected by outer influences (Collins, 2009). The student should be able to access knowledge whenever needed, not only when they are preparing for a test. This can be compared to knowledge that has withstood the test of time, supported and reinforced by other concepts. Similar to the faculty and staff of the school, the hive reflects a community, where each member has his or her own role, contributing to the team effort as the needs of the collective are addressed (Collins, 2009). Thus, 'extracting honey (ideas, knowledge) from hives' is analogous to developing concepts by taking the best from members of the collective, i.e., participants in professional development sessions.

In Arabic, Baynahum is derived from the root word 'bayan. Wehr (1976) defines bayan as clearness, obvious, manifestation, illustration. Omar (2005) extends the definition as the act of making things clear or exposing the meaning. The noun, bayanun reflects intelligent speech, guided by knowledge (Omar, 2005).

In Islam, there are signs found in creation that should be used to acquire and understand knowledge. The Arabic word for signs is iyats. According to Islamic teachings, iyats are revealed from within creation and are used as tools for providing meaning (The Holy Quran, 1492 A.H./1992). The word iyat also means sign or proof based on evidence (Omar, 2005). Therefore, the clearness or manifestation of concepts is based on evidence or sound support. A person's intellect is enhanced when they are receptive to and able to use the signs which come from the environment (Mohammed,

2005). Signs, messages are all around (The Holy Quran, 1492 A.H./1992). The unique features of each phenomena reveals itself as the signs or the new concepts are studied (The Holy Quran, 1492 A.H./1992).

During Shuraa discussions, each member of the group presents what they have constructed (what they already know). All relevant information is 'placed on the table'. The information is mulled over. Cognitively, concepts are developed and reinforced as the discussion continues. The members of the group agree on 'the best,' as supported by sound decisions.

The English translation for Shuraa Baynahum that comes closest to the Arabic meaning is mutual consultation. Mutual refers to consent, reciprocal, no dominant leaders (Zollinger, 2010). The final decision is based on consensus between the teacher and student because "students see the humanness of their teacher" (p. 212). That does not mean the majority rules. Consensus suggest that all sides are heard equally, providing the members of the discussion with the best possible outcome (Collins, 2009). Consultation reflects the behavior of dialogue, presenting concepts that are relevant to the idea being discussed and using what is presented to guide the decision (Collins, 2009). Consultation also suggests examining things from several angles (Collins, 2009). In English, consultants are considered to be experts knowledgeable about a specific topic (Collins, 2009). Therefore, consultation reflects open discussion being guided by those who know, or the experts.

Connecting Shuraa to Teacher Development

How does mutual consultation or Shuraa Baynahum fit in with teacher development programs? A major component needed by any pre-service or in-service program designed along the constructivist paradigm is the opportunity collaboration between participants as a means for social learning or social development of skills (Vygotsky, 1986). Each individual engaged in the social setting contributes to the educational experience. As one contributes, he or she receives from others information that helps to confirm and or build onto their cognitive understanding of the phenomena. As each member of the social setting cognitively gives to and receives from others, he or she contributes to the metamorphosis of the cognitive road map – schema of each member of the conversation (Piaget, 1985). The metamorphosis occurs as the, “Innate perceptual/conceptual capacities and cultural processes work in tandem” (Sklar, 2009, p. 157). The metamorphic change does not occur as well if the individual is only receiving information – storing it for another day. When the individual engages in social dialogue within settings aligned with the work experience matching the phenomena being discussed, he or she cognitively internalizes specifics from the dialogues, environmental data and prior knowledge that help to frame the metamorphic changes – refining the schema. Schema development or refinement is dynamic, “occurring as one continues to engage in related social and environmental experiences” (p. 158).

During the social and environmental experiences, the individual refines his or her schema by juggling, refining or perfecting meaning. Social constructivists contend

meaning is developed and enhanced as the individual combines social interactions and content knowledge within a “context-specific” environment (Vygotsky, 1978; Woo & Reeves, 2007). An educational environment providing an opportunity for individuals to engage in social interactions or dialogues with others sharing the educational experience fosters the development of meaning as the members of the dialogue cognitively synthesizes meaning. Cognitive synthesis occurs as the individuals cognitively toss around ideas, creating conflict with what was known, analyzes prior knowledge with new information received from the educational experience, and uses critical thinking skills to manipulate what is being received to fit the current or previous schema (Piaget, 1985). During this process the individual develops or refines meaning, leading to the ability to make decision about the educational phenomena under discussion (Schwandt, 1994; Shepardson, 1996; Woo & Reeves, 2007).

So, what must be done to help teachers learn how to use inquiry skills as they learn to identify student needs, match those needs to the curricula and select appropriate strategies? What are the key design features needed for an effective professional development program that facilitates the development of inquiry-based instructional strategies? What should the professional development program look like that facilitates the development of the learning conditions needed to enhance inquiry-based skills in students? What are the necessary components needed to provide the basics of PBL, and develop and implement lessons, using PBL strategies? Knowledge of the participants (adult learners) and content (critical thinking) must be used to design the professional

development program orchestrated to facilitate the development of critical thinking in teachers.

Critical Thinking Instructions

Why focus on inquiry-based learning? Since the beginning of formal education in this country, educators have attempted to provide society with what it needs (Sarason, 1996). An example of what any society needs is the existence of individuals prepared to enter the workforce. Educators try to help prepare the students for the workforce by designing and implementing effective educational activities – development of skills that can be carried on/transferred to other practical situations.

What type of educational activities should modern day education focus on? Ettinger (1998) identified several characteristics needed by employees to meet the demands of the workforce as the 21st century begins. She suggests that new employees should be problem solvers, able to work in groups, initiate and structure activities for themselves as well as their colleagues, be able to facilitate (being less intrusive/directive) and demonstrate the ability to generalize knowledge and skills that have been learned (Ettinger, 1998).

In addition, research has reinforced the need to have humans become more sensitive to the uniqueness of various cultures within our society (Freire, 1970; Ladson-Billings, 1999). Some contend the need is not for assimilation, but for the recognition that individuals have needs and desires that can help them reach their fullest potential as active citizens of this nation (Gonzalez, 2005; Ladson-Billings, 1999; Moll & Gonzalez,

2004; Moll et al., 2005; Sleeter & Delgado-Bernal, 2004). Researchers have sought to adjust our educational system's focus on improving achievement scores by empowering underrepresented groups (Ladson-Billings, 1999; Sleeter & Delgado-Bernal, 2001).

Others have sought to improve the motivation, self-esteem and self-advocacy of underrepresented youth (Akom, 2009; Cammarota & Fine, 2008; Gutstein, 2009; Payne, 2009; Tan, 2009).

What is the tool to be used to help improve the preparation for all students in the workforce? Freire (1970) contends:

That which had existed objectively but had not been perceived in its deeper implications (if indeed it was perceived at all) begins to "stand out," assuming the character of a problem and therefore of challenge ... (p. 83)

If problems exist within the individual, within the society, the goal is to eradicate them. Freire (1970) is suggesting some of the problems may have been stifled or smothered by our culture. Now they are surfacing because they are affecting how citizens react with each other socially and in the workforce.

Problem-posing education affirms men and women as beings in the process of becoming – as unfinished, uncompleted beings in and with a likewise unfinished reality ... necessitating education as being an ongoing activity (p. 84).

What is the solution? Taking a critical look at the historical framework guiding the development and running of the educational system in this country, Gutek (2009) purports the educational system develops a dominant submissive relationship between the student and the teacher. In addition, discussing the top-down approach to teaching, Garet

and colleagues (2001) contend dissemination designs do not effectively increase student follow-through. They define follow-through as student's ability to implement concepts presented during instruction outside of the classroom. They also contend lessons do not provide the students with skills needed to address societies needs (Garet et al., 2001). Positions taken by Gutek (2009) and Garet and colleagues (2001) help to support the need to improve acquisition of knowledge and skills that leads to increased student performance, teachers may need to use more inquiry-based instruction.

Inquiry Based Instruction: Problem Based Learning

Teaching students to think, to problem solve helps to improve the long term effects of education. It teaches students inquiry, investigative skills. Inquiry learning practices help to promote the development of critical thinking skills. An example of an inquiry-based program is Problem-Based Learning (PBL). PBL promotes the development of critical thinking skills in the students engaged in the strategic problem solving. PBL is an example of a program that helps to foster higher order thinking skills (HOTS). Problem-based learning has been defined by some as a self-directed form of learning, allowing students to expand their knowledge by actively engaging in small group discussions about particular questions or problems (Neville, 1999). Others define PBL as an educational framework allowing the teacher to move into position of facilitator. Students become actively engaged in group work that allows them to strategically solve problems (Klein, 2003; Prince, 2004).

PBL refers to the academic strategy of teaching content and process skills as students work collectively to solve a real-life problem (Murray & Savin-Baden, 2000; Prince, 2004). PBL is not supposed to replace but enhance the teacher's choice of strategies. It can be used in conjunction with lectures and other academic strategies (Biswalo, 2001; Choike, 2000; Darling-Hammond, 1998; Klein, 2003; Wagner, 1998).

Historically, PBL has been used mainly in the medical profession, beginning about 30 years ago (Buysse, Sparkman, & Wesley, 2003). Several studies, completed and documented within the last five years include the use of problems, identified in case studies, as a vehicle for teaching students how to apply concepts learned while developing and using critical thinking skills. Medical models allowed pre-nursing students the opportunity to read, discuss and solve specific medical problems found within case studies. Within the studies, the pre-nursing students discussed the facts of the case, used resources gathered during their courses and formed independent searches to create a solution to the problem identified in the case studies. Each study made reference to the role of the educator as a facilitator (Klein, 2003; Shore, 2000).

In a study by Davis and Harden (1999), all of the first and second year medical students of a specific medical college spent time gathering factual information, selected and designed by the instructors. The next step was to have the students combine their prior knowledge, factual information from the courses and other resources to solve the problem. Davis and Harden identified the problem as the stimulus creating the desire to search and learn more, followed by self-study, synthesis of new information and the

reflections of what was learned. The students did need some help from the teachers. The more cognitively engaging the intellectual abilities of students, the less help the students needed from the tutor or the facilitator (Davis & Harden, 1999).

Similar to the Davis and Harden study (1999), research by Jitendra and colleagues (2002) showed that providing eighth grade learning disabled students with guided instruction helped to develop critical thinking skills. The intervention plan was implemented by SPED and GED math teachers helping students structure and organize the points of math word problems by mapping out what is given, what is desired and what is needed to get to the answer.

Once the students organize the word problems, they were better able to use knowledge gained, prior knowledge and the schematic map of the word problem to solve the problems within groups. The groups mapped out their discussion and their support for the answer to the word problem. Jitendra and colleagues (2002) recognized that the LD students in this study had organizational concerns to begin with. Therefore, the input of the teachers, helping the students develop organizing concept maps allowed the students to develop the critical thinking skills despite their organizational deficits. Again, the greater the students cognitive need, the greater the need for input from the teacher (Jitendra et al., 2002). The design of the BPD professional development program implemented for this project is guided by the need to help teachers provide the appropriate input required to address student needs.

The Illinois Math and Science Academy (IMSA) is an example of a school that structures its curriculum around the framework of PBL. The school is located in a small rural town near Chicago. It serves as a boarding school for residents of the State of Illinois. IMSA recruits high school students, who pass test and or have demonstrated that they are critical thinkers. All of the teachers have their masters degree or higher. Many of the teachers are or were researchers and/or professionals in corporate America in the areas they teach. For example, the English teachers may have been journalist or university English professors. The math teachers may have been engineers or architects. Based on this, many teachers bring a wealth of practical experiences to their courses (“Pblnetwork: Collaboration,” 2010).

To prepare the teachers for PBL implementation, as well as help teach PBL teaching strategies to others, IMSA offers a special summer program, the Harris Institute that helps to introduce the PBL program to educators. The Harris Institute is a four-day program that teaches teachers by having them engage in the PBL process. The program coordinators provide background information on tenets of PBL and then the teachers actually engage using PBL strategies to solve to solve a problem (“Pblnetwork: Collaboration,” 2010).

IMSA structures the program so participants compare traditional components of teaching to PBL practices. Some of the traditional methods compared include lecture, cooperative groups, direct instruction, case methods, simulation and gaming. The teachers identify the role of the teacher and the student as they observe the characteristics

of both. They take the comparison a little further by comparing the cognitive and metacognitive characteristics of each method of teaching. Based on the results of the structure of the Harris Institute, lectures and direct instruction are examples of the lowest level of Bloom's Taxonomy (regurgitating facts, passively engaged). Case methods, discovery-based learning allows students to apply general knowledge learned with prior knowledge. Problem-centered learning and simulated learning allow students to combine their own individuality with knowledge learned to solve problems and construct models of the real world (Harden & Davis, 1998; "Pblnetwork: Collaboration," 2010).

Problem-centered learning (PCL) and problem-based learning both allow students to synthesize. PCL allows the students to synthesize knowledge received. PBL allows students to synthesize and construct knowledge (active learning) as a method to solving the conditions of the problems. During PBL, the students solve a teacher directed problem, using specific methods and materials given by the teacher. Students engaging in PBL activities must choose from among all of the resources available, and/or not available, the appropriate content to solve the problem. PBL allows the students to identify the strategies and/or activities that guide their problem solving efforts ("Pblnetwork," 2010).

In an effort to help retain and keep the skills of general practitioners sharp, Smith, Singleton, Teague, Ross-Harper, Wilke and Hilton (1998) used a quasi-experimental approach to evaluating the effectiveness of group learning on the field experience of eleven general practitioners. The general practitioners engaged in weekly group sessions

as part of a professional development experience. Smith and colleagues conducted pre and post interviews and job satisfaction surveys to evaluate the success of the professional development group activities. Results show the general practitioners had a better sense of patient care. In addition, each participant indicated less job related stress and improved job satisfaction after the group activities. Knowles (1984) suggest that group learning allows the participants to find the relevance and or connection between theory and practice. Finding relevance in a learning experience makes the experience more meaningful, thus reducing the stress level (Biswalo, 2001).

Smith and colleagues (1998) included in this project a facilitator, someone who helped the participants contribute and build off each other's contributions. Analysis of the interview data revealed that the participants agreed that they felt the professional development program was effective, helping them learn and eventually use the problem solving skills learned. Some of the reasons noted included a boost in their confidence level, the ability to work with partners, a reduction in their anxiety centered on working with others. This study represented veteran doctors. As they participated in problem solving, they learned collaboration skills. Smith and colleagues identify the role of professional development as a way to improve morale, helping to combine practice with providing service.

Charlin and colleagues (1998) and Christensen (1987) identify three tenants of problem-based learning: begins with a problem instead of providing specific disciplinary skills, uses the problem as a catalyst for learning specific skills, and allows for individual

learning. The problem represents real-world conditions. The teachers design problems to promote investigation and the use of resources. The problems used encompass several disciplines, several skills. The students should do the work, not the teacher. They design the problems to have the students learn as they solve them (Charlin, Mann & Hansen, 1998; Christensen 1987).

When using the PBL strategy, teachers help students select problems that elicit investigation. The problem helps students learn critical thinking skills as they construct the solution (Charlin et al., 1998). Walton and Matthews (1989) identify PBL as an educational approach instead of simply a learning strategy. This educational approach has the learner as an active participant, engaging in self-directed activities to solve problems as they learn specific skills (Boud & Feletti, 1991).

The PBL problem is student centered. The group attempting to solve them tailors the activities involved in solving the problems. Students are able to do this by choosing the resources to use, the strategies, and the time needed to solve the problem satisfactorily, all based on their needs (Charlin, 1998; Knowles, 1984). By the time the students gain this type of freedom of choice, they have already learned some general knowledge. The activities of solving problems do not begin with a lecture. Prior to the students taking classes that include PBL techniques, the teacher has taught some basic skills already. In addition, the students formulate their own objectives, determine the depth of the investigation as well as assess their own achievement. The students use

reflections to isolate the skills that they have learned. They isolate knowledge factors and processes used (Charlin, 1998).

It is very clear from the literature, many researchers and practitioners have identified the need to increase the critical thinking skills of students as a way to improve the educational outcomes, matching the growing demands of the society. Of the many programs designed to teach inquiry-based skills by using problem-based learning, none provide guidance for or instruction for preparing the teachers with the important skills necessary to provide students with the appropriate critical thinking skills. This research project seeks to apply several of the key components of effective professional development programs, including the voice of the participants. Their voices served as a vehicle to examine how key elements from literature impacted the participants. In addition, this project seeks to identify a relationship between the presence and or absence of the key components and the level of carry through of the program into the classroom.

Summary

As identified in the literature review of this study, research findings suggest that there are some specific components that effective professional development programs must include: collaboration, inquiry-based, opportunities for follow up and feedback support, include content in a meaningful way, guidance/coaching, have participants help develop the design and contents of sessions, and opportunities to reflect. In addition, literature supports that adult learners learn better when there are opportunities for: including their preferences (such as learning styles) in the design of the program; mutual

coaching between participants and program designers; reflecting on their activities; participants to help control the learning process; participants to learn from experiences that connect to prior knowledge; activities that are paced to match the adults developmental level; job specific performance based activities; and self-direction. Finally, to help teachers learn well enough to be professionals, they must become experts. Experts utilize critical thinking skills to analyze incoming information to refute or construct new information.

Based on the above summary, the premise of this research is that a professional development program must include several key components to help adult learners develop inquiry based PBL skills needed to effectively teach inquiry skills to their students. The key components are as follows: input from teachers about design needs, opportunities to collaborate, constant feedback from professional developer and administration, opportunity to investigate and solve problems, opportunities to reflect on practice, inclusion of tenets of PBL and connection of new concepts to academic foundation.

CHAPTER III

METHODOLOGY

To study the effectiveness of the Bait Professional Development Program (BPD) the following research questions are examined:

1. Is there a relationship between the level of teacher participation and their ability to use Problem-based Learning curriculum?
2. Is there a relationship between the level of teacher participation and the use of Shuraa Baynahum (collective consultation)?
3. Is there a relationship between the level of teacher participation and student achievement?

BPD addresses the professional development needs of a newly-opened faith based private school in a small suburb outside of a large metropolitan area. The data used for this study was accumulated over a two-year period, August 2004 through May 2006 (McBurney & White, 2004; Mitchell & Jolley, 2004). The sources used to collect the data over the two years included: field notes from BPD sessions, a sample of lesson plans representing pre and post BPD sessions, students' pre and post standardized achievement scores, and teacher reflections addressing what did and did not work for students.

To evaluate the effectiveness of the BPD, a mixed model approach was used (Johnson & Onwuegbuzie, 2009). The mixed model approach included both qualitative and quantitative analysis of the data. Field notes, lesson plans, reflections and other

archival data was used to qualitatively analyze teacher behavior and responses during a two year inquiry based professional development program. The qualitative data provided some first-hand comments from the participants and some third person observations of teacher experiences.

Most of the qualitative data was coded and quantified by using behavioral rating scales. The quantitative ratings or teacher participation during the BPD sessions was compared to the ability to follow through with the skills learned in the classroom. In addition, teacher ratings were quantitatively compared to student performance. Using the curriculum coordinator's field notes from the BPD sessions, lesson plans, and student performance (as measured by standardized and criterion referenced assessments), quantitative evaluations identify the impact (if any) of teacher behavior during BPD activities on their ability to impact change in the classroom (see Figure 1).

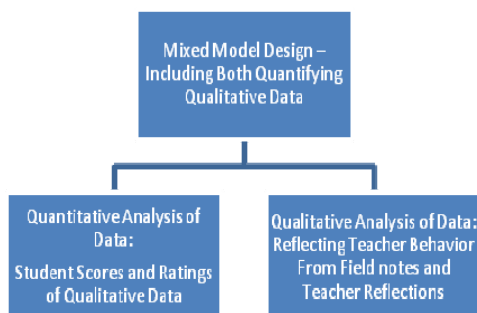


Figure 1. Summary of Mixed Model Design

Using the MSCOPS observational analysis (Stuessy, 2006), qualitative – thematic analysis of field observations, teacher dialogue during the two years, and teacher reflections helped to identify how teachers explain their BPD experiences.

Setting

The BPD program was designed and implemented to address the staff needs of a faith-based elementary school in a suburb of a major metropolitan city. Faith-based refers to the holistic approach to educating children, including the social and academic needs of the child (Saunders, 2001). BPD's faith-based curriculum includes all of the state academic standards seamed together by value based themes. Enrollment for the first year was 14 students. At the end of the professional development program, May, 2006 there were 17 students. Of the 14 students enrolled in 2004, five were primary students (K-2nd grade); three were 4th and 5th grade students, no 6th grader, one 7th grader and five eighth graders. At the beginning of the next school year, Fall, 2005 there were seven primary students (K-1st grade), eight intermediate students (3rd – 5th grades), and two middle school students (grades 6th and 8th).

Based on entry level test, the academic level of Bait's student body, enrolled during the BPD years of 2004-2006, ranged from high achievers, average, and slow learners. The entry level test also revealed the following; two students had visual discrimination difficulties, two primary and one elementary students had difficulties with organization, and all kindergartners during the first and second year were four years old (demonstrating math and reading readiness skills equal to and higher than the kindergarten level, while socially acting as a four year old).

Bait was established in 2004 upon the principal of teaching children to be critical thinkers, problem solvers. Bait's curriculum encourages teachers to facilitate the

development of inquiry skills. Bait's mission puts forth that teachers are to prepare students to:

... work collaboratively with fellow students, advisors, mentors and professionals [to] identify, organize, plan and allocate resources [as the students] examine the natural world with the purpose of reasoning soundly and questioning carefully in order to formulate hypotheses about man/woman and their individual and collective roles as Khalifa (caretakers) on the earth and servants of G-d (Abdullah, 2004, p. 1).

In addition to the mission, the schools vision statement includes the following:

We seek to provide a nurturing environment that engages students in the careful analysis of G-d's creation and the order of the universe while developing a cooperative partnership among students, family, and community (Abdullah, 2004, p. 2).

Thus, the mission states teachers at Bait have the responsibility of developing critical thinking skills by infusing concepts of inquiry into the curriculum. Using the state board of education curriculum as a foundation, Bait's staff developed the curriculum to teach academic, leadership and social skills at each grade level. The curricula included language arts, math, science, social studies, Spanish, Arabic, gym, and computer. Primary teachers taught all subjects (language arts, math, science, and social studies). Teachers of third through middle school students taught specific academic subjects (departmental, not grade levels). Table 2 includes the subjects and grade levels taught by each teacher evaluated as part of this study.

Table 2

Grade Levels and Subjects Taught by Bait Teachers

Teacher Code	Subjects Taught (Grade Level)	BPD Participation	Grade Levels
Alif	Language Arts and Social Studies	All -1	2-8
Ba	Primary)	All	K-2
Ta	Tai Chi, Spanish and Arabic	All	All
Tha	Arabic	1	All
Ja	Math	3	Intermediate
Dal	Gym	1	All
Ra	Computer	2	All

Subjects

The Bait faculty included elementary and high school teachers who agreed to teach classes at a newly opened (Fall, 2004) faith-based elementary school in a suburb of a major metropolitan city. Each teacher approached the school about helping in whatever way they could. At the onset of the BPD program, none of the teachers had enrolled in or completed a pre-service teacher education program. Prior to the school opening, each teacher involved in the first year of the professional development activities volunteered to get the school off the ground by doing various task before the official date for teachers to arrive. Table 3 reflects a summary of teacher characteristics.

Table 3

Characteristics of the Teachers at Bait

Code	Level of Education	Gender	Age Range	Full or Part Time	Prior Experience	# of Years at Bait	Bait at End of BPD
Alif	PhD – Policy Studies	F	> 40	F	0	1.5	Y
Ba	PhD – Early Childhood	F	> 40	F	0	1.5	Y
Ta	AA – Social Work	M	> 40	P/F	0	1.5	Y
Tha	AA – Business	F	<30	P	0	1.0	N
Dal	BS – Social Work	M	<30	F	0	.7	N
Ja	BS	M	< 30	P	0	1.5	Y
Ra	BS – Economics	M	< 30	P	0	1.0	Y

Seven teachers participated in the BPD program. For the purposes of this study, each teacher is identified by an Arabic alphabet (Alif, Ba, Ta, Tha, Dal, Ja, and Ra). At the start of the professional development program, each teacher had some college experience. During the school's first year of operation, all teachers had a post-secondary degree. Two had an AA degree, four BA, BS degree and two PhD degrees. The second year, all teachers had at least a bachelor degree. None of the teachers had teaching certificates. Teacher Ta has a BA in social work. Tha has her BA in communication. Dal has earned his BA in business administration. Ja has a BA in art. Ra posses substitute

certificates. Ba has a PhD in early childhood administration. Alif teaches at the post-secondary level for a state university. Dal has a teacher assistant certificate.

All together over the first two years of operation, eight different teachers worked at Bait. During the time of the study, Alif, Ba, Ta and Dal had worked for the entire two years. Tha was temporary, leaving due to outside obligations. Alif and Ba were the only full-time employees throughout the two years of the study. In addition to the full-time teachers, various teachers work part-time, coming in to teach specific classes and then leaving. The full-time teachers focused on language arts, math and social studies. The part-time teachers are responsible for science, computer, fine arts, foreign language and physical education. During the first year of the study, there were three resource teachers. During second year, there were four, based on the design of the curriculum and grade levels taught.

Tha only taught the first year of the program. During the time of the BPD session, she was working on her BA. Due to a schedule change she did not work the second year, giving her classes (Arabic) over to another part-time teacher, Ta. He was also a college student working on his BA and taught Spanish the first year of the program and Spanish and Arabic the second year. In addition to teaching the foreign languages, Ta also taught Tai Chi to all students during the second year of the program, when he began to work fulltime. Since opening day, Dal has taught physical education to all students. Ra taught computer and social studies to middle and upper grade students.

Design of Professional Development Program

The Bait professional development program (BPD) provided teachers with an opportunity to learn inquiry skills as they tailored instruction to fit the individual needs of students. BPD used the components of the professional development programs outlined in literature (see Table 1). Specifically, BPD included content relative to the participants, allowing them to get their personal needs and concerns addressed. By including comments from teachers and school administrators when selecting topics for BPD sessions and the method of delivery for most of the sessions, the BPD program was tailored to the needs of the school and teachers. Inquiry is part of Bait's mission and vision and included in the design of BPD. BPD included guidance for all participants, allowing for more individualized instruction. Teachers were helpful in designing the instructional methods aligned with their learning preference, allowing teachers to become more engaged in the learning process as designers and participants (Keefe, 1979; Stewart & Felicetti, 1992). BPD included opportunities for flexible long-term follow through, allowing teachers to have direct contact with the curriculum coordinator when needed. Finally, BPD included an opportunity for participants to reflect on their own growth, making the learning experience personal and increasing metacognitive growth (Brown, 2009; Bruer, 1993). Table 4 provides an overview of the professional development program, including research-based phases. Each is elaborated on in more detail in the next section.

Table 4

Schedule of Inquiry-Based Professional Development Program

Research- Based Phases	Instructional Methods	Timeline
Content –Relative, Meaningful	Informational Sessions	- August, 2004 - September, 2004 - November, 2005
Design of Program	One-on-one to collect information	- November, 2004
Inquiry-Based	Whole-group - Collaboration and Facilitation	On-going, starting 1 st year
Guidance	Small Group – Planning and Dialogue (as needed)	On-going, beginning before the first year
Long-Term Follow-Through	One-on-one session between curriculum coordinator & teachers	On-going, beginning before the first year
Built-In collaboration & Flexible Time	Whole-group – Planning and Dialogue	After informational session & upon teacher request
Engaging		On-going, beginning 1 st year
Participatory Autonomy		Increasing as time goes on
Reflections		On-going

Content Meaningful to Participants

The above topics were included in an effort to provide a working foundation for teachers to build upon. The BPD information sessions were aligned to match some content of a pre-service and in-service program. Bait teachers were not certified, never attending a methods, characteristics and/or educational psychology classes, prompting, the curriculum coordinator to select content from various foundation courses (i.e., child development, curriculum development and some core content topics) that matched the needs of the teachers. Even though the topics are typically found in pre-service

programs, the curriculum coordinator made a conscience choice to include them in BPD because of the professional development program was designed to meet teacher needs.

BPD used the several strategies in the informational sessions to share content: the dissemination of general knowledge, guidelines for teachers to gather more information as needed, and opportunities for additional support as needed. Content and methods used for the informational sessions matched the need of the professional developer and the school. PBL was the topic of one session. This topic matched the mission and vision of Bait: teachers facilitating the development of critical thinkers and problem solvers. However, BPD included more than general information required by the school. The curriculum coordinator also selected topics based on previous conversations with the participants.

As part of BPD, the concerns and needs of teachers were used to guide the format and selection of content of each session. To ascertain the opinions of teachers and their needs, teachers were allowed to contact the curriculum coordinator at any time for assistance. The results of the meetings helped to identify each teacher's opinions of what was helpful and of his or her needs. This information helped to guide the content of the individual and collaborative group sessions.

Based on teacher preferences observed during interactions with teachers, the curriculum coordinator decided to be available to teachers several times a week by phone and/or e-mail. In addition, the curriculum coordinator prepared to stop by the school once a month to observe and/or have private meetings with teachers, as needed. If Bait

administration and/or teachers made a special request for assistance, the curriculum coordinator became available for personal consultations. The personal consultations continued throughout the remainder of the two years. It was anticipated that teachers would identify the method and content as being meaningful to their teaching practices.

Inclusion of Participants in the Design of BPD

The curriculum coordinator used multiple strategies during the BPD sessions, selected based on the request of the teachers (based on their needs and/or concerns). The original design of BPD was to use inquiry-based strategies. However, conversations with teachers and the curriculum coordinator dictated a need to develop teacher background on the topic before they could employ inquiry-based strategies. As a result, the curriculum coordinator implemented two types of professional development sessions: informational and skill development, to prepare them for inquiry-based strategies.

Inquiry-Based

The researcher/curriculum coordinator trained and coached all teachers as they developed and taught individualized educational programs for all students. The curriculum coordinator taught and coached all instructors how to use individual characteristics to develop and implement modified lessons for all students. Table 5 includes a task analysis for inquiry-based instruction. In addition, Table 5 includes the artifacts used to collect the data to support BPD inquiry-based methodology.

Table 5

Inquiry-Based Learning Task Analysis

Sub-Task Needed to Develop Inquiry Learning	Methodology	Artifacts
Construction With Guidance	Facilitation during Consultation	Transcripts from Informational Sessions
Exploration	Reflective Thought	Reflections
Focus on Process vs. Answer	Reflective Thought	Reflections
Summative not Formative	Reflective Thought	Reflections
Investigative	Collaborative Discussion, Consultation	Transcripts form Informational Sessions
Action	Plan and Develop Lessons	Lesson Plans
Data Driven	Provide Support and Rationale for Decisions	Reflections, Lesson Plans, & Informational Sessions

Keeping to the structure of PBL, the design of each session matched the individual needs of the teachers. In addition, the curriculum coordinator structured the sessions to help improve the problem-solving and critical thinking skills of the faculty. By structuring the professional development sessions along the inquiry design, the facilitators serve as models of PBL instructional activities that teachers can use in their classes.

Guidance for Participants

As a facilitator, the curriculum coordinator provided assistance when requested by teachers. The BPD design allowed the curriculum coordinator to provide support for teachers in various ways. When selecting the kind of support, the curriculum coordinator used several factors when making decisions of how to assist the teachers:

- 1) Being a facilitator instead of disseminator;

- 2) Helping teachers learn how to use resources as guides (leading to more independence instead of dependency on the professional developer);
- 3) Using Bait's vision and mission to develop student's problem-solving skills by helping teachers learn how to design their lessons while engaging in problem solving activities themselves;
- 4) Helping teachers learn to make informed decisions; and
- 5) The diversity of the teachers.

During each session, teachers presented their concerns. Each teacher introduced the original problem; what they had attempted; and what did and did not work. The curriculum coordinator used probing questions to lead them to their answers by directing them to consider some ideas from other perspectives. The probing questions helped the teachers focus on concepts they had not considered. As a way to facilitate, the curriculum coordinator also used probing questions to help teachers reference concepts related to the subjects they taught and the content of BPD informational sessions. The curriculum coordinator also used the probing questions to help the teachers focus on data compiled on each student to resolve concerns.

The curriculum coordinator provided the school with several books on teaching differentiated curricula, inclusive classes, individualizing instruction and instructional methodology. During meetings with the teachers, the curriculum coordinator would guide them to several references, as needed. Some teachers needed help with teacher editions, others with how to individualize instruction based on student need. Some

wanted to know how to work with one group and keep the other students actively engaged in learning at the same time.

Using the resources and bouncing things off each other allowed the teachers to construct a framework for confronting similar issues in the future. Thus, the curriculum coordinator made an effort to help the teachers become more independent by helping them come up with the answers. The design of BPD was to have the curriculum coordinator provide a helping hand, guiding teachers' thoughts and actions as they collected and analyzed data.

Long-Term Follow Through

The curriculum coordinator provided the teachers with observational, analytical, planning and implementation support, as needed. This support lasted for the full two years. The curriculum coordinator informed all teachers that professional development assistance was available as needed. There was no time limit to the services of the curriculum coordinator. This professional development program was not based on a grant or other limited funding. It was an integral part of the original design of Bait. The data used for this study spanned across two years. However, the professional development program continues.

Teachers received one-on-one coaching, as needed. Some teachers selected to converse via e-mail, others preferred personal meetings. Several teachers engaged in discussions as prompted by the curriculum coordinator. The purpose of each conversation was to establish the current knowledge base of the teachers and measure

teacher growth related to: the curriculum, support for selecting specific strategies, cognition, critical thinking and inquiry-based learning.

Collaboration Time and Focus

The teachers received assistance to help them evaluate performance level of the students, examine the curricula (standards), and the available resources. The design of BPD allows the teachers an opportunity to meet with the curriculum coordinator and with each other in an effort to develop the appropriate strategy for teaching each child. The teachers met collectively to discuss school-wide issues and/or concerns.

Flexible Time

The schedule of the BPD sessions was semi-flexible. Knowledge (facts and general education principals were presented during the information sessions. These sessions were held at specific times, based on the needs of the teachers regarding – students, curricula, and administration. The remainder of the components of BPD occurred according to each teacher's need and schedule. Some of the collaborative sessions occurred after the information sessions. However, some teachers collaborated on their own, before school and after school. Planning for collaborative time was limited because the teachers did not share a common prep period during the instructional part of the day. Collaboration time also occurred over the weekends, based on need.

The teachers were able to collaborate before and after school partially because they did not punch a clock. For the first two years of Bait's existence, teachers received a small salary every pay period, based on service. They did not receive hourly wages.

Therefore, if teachers needed to come early and or stay late, they did, allowing themselves time to be as prepared as possible. Teachers had the ability to schedule their collaborative time, and coaching time to fit the needs of the teacher and students (not only the curriculum coordinator).

Engaging

BPD required teachers to present the characteristics/dynamics of their classes during each informational, group and individual collaboration sessions. Characteristics included relevant information from students' academic and behavioral characteristics, curricula demands, teacher observations, criterion reference and standardized scores and formative and summative scores. Once teachers provided the characteristics, the participants in the sessions (colleagues, curriculum coordinator, etc.) used the information to help the teacher address concerns. The participants in the sessions provided input designed to help the teacher develop solutions to concerns.

BPD activities were constructive. The teacher used knowledge received from each session to resolve concerns. Due to the constructivist's design of BPD, it was set up to be cognitively engaging. Cognitive engagement suggests the teacher was an active participant by providing information, analyzing new information and synthesizing a solution, based on relative information and support (from BPD sessions). The other participants in the BPD sessions benefited by engaging in the process of cognitively retrieving, sorting and presenting options and/or solutions to others. The BPD design did

not foster passive waiting until the topic was ‘one that I needed.’ Everyone was encouraged to participate. BPD was designed so that no one was identified as an expert.

Participant Autonomy

The focus of BPD was to help the teachers make informed decisions about what and how to teach their students. BPD’s objective was to facilitate the collection of, analysis and use of student data to inform instruction. Teachers began collecting data on students as soon as they enrolled in Bait.

BPD was also designed to provide instruction to help each teacher use curricula resources, text, and other resources to make educational decisions, as needed. BPD’s design provided opportunities for the curriculum coordinator to provide enough nudging to help them function without constant help from the curriculum coordinator. To help develop independence, BPD included guidelines and opportunities for experiences that fostered active learning. Active learning should lead to independence, thus the ability to make decisions freely without the direct assistance of the curriculum coordinator. To increase accountability of the autonomous teachers, BPD included an evaluation of lesson plans to assure that teachers prepared and implemented lessons aligned with the mission and vision of Bait.

Content of BPD Matching Bait's Objective

Bait's curriculum included project based learning as part of the desired curriculum for the students. Thus, BPD was designed along the PBL format. Figure 2 includes a summary of PBL characteristics. These components match the research based components of effective professional development programs (included in Chapter II).

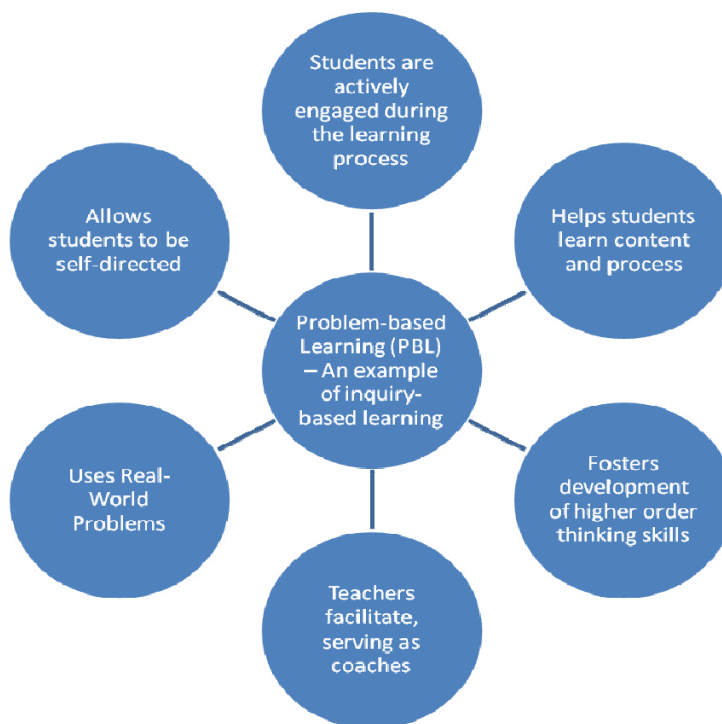


Figure 2. Characteristic Summary of a Problem-Based Learning Program

Multiple Instructional Methods Used For Bait Sessions

To address specific concepts required to provide participants with needed information, the BPD program included four different methods of delivery. Two large group components, informational sessions and whole-group collaboration, were delivered

to the whole group. Small group collaboration and one-on-one sessions were delivered as small group sessions. During the informational sessions, the curriculum coordinator planned to use two forms of disseminating knowledge: lectures with audio/visual aids and handouts as well as constructivist whole-group activities.

The curriculum coordinator developed flexible agenda for each informational and whole-group collaboration sessions to allow specific needs of the participants (teachers). Throughout the BPD program, three informational sessions were held; once before the beginning of the first year to lay the foundation for teaching, second after the first few weeks of school to allow teachers to use actual student characteristics to begin to plan and modify lessons based on student characteristics, and third at the beginning of the second year to help teachers learn to implement PBL instruction. The schedules for all other methods were flexible, scheduled as needed by school administration and/or individual teacher needs (as summarized in Table 4).

In addition, small group sessions allowed for more individualized instruction. One-on-one sessions occurred as needed by teachers. Teacher's interest and needs guided the content of each session. The curriculum coordinator made multiple resources available to the school and individual teachers. The curriculum coordinator helped teachers identify required resources and instructional methods to match student characteristics/needs and curricula content.

Both whole and small group collaborative sessions allowed teachers to construct concepts and understandings. Teachers could provide data gathered from teaching

activities, prior knowledge and resources to construct ideas to help them and/or other teachers effectively select instructional materials and implement instructional methods. Teachers were allowed to bond with teachers of their choice to form the small group sessions. Whole-group collaborative efforts could have been called by the curriculum coordinator or Bait administration, allowing teachers to be a part of the planning, re-planning process. Table 6 includes a summary of the instructional methods incorporated in the BPD sessions. Using Bait's inquiry-based academic program and the desired behavior of the teachers, BPD was aligned with research based tenets of inquiry-based instruction. Table 5 above, reflects the task analysis of the inquiry-based tenets of BPD.

To align the BPD curriculum to Bait's curriculum, the curriculum coordinator guided teachers as they matched the state standards and individual student characteristics (strengths and weaknesses) to construct individual academic and social educational plans for each student. In addition teachers were coached as they examined data from entrance exams, classroom observations and criterion referenced tests to explore the appropriate academic level and strategies needed to effectively provide individual instruction for each student. The curriculum coordinator conducted several group and one-on-one discussions to help teachers provide rationale for major academic and social decisions.

Table 6

Structure of Bait Professional Development Program (BPD)

Nature & Frequency of PD	Procedure	Purpose
Three – 2 Hour Informational Sessions held over two years	1-Introduction – Questions to identify interest, need and/or group dynamics 2-Meeting Vision, Mission, Operating Structure (Subsequent meetings were tailored to need of teacher or curriculum) 3-Information on pedagogy 4-Information on how to implement curriculum 5-Provide guidelines for skill development 6-General information on how to implement PBL	Dissemination of Knowledge – Bait’s Curriculum, Pedagogy, Differentiating Curricula, PBL
One-on-one session to collect information from teachers, scheduled as needed by the participants	Identify major concerns about; 1) teaching, 2) strengths and/or weaknesses of students, 3) knowledge level of subject to be taught, 4) knowledge level of pedagogy, 5) Needs from curriculum coordinator, 6) Preferred teaching style per teacher, 7) Preferred method of learning & 8) Why	Provide guidance for designing and implementing program
Whole-group - Collaboration and Facilitation as needed by the participants	1-Facts on students, test scores, cum records, performance in class, observation, etc. 2-Open discussion, identifying teacher concerns 3-Time for group dissection of data 4-Time for group brainstorming 5-Time for reflective writing	Gathering and using data to guide and inform instruction
Small Group Sessions, scheduled as needed by the participants	1-Gathering and use of various resources 2-Use of probing, guiding questions to help teachers frame and organize ideas 3-Feedback from curriculum coordinator	Gather & use of data to guide & inform practice,
One-on-one session, scheduled by participants as needed	1-Student scores 2-Teacher identifies major concerns of participants 3-Time for group brainstorming	Ongoing support & guidance
Whole-group – Planning and Dialogue, as requested by participants	1-Open discussion to understand information 2-Teacher engaging in constructive dialogue –Shuraa Baynahum	Construction, Immediate Feedback
Participant Reflection	1-Map of teacher development 2-Prior knowledge and support 3-New knowledge and support 4-Level of growth	Teachers’ description & rationale for their behavior

In addition to matching the state standards and needs of the students, BPD aligned content to match the long and short-term needs of administration. During the course of the professional development program, the school applied for a project-based learning grant. The BPD program included several key components of PBL, including but not limited to: identifying problems, gathering information from resources, collaboratively discussing information, planning and implementing solutions.

Data Collection

To measure the effectiveness of the Bait Professional Development Program, the curriculum coordinator collected data on three levels: teacher participation (attendance at BPD sessions and reflections), and curriculum level (individualize instruction, use of inquiry-based instruction, and use of Shuraa Baynahum when planning and implementing lessons) and student performance (entry level test and end of the year math, reading, and cognition scores). Each data set was originally earmarked for documenting the steps involved in starting and operating schools. The founding members of the board of directors of Bait decided to collect information from the schools regular activities for future publications on how to start an independent faith-based school. Minutes from the initial planning sessions used to establish the structure of Bait indicated the board members earmarked several key components of the school's structure for inclusion in 'a how to book' on private schools; including curriculum development, content of professional development such as minutes and informal observations of the professional development sessions by the curriculum coordinator, accountability procedure and forms,

involvement in community based problem solving, student performance, teacher performance, teacher retention, student retention, student matriculation, graduation rate, percent of students in each grade level, and parent participation.

Data Reflecting Teacher Performance

Teacher behavior during the BPD sessions was used to analyze teacher performance. The curriculum coordinator noted how teachers reacted to the concepts addressed during BPD sessions – individual or small group/consultative, collaborative whole-group informational activities. Using Bloom’s Taxonomy (1956) and M-SCOPS (Stuessy, 2006) as a foundation, the curriculum coordinator developed a rating scale (1-6) to analyze teacher participation during the BPD sessions (see Table 7). A rating of six indicated that a teacher was cognitively engaged. A cognitively engaged teacher add attempts to problem solve by adding comments, asking questions and generalizing (Bloom, 1956) by connecting concepts to specific lessons and/or examples of student behaviors that could apply to ideas being discussed but were not directly referenced during sessions. A rating of five reflects a participant, who attempts to connect concepts to make connections and present justifications for using key concepts and ideas. A teacher receiving a five demonstrates the ability to use concepts presented to synthesize (Bloom, 1956) hypotheses, predictions, analyses when describing student behavior used to develop lessons.

Table 7

Ratings for Level of Teachers' Participation During BPD Sessions

M-SCOPS Rating	Bloom's Taxonomy	Characteristics of Bait's Teachers
6 – Generate	Evaluation	Engages in problem solving activities by merging together all of concepts and resources together. As a part of problem solving the efforts, the participants synthesize new lessons, transferring concepts from examples presented during the BPD session to students with varying characteristics/needs and curriculum demands
5 – Connect	Synthesize	Synthesize new lessons, transferring concepts from examples presented during the BPD session to students with varying characteristics/needs and curriculum demands
4 – Transform	Analyze	Synthesize new lessons by connecting concepts to similar students and/or curricula materials
3 – Rearrange	Application Comprehension	Applying concepts to make lessons that are similar to the examples presented during the sessions
2 – Replicate	Understand	Nodding and/or verbal responses to validate that concepts were heard and/or understood
1 – Attend		No response (looking, not nodding or speaking)

Teacher comments, questions and behaviors responding to the BPD topics addressed leading to suggestions of how each topic relates or can be connected to specific lessons and/or instructional activities received a rating of four. Teachers make the connections by looking for analytical patterns or correlations with ideas and concepts (Bloom, 1956). However, the teacher rating of four indicates that the teacher made the suggestions without considering the specific needs of the students.

A rating of three reflected teachers who made comments about the topic – usually related to mechanically applying the concepts to lessons similar to the examples

presented during the BPD sessions. A rating of three suggests teachers did not include or correlate knowledge about the unique characteristics/needs of students as they applied concepts being discussed during the BPD sessions (Bloom, 1956).

The curriculum coordinator used a rating of two to reflect teachers who nodded or gave verbal affirmation to confirm they heard and/or understood a concept. However, teachers receiving a two did not add anything new, or make connections to their classes, lessons, students, etc.

Teachers receiving a rating of one were in attendance and did not give any type of feedback. They appeared to be looking at the speaker, text being referenced, and/or other visual aids being discussed at any given moment. However, the teachers did not make any verbal and/or other physical gestures to add any feedback to the discussions. Teacher behavior was monitored both during the whole-group information sessions and during the small group, consultative sessions.

Teachers' Opinions of Effectiveness of Professional Development Program

Besides lesson plans, fulltime Bait teachers were asked to keep reflective notes of their concerns and/or accomplishments. The researcher coded reflections, comparing the results to the quantitative values to provide support for qualitative analysis of teacher's reflective descriptions. Table 8 summarizes the reflective codes.

Teacher reflections showing teachers planning and carrying out instructional activities supported by knowledge of student performance and student needs rated five. Reflections showing teachers considering data that has not been collected (anticipated)

based on stereotypes common practices rated four. Teacher reflective comments resulting from stimulus/response were rated three. Behavioral reflections sharing activity of student causing a counter activity of teacher with no support or rationale were rated two. Reflective statements listing student activities rated one. The actions of teachers who attended the sessions without making comments rated zero.

Table 8

Ratings for Teachers' Reflections

Rating	Characteristics
0	No reflections
1	Reflections include list of actions
2	Inclusion of actions and outcomes
3	Inclusion of actions, outcomes and cause of affect
4	Evidence of actions guided by data
5	Evidence of actions guided and required by data

Performance of the Inquiry-Based Curriculum

The curriculum of Bait required teachers to meet the individual needs of students as well as teach inquiry skills. Two different factors were evaluated to identify the use of inquiry-based instruction: the ability of the teacher to individualize instruction and the use of problem-based learning tenets during instructional planning and implementation.

Rating Teachers' Level of Individualized Instruction

Using the codes found in Table 9, the curriculum coordinator examined the lesson plans and observational data collected over the two years of the BPD program. The unique characteristics/needs of the students in each class were compared to the type and number of objectives and strategies included in the lesson plans and instructional activities of each teacher participating in the professional development program for two years. In addition, lesson plans and instructional activities were reviewed for the teachers' ability to increase the complexity of the lessons (making them more inquiry-based) as frequently as possible.

Table 9

Ratings for Teachers' Individualizing Instructions

Rating	Teacher Planning/Teacher Behavior
0	Teachers giving students direct instruction (step by step)
1	Some evidence of groupings or probing questions along with some direct instruction
2	Use of a combination of peer groups, probing questions along with some direct instruction
3	Evidence of teacher using different strategies periodically – not connected to student plan
4	Use of student data to guide student activities, interjecting advice when students ask
5	Using probing questions to guide planning to include: investigation resources, timeline

The unique characteristics/needs of the students in each class were compared to the type and number of objectives and strategies included in the lesson plans and

instructional activities of each teacher participating in the professional development program for two years. In addition, lesson plans and instructional activities were reviewed for the teachers' ability to increase the complexity of the lessons (making them more inquiry-based) as frequently as possible.

The lesson plans and field observations of instructional activities using one strategy for all students was scored zero. Lesson plans and observational data indicating the use of multiple strategies used one at a time, not aligned with student or curricula needs was rated one. Instructional planning and activities (from field notes) including two instructional methods used once, but not aligned with student characteristics rated two. Instructional planning and activities including use of more than two strategies that are not connected to student performance rated three. Planning and activities using knowledge of students or student behavior to select appropriate instructional methods and curricula content rated four. Planning and activities showing evidence of teachers connecting knowledge of students and curricula with inquiry-based probing questions rated five.

Use of Problem-Based Learning Curriculum

In addition the lesson plans and instructional activities were reviewed for the use of inquiry-based instruction. The specific inquiry-based curriculum model used by the Bait teachers was Problem-based Learning (PBL). Not all lessons were appropriate for PBL methods. Thus, lesson plans and observed instructional activities were also evaluated for the appropriate use of strategies, matching the characteristics of the students

and curricula demands. The lesson plans and instructional activities of teachers using PBL demonstrate the teachers' use of themes to combine ideas and/or, skills being taught.

If the lesson plan demonstrated the teacher selected themes from teacher manuals, student text and/or other teacher resource, the lesson plan or instructional activities received a rating of one. If the teacher used themes aligned with the schools calendar of events, special holidays or other periodical events and not the characteristics and/or ideas of the students, the lesson plans and/or instructional activities rated two. Instructional planning and activities using themes aligned with student interest and the interest the school's interest rated three. Planning and instruction using student centered themes and a few canned themes rated four. Instruction and planning using themes and instructional activities aligned with student interest and concerns rated five. Table 10 includes a summary of ratings for inquiry-based themes.

Using themes and student characteristics and curricula needs to guide instruction is all part of inquiry-based learning. Helping students identify problems, design and implement solutions as they incorporate previous, current and new knowledge, appropriate resources and help from teachers are all tenets of PBL. This study rated the ability of teachers to align student characteristics to PBL tenets.

Using lesson plans and instructional activities observed by the curriculum coordinator, the correct use of PBL practices were rated. Instructional planning and activities showing no use of problems rated zero. Instructional plans and activities demonstrating teacher oriented problems rated one. Plans and activities including teacher

oriented problems aligned with teacher selected themes rated three. Plans and activities indicating student focused projects to solve student selected problems, which allowed students to make inferences and generalize to real world solutions rated four. Plans and activities evidencing structured student centered problems helping students generalize to real world situations rated five. The rating scale for use of PBL problems is summarized in Table 10.

Table 10

Ratings for Problem-Based Learning Practices

Rating	Use Of Themes To Guide Projects	Correct Use Of PBL
0	Teaching lessons in isolation, no themes	No evidence of using PBL principals, including use of problems
1	Using textbook or canned themes	Use of teacher oriented projects that did a teacher directed problem to teach skills
2	Using themes presented by Bait and or other schools	Use of teacher oriented, thematic, multi skilled projects centered around solving a teacher oriented problem
3	Using some student oriented themes and some of Bait's	Use of student oriented, thematic multi skilled projects
4	Using mostly student oriented themes and a few canned themes	Use of student oriented, thematic, multi skilled, reflective projects addressing student centered problems
5	Using only student oriented themes to guide instruction and projects	Use of student oriented, thematic, multi skilled, structured, reflection guided projects designed to solve a student centered problem

Shuraa Baynahum

Curriculum coordinator's notes provided evidence of teacher's behavior during BPD sessions and classroom behavior. Teacher's behavior was coded for use of Shuraa principals while engaged in BPD activities. Table 11 includes characteristics of teacher's behavior used to evaluate the use of Shuraa Baynahum as they consulted with other adults during the two years of BPD. Full-time teachers had several opportunities to collaborate before school, after school, and via email. The Bait curriculum included the use of school-wide themes to guide instruction. To help teachers utilize the themes when planning their lessons, teachers needed to meet to plan out their calendar, identifying themes to be used at various times of the school year. In addition, the field notes included examples of teachers using consultative discussions during small group BPD sessions. The method of analyzing themes is found in the previous section.

Collaborative consultation of teachers with students was supported by examining lesson plans of the full-time teachers and the field notes. As explained earlier in this chapter, teachers' participation levels during BPD sessions were ranked 0-5. Column 2 of Table 11 includes the codes for rating field notes for Shuraa Baynahum practices during BPD sessions. Teacher's behavior including no mention of Shuraa principles rated zero. Instructional activities where teachers mentioned "Shuraa" during any type of BPD sessions rated one. Instructional activities based on field notes that demonstrated the use of Shuraa principles when prompted by others rated two. Instructional activities reflecting teachers' ability to select or utilize Shuraa principles at various times during

BPD sessions rated three. Planning and instructional activities evidencing teachers' ability to utilize Shuraa principles regularly rated four. Observational data supporting the use of reflective practices when choosing to use Shuraa principles was rated five.

Teachers, working together by collaborating in small groups reflect an example of Shuraa Baynahum principals. Column 3 of Table 11 includes the codes for evaluating planning and instructional activities. Teacher behavior when planning and implementing instruction that was void of collaborative efforts between teachers ranked zero. Lesson plans and instructional activities supporting teachers' use of conversation to share common themes across academic subjects rated one. Planning and instruction supporting teachers collaborating with students to decide on resources to use, instructional methods, and skills to be taught rated two. Evidence from planning and instructional activities reflecting teachers collaborating with students as students select educational activities rated three. Planning and instructional activities demonstrating how teachers allow students to select educational activities with teacher coaching rated four. Planning and instructional activities supporting teachers' ability to allow students to lead discussion for selecting appropriate student centered themes used to teach skills across the curriculum rated five.

Table 11

Ratings for Teachers' Performance Aligned with Shuraa Baynahum

Rating	Level Of Shuraa Evidenced	Level Of Collaboration
0	No proof of Shuraa in any activities	No sign of developing lessons or themes with others
1	Mention Shuraa in Open discussion	Some evidence of sharing of themes across subjects
2	Demonstrate Shuraa Principles when prompted	Some evidence of teachers and/or students selecting themes together
3	Appropriately select to use Shuraa principles at various times	Evidence of teachers collaborating as they and/or students select themes
4	Shuraa principles found throughout teacher activities	Evidence of teachers guiding students to select themes
5	Reflective and/or other comments to support choices and actions	Evidence of teachers collaborating as they guide students as they select interwoven themes

Data Reflecting Students' Performance

To measure the effectiveness of the level of teachers' participation during BPD sessions on student achievement, entry level and achievement scores of each student was retrieved from administration and analyzed. Bait used the Woodcock-Johnson III (WJIII) Tests of Cognitive Abilities (2001). All WJIII scores are evaluated with a mean of 100. In addition, grade equivalent scores are reported for all sub-tests. WJIII reports student achievement in 11 sub-tests.

For the purposes of this study, three subtests scores were gathered and compared: cognitive, reading and writing. The WJIII entrance exam given to all students measured the grade equivalent readiness score for reading and math. In April of each year, all students re-took the WJIII test to measure student achievement, including: cognitive scores, math, and reading grade equivalent scores). To measure students' cognitive growth, the cognitive scores from the achievement test at the end of the first and second year were compared. In addition, teachers kept criterion referenced data from in-class assignments. Teachers also kept project scores, which the used to measure academic, social and leadership skills.

CHAPTER IV

RESULTS

In an effort to measure the effectiveness of the Bait Professional Development Program (BPD) this study examined the relationship between teachers' level of participation during BPD sessions and their ability to use inquiry-based instruction. This investigation also explored the relationship between participation and the teachers' ability to engage in Shuraa Baynahum (mutual consultation), and student achievement. Based on a review of literature addressing the essential characteristics of effective professional development programs, the following concepts provided structure for this research project: 1) inquiry, 2) inclusion of participants' characteristics or desires in the design, 3) active engagement, and 4) use of mutual collaboration/consultation. Mixed models approach was used to analyze the relationship between the level of teacher participation and effectiveness of the BPD program.

Design of BPD

To explore the meaningfulness of the design of the BPD program, an understanding of the structure and content of each BPD session is necessary. The BPD program included four different methods of delivery. Two large group components, informational and collaboration sessions were delivered to the whole group. Two small group delivery options for teachers to request to work with the curriculum coordinator

included: two-way dialogues with two teachers, and one-on-one teacher dialogues. The following reflects the contents of each type of BPD methods of delivery.

Whole Group Method of Delivery – Informational Sessions

Teachers participated in three different informational sessions during the course of the BPD program. The curriculum coordinator used each session to disseminate concepts using the traditional whole-group method of professional development. The first occurred during the summer just before the school opened. This initial informational session provided teachers with the unique features of Bait, including the mission and vision statements. As stated in Chapter III, Bait’s mission requires teachers to help students “... examine the natural world with the purpose of reasoning soundly and questioning carefully in order to formulate hypotheses ...” To address segment of the mission statement “reasoning ... questioning ... formulate hypotheses ...,” BPD included inquiry-based content to develop critical thinkers among the teachers. The school’s vision promotes the idea of creating a learning community, including “... partnerships among students, family and community ...” As a result, the first informational session also included guidance on creating a learning community, inclusive of parents, teachers and community members.

Because none of the teachers had teaching certificates or completed a formal teacher education program prior to participating in this study, the first informational session included an overview of child development theories and examples of how curricula are aligned with those theories. (Table 4 in the Methods chapter provides a

summary of each participating teacher's educational background.) In addition, teachers were taught to use assessment tools to determine student strengths and weaknesses.

During the informational sessions, teachers were also instructed on how to use the state board of education curriculum to select lessons appropriate for specific developmental levels, learning styles and academic needs. The curriculum coordinator provided teachers with examples of selecting specific methods of instruction for students based on student characteristics and curricula needs. An example included the introduction of 'rote memory' as a method of helping students with strong memory skills retain facts. Teachers learned how mnemonics could help students who have weaker retention skills retain facts. Teachers were introduced to the use of models, demonstrations and simulations to help students connect basic skills and facts to practical use in the real world.

In addition, teachers learned to compare practical use of peer groupings and whole class activities. They learned to use peer grouping to help students learn from each other by developing new understandings from prior and new knowledge. Teachers received examples of whole class lectures or explanations as a method of providing everyone with facts. Table 4 summarizes the content of each session. How teachers reacted during each BPD session and how the knowledge was implemented is presented later in this chapter.

The second informational session started off with a review of the school's mission and vision. By the end of September, 2004 each novice teacher had experienced working

with students and the curriculum, prompting the curriculum coordinator to review the methods introduced during the first instructional session. During the methods' review, knowledge of students and curriculum provided a reference for teachers to begin to select appropriate methods to match student characteristics and curricula demands.

In addition, the second informational session included guidelines for using themes as a method of helping students understand patterns or theories while developing a cognitive understanding of ideas being taught. The curriculum coordinator introduced themes to provide teachers with guidelines for helping students see or learn the big picture.

The third informational session provided the teachers with an overview of problem-based learning (PBL). Teachers were made aware of the PBL grant proposal being developed by the Bait's administrative board. The grant proposal included Bait's needs:

- Build and improve the schools ability to address the needs of the students
- Teaching global – top/down learners
- Teaching gifted underachievers
- Helping students learn practical knowledge
- Developing independence
- Teaching remedial skills as needed
- Developing critical thinking skills of middle school students (May, 2005).

The above section was part of the proposal overview provided to teachers during the third informational session. The overview included help for the teachers to understand how students learn patterns when organizing new concepts. The top/down approach included in the grant proposal indicates the designers of the grant wanted the

teachers to be aware of the meta-cognitive behavior of learners. The curriculum coordinator explained to teachers that top/down learners gain an understanding of the big picture, which is a pattern composed of smaller pieces. In addition, the curriculum coordinator drew a parallel between helping students understand patterns and problem solving as an instructional activity.

The proposal outline presented to the teachers provided examples of problem solving guidelines designed to help students learn to apply state mandated math, language, social science and science standards in real life situations.

- Provide students with the needed basic skills and develop critical thinkers – problem solvers . . .
- Develop an innovative learning program for all students that allows them to learn basic skills as they develop higher order thinking – reasoning skills at the same time
- Utilize the resources of the community and the world to broaden the educational program of each student individually
- Develop a PROJECT-based curriculum, allowing students to learn as they design, implement and critique individual and group PROJECTs.
- Develop teachers who are coaches/facilitators
- Utilize grant dollars to offset the expenses, taking the financial pressure off the school

Teachers learned the importance of using problem solving skills to develop meaningful lessons to facilitate the selection of student centered problems, aligned with student interest, academic strengths and curricula demands.

The curriculum coordinator also provided the teachers with examples of using PBL skills at all academic levels. The self-contained primary teacher received examples of student centered inquiry assignments inclusive of teacher modeling and guidance activities throughout. The two self-contained teachers of second through sixth grade

students received examples of student centered problems, aligned with student interest and/or characteristics. Departmental teachers of seventh and eighth grade students received from the curriculum coordinator examples of ideas for teaching problem-based skills as students worked on solving problems. During the third informational session, all teachers received guidance on the use of probing questions and support for coaching students as needed by the student. Teachers learned that students would become more independent of teacher directed lessons as they engaged in more PBL lessons, allowing the teachers to wean themselves away, losing the metaphorical reins of control in the classroom.

Probing questions help educators foster or promote thinking among their students. Probing questions help the teacher and the student think through experiences or concepts to make cognitive connections (Kebaetse, 2010). The curriculum coordinator modeled for teachers the use of probing questions. In addition, during the BPD sessions, the curriculum coordinator encouraged the teachers to use probing questions to help their students make cognitive connections as frequently as possible.

To help the teachers use PBL to teach the basic skills aligned with state and local math, science, language arts and social studies standard for elementary school students, the curriculum coordinator worked with two teachers, Alif and Ta to design the PROJECT package for students. The curriculum coordinator merged her ideas with Alif and Ta to form the PROJECT handbook. More details on the development of PROJECT

handbook is discussed later in this chapter. Data addressing the collaboration with Alif and Ta is analyzed later in this chapter.

Preferred Methods of Delivery

Just after the first informational session, the curriculum coordinator asked each teacher to identify his/her preferred method of instruction. Teachers verbally responded to the request. Table 12 includes the results of teacher preference.

Table 12

Teachers' Preferred Method of Delivery

Teacher	Preferred Method of BPD Delivery
Alif	No Preference
Ba	Small Group Dialogues
Ta	One on One
Tha	No Preference
Ja	He included two: One-on-One & Small Group Dialogues
Dal	Whole-Group Collaboration
Ra	Whole-Group Collaboration

Alif and Tha did not indicate a preference. Alif, one of the full-time teachers mentioned she was fine with whatever method was used. Tha left early and did not indicate a preference. Ja, a self-contained middle school teacher, did not make a distinction between small group sessions. He mentioned he could work one-on-one or

with another teacher. Other teachers were specific, providing the preferred method included in Table 12.

The curriculum coordinator informed teachers at the beginning of the professional development period that she was available daily if needed, giving each teacher email and phone contact information and permission to request a personal visit whenever needed. Both Alif and Ba emailed the curriculum coordinator requesting some time during the second year of the professional development program to address a concern. However, outside of these two requests, the curriculum coordinator spent three hours a visit, sitting, listening, and interjecting as needed. The three hour visits occurred once a month on a Monday, Tuesday or Thursday.

The curriculum coordinator visited the school 22 times during the two years of the professional development period. Three of the visits, the instructional sessions were announced as mandatory meetings for faculty and staff. During seven of the 22 visits, the curriculum coordinator observed activities of the teachers and students. Four of the visits resulted in whole-group collaborative sessions. Five visits resulted in small group dialogues between the curriculum coordinator and two or three teachers. Five of the visits included one-on-one sessions with a teacher and the curriculum coordinator. During two of the visits the curriculum coordinator engaged in more than one method of delivery with teachers, based on teacher needs. The following sub-section includes descriptions of the methods of deliveries aligned with teacher request; whole-group discussions, small group dialogues and one-on-one sessions.

Contents of the Whole-Group Collaboration Sessions. The whole-group discussions sessions were impromptu. The teachers started the discussions to address specific needs. Other teachers would hear the conversations and join in. Throughout the professional development period, there were four whole-group collaborative sessions.

The first collaborative session, held in November, 2004 began as three of the full-time teachers were talking about two students, a brother and his younger sister who were excelling in their work. A segment of the field notes collected by the curriculum coordinator from this observation follows:

Ba mentioned to me she was concerned about keeping Martha moving. She mentioned, Martha would sit at her seat soaking up assignments, completing them as fast as Ba gave them to her, 'completing school and homework accurately at a pace faster than the other students in class.' Without lifting her head from her desk, Alif added, 'John is also doing the same thing.' She added, 'John who was also completing his work, picking up the skills quickly and accurately.' Ba mentioned some students who were doing ok, moving along at a 'steady pace,' needing help from time to time. Martha needed more work ... Ta said 'Martha is doing as well as the older children with the Spanish. She probably would do as well as her brother if she was in his class. She is so little, I wouldn't put her with the older boys. She is a good student ...' Alif and Ba were opposed also to moving Martha into the class with the older children, noting her innocence as a young girl ... I asked them to think about all of her academic skills, is she strong in every area? Ba added she was good in everything once she had been taught ... (November, 2004)

The above segment of field notes helps to demonstrate how teachers created the whole-group collaboration discussion to address personal concerns. The two self-contained teachers, Alif and Ba and the Spanish teacher, Ta used an opportunity after school to share notes on student performance by not only focusing on problem students but also on students who were doing well. Ta taught Spanish and Tai Chi to both

students and added to the discussion occasionally by providing support for Martha's progress as a fast learner.

The teachers collaborated on the best approach for keeping the two students learning and motivated as the teachers worked with other students not progressing as fast as the brother and sister. The curriculum coordinator facilitated the session by asking the three teachers probing questions, helping them use objective data to drive their discussion. As a result of the conversation between the teachers and the results of the answers to the probing questions, Ba and Alif wanted to move both students into a higher grade level within the same classroom, prompting the curriculum coordinator to instruct the teachers on the use of enrichment activities. Teachers were provided information on how enrichment lessons allow students to move forward, learning at higher cognitive levels without skipping key concepts taught in particular grade levels, missing foundation skills. Examples of data and analysis to support the behavior of the teachers and the curriculum coordinator are found later in this chapter.

The second whole-group collaborative session occurred in December, 2004 three months after the second informational session. It began as Ba expressed her concerns about a student experiencing long-term memory difficulties. The issue of examining student characteristics to plan and implement instructional activities was introduced in the first informational session and reviewed in the second. Two nearby teachers heard Ba express her concerns and joined her and the curriculum coordinator in dialogue. One of the two, Ta also taught the same student Ba expressed concerns about. During the

discussion he listened and expressed agreement with Ba from time to time. He did not add anything new to the conversation. Alif, the third teacher in the conversation added helpful hints to help Ba with her dilemma. The following is a segment of the curriculum coordinators notes:

Ba mentioned to me she was concerned about keeping Martha moving. She mentioned, Martha would sit at her seat soaking up assignments, completing them as fast as Ba gave them to her, 'completing school and homework accurately at a pace faster than the other students in class . . . (November, 2004).

Part of the problem faced by Ba was a concern about overloading the student with too much information. Based on Ba's concerns, the curriculum coordinator added cognitive load theory to the agenda for the next informational session.

The third collaborative session attended by the curriculum coordinator was held eight months later, August, 2005. This collaboration session included an opportunity for teachers to brainstorm or trouble shoot, as they looked for behavioral and academic antecedents to help explain problems they may encounter with incoming students based on diagnostic data. A segment of the curriculum coordinators field notes follows:

Today when I walked in, the teachers were sitting together discussing student strengths and weaknesses to inform their instruction. Ba was sharing with Alif what she knew about the first graders moving on to second grade. Alif was sharing what she knew with Ja similar information on his incoming students she taught the previous year . . . I did not say much. I just allowed them to talk with each other. Ja did not say much. He just listened . . . Do you have any concerns, I asked. He said 'No.' He appeared to want to get into his books to plan out his lessons . . . students are students . . . After asking him what he planned to do about the students Alif mentioned would not do any work, he mentioned he would just have them do homework. He had to leave, to go to his other job. Therefore, he

mentioned he would take his teacher manuals home to read them and plan his lessons . . . (August, 2005)

As seen by the notes above, the curriculum coordinator did not provide any new information during the collaborative session. She asked questions, such as: “Do you have any concerns? ... what he planned to do ...” to illicit input from those who were not participating verbally. She allowed the teachers to summarize what they learned from their students during the prior year to share with others. This is addressed later in this chapter.

The fourth collaborative session started out as a small discussion between the curriculum coordinator and Ra. Alif and Ta heard the conversation and jumped in to help Ra understand a concept he was struggling with. This conversation occurred in May, 2006 five months after the third informational session. The discussion addressed implementation of PBL practices as presented in the handbook prepared with the help of Alif and Ta. Ra was having difficulties implementing the PBL curriculum. More information on the contents of the session is presented and analyzed later in this chapter. This session allowed teachers to help teachers, starting small and growing as teachers saw the need to contribute. Ra was having difficulties seeing how to implement the concept presented five months earlier and during this current session. His colleagues, taking ownership of their handbook, jumped in to help him interpret what he had received from the curriculum coordinator.

The whole-group collaborative sessions allowed teachers to dictate their concerns. Two teachers originally identified this method of delivery as their preference. However,

only Ra, one of the two teachers demonstrated active behavior during one of the four sessions. Ja did not engage in dialogue during any of the whole-group sessions. The curriculum coordinator helped the teachers bring forth facts on student behavior helping teachers select the appropriate characteristics that can inform their instructional practice. Teachers learned from each other by gathering facts to guide instruction and gain a better understanding of concepts taught. Because the teachers were able to discuss their concerns, literature suggests the collaborative sessions were meaningful. Teachers were cognitively engaged as they selected what to discuss and provided each other with information and assistance. In addition, the collaborative sessions allowed the teachers to participate by using facts about the students and curriculum to inform their instruction, studying what they had to do, what they had to work with and how best to make things work. Several of these discussions started out as small group discussions, two individuals talking and grew to large group discussions. There were several discussions that stayed small.

Small Group Dialogues. Throughout the BPD program, the curriculum coordinator observed teachers discussing educational practices with other teachers. During some of the discussions the teachers were demonstrating skills learned. By listening and not interfering, the curriculum coordinator used these sessions to assess teacher performance as teachers expressed what they knew. Field notes including observations from these small group discussions are addressed throughout this chapter.

During five different visits to the school, the curriculum coordinator did participate in small group sessions, helping teachers resolve concerns. The first instructional small group dialogue was observed in October, 2004, one month after the second informational session. The dialogue was between two full-time self contained teachers:

Today, during the lunch period, Ba sat with Alif for lunch. Alif stayed in her classroom area to monitor a student completing late homework. Ba asked Alif if she could help her with her vocabulary plans. Alif and Ba began their dialogue . . . Ba began to make general statements about the average learner ... She should be able to do the work like everyone else. She cannot. Maybe she can't ... She can not remember anything from the week before, from September. I think she is not trying ... I asked Ba to think about Sara's strengths, circumstances when was she successful ... Alif mentioned her mother had offered to help out in any way the school needed. She offered Ba an opportunity to have the mother help out with any of Sara's problems ... (October, 2004)

The above example demonstrates Ba's need to get help with teaching curricula content to one girl with short-term memory difficulties. Her colleague, Alif was able to help Ba by reminding her of the school's learning community, reconnecting Ba to ideas provided during prior informational sessions. In addition, Alif modeled use of the school's vision, bringing in a parent to help educate a student. The curriculum coordinator interjected, providing guidance by helping Ba examine data to form a conclusion. The first and second informational session included teachers learning to match student characteristics to curricula content. The above field notes provide evidence of teachers calling a meeting to handle concerns related to addressing student needs. By using probing questions as a method to point Ba towards examining the data,

the curriculum coordinator provided guidance on what to consider when matching student characteristics to curricula content. In addition, Alif was able to help Ba by reminding her of the school's community reconnecting her to information provided during prior informational sessions.

The second dialogue occurred one month later, November, 2004. Alif and Ba were engaged in a dialogue addressing the use of themes to guide instruction. Ba expressed she felt overwhelmed trying to merge student characteristics and curricula content.

... Ba slumped in the chair, expressing that she was totally busy, not feeling that she was doing an effective job. She mentioned she was spending hours at home trying to get things ready for her class. She was losing a lot of sleep trying to be ready for the next day. "How do I add themes? I don't know if I can." I asked her to tell me what her morning story was that day. She mentioned the Thanksgiving holiday. I asked both Alif and Ba's teacher manuals. After laying them out on the table, open to the curricula sequence section for each manual, I asked both Alif and Ba if any math, language, writing, reading concepts etc could be taught while teaching students the history and value of Thanksgiving. Ba noticed some stories in the reading text dealing with children thanking elders for their sacrifices that paved the path for the present life ... They each were able to provide some support for using math, language, science and social science skills that would help to teach students the value of giving thanks to others ... (November, 2004)

Having to add themes to her lessons, Ba believed was too much. The curriculum coordinator modeled the use of themes, such as "Thanksgiving" to frame curricula objectives of various subjects. Later in this chapter, field notes are analyzed to show how Ba made the connection between the model and the science curricula, deciding to use the science fair as a theme to frame lessons for the next few months.

Alif appears to be gathering data, as she listened to Ba's comments about a student, using the data to contact Sara's parents. Are the teachers able to continuously alter their activities by continuing to inquire, re-evaluate instructional activities and make changes accordingly? The following reflects segments from a follow up discussion after the informational session and small group dialogue addressing themes:

Alif, Ba and Ta were combining their experiences about student Sara. I noticed they were including comments from their experience with parents, working with the student in class, and prior knowledge from the entry-level test. Ba commented that she was pleasantly surprised the way Sara was progressing. This student was learning at a pace that Ba did not expect. She stated that Sara would do work that the older children were doing. Sara would help the younger children with their work. Then on other days, she would not do well at all. She would make mistakes on things that she did the day before (November, 2004)

... Ba also introduced she had a positive result from her discussion with Sara's father. After the discussion with the father specifically, Ba noticed Sara was turning in her homework regularly and doing exceptionally well on her spelling and math test. She thanked Alif for the insight. Ta mentioned that he noticed Sara being able to retain the Spanish concepts well. She participated in class ... she did not appear to be having any problems. He noted she appeared to be motivated by the class. He noted he only gave her as much as she appeared to be able to handle.

Ba chimed in, adding she noticed that Sara did not seem to do well when she felt overwhelmed. She seemed to need more time to grasp new concepts. If she did things for homework or had numerous chances to be presented with the concepts, she would do well. The times she appeared to be forgetting what she learned before appeared when she was getting new concepts back to back, possibly overloaded ... (December, 2004)

During the above collaborative sessions, three teachers added their data to the 'pot.' Each teacher fed off of the comments of others. Ba took the comments and drew a

conclusion about what may have been happening with the student. Ba appeared to be ready to make other modifications.

The BPD information session that followed the above discussion included a segment to introduce ‘cognitive load theory,’ helping teachers understand how loading students with too many facts and no method of creating a unifying theme to group the information causes students to shut down because they are experiencing short term memory overload. The following quote from the field notes shows how the contents of the professional development program were fed by data pulled from watching teachers:

... I added a component of cognitive load theory because of the discussion about Sara ... During the most recent information session, Ba, Alif and Ta immediately responded that they could see Sara having this problem ... In their comments, they noted Sara ... (November, 2004)

In several recent one-on-one sessions with Ba, she commented that Sara was doing well. Today Ba was very up-beat. I asked her how Sara was doing. She mentioned she was doing well. I said was there anything she could attest to that was helping her do well. Ba commented she was carefully monitoring how much she gave the student and monitoring the student’s workload, making sure she did not give her too much work, too many skills to learn at a time before she completely processed the skills learned ... (May, 2005)

The above quotes reflect the first year of Bait’s Professional Development Program. The student referenced in the comments was in the first grade and taught by Ba. The second year, she was in Alif’s class as a second grader. She received the information being given to Ba and agreed with her that Sara had issues with overload. She was listening in on a discussion of a student who was not hers; suggesting Alif was paying attention during the session of November, 2004. This demonstrates the value of

working on concerns within a group setting, Alif heard things, witnessed things that could help her in the future.

The second quote, dated May, 2005 indicates Ba took the advice and reduced the amount of work for the student, in addition to continuing to study the student's workload. This suggests she was paying attention to data collection and analysis based on the evidenced collected. She not only focused on the problem, but the field notes suggest she wanted to make sure the solution is working. The May, 2005 observation does not indicate that Ba mentioned anything about feeling overwhelmed. As mentioned above, she was 'up beat,' feeling more comfortable with her actions and workload, to be discussed in more detail later.

The next small group session was also with the curriculum coordinator, Alif and Ba. This session occurred April, 2005. It was during this meeting the curriculum coordinator received information from Alif about a possible grant proposal for providing funds to help pay teachers.

Working with other members of the school board, Alif and Ba had aligned the schools mission and vision statement with the intent of the grant. They also wrote out a tentative budget for five years, including increasing teacher salaries to implement the program. What Ba needed help with was the curriculum ... After hearing what PBL was, she and Alif began to discuss ways to implement PBL with difficult students ... (April, 2005)

The teachers needed help understanding PBL tenets. The curriculum coordinator interjected, providing on the spot assistance as requested by two teachers. Examining the field notes from this session, the curriculum coordinator provided teachers with examples

of how to use PBL as a method of matching student characteristics with curricula demands.

The final instructional small group session occurred after a school visit of two teachers and the curriculum coordinator, dated May, 2005 to observe how PBL works. The curriculum coordinator called the meeting as a follow-up to the school visit. The following field notes include comments by the curriculum coordinator explaining the behavior of two teachers:

I had him pull up the learning objectives under the foreign language standards. I had Alif pull up the objectives for language arts. I asked them to find similar task between the two. I also had them examine science and social studies objectives. Alif and Ta were then instructed find common objectives between the subjects. Ta recognizes they all include some level of research and data gathering.

Alif said this was fine. However, she has to teach multiple levels. She thought it would be helpful if she could examine several objectives for several grade levels at a time, helping to save her time. Ta mentioned having the skills already available for people to see without having to look them up. They thought it would be helpful if teachers and students could have the objectives, written in layman's terms for easy access and easy understandings. I used their suggestions to develop an objectives table with all of the skills for each developmental level . . . (May, 2005)

The teachers discussed their observations and concerns about using PBL as an instructional method. The concern of using themes and problem-based learning when teaching students with academic weaknesses was presented by Alif. Ta mentioned how he could implement the PBL tenets while teaching foreign language and Tai Chi lessons. The curriculum coordinator helped the two teachers work with the learning objectives of multiple courses to develop a plan for teaching multiple skills from multiple subjects via the use PBL projects. The teachers suggested the curriculum coordinator help other

teachers and students understand this by cutting out one of the steps in the process, researching standards and learning objectives, by condensing them and writing them in layman's terms.

Their involvement during these sessions allowed the teachers to be a part of designing student and teacher resources, increasing buy-in and meaningfulness. The design of BPD allowed teachers to determine when and how they needed help, increasing teacher buy-in as they selected the method of delivery matching their learning style. During each small group dialogue sessions, teachers collaborated with each other and the curriculum coordinator. In addition, teachers started the conversation, bringing personal experiences into the discussion, increasing meaningfulness. Some of the small group discussions were one-on-one, between the curriculum coordinator and one teacher.

One-On-One Sessions. During the two years of BPD's program, the curriculum coordinator responded to teacher requests five times to provide one-on-one assistance. The one-on-one sessions occurred at the school, during unannounced and announced visits. The first one-on-one discussion happened during an announced visit one month after the second informational session, October, 2004. During the discussion, Ba asked for help planning out her lessons. She mentioned she felt overwhelmed, not able to deal with the various grade levels and curricula demands. At the same time she was asked to use themes and tailor lessons to meet student characteristics. Evidence from field notes and her reflections are presented and analyzed later in this chapter. The curriculum coordinator provided her with guidance on how to use the lesson plans in the teacher

manuals, allowing her time to work on creating themes and analyzing student behavior to identify characteristics.

In March, 2005 the curriculum coordinator observed the following during an unannounced visit:

... During today's visit, teachers were engaged in working with all students. It was obvious when I walked in that every child was engaged in work, not always the same work. Teachers had provided students with resources and individual instruction, allowing students to receive instruction according to student needs ... Ta came to me after he was done with his class. He did share that he was perplexed about what to do with Ned and Will. He wanted to move them forward, but they were not doing their homework ... Ta had Ned lead ... I asked him what he wanted to do. His response was to separate the work, having students do what they could, allowing him to work with those who needed more help and allow those who were able to move forward ... Even though he is in 8th ... (March, 2005)

During this session, Ta expressed his concern of helping two students get over their organizational weaknesses so he could help the students reach their Arabic potential. Based on his desire and recognition of the homework weakness, it appeared he was able to recognize student strengths in Arabic and weakness with follow-through at home. He did recognize one of the boys with the homework problem also had the ability to model for other students by leading the lesson. By suggesting the need to have the student lead the lesson, Ta was attempting to use the students' strengths to help address the students' strength. In this particular case, the student needed more practice. By having him lead the other students, the student was able to practice at school what he should have done for homework. In addition, he was able to provide his peers with more instruction and repetition. Ta had an idea of how to solve the students' problems, but lacked the

confidence to do it. The curriculum coordinator used questioning, “I asked him what he wanted to do,” giving him an opportunity to bring his idea of the solution into the conversation “separate the work.” He needed encouragement, as demonstrated during his reflection presented and analyzed later in this chapter.

The third one-on-one session occurred at the beginning of BPD’s second year, September, 2005. During the first month, Ba brought her concern about a first year student with no previous school experience who was not making substantial progress. The curriculum coordinator helped Ba examine various assessment tools to diagnose his academic strengths and weaknesses. Ba was taught to use various criterion referenced test, collect anecdotal data and develop task analysis to determine what led to the new student’s success and failure. Evidence and analysis of the discussion is found later in this chapter.

The fourth one-on-one session occurred directly after the third informational session. One teacher, Ja came to the curriculum coordinator after the informational session of November, 2005. He approached the curriculum coordinator for assistance with one of his students. The discussion allowed Ja to vocalize what he learned and express his concerns. The curriculum coordinator used probing questions to guide the discussion, allowing Ja to connect the student’s characteristics to the dynamics of the curriculum and the learning environment. More details of the conversation and the outcome are provided and analyzed later in this chapter.

The fifth and final one-on-one session occurred in January, 2006. Ta also did not openly engage in dialogue during whole-group sessions. He pulled the curriculum coordinator aside after an announced visit to address PBL. The curriculum coordinator used probing questions to help him examine his approach to coaching students. A more descriptive analysis of the dialogue is analyzed later in this chapter. A detailed summary of each method of delivery is provided in Table 6 of the Methods chapter.

Teachers dictated what method of delivery they preferred for the BPD professional development sessions. Did using multiple methods of delivery affect the cognitive engagement of teachers during various BPD sessions?

Evaluating Level of Teachers' Participation

To analyze the impact of the content and design of BPD program on each of the six participating teachers, their level of participation was evaluated using the field notes which were coded to identify behavioral patterns during all BPD sessions. To measure the effectiveness of the BPD program on increasing teacher engagement and participation during their preferred method of professional development instructional delivery, each teacher's participation during the three informational sessions was evaluated and compared to behavior during his or her preferred method of instruction. Using the M-SCOPS rating scale as a model, the six different behavioral patterns observed by the curriculum coordinator were rated as follows: 6 = generalizing by evaluating how the new ideas and concepts can be used outside of the context within which they were developed, 5 = synthesis and transfer of concepts learned to specific student and curricula

needs, 4 = limited synthesis of lessons and instructional activities based on contents presented during BPD sessions, 3 = basic application of concepts learned within specific BPD sessions in the classroom, 2 = nodding in agreement with comments presented by colleagues and/or the curriculum coordinator, and 1 = repeating of concepts presented, and no response or change in physical expressions. A detailed summary of each rating is provided in Table 7.

Teachers' Participation Level During Informational Sessions

At the beginning of the BPD program, teachers received guidance on key concepts addressing the unique features of the school and the curriculum. Teacher behavior during the informational sessions, reflecting the traditional method of delivery for most professional development programs, was used to compare teacher behavior during their preferred method of professional development instructional delivery. This section examines the behavior of teachers during the one-size-fits-all or whole group traditional method of delivering professional development programs.

Alif, one of the seven teachers attending all informational sessions taught self-contained second, third and fourth grade students. She taught language arts, math, science and social science. During the first information session, she was observed:

During the meeting today, Alif went to the computer and printed out a copy of the school's mission and vision for each teacher present. When she came back, she didn't say anything to the other teachers. After I went over the contents of each, tying them into the curriculum, she added the need to make sure each teacher do what is needed to help the students achieve. She went off on a tangent about how important it is to reduce the number of children failing. She wanted teachers to be aware that it takes a village to raise children, involving the parents, business people and others

as much as possible. She also spent time talking about the need to help the students make good decisions when they graduate so that we can break the mold of having so many children lost as adults in prison or worse. She mentioned the desire of Bait's curriculum is to help the students learn to make good life decisions ... (August, 2004)

During the first and second instructional sessions, dated August and September of 2004 respectively, the curriculum coordinator observed Alif making connections between the school's mission and vision statements to the objective of teaching. She noted how decisions made by children are a reflection of what happens in schools; teaching students critical thinking skills helps them make decisions that keep them from getting into trouble. From this, she appears to be inferring that a curriculum based on critical thinking, following Bait's mission statement, increases the ability of students to avoid getting into trouble later.

Alif was not present in the same room during the second or third informational sessions. She was in the school, close enough to hear what was being presented. However, she was engaged in administrative duties and not actively engaged in taking notes or giving feedback during the informational sessions.

Her involvement during the first informational session suggests a higher level of thinking, using her understanding of what is taught in school and how that knowledge impacts students once they graduate from school. Her distant involvement during the second and third informational sessions did not stop her from gaining skills that she used later when working with other teachers. Based

on field notes, her behavior was ranked five, indicating an ability to synthesize her knowledge of the school's mission and vision statements and what she conceived to be the needs of the students. Alif said she had no preference on how she was taught. She is identified with having no preferred method of delivery; she behaved the same during all methods of delivery, as seen in Table 13.

Table 13

Level of Teachers' Participation

Teacher	Participation During Informational sessions	Method of Delivery	Rating	Teacher Behavior
Alif	5-Infering	No Preference	5	Synthesis of ideas with examples
Ba	4-Synthesizing new ideas	Small Group	5	Synthesis of ideas with examples
Ta	3-Superficial use of skills	One-on-One	5	Synthesis of ideas with examples
Tha	2-Not active	N/A	N/A	N/A
Ja	2-Not active	Small Group	2	Looking, nodding and/or verbal understanding
		One-On-One	4	Help making new lessons
Dal	3-Superficial use of skills	Whole-Group	1	Looking, no comments
Ra	4-Synthesis of new Ideas	Whole-Group	4	Apply ideas to current Lesson plans

Ba was also self-contained, teaching kindergarten and first grade. She taught math, language arts, science and social science. The following segment of the curriculum coordinator's field notes addresses Ba's behavior during the first informational session:

... Ba was winding down from registering students. She expressed an interest in getting her books to take them home. She was interested in

going home to do her lesson plans. She was packing and arranging things during the informational session. From time to time, she would stop and pay attention. Thinking back on the session, I noticed she looked at the board as I wrote out the academic subjects and the way they can be connected. In addition, I mentioned how the classes will all contain multiple grade levels. Teachers were told they should look at their lesson plan books to determine overlapping or common units. I encouraged the teachers to consider using themes to connect multiple grade levels and/or subjects together ... (August, 2004)

Based on the notes from the first informational session, Ba did show an interest in the content, by stopping and looking at the board and the curriculum coordinator when information was being discussed and written on the board. However, she did appear to be preoccupied by the desire to go home and work with the books.

The field notes below were written after the second informational session, where teachers received information on selecting academic strategies to match student characteristics:

... During the sessions, other teachers sat and listened during most of the instructional session. Ba did add to the conversation at times during the pedagogy section that she was afraid of group work because most of her students had limited pre-requisite skills. She also did not see how she could lecture because she had so many things to do. No one else spoke up with suggestions ... as curriculum coordinator, I gave her input into how to provide some students with desk work while others did group work with her. As an example I modeled for her how to give four year old, Sal some desks work, using manipulatives with Sara while she read to the kindergarteners. I also included information on ways to get Martha to read to Sal as she worked with Sara on her first grade words. She decided to use the table in her room for working with small groups. She decided to make copies of work sheets for individual seat work ... (September, 2004)

The segment of the field notes above (September, 2004) indicates she was afraid to use multiple strategies, “group work ... lecture,” due to student “... limited pre-requisite

skills” Ba used individual seat work during the first year, the first month of the BPD program. However, during the second informational session, she mentioned her hesitancy with using some of what had been presented, such as lectures and group work because she felt the students were not academically ready for the curriculum content. Her discussion reflects an attempt to match student characteristics to the content of the professional development content. As stated earlier, the content of the first informational session and the review at the beginning of the second provided teachers with examples of instructional methods.

During the two sessions teachers also received examples of implementation by the curriculum coordinator. One of the examples included advice on how to keep a four year old pre-school student engaged as she worked with the kindergartners and first graders. The example included using peer help, Martha reading to Sal and differentiated instruction, having some of the class work on independent assignments as others worked with manipulatives. After the comments by the curriculum coordinator, Ba added to the discussion how she could use the classroom furniture and layout to set up a group station, using a work table in the room for small group activities. Thus, it appeared she used the example given about Sal, Martha and Sara to visualize making changes in her room to accommodate the very same methods presented earlier to the entire faculty.

Ba was uninvolved slightly during the first instructional session, showing an interest in what was being presented by the curriculum coordinator by changing her focus from her lesson plan books to the contents of the presentation. Therefore, her first rating

was a two, being aware and apparently not in disagreement with the comments being made by the curriculum coordinator. During the second informational session, she received help with how to use knowledge of student characteristics to group one of student with others, and she could not make the connections on her own, her behavior during the second informational sessions was rated four. Rating four suggests an ability to generate an instructional plan from what has been introduced during the BPD sessions with further guidance from the curriculum coordinator.

Ra was a part-time departmental instructor, teaching social studies and computer science to grades five and up. The following field notes were written just after the first informational session:

... Ra thumbed through a couple of his social science books, mentioning he probably will use class time to have the students read and answer chapter test from the text. Ta and Dal both sat and listened. When asked if they had any concerns or suggestions on how they will start teaching, both Ta and Dal said they would follow the book, using it as the curriculum for teaching students. Tha and Ja did not say anything. They did not have anything to add when called upon. They both said they knew how to teach their subjects. Tha mentioned she would follow the same way she was taught. Ja mentioned he would just teach his subject the way most teachers do ... (August, 2004)

Ra took the time during the first and second informational sessions to read through his text and/or written notes "... thumbed through ..." Ra did not dialogue to help anyone else. He was focused on his subject "... have the students read" During the informational sessions he took time to connect ideas to his lessons without making any connections to the curriculum of any other teacher. His behavior was also rated as four.

Two teachers did not offer any comments for others. Ta, the Arabic, Spanish and Tai Chi teacher and Dal, the gym teacher taught all levels of students. They also did not include any statements to indicate direct use of skills presented during the informational sessions in their daily activities. There was no connection being made directly to Bait's mission, vision, and/or curriculum. In addition, there was no direct connection made during the first two informational sessions to the student needs.

Both Ta and Ja did indicate they would follow the book, using it as a guide for instructing students. Thus, there would be no synthesizing of information presented during the session for matching curricula content with student characteristics. Because, they decided to apply the methods used to the content of the curriculum guide, instead on synthesizing new lessons, their behavior was rated three for basic application of curricula without synthesis or transfer to other disciplines, other grade levels, other teachers.

Two teachers, Tha and Ja both demonstrated limited input during the whole-group sessions. Tha, the Arabic teacher only attended one informational session. Ja, the self-contained teacher for grades 4 through 6 taught math, language arts, and science attended all three informational sessions. They did not take notes or provide any evidence of accepting any of the concepts or ideas introduced. As evidenced from the field notes of August, 2004, both mentioned teaching the way they learned as students. This suggests they were not internalizing the concepts being presented. Their comments came towards the end of the first informational session. Ja did not make any comments during the second or third informational sessions.

Tha only attended the first informational session. Her behavior was rated based on her attendance at that session. Both Tha and Ja's behavior during the informational sessions was rated as 2 due to not providing any physical evidence of verbal or physical response to any of the efforts of the curriculum developer or the contents of the informational sessions. In addition to not showing any physical signs, they both commented they would teach based on prior knowledge of the subject or a previous teacher, regardless of student characteristics or Bait's mission or vision. Table 13 includes a summary of each teacher's level of participation during the informational sessions and their preferred method of delivery.

The second type of BPD implemented during the first and second years was aligned with teachers preferred method of delivery based on initial questions posed to them during the first instructional session, what was his or her preferred method of delivery. There were three different methods of delivery requested by teachers: whole-group collaboration, small group dialogues and one-on-one sessions.

Teachers' Participation Level During Preferred Method of Delivery

Teachers' behavior during the preferred method of delivery were rated using the same rating scale used to rate cognitive behavior during the informational sessions. The following analysis begins with teachers demonstrating high cognitive engagement.

Ba's Participation. The contents of the first two informational sessions provided the teachers with a foundation for establishing a framework needed to guide instruction.

The following curriculum coordinator's field notes reflect the first small group session, held two months after the second informational session.

Today included an opportunity for teachers to get help on implementation, implementing a lot of the skills learned during the previous two sessions. Ba asked to speak to me about a few students. Before speaking to her, I looked around to get a sense of how things were going with teachers before sitting with her ... By the end of the school day Ba, Ta and Alif were sitting together sharing their day's activities ... included in Ba's curriculum was to have teachers to use themes to help teach concepts ... Alif wanted the teachers to have students get ready for an in school science fair by the end of January. This is probably going to be the school's first theme ... Listening to Ba and Alif talking about the science fair. Ba panicked, saying she felt so overwhelmed, not sure she could add on any more. During today's session it seemed Ba needed help with incorporating themes in her lesson plans. ... After my comments, Ba interjected I could just let that be her science classes. She mentioned the idea of helping students learn to write, make graphs, and scientific method while having them work on science fair projects ... (November, 2004)

The curriculum coordinator went to the school with anticipation of seeing the teachers "... implementing a lot of the skills learned ..." The collaborative group activity between Ba, Ta and Alif "... sitting together sharing ..." allowed the curriculum coordinator to see the teachers use one of the major concepts introduced during the second informational session, themes into plan lessons. During this session, Ba demonstrated an inability to merge information on themes in with her curriculum, "... overwhelmed, not sure ..." Her colleague had made a suggestion, "... science fair ..."

Yet, Ba was still struggling with how to make the connection between themes and student characteristics. However, she did become more aware of what to do after help from the curriculum coordinator, assistance with using themes such as Thanksgiving as referenced

earlier in this chapter. She began to see how she could make connections, "... helping students learn to write, make graphs ..."

The following field notes reflect the first visit to the school after the beginning of the second year. The curriculum coordinator was not called to the school. The visit was announced at least three weeks prior, allowing teachers time to prepare to meet if necessary. During small group meetings, Ba brought samples of student work and anecdotal records to help paint a picture of her class, academic concerns and accomplishments of the students. She shared her innovative ideas with other teachers. The following curriculum coordinator field notes were written just before the final informational session:

... Sara was in Ba's class the first year of the study. During the second year she was in Alif's class for math and language arts. Ba taught core subjects, excluding Arabic, Spanish or Tai Chi. During a few meetings with Alif, Ba gave advice on how Sara best learned Math. "Her mother is very supportive. I suggest you use her mother's help by giving her more homework to help her get more practice ... (October, 2005)

Ba gave advice to Alif, exclaiming she made several observations during her previous work with Sara. She shared this knowledge with Alif. Not only did she share that Sara was creative, Ba also noted that Sara did not have problems the first year of instruction. Based on conversations between Alif and Ba, the math problems started the second year.

... Ba noted Sara's mother brings food for students who do not have lunch. She went on all field trips. There were some days she would stay late and help with the after school program ... "She is always there when I need her," Ba mentioned. ... Ba continued that she noticed a problem with Sara doing multiple tasks. Sara appears to have a hard time completing

assignments when there are multiple parts to the problems. She had a problem writing down the steps to a science project. However, she did real well with creative writing stories. “She has a very vivid imagination, Ba added. She mentioned how the creative writing essays were full of details. This was a contradiction. However, Sara could not think further than a specific concept or skill when doing multiple concept assignments. Alif mentioned that she may be having problems with multiple concepts while doing the math word problems. Ba suggested sending home worksheets with two step word problems to re-enforce Alif’s use of two step word problems in class. Alif also decided to use a math workbook with multiple pictures, possibly increasing the use of vivid art to help Sara process the math skills. Ba reminded Alif that she had found Sara to be very receptive to the opportunity to use pictures to tell stories. Ba mentioned Sara drew pictures with words, very colorful words when writing short essays during the previous year. (October, 2005)

Ba knew the mom had a desire and ability to help. She suggested the additional math problems because she believed Sara’s mom would be a good source of support – generalizing. By selecting to use math workbooks with pictures, Alif generalized by merging her knowledge of Sara’s vivid writing skills and weakness in math.

Ba was able to take what she knew about students to provide positive help to her colleagues. The following curriculum coordinators notes reflect comments from a small group session:

... They each were able to provide some support for using math, language, science and social science skills that would help to teach students the value of giving things to others. To help explain why she thinks this may work, Ba gave an example of a reading story where she had the students writing an ending to a story from the class. The story was about a boy who had a pet. In the story, she mentioned the boy learned responsibility as he learned to take care of the pet. Ba continued with comments about how she was happy that she was able to get all of the students writing something about what they were responsible for. She did share one specific student who normally had difficulties with writing paragraphs, Sara. However, she noted Sara used so many colorful words, you could almost see the story in front of your face. I asked Ba to share why she

thinks Sara had a good time changing the ending to the story. She mentioned Sara liked the story, welcoming the opportunity to add more to the story. Ba believed Sara could connect to the story because she has the responsibility of helping to take care of a younger relative at home ... (December, 2004)

Comparing Ba's comments during the December, 2004 and the October, 2005 sessions, Ba recognizes Sara has the ability to write essays that include numerous adjectives and adverbs. The field notes show that Ba recognized during both sessions that Sara had an affinity for "colorful words." She used this knowledge to help Alif address Sara's needs in Math. In the October, 2005 session, Ba was suggesting that Alif provide Sara with "pictures" to address her difficulties with math. By connecting Sara's writing strengths to the need to help her with math, Ba demonstrated the ability to generalize Sara's interest and strengths.

Ba's small group behavior was ranked as five, as compared to her informational session rating of five. She demonstrated the ability to take knowledge known about students, information known about another teacher's curriculum and help her colleagues. Alif verbalized an approach to teaching a former student.

When receiving information in the whole-group informational sessions, Ba demonstrated an ability to generalize by connecting the concepts of the professional development session with her curriculum and student needs. "... I can do this with Sara ... I can do this with Martha etc ...," as per field notes. However, she did not offer anything new for other teachers during the whole-group sessions. She focused more on

her students' academic and social needs. As a result, her informational session behavior was ranked as four.

Ta's Participation. As stated earlier in this chapter, Ta's participation during the informational sessions rated three, because he was not as visibly engaged as Ba during the informational session. Ta was quiet until called on by the curriculum coordinator or others. When asked how he would implement the strategies and/or other concepts presented during the information sessions, his responses were vague, not specific for any one child, as evidenced in the notes from November, 2004. In general he planned to have the students read more in class. He did contribute from time to time to the whole-group with comments that were not specific to any one child or lesson. He did take some written notes as he listened. On the other hand, he would meet with the curriculum coordinator after all of three informational sessions and two of the group sessions, to discuss specific students and specific lessons. He also would call the curriculum coordinator to get assistance, check to see if he was approaching lessons and student performance accurately and to test out lessons before teaching them.

During the one-on-one sessions, Ta synthesized lessons, combined knowledge about Spanish and Arabic with his knowledge of how students learned and behaved as he selected the appropriate strategies and behavioral approaches needed to work with the children. He demonstrated more cognitive engagement during the one-on-one sessions with the curriculum coordinator than when in the whole-group meetings. Ba and Ta behaved differently when engaged in various BPD delivery methods. Both teachers

ranked a five during the preferred delivery method, which was higher than their participation during the informational sessions.

Alif's Participation. Alif, the self-contained teacher for second through fourth grade students, did not indicate an instructional preference and was actively engaged in all sessions she attended. She was cognitively engaged during all activities by asking questions and making inferences pertaining to the topics. Below is an example of her cognitive and collaborative engagement during the second informational session on planning instruction by using instructional themes:

... Today, Alif jumped in when I was speaking to Dal about using themes to teach gym, she interjected with him being able to use this when he teaches health. She even went around the table making suggestions on how Ba could tie in the theme with social studies, math, and science ... (September, 2004)

The school had an upcoming project for Black history month. Alif mentioned ways to have teachers use a history theme to connect to their curriculum content, as supported by the following field notes:

... She included some suggestions ... Black scientist for science, Black athletes for gym, civil rights leaders for history, business leaders for math, etc ... (January, 2005)

Not only did she internalize the idea of using themes for herself, she also internalized the use of themes for her colleagues. She demonstrated the ability to connect the Black history theme to various curriculum demands, transferring skills learned to other situations. During the second informational session, the curriculum coordinator introduced local state descriptors for each discipline. Each academic discipline included

a section on research and career development. Thus by helping the science, math, social science teachers use these two skills to have the students research African Americans aligned with their discipline, they were able to use the next month's activities to tie together some of the skills being taught.

During a one-on-one session, Alif mentioned advice she gave to Nel, a student with behavior and academic difficulties, at the end of the first year of the sessions:

... Alif mentioned Nel had been assaulted by an adult before enrolling in our school. Faculty members from her prior school were not able to help her during and after the assault. It appears the girl has lost faith in adults, in authoritative figures. In an effort to give her a voice in solving problems and deal with her own behavior concerns, Alif thought it was good to give the student some leadership responsibility. Alif brought up a few more students with problems following instruction, who also had rough school experiences and have been giving their parents problems. Thus, she encouraged the students to start a student council to advise administration ... (May, 2005)

This occurred after the curriculum coordinator visited Bait in order to provide individual assistance for teachers as needed. Alif volunteered the above referenced comments when the curriculum coordinator asked if she had any specific concerns. During this one-on-one conversation, Alif shared her approach to dealing with the behavior problems of older students who may influence the younger students. She paid close attention to the past and current behavior of the student in an effort to decide how to help her. Alif notes the past experience as she discussed the student's problems with authority figures. No one helped Nel when she was assaulted. Alif did not elaborate. However, she did mention the two comments together, suggesting her mind had made a connection between them. Examining Alif's approach, it appears she used her

knowledge of a student's background to select solutions to behavior problems. Because of Nel's past experiences and her age, being a young adolescent Alif believed she did not trust or revere authority figures too highly. The student appeared to buck authority. Alif suggested an opportunity for students to see how those in authority, specifically of the school make decisions. She did not stop there. The curriculum coordinator wrote:

... Alif asked Ra to possibly have the older students make a student centered magazine (May, 2005)

As an extension of helping Nel, Alif encouraged the part-time social science/computer science teacher to use the student council idea to show students how laws are made. She suggested to, not demanded her colleague to have them develop a magazine for the student body as a means of increasing student voice in resolving school concerns. At the same time, the computer science curriculum would be used to help develop and enhance social science skills.

Just prior to the time of the curriculum coordinator's visit, Bait had just adopted the Problem-based Learning (PBL) approach to teaching students. One of the discussions during the whole-group discussion a few months before the above referenced notes was the nature of PBL lessons. How teachers responded to PBL instruction is analyzed later in this chapter. The following comments from the curriculum coordinator represent Alif's behavior after the PBL practices were introduced:

During today's visit, Alif was sitting at her desk, working on some administrative responsibilities. She began talking to me about an idea she had for helping Nel and some of the other junior high students. The idea was to have them take on some of the concerns of the school and help to come up with rules and suggestions for dealing with problems, maybe they

won't be as problematic as before. The student council allows them to become part of the solution and not only be part of the problem. She felt this would decrease the issue of students misbehaving and student disruptions. She also noted students who feel that they are part of the solution, usually do not become or continue to be part of the problem. She felt the student involvement would allow the students to become active stakeholders in the administration/running of the school. (October, 2005)

These comments from the curriculum coordinator in addition to those presented above help to suggest Alif has developed the ability to incorporate concepts presented during the BPD sessions to synthesize lessons for various students and help transfer concepts to more than the math and language arts curriculum, which she taught. She did not initiate phone calls or emails to the curriculum coordinator to inquire about student needs and/or work on any specific concerns. However, she did interact with her colleagues when they approached her with concerns. Over the course of the sessions, Alif and Ba met, as a small group, with the curriculum coordinator after the informational sessions to discuss student performance. Alif's whole and small group behavior was evaluated as five. As seen in Table 7, a rating of five indicates that the teacher synthesized new lessons, transferred concepts from the examples presented by the curriculum coordinator and her students in the actual classroom. As stated above, she did not indicate a preferred method of delivery. She was apparently eager to learn, eager to become cognitively engaged. Behavioral patterns of three of the six two-year teachers, Alif, Ba and Ta received a rating of five while participating in BPD activities matching their preferred method of instruction.

Ra's Participation. Ra scored the same during all whole-group activities, which were his preferred BPD methods. He commented during the third informational session, addressing curriculum implementation and PBL strategies:

Ra mentioned today he did not see how he could use long-term independent assignments when students have a hard time doing homework. He wanted to continue to do short assignments, not connected to themes that allowed him to get homework back daily. He wanted to teach skills in isolation. He felt the best way was to follow his teacher manuals . . . (November, 2004)

This suggested that he was struggling with ways to transfer the knowledge he had about the students to other strategies and lessons. He was comfortable using specific strategies (i.e., peer grouping, whole class lecture, demonstrations and individual seat work) as observed by the curriculum coordinator. However, he did not see how he could merge together his knowledge of the students and curriculum to develop meaningful lessons that would increase student engagement and motivation, encouraging them to do the independent assignments, as opposed to the teacher directed lessons.

In addition, Ra did not ask for one-on-one sessions with the curriculum coordinator and/or call or email the curriculum coordinator for any assistance. He responded to the call for meetings by the curriculum coordinator or other teachers. As an example, Alif reached out to Ra during the May, 2005 small group discussion referenced above, giving him advice to start a student council. He did watch and follow what others modeled. He provided information on student performance and his concerns during the informational sessions as well as when teachers collaborated in whole-group discussions. He participated in discussions including student work, learning styles, behavioral

problems and curriculum content as he put together suggestions on how he could best teach the students.

His behavior during all whole-group professional development sessions was rated as four. He had a limited ability to synthesize some new lessons. He had a limited ability to try new strategies. Usually he had to be nudged a little by other staff members.

Mixed Level of Participation – Ja. When asked about his professional development preference, Ja mentioned small group and one-on-one. He participated in one-on-one sessions with the curriculum coordinator twice to discuss his students. Below includes segments from the field notes during a one-on-one follow-up meeting with Ja after the third informational session:

Today after the group meeting, Ja asked about working with one of the fourth graders. Examining Hal's behavior in class, it appears that he is working at the level of a second grader. Ja's efforts to speak to me directly (one-on-one) was a positive sign, because he did not say anything during the meeting today. He sat quietly, not showing any evidence (taking notes, nodding, sighing, etc.) he connected to the contents of the session . . . During this one-on-one meeting, Ja asked for help working with Hal. This fourth grader is not doing well in school. His grades averaged "D." The only thing keeping Hal from failing are the marks he gets on his homework, which Ja mentioned are always done correctly. He wanted assistance on how to use themes and PBL practices to teach Hal, who had not mastered third grade skills. Ja felt it would have been better to just have Hal do the work from the book, maybe a second or third grade book. For example he did not know his multiplication facts. Ja wanted him to know them from memory. Another problem Ja noted is Hal's low comprehension level ... My questions today were to help Ja identify the source of Hal's difficulties. I asked him to highlight Hal's strengths and weaknesses, antecedents for success and failures ... from the responses, Ja begin to see that Hal did better when things were read to him ... he got an older student to help Hal by read his stories, content from subject area books and directions ... classroom practices it appears that he made some modifications for students based on grade level ... (November, 2005)

He initiated the discussion after remaining silent during the whole-group meeting. Instead, he asked his questions, minutes after the informational session ended. The questions he asked related to using themes to teach students inquiry skills. This is a merger between the skills taught during all three informational sessions; evaluating student characteristics to guide instructional activities, school's focus on critical thinking/inquiry-based themes and use of inquiry as an instructional method. He recognized the student's auditory comprehension level was stronger than comprehension from silent reading. By using an older student to read to him and help him acquire concepts using his auditory strengths, the field notes referenced above from November, 2005 support that Ja did learn how to make academic decisions based on student characteristics and curricula demands. This was part of the discussion during the second informational session.

When the curriculum coordinator observed him teaching, he had the students working out of workbooks, heads down writing or calculating math problems.

... he had Mary sit with Hal, helping him with his reading. She was a good writer. He mentioned she organized her writings well, including main ideas and several minor details for each. He mentioned that Mary was good with her homework ... (January, 2006)

After the discussion in November, 2005, he appeared to have more students grouped, working together, matching what he proposed during the November, 2005 meeting. One example mentioned above, Ja took an older student who completed her work early to help a younger one. This demonstrated his ability to provide individual

help as needed, considering the needs of the tutor and tutee, as per notes from teacher collaboration section later in this chapter.

He did not say a word during the four small group dialogues with other teachers, just looking on as other teachers made comments. He only discussed things one-on-one with the curriculum coordinator. Being able to use knowledge of Hal's academic characteristics to decide on an approach to getting him help during class, Ja's participation during one-on-one sessions was rated four. However, his silence during the small group dialogues results in a participation rating of two.

Lower Level of Participation – Dal and Tha. Some of the teachers were not as involved during the method of delivery they identified as their preference. Tha never participated in any BPD sessions other than the first two informational sessions in 2004. Dal scored three during the informational sessions. He identified whole-group collaboration as his preferred method of delivery. During the second informational session's review of methods aligned with student characteristics of September, 2004, Dal mentioned he could not use most of the methods suggested, because he taught gym. He believed that he did not have to worry about having students read, remember concepts to compute math problems or any other strategies related to students acquiring and retaining information. He mentioned that he only had to worry about teaching students the physical lessons. However, he did not add anything during the whole-group sessions where teachers were allowed to provide special concerns or needs. During the whole-group collaboration session which he identified as his preference he did not participate in

the meeting by adding any comments, writing down any notes and/or sharing any information about specific students or specific lessons. His performance during small group collaboration was rated one. He never sought a one-on-one session with the curriculum coordinator. He never stayed long enough to work with any small groups after the whole sessions were over.

Summarizing Level of Teachers' Participation. Figure 3 reflects the levels of performance of teacher behavior during several BPD activities included in this section. The first bar on the graph reflects the cognitive behavior of each teacher during the informational sessions or whole-group lectures. The second bar reflects the cognitive engagement of teachers during his/her preferred method of professional development as aligned with each teacher's assessment of his/her preferred method of professional development (i.e., one-on-one, small and/or whole-group activities). During the first informational sessions, when teachers were asked to identify their preferred method of delivery, one teacher, Ja identified two methods, small group and one-on-one. As a result he has two scores for preferred method of instruction, as evidence in Table 13. The level of participation rating scale is summarized in Table 7 of the Methods section.

One teacher, Tha only worked at Bait for a brief period of time, attending only two informational sessions. She was not present when teachers had a chance to voice their preferred method of instruction. Therefore she only has a score for the instructional session, where her behavior rated two, because she did not make any verbal connections to concepts presented during the informational sessions with the curriculum or students.

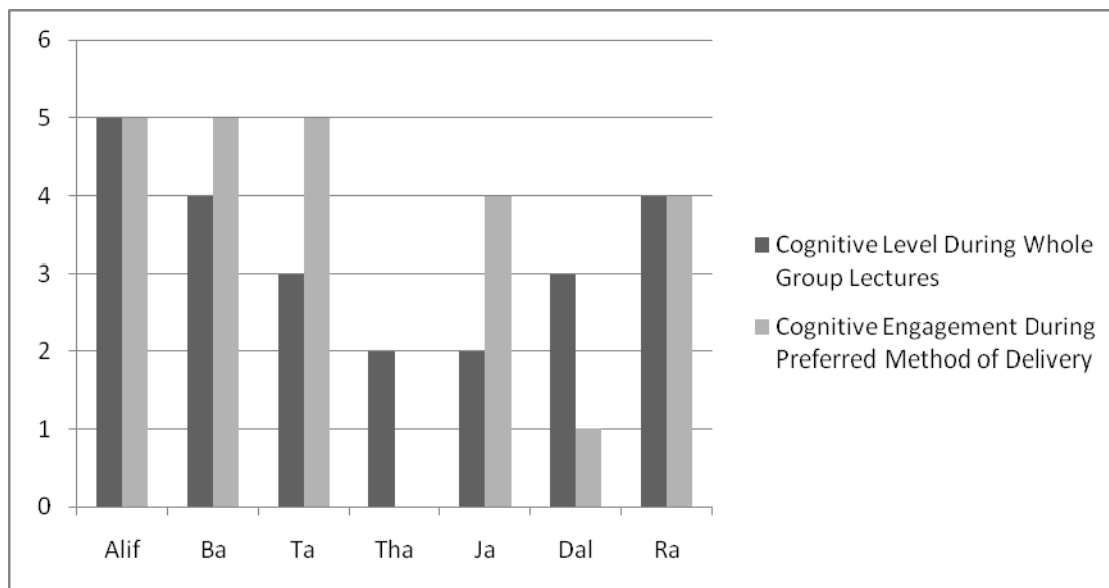


Figure 3. Teachers' Level of Activity During BPD Sessions

Based on the results summarized in Figure 3, three of the seven teachers were more cognitively active during his/her preferred method of delivery for professional development programs. The cognitive engagement of two teachers ranked the same during the one-size-fits all and their preferred method of delivery. One of the two did well all around, being hungry for information and the opportunity to help others. The other teacher identified whole-group lessons, similar to informational sessions as his preferred method of delivery. Five of the teachers ranked four or five during their preferred method of delivery, suggesting the sessions may have been meaningful, allowing them to learn specific and general concepts needed to address student characteristics and curricula demands. In addition, teachers were given a chance to select the method of delivery closely matching their learning style. The ability to select content and method of delivery increased buy-in to the design of the BPD sessions. The fact the

participation of five out of seven teachers ranked a four or five during their preferred method of delivery suggest the teachers participated more if they contributed to the design of the program. The two teachers who did not demonstrate higher cognitive engagement during his/her preferred method of delivery were not with the program throughout the entire two years. This helps to support that long-term follow through of two years may have increased the ability of cognitive engagement.

Did the increased cognitive engagement help teachers recognize their growth? To evaluate the ability of teachers to recognize change, teacher comments and behaviors were evaluated to assess the ability of teachers to cognitively recognize their growth.

Teachers Reflecting on Personal Growth

To address the relationship between each teacher's level of participation and their ability to reflect on their own growth, teacher reflections were coded for the cognitive awareness of change. Teacher reflections including evidence from their practice or past experiences were rated five. Reflections demonstrating teacher activities guided by evidence of students' needs or teacher knowledge received a rating of four. Teacher reflections demonstrating the teacher's ability to recognize cause and affect patterns in their behavior received a rating of three. Reflections listing behaviors and results from behaviors with no rationale support received a rating of two. Reflections listing teacher behaviors with no explanation were rated one. If the teachers did not indicate reflective thoughts they received a zero for reflective behavior. Only two of the full-time teachers, Ta and Ba wrote one big reflection at the end of the second year of the BPD sessions,

upon the request of the curriculum coordinator. The results of two of the three full-time teachers are analyzed and compared to their level of participation during the BPD sessions. Table 8 summarizes codes used to evaluate teacher reflections.

Ta's Growth. Ta was cognitively active during his preferred method of delivery, rated five during one-on-one dialogues. As evidenced during the previous section on teacher participation during preferred method of deliver, he was able to synthesize concepts introduced as he developed lessons for his students.

Ta completed his reflection during July, 2006, one month after the end of BPD's second year. The quote below was found early in his reflection:

... I used my experience as an average student to see the importance of giving the students the foundation. We started off with the vowels, basic conversation. My methodology was repetition. If you repeat something for twenty times, it will stick to you. I taught them ... I now know the importance of teaching children. And talking to [curriculum coordinator] by her being an outstanding educator has inspired me a little bit...

Ta is suggesting being average himself allows him to connect more with his students. Earlier in this chapter, field notes of May, 2005 support he indicated to the curriculum coordinator that he struggled in school. He did not write this into his reflection. He continues by mentioning that he deemed it necessary to provide the students with a strong foundation. This suggests he was more interested in presenting the facts regardless of what students needed. He did not see the need to individualize. He felt it necessary to use repetition for all students, which is how he learned – not allowing student characteristics to determine academic methods.

Continuing in his reflection, Ta acknowledges his appreciation for the guidance given to him by the curriculum coordinator. He contends that he has learned the importance of teaching, implying he wasn't teaching the individual student before participating in BPD activities.

What is the difference between the way he started and the way he found himself teaching? The following quote, found further into the reflection shows his realization that he could not teach students to memorize only. He realized the need to teach the students how to apply what they learned. Prior to participating in the BPD program, he was teaching students to memorize statements. He began to realize the need to teach understanding and application of grammar skills:

...When I first started off I did not emphasize grammar. I taught the children how to read and writing and speak. As I went along, I realized how important it was for the grammar, for students to maintain and change the grammatical structure of the language. That is if they need to. Emphasize more writing and conversation. At first, I did not think that grammar was that important. Sitting in different class rooms with various teachers including [curriculum coordinator], I realized that grammar is very important...

In addition, Ta referenced his ability to identify skills students need by combining the guidance given by his college professors in addition to what he got from the curriculum coordinator to identify needed skills. Ta provides another example of using information to examine himself:

... I feel real confident in myself because my parents needed more than I thought I needed. When I am in the classroom with the children, I do not see myself as a teacher. I see myself as being a student. Because in the classroom with 10, 15, 20 students, each one has knowledge that I do not have, personalities, dispositions. I watch their behavior. I noticed in the

class different levels of learning. Some were good at verbal, some were good at written. Some did not do well in terms of writing. Others did not do well as far as expressing themselves. So my method of grading, I took verbal written and put them all of that together. Then I average it out. Like the A, B and C did not tell you how much a student knew...

Ta recognizes that he gathers information from his students, learning from them as he teaches. Because he is learning, he sees himself as a student in the classroom. He uses the information to inform his instruction. He contends that he collected information on prior knowledge, personalities, learning styles and attitude towards learning. Finally, he admits he used the information to determine his method of teaching and grading. To include all students in the assessment process, he used different methods to address the learning styles of students. During his reflection, Ta demonstrated an example of how he changed his approach to teaching based on guidance during various BPD sessions. This suggests he found his experience effective, helping change his method of instruction, by using student characteristics and curricula demands to guide his instruction. Ta's reflections rated a four because he was able to recognize his ability to increase in his ability to use student characteristics more.

Ba's Growth. Ba's behavior during small group sessions, her preferred delivery method was five. She completed her reflection in August, 2006, two months after the end of the BPD program, upon the request of the curriculum coordinator. She began her reflection with:

So that has been extremely helpful. I have become more comfortable after the second year than I did at the beginning. I do not have to sit down three to four hours every night literally doing lesson plans, just going over them, writing notes on the side so I would not miss anything. I even now write

specific notes for specific kids, as I teach, if I know what their challenges are ... (August, 2006)

Ba's comments imply her ability to individualized lessons has become second nature. As per field notes presented earlier in this chapter from September and November, 2004, Ba struggled with time management, feeling overwhelmed with writing lesson plans. Thus, she was able to identify that she has begun to shorten what she writes, just to give herself guidelines, reminders of what to do. She does not have to write out the entire script, just the highlights, making her job easier. The November, 2004 field notes also show she struggled with helping one or two students during whole class lessons. Two years later, she does recognize her ability to individualize lesson to address student characteristics.

Helping to support the concept of gathering data from students to inform instruction, Ba wrote:

... You learn their strengths and weakness. I have learned to teach to my students' strengths. Even when my lesson plans may be kind of general, the book Scotts Foresman is excellent, it will take you up a grade, it will take you down, it will give you enrichment, and it will give you re-teaching. So that has been extremely helpful. I have become more comfortable after the second year than I did at the beginning ... I have become more confident in myself once I have had success with students, seeing what they can do. I have worked with [curriculum coordinator] and now I can kind of pick up where they are ... (August, 2006)

She appears to be suggesting that she has learned to teach to the strengths and weaknesses. She admits that she has used her text and lesson plans to teach to the academic characteristics of the students, teaching "up" or "down," as evidenced by the first two lines of the above segment of her reflection. In addition, Ba admits she has

“become more confident” by gathering data on student performance. She is becoming more of an expert than a novice.

Her reflective behavior is aligned with the field notes referenced above. All of the field notes written by the curriculum coordinator in 2004 show Ba participating in all of the BPD sessions, including small group activities and the first two informational sessions. The focus of BPD’s whole-group and small group sessions included guidelines on individualizing instruction by recognizing and matching student characteristics to curricula demands. Based on Ba’s reflection, she is aware that she has learned these skills and feels comfortable using them. Ba’s reflective practices included evidence to support her growth as measured by her instructional practices and was rated a four.

The participation of both Ta and Ba during their preferred method of behavior were rated five. Their reflections received a rating of four out of five, because they both were able to write reflections that identified growth in the area of fine tuning instruction to match student characteristics to curricula. Both teachers admit they learned to identify student skills and lack of skills to determine how to teach students. They both demonstrated the need to gather information from students, about students to make decisions about students. Ta went as far as to say he learned from his students as he worked with them. In addition, the teachers engaged in using inquiry skills, addressing mental questions about student needs. Literature supports the participation in inquiry-based and reflective practices increases the impact of the professional development on the participant.

The reflection of both Ta and Ba did not include the use of inquiry-based instructions for students. BPD included providing teachers with inquiry-based skills to increase their ability to use the skills to inform their instruction and include in their lessons for students. The next section analyzes the teachers' ability to teach an inquiry-based curriculum.

Level of Participation and Use of Inquiry-Based Curriculum

To analyze the relationship between each teacher's level of participation in BPD sessions and their ability to utilize inquiry-based instruction the lesson plans of the three full-time teachers and field notes were evaluated and compared to each teacher's behavior during their preferred method of instruction. The professional development skills taught during the BPD sessions aligned with inquiry-based curricula are individualized instructions based on student needs and curricula content, and the use of PBL, which is an example of inquiry-based curriculum strategies. Table 9, included in Chapter III, summarizes the rating scale used to analyze individualized instruction. Table 10, summarized in Chapter III includes the codes for evaluating the problem-based inquiry components of the lesson plans and teacher activities in the classrooms. The two inquiry-based skills are compared to the level of teacher participation in the next sections

Level of Participation and Individualizing Instruction

Instructional planning and activities provided data for analyzing ability of teacher to individualize instruction. Initial lesson plans and instructional behavior, prior to teacher participation in his/her preferred method of BPD of each full-time teacher

provided baseline data. The initial lesson plans were acquired during each teacher's first month of employment at Bait. The field notes began during the first informational session, held during August before Bait opened. However, teacher behavior during small group sessions were used to gather baseline data for all teachers not submitting lesson plans. Baseline data from field notes commenced during the first small group meeting observed in November of 2004.

To measure the effectiveness of the Bait's Professional Development Program's efforts to foster teacher change that leads to an increased level of teacher differentiation resulting in individualized instruction; field notes and lesson plans showing each teacher's instructional behavior was evaluated using a rating scale. The rating scale used to evaluate level of individualizing instruction includes: 0 = no individualized instruction evidenced; 1 = evidence of one level of grouping, probing questions and direct instruction; 2 = evidence of grouping, probing questions; 3 = multiple strategies, not directly aligned with any student characteristics; 4 = use of student characteristics to decide specific instructional strategies; and 5 = making selection of instructional strategies by matching curricula content, student characteristics and increased level of teacher as instructional coach. The rating scale is summarized in Table 9.

Alif and Ba both attended all BPD sessions. As stated earlier, the BPD participation level of Alif, Ba and Ta were rated as five, the highest level of cognitive engagement. Both Alif and Ba asked questions, rephrased concepts, brought in additional ways that the information could be implemented, spoke about individual

students and made suggestions to other teachers about what could be done, as evidenced in field notes dated November and December, 2004, January, May and October of 2005 in the teacher participation section above. The following sub-sections examine data from each teacher working for the duration of the professional development programs.

Alif's Individualized Instructions. As stated earlier, Alif was present in the school during each BPD session. She was not present in the vicinity of the meeting. She was usually multi-tasking, sitting close enough so that she could hear and respond if needed. She asked questions, rephrased concepts, brought in additional ways that the information could be implemented, spoke about individual students and made suggestions to other teachers about what could be implemented. Her behavior during all BPD sessions was rated five.

During BPD's first year, Alif's lesson plans included pages from each student's book per grade level and academic subject. For example, the October 4, 2004 lesson plan included page numbers for a writing assignment for the second and fifth grade students. The third grade students had a page numbers for a reading assignment. In math, all students completed pages in their math workbook. The lesson plan also included written comments for all students to do a book report and handwriting assignments. The following section is from the field notes dated November, 2004:

... Alif had a solid routine. As I entered the school, her students are sitting down engaged in desk work. Each student has his head buried in a text as he worked on his work. Each student had specific assignments, following sequence of the text book. As they finished one assignment, she asked them to take out a specific book or folder and began working on the next assignment ... Today, Will came up to her desk to get some help. Alif had

him come next to her desk, where she gave him help, re-stating the rules for solving the math problem he got stuck on ... (November, 2004)
She did provide individual assistance as students asked for it. The students

basically followed the format laid out by authors of the text book. Alif's initial effort to individualize instruction appeared to be limited to stimulus response, deviating from classroom layout as a response to student behavior without being proactive and examining student needs before problem arose. If a student said 'I need help,' she helped.

... The students were doing various assignments today. Alif's students were completing various assignments. Sara, Ned, Will, Josh and Nel all had stacks of text books in their desk. Alif went to Will's desk, having him take out all of the excess paper, pieces of garbage, pencil shavings and knickknacks. She instructed him to place the books back in his desk in a similar way. She moved to John, having him unfold the paper airplanes he had stashed in his desk ... Pull out his homework and straighten out the wrinkles ... told Ned and Will to sit down after eating lunch and complete their homework prior to going outside for recess with their peers ... (December, 2004)

A couple of students had difficulties with organizational issues. Being reactive, Alif had several boys clean out their desk and re-organize their books. She noticed the boys were spending a lot of time playing and using whatever they could to occupy their time other than their school work. By March, 2005, she helped to eliminate the opportunity to play with things in their desk by having them turn their desk around. This is an example of her efforts to help the boys become more focused on academic concerns and reduce frequent distractions.

As stated earlier, the second informational session included content on various methods of instruction and ways to individualize instruction and classroom practices to

address student characteristics. Her instructional practices during BPD's first year did not show change. She followed the lessons in the teacher resource book for all students per grade level, matching chronological age to grade level.

During BPD's second year, Alif's instructional planning and implementation changed, as evidenced by Alif's collaboration to prepare to fine-tune her planning and actions to address student needs. During the October, 2005 field notes, the curriculum coordinator observed Alif collaborating with Ba to tailor instructional activities to better match Sara's needs, addressed earlier in this chapter. As a result of her knowledge of Sara, Alif selected workbooks full of graphics for Sara, allowing her to learn the same curricula skills as the other second grader, using an educational tool matching Sara's need. During the same lesson, she adhered to the need of another student, Will accordingly.

... Will, Rich and Ned are all having difficulties with doing homework ... difficulties with follow through. Their teachers believe they are having this problem because they are not getting the correct practice at home. In addition, the parents are separating. The mother comes to pick the boys up from school late. Alif has convinced her to enroll the boys in the after school program, allowing them to do their homework while waiting on their mother. Alif assigns parent volunteers to work the after school program – where they can tutor students as necessary ... (October, 2005)

The above field notes were written just after the first curriculum coordinator's visit to the school after the whole-group collaboration session just before the start of the second school year. This collaboration session included an opportunity for teachers to brainstorm/trouble shoot, as they looked for behavioral and academic antecedents to help explain problems encountered with students.

During BPD's two years, Alif taught a mixture of second, third and fourth grade students. Alif's second year lesson plans included specific lessons for the second, third and fourth grade students.

... Sitting and watching the middle class today, I noticed Sara and Will were doing the same assignment, completing word problems using money. They both had a tray of play money on their desk and their math book in front of them. Will was preoccupied talking with John. John was not paying attention "... I had John doing work with Ned. He is doing well. The higher lessons keep him busy ... I think Sara is doing much better understanding the math with the new work book she is using ... She is able to do the work with the boys ... (March, 2006)

For the math classes, Alif individualized her lessons to include specific skills according to student's abilities. Sara, a second grader was working on word problems including adding money similar to Will, a third grader. Each had manipulatives and a different third grade math text. Sara's book was filled with graphic images and Will's was a regular 3rd grade math text. John was a 3rd grader doing work with the fourth graders.

Alif appears to have collected information from her own experiences and the experiences of other teachers to help make decisions about Will. When Alif had him go back in his notes to review notes on averages, she was helping him take ownership in getting the help he needed. During the previous year as evident in the field notes from October, 2004, Alif would cater to his needs, basically helping him every time he or his brother Ned had a problem. Using the help of parent volunteers, she set up an opportunity for them to do their homework. This gave the boys an opportunity to address an academic problem, not remembering things previously taught. She must have decided

they needed to help themselves. The second year of the professional development program, the boys were in third and fourth grader. Alif made efforts to help both boys realize the need for homework and studying.

... Examining Alif's lesson plans from the beginning of the second year, she wrote a note to herself to check the boys notebooks. I noticed a couple of times when visiting her, she made the students take out their notebooks to write down rules and examples from the board and out of books. Most of the times she had them competing pages to turn in. However, she did have them taking notes from time to time. ... (June, 2006).

The above notes were written at the end of the professional development program as the lesson plans were being reviewed. Alif did not write a final reflection. The curriculum coordinator did not ask her about the comment she wrote or her reasons for having Will and his brother review their notes from time to time.

There appears to be an effort on Alif's part to have Ned and Will become more responsible for their school work. Another point to help support this is her effort to build leadership skills with the students. The next statement from the curriculum coordinator's field notes is a continuation of the lesson plan summary, completed at the end of the BPD program:

... Alif's lesson plan dated September 13, 2004 showed major themes she wanted to use for the group sessions with students she lead every morning, jump starting the day. The themes included ... (June, 2006)

Apparently, she was concerned with developing leadership skills. In addition, she was the co-founder of a non for profit business that focused on developing leadership skills of young adults.

Her lesson plans for the first year of the sessions only included page numbers and text activities per grade level, regardless of the student needs. She followed the layout of the publisher. The second year of the professional development sessions included more than page numbers and text. She included learning objects with specific skills for each state goal and standard included in the lesson plan. She had separate plans for each grade level and subject taught, such as math, language & science. The lesson plans also included common themes.

As an example, Alif's math lesson plans for 2nd, 3rd and 4th grade students dated the week of January 30, 2006 all included charts, tables and graphs. The second grade lesson plan included making tables to tabulate the items in the classroom. The third grade lesson plan included graphs of student attendance. The fourth grade graph included making attendance graphs and reading and interpreting the graphs of classmates. Thus the curriculum demand included data analysis. She merged the skills of each grade level to help teach common skills at the level the students could handle – being aware of the curricula demands.

Alif's ability to use curricula content to match student needs is evident in her classroom behavior, as observed by the field notes:

... Sara was working from a workbook with charts and graphs. The book was filled with colorful images of charts and graphs. Instead of numbers, the book had stacks of apples, oranges and other fruits to show frequency distribution. As the other students focused on interpreting graphs made from the furniture and other items in the classroom, she focused on answering questions from the workbook aligned with the same skills the other students worked on ... Will worked alone for awhile. He ran into a hurdle, needing help understanding a question on averages. Alif instructed

him to go back in his notebook and look at a previous lesson, where he solved problems related to averages ... (February, 2006)

Combining her actions with Sara and Will, it appears Alif is able to combine knowledge of student's characteristics/needs, strengths and weaknesses with the demands of the curriculum to develop instructional strategies to help students learn in the most optimal way. Her behavior at the beginning of the BPD sessions was more sporadic. She would respond to the stimuli of the students. Later as she began to talk with parents and colleagues who helped her gather more information, she fine-tuned her thoughts and behaviors, as she conversed with colleagues to make her more proactive instead of reactive when resolving academic dilemmas.

Her initial lesson plans for the beginning of the BPD sessions were rated a two for individualizing instruction because of her sporadic tutoring of Will and others, as evidence by the field notes. Her lesson plans for the second year of the study were rated a five, because she appears to have structured lessons according to common threads or themes and adjusted the methods and materials to match specific student needs. As an example, she ordered Ned and Will to keep notebooks with notes of prior lessons to help them refresh their memories for developing new skills. She was able to have him go to the notes for review.

She used data she gathered from working with Ba and her current observations to draw conclusions of her own. She described her encounters with Sara. The following field notes were written at the end of the BPD program:

Reviewing notes from BPD's second year, I noticed a change in the way Alif worked with Sara. Alif kept pouring assignments on her. She allowed the student to move forward. She also gave the student constant feedback. Alif allowed the student to work in small chunks, completing one skill at a time. I questioned Alif about how well the student was doing? She commented that she was doing well. She got a new lease on learning. She has been soaring all year. From her view point, Alif suggested a change as Sara gained self-confidence. She noted each positive comment from her, the student's father or other teachers seemed to help the student increase her confidence level. She wanted to have the adults praise her. According to Alif, she fed off of the positive feedback. Once energized with positiveness the student continued to flourish (June, 2007)

Thus, it appears that Alif gathered data and used the data to formulate conclusions. The data came from dialogues with each other, parents, and observations from student behavior and student grades. She combined the data with the content of BPD sessions to develop individualized lessons. In addition, the BPD sessions were informed from the data gathered from teachers and other observations from the curriculum coordinator.

Active participation in BPD sessions appears to have made a difference for Alif. She has been able to increase her level of individualize instruction when choosing correct methods and combining and altering curriculum content, rating a five during the second year of instruction for individualizing instructional planning and activities.

Ba's Individualized Instructions. Ba's BPD participation was also rated a five. Like Alif, at BPD's onset, all of her lesson plans were copied from the teacher's manual for each subject. Her lesson plans were direct duplicates of content of teacher's manual.

... When I spoke to Ba about her concerns, she immediately brought up that she is so overwhelmed with structuring, organizing and teaching. She was missing sleep and having a hard time. I asked her to explain to me

what was taking the most time. She mentioned her lesson plans. When I looked at one of them, I realized she was copying from the teacher's manual I suggested she simply use her manual for the lesson plan until she got things under control ... I had a set schedule for reading in the morning she shared. She was trying to have everyone on the same assignment at the same time ... (October, 2004)

The initial conversation referenced above was a response to an email from Ba asking the curriculum coordinator to phone her. The field notes above reflect a summary of the conversation. Ba, a first year teacher was feeling totally over loaded. She was using teacher manuals for three different grade levels; pre K, kindergarten and first grade. In addition, Ba taught four different subjects; language arts, math, social science, and science. She was copying the lesson plan included in the resource section of each teacher's manual. The lesson plans were generic, aligned with the characteristics of the average classroom. The lesson plans from the teacher resource book did include enrichment and remedial assignments.

Ba originally taught straight from the text book plans without including enrichment or remedial activities. Her spelling words, reading stories, math problems were aligned with those in the teacher's manuals. Thus, during the first year of the program, she spent time following the recipe-type guidelines of the teacher's manuals. In addition, she followed a strict schedule for each period. Every grade level was doing math at the same time, spelling, reading, writing, etc. To help her relieve some of your burden, the curriculum coordinator suggested she not write out lesson plans for awhile, which lasted the rest of the school year. The purpose of having her not write out lesson plans for the first year was to free up her time from regurgitating activities, allowing her

more time to learn to understand what to do and why. By freeing up her time, she had more time to think and reason to find support for her actions.

The results were seen immediately. The next two months, Ba's instructional behavior began to change. The curriculum coordinator noted after the two months of instruction and two informational sessions:

... Today in Ba's class, she had the spelling words for the first graders on the board. The kindergarten students had a list in their desk and in their homework folders. The pre-schooler had alphabet sheet to trace over ... Alif was making copies of pages from workbooks to compile the homework package for the students in her class and Ba's class. She used grade level books matching each student's grade ... In class, Ba had Martha working on her spelling words while Sara did math activities ... Each student appeared to be working on individual work at their grade level. The schedule varied according to grade level. The kindergartners were doing spelling while the first graders were doing math manipulative with Ba ... (November, 2004)

Ba began teaching during the first year of the BPD program by giving all students assignments to match their grade level, according to their chronological ages. Based on the field observations above, Ba had altered her schedule to control the classroom behaviors more. She had some students doing seat work while she gave individual help to others. She was still basing her activities on the text book, following the curriculum laid out by the authors.

However, she did start to recognize the unique needs of students. Her open discussions during professional development sessions showed that she was starting to notice major differences between students. The curriculum coordinator listened in as

Alif, Ba and Ta engaged in a conversation about a third grade boy and his kindergarten sister during the small group session in November of the first year of the sessions:

... Ba explained that Martha was eating up all of the class work and turning in all of her homework correct and on time. She felt Martha could handle more without being overwhelmed. Alif jumped in discussing Martha's brother, John. Alif mentioned that John also was doing well, keeping up with all assignments and scoring well on all assignments. They (Alif and Ba) jumped, asking Ta how they were doing in Spanish. His response indicated they were both doing well. Ba interjected with she wanted to give Martha more advanced words, the words she had for Sara. She mentioned this would help in two ways: she could challenge Martha and have someone for Sara to study with in class ... (November, 2004)

Ba attempted to move a student forward by having her do more challenging work.

Part of her goal was to keep the girl moving forward. What she did not discuss during the informational session was the need to strategically learn skills to help one be able to do more complicated problems later. What she also did not mention is that Martha did not go to pre-school. This was Martha's first school experience. She scored zero grade equivalent score on the entrance exam, measuring readiness skills. This suggests she was pre-first grade. Considering all of this, it appeared that Martha needed to learn kindergarten skills. Martha's history suggests she was not ready to skip over kindergarten work. Her perfect scores in reading, math and spelling suggested she grasped basic skills well. Ba was teaching from the regular curriculum. Up until that day she did not teach enrichment skills. Her thought was to move the student forward.

... Listening to Ba and Alif speak about Martha and John prompted me to introduce the lesson on enrichment verses jumping grade levels. I used Ba's math and LA manuals to demonstrate how to follow the skills, not the assignments. Students should learn regrouping when subtracting certain types of problems. They should learn certain phonics and spelling

rules before receiving certain types of problems or words. In addition, I showed the teachers how enrichment assignments allow students to use the skills learned to do more in-depth assignments, usually using higher order thinking skills. I gave the example of using spelling words to write stories instead of sentences. Another example is to use the math skills to solve one-step and two-step word problems ... (November, 2004)

The above notes written later on that same day demonstrates how the BPD program allowed for flexibility, by listening to the comments of others, it was possible for the curriculum coordinator to provide meaningful guidance to address actual concerns of each teacher. In addition, the examples used during the second informational session modeled for Ba how to make modifications in her practice while still using the same lesson plan. This added more work for someone already thinking they were overwhelmed with work.

However, it saved Martha from moving too fast and missing the development of key skills. Throughout the remainder of the first year, Ba did not write lesson plans as stated above. She focused on teaching, making observations, leading to adjustments as she went along.

Ba wrote lesson plans during the summer just before BPD's second year. She continued writing lesson plans throughout the second year. The lesson plans used during the second year included specific assignments for specific students or groups of students. As an example of Ba individualized by providing for student needs, she was observed making efforts to help a student she had major difficulties with Rich, the brother of Will and Ned. He started during BPD's second year. His twin sister was born with cognitive

concerns due to lack of oxygen during birth and has been receiving specialized services since birth.

... Ba approached me today about Rich. She is concerned because everything she has done for him has not worked. She mentioned to me today her efforts to assess his difficulties using the instruments she has become familiar with. When we tried to get him to answer questions on the entrance exam, she shared, he did not answer any questions correctly. She attempted to get a sealing for him. She could not. She asked me if I would test him. I sat with him, away from everyone else. I asked him to share with me what he had done in school that day. He stared off into space ... As a result of his behavior, I decided what he needed was beyond the scope of the instruments we had at the school. I encouraged Ba to set up a meeting with the mother, informing her of the concerns about his academics ... (September, 2005)

... Rich's mother never came in for a meeting. She kept making excuses as to why she could not come in. The father was contacted by phone. Ba mentioned he was not agreeable to having Rich tested or receiving any special assistance. He felt his son needed more discipline and time with him. Ba mentioned that she encouraged the father to come in and share some time in the class while he was working. He was too busy also ... From the conversations Ba had with both parents, I encouraged her to continue to work with Rich, keeping the parents aware of his progress regularly ... (January, 2006)

Ba found Rich un-testable. Ba recognized that Rich was having difficulties early on. Each teacher administers the entrance exam to their new enrollees. Because Rich was entering her class, Ba evaluated him. Therefore, she did not have much data on him to begin the year. He had not been in school prior to enrolling in Bait as a first grader. Ba was not privy to a transcript, report card or any other school records. She had to wait until the state deadline, October 15th to get his medical forms. The parents were not able to give her any information needed to help her diagnose his strengths or weaknesses. Due to Bait's limited resources, the curriculum coordinator was unable to informally assess

him. The parents disagreed to formal assessments beyond the entrance exam, which he was unable to complete.

During the time Ba, school administration and the curriculum coordinator's efforts to get assessment data on Rich, Ba continued to teach him.

... I noticed he was doing better, Ba said to me today. Rich's parents are still refusing testing or additional help outside of the school. But, Ba has seen remarkable progress with math. She mentioned he is able to recognize numbers, sets of numbers, add, and subtract single digit numbers. Ba notices he counts quietly as he computes numbers. He gets lost when he gets sums or differences over 15. Rich needed to learn how to use math manipulatives. She mentioned that she pulled some out for him. He refused to use them when he worked independently. She attempted to have him draw sticks on the paper. He would not draw sticks when working independently. She did notice him counting on his fingers – hiding his fingers while doing so ... She encouraged him to continue ... Rich did not use his fingers to compute problems ... He seemed afraid to ask for help ... Ba mentioned Rich felt he should know certain skills without needing help. When he could not do things as well as others, Ba mentioned he shut down ... (March, 2006)

Ba's comments and behaviors help to show her ability to begin diagnosing and prescribing a tentative approach to teach a difficult student. She identified his strengths, the ability to compute single digit numbers. She noted the method he was using to solve the math problems, counting/computing in his head. By using sticks and counters, she made several attempts to help him extend his computation skills. However, she noticed a problem, he apparently was afraid to use manipulatives for what ever reason. She did not stop. She wanted help him either get over his fears of using manipulatives or develop a mental picture, schema for computing math.

... For that lesson, Ba had Rich add to ones column and the tens column separately. I asked her why. Her comments indicate her hope that she

could do something to help him learn how to add and the value of manipulatives. If he did not, maybe he could develop a strategy in his head of looking at numbers and applying mental math strategies for computing ... (April, 2005)

Another example of Ba helping students based on her observations and study of student needs was her efforts to analyze Sara's pre-screening assessments. She detected an inability to complete computation problems due to short-term memory problems.

However, Ba noted in her reflective notes the following:

... Sara has a creative mind. Today in class, she used the spelling words today to create a really amazing story. The story was filled with imagination. The imaginative part of the story was supported by her pictures, her illustrations. At first I did not believe she wrote the story. So I had her share the story out loud to the class. She referred to the pictures as she told her story. She used the details of her picture to express the main idea and supportive details of story. Her activities showed the creativeness I expected in an older more mature student ... Sara continues to write exciting stories. She writes them in class and at home. She is even using some of the words from other spelling list ... Today, Sara interrupted the class to ask to change the ending of the story we read in class about a girl with a moral dilemma. I am glad I gave her permission to. She used the main idea of the story and the supportive details to give a different moral (ending) to the story, one that would fit in with what the author intended ... (April, 2005)

It appears that Sara's achievement scores showed an increase at a pace equal to the average first and second grade students (between 0.8 to 1.0 yrs per 10 months of school). This shows some improvement in Sara's academic performance considering that she started at Bait slightly behind the average first grader (0.4). It is expected that a student entering first grade on level would score a minimum of 1.0 on the entrance exam. Without having total access to her pre-school and kindergarten records it is difficult to say if this is a significant improvement.

Sara also appeared to demonstrate strong visual and verbal skills during her first year at Bait. Based on Ba's notes above from her final reflection at the end of the program, Sara appears to express herself with drawings and visual sentences. It also appears she is able to pick up visual context clues when expressing the meaning of written text.

During the first informational session, at the beginning of the first school year of the professional development program, Bait teachers were introduced to the various modalities used for learning. During this session, examples were given when students perception and reception difficulties. Expressive and receptive language difficulties were addressed as well and difficulties associated with learning difficulties. The session also gave some suggested strategies that could be used to address student needs. It appears that Ba was able to pick up on the clues from Sara's performance and make observations that guided her lessons and instruction. Based on Sara's growth, it appears that Ba's modifications worked.

According to a summary of Sara's growth for the second year, completed by Ba after teaching her the first year, Sara works more efficiently when she has pictures/ images when doing math problems. Alif was her math teacher. She had Sara working in a math workbook with plenty pictures and images. In addition, she made math manipulatives available for all students who needed them. In her lesson plan, Alif had Sara working on a page, ahead of the other students in her class. She had Sara doing homework different from other 2nd graders, pages that included more images and

pictures. In addition, Sara was encouraged to draw out the images on her homework to allow her more visual assistance solving the math problems. Some of the discussions between Alif and Ba, as referenced earlier in this chapter included Ba using data from her encounters with Sara to inform her instructions.

Ba's participation during small group sessions, her preferred method of delivery was rated a five. The curriculum coordinator guided Ba as she attempted to interpret the results of a student's diagnostic test to determine the best method to educate the student. The student that she had problems with did not score well on the entrance test. When she tried to isolate the difficulties, she could not determine a pattern. When Ba contacted the curriculum coordinator she mentioned that she could not find the students difficulties, as represented in the field notes below:

I used the test on her. Rachel did well in math. But she keeps getting stuck on reading numbers. She will say "three" correctly. Later, she will mispronounce the three. She does the same thing with "thirteen, twenty-three and thirty." I have never seen anything like it. She will do the same thing with the letter "e." She can spell words. She can read words and passages fairly well. But she will start off well and start to make mistakes as she goes. Can you come by and help me figure out what is wrong.
(October, 2005)

The curriculum coordinator met with Ba during her prep period about a week later. During the meeting, Ba showed some of the test material and follow up assignments she used to try to pinpoint the problem. The test included a section that required the student to read a series of numbers:

33 12 12 31 41 4 5 6 37 54 3 37
13 58 34 **35 36 3** 1 2 12 **13** 6 14
37 13 **34 33 32** 5 6 7 **33** 12 9 54

Ba selected an activity from her reservoir of teaching and assessment tools. This instrument had the same type of characters and format as the entry level test. She used this to verify that the student was actually missing numbers and letters that she had recited correctly earlier. Ba then demonstrated how Rachel could add two digit numbers including 3, 13 and 23. The addition problems required that the student write numbers including “3” as a sum. Rachel did well on these assignments. She added correctly, reading the addends and sums correctly. However when asked to read the group of numbers similar to those above, Rachel still had problems saying the numbers in bold print. The student recognized each number correctly when they were written alone. However, she mispronounced the numbers when they were written within a group of random numbers. There was no pattern to the mispronounced numbers.

The curriculum coordinator informed Ba about visual discrimination difficulties, making comparisons with the characteristics of auditory discrimination problems. Before the curriculum coordinator could finish with the discussion, Ba interjected with:

All of the ones she said correctly where at the beginning of the passage. She started making mistakes towards the middle and at the end of the passage. She knows what three is. I thought she was forgetting it. I see now, she cannot see the three in rows two, three and four. (cont. October, 2005)

Several of the follow-up conversations have addressed how well the student is doing. The most recent conversation was two months after the BPD program ended and one month after school closed. Ba feels confident enough about testing and developing a

plan for remediating difficulties that she has agreed to begin to work with the older brother of the student discussed above, who needs tutoring and is not a Bait student.

Ba consistently added comments during BPD information sessions and one-on-one sessions with the curriculum coordinator. She would present the characteristics of the students and ask for suggestions of ways to have the students present what they knew. As time went on, she began to recommend more strategies based on the characteristics of the students.

Based on the above comments and analysis, Ba did make changes in her instructional practices to allow her to fine tune her activities to better meet the needs of specific students. The first contact was after the second instructional session, seeking help to reduce the work. The content of the second informational session included helping teachers learn to match student characteristics to academic methods. She appeared to grasp many ideas and could not see how to implement them with all of the work she was faced with at the beginning of the first year. Based on this, her behavior for the first three months of the study rated zero, she did not make any modifications for students based on student characteristics and curricula needs.

Removing some of the responsibility allowed Ba to begin to focus on making modifications. She worked collectively with Alif, Ta and the curriculum coordinator and figured out what to do with Martha, Sara, Rich and Rachel. During the first year, she altered her daily routine to allow her to fine-tune instruction to address a high functioning kindergartner and a lower functioning first grader. She made changes in the classroom

while focusing on student records and performances. During the second year she actually began to design instruction by writing lesson plans, use more challenging activities for advanced students while continuing to teach required basic skills, matching student needs instead of teacher manuals. Based on this Ba's level of individualizing instruction at the end of the second year was rated as a five, because she used multiple resources, activities and text to teacher different students as required by student characteristics and needs.

Ta's Individualized Instructions. Ta attended every BPD informational session, rating a level three for participation. His behavior rated a five during his preferred method of instruction, one-on-one sessions. Over the course of the sessions, Ta communicated ten times with the curriculum coordinator, in one-on-one and small group discussions. At the beginning of the sessions, he did not make many modifications, following the way he was taught language by his elementary and high school teachers, per his final reflection included in the previous section.

As he learned more, he began to make modifications. Four months after the second informational session addressing the use of instructional pedagogy and individualizing lessons, Ta approached the curriculum coordinator with a concern. Prior to the meeting, the curriculum coordinator observed the teachers working with students:

... they had Will and John sitting side-by-side. John was completing a page or two ahead of Will at the beginning of the school year. Now, he was about a chapter ahead. Alif had him moving along at his own pace by now. Will had been having organizational issues ... It appears, they want John to show Will and maybe Ned how to keep organized and the importance of completing work on time ... follow through with homework ... Today, Alif and Ta had to both get on Will about not having his homework. I heard Ba also get on his younger brother Rich for not having

his homework. Ned the eldest brother also did not have his homework ... Alif mentioned that Ned and Will could be farther along if they kept up with things and practiced more at home ... (January, 2005)

John, the older brother of Martha was diligent about completing class work and homework on time and correctly. Siblings of another family, Ned and Will did not do homework without external motivation from teacher and/or parents. In an effort to motivate the brothers to do more, retaining more and become more organized, Ta showed John's homework as a model for what he wanted and expected. Will and John were both 3rd graders. However, John was moving along faster than Will in all subjects except Arabic. Therefore, Ta and other teachers originally sought out to use John's performance as a peer stimulator or model for Will and others.

In the March, 2005 field notes, Ta made modifications based on observations of students:

... Ta had Ned lead the class today, showing other students how to read the Arabic words on the board. He had Ned recite a short ayat (verse from scripture) that included some of the focus words for the week ... gave Josh alphabet sheets for writing out the Arabic letters alone, at the beginning, middle and ends of words ... scolded Will and Ned for not completing their homework. He showed John's homework as an example of good work ... boys are getting the Arabic faster than everyone else. I think their father is helping them ... Even though he is in 8th grade he has no Arabic experience ... Ta shared with me. ... (March, 2005)

Ned and Will's father spoke classical Arabic. He read Quranic scripture, in Arabic in the home regularly. The boys had been exposed to Arabic concepts early in their lives. He is an African American born and raised in a large metropolitan area. Based on this, it appears the boys were able to learn Arabic concepts easier – because of

previous exposure. On the other hand, Josh, a 13 year old had never had an Arabic language lesson or had the experience of an Arabic speaking parent in his home. He was a novice, being exposed to the language for the first time. Therefore, Ta decided to make the adjustments, giving the novice repetitive seat work to build foundation skills, while helping students with prior exposure to the Arabic language use skills learned in his classes to recognize, read and apply Arabic learned as they read Quranic scripture.

As time went on, Ta began to make modifications in his approach to teaching by using different strategies and providing tutoring for students, as needed. As an example, his lesson plans from the second year include lessons for various grade levels. His lesson plan dated “Week of April 14 – May 11 (2006),” he wrote lessons specifically for the “9th” grade student, Josh which included the use of “DVD interactive – Advanced.” He used “DVD Interactive Basic” for the “2, 3, 4” graders for the lesson plan dated Week of April – May 11.” The lesson plans above reflect Spanish. “[Josh] was in Spanish. He had it before,” based on Ta’s statements to the curriculum coordinator. Prior to enrolling in Bait, Will and Sara had not taken Spanish prior to enrolling in Bait. The two different lesson plans were written to address different levels of learning – based on student needs.

During the beginning of the session, Ta quietly sat, observed and offered very little. This changed as time went on. Ta critically examined his instruction behavior, feeling inadequate as evidenced by his final reflection, which includes, “... I sometimes felt intimidated ...” He did not feel his comments and opinions mattered. However, he recognized that he became more self-confident. As time went on, he began to feel more

confident, “I feel real confident in myself ... I measure my progress by how the students turn out ...” Thus, after some success, he felt stronger and able to do more.

Ta reflects on how he had to make modifications when preparing to teach his Spanish classes based on his knowledge of the students:

... Sometimes I have three or four kids who cannot read well. I take them to the side and work with them one-on-one. Don and 3 or more in the same class came in the middle of the year. I had two levels in the same class, advanced and beginners. I took them to the side, giving them five words instead of the 10 or 15 that I gave the advanced students ... I asked Don what is it about the language that he liked. Such as, “What is your favorite program on T. V.” I find something they liked and pull the Spanish from that. He said he liked super man, I found something about superman in Spanish. If it is baseball, if they can relate to it they will learn ... (July, 2006)

He demonstrated in this segment of his reflection how he collected data from several sources; the student’s academic performance level, student characteristics, and the Spanish curriculum to develop and implement a plan of action for the student.

His reflection at the end of the year also helps to support that he recognized students had various characteristics, various needs.

... I noticed in the class different levels of learning. Some were good at verbal, some were good at written. Some did not do well in terms of writing. Others did not do well as far as expressing themselves. So my method of grading, I took verbal ... written and put them all ... average it out ... (July, 2006)

He used this knowledge to develop lesson plans that varied as demonstrated by examining his lesson plans dated April through May, 2006, mentioned earlier in this chapter. It was apparent Ta used knowledge about the children’s characteristics to decide on resources, skills and methods of instruction based when teaching both Arabic and

Spanish. The above reflective statements help to suggest he made his changes based on knowledge of student needs, student characteristics and curricula content. Thus, Ta used student need and curricula needs together to individualize instruction, rating a five. He learned how to deviate from what his teachers used to use the one-size-fits all approach.

He used the concepts to expand lessons, making statements to show how he could implement the concepts in Arabic and Spanish lessons. He did not start out teaching individual students by individualizing instruction. His own reflections above and field notes cited earlier in this chapter help to support Ta taught the way he was instructed, one lesson for everyone, rating his initial behavior as zero.

Ra's Individualized Instructions. Ra, the computer teacher attended two informational sessions. He did not meet one-on-one with the curriculum coordinator. He ranked a four during his preferred method of instruction, which was whole-group dialogue and during the informational sessions, as mentioned earlier in this chapter. He attended four whole-group collaboration sessions.

The content of the third informational session in November of 2005 was to address Bait's curriculum requirement that students engage in inquiry-based problem solving. The inquiry-based program adopted by the school was PBL. The PBL program required that the students use computers to gather and process information needed to complete projects. The first PBL project completed by the 5th, 6th, 7th and 8th grade students addressed the economic plight of third world countries, specifically Spanish speaking countries.

When Bait's administration decided that PBL was to be a part of the school's curriculum, Ra was appointed PBL advisor.

Visiting the school today, all of the upper level students were in the computer room, working on research. Ra was in the room, trying to get Nel to read through the information on the computer. I pulled Ra to the side to get a feel of what he was doing. I asked him if he had a copy of the handouts or any other instructions given to the students to help them through the process. He did not. Teachers were given an example of guidelines for completing PBL projects during the November, 2005 meeting. Ra pulled the guidelines from under a stack of papers on a desk and went directly to Alif with the papers. Alif and Ra begin discussing the forms. She was encouraging him to have the students develop a plan for addressing the problem they had already identified. He informed her that he gave them the actual problems to investigate. She mentioned to him that he had to teach them how to solve the problem. Alif mentioned that solving the problem was more important than the answer to the problem. Ra mentioned, "I am having a time getting them to do the research, just using a simple computer to put in the correct search words to get information." Ta walked up and suggested that Ra have the students decide on what they wanted to know about the country. Ra mentioned the students just wanted to follow specific instructions, not think for themselves ... After the discussion, he walked away without agreeing with the idea the students could engage in PBL tenets. Ra appeared to be upset, not agreeing with the input from the other two teachers (January, 2006)

Ra did not know how to implement the program. He had put the papers he received in November, 2005 during the informational session to the side. He had the students doing research work without having them structure the problem and method for developing and implementing the solution. The students were researching a teacher given topic. When he received help from Alif and Ta, he presented questions, concerns and problems understanding how to have the students think on their own, solving the problems by making decisions, such as what to investigate, what problems to address,

what topics to investigate, how long it will take and the steps to solving the problem. He appeared not to be ready to have the students develop projects on their own. He felt they could only work on teacher directed activities, not independently. Yet, he had papers that could be used to help students develop a problem and plan and organize the process of solving the problem in the package that he had under a stack papers.

Alif and Ta joined Ra and the curriculum coordinator to help to create a collaborative group. The curriculum coordinator did not add anything to the discussion out side of the original probing questions. The first project was the Black History project in February, 2006. The second was the Central American project presented in late May, 2006. The curriculum coordinator noted:

... Today was a very active day at the school. The upper level students were moving around from area to area, getting books, working on the computer, sitting and talking in small groups. Ra was sitting with his back to the door working on a computer next to Ned. He was talking to the student, asking him what she wanted to do for the assignment. He was typing in the ideas Ned gave him in an effort to help Ned surf the net. I interrupted them by pulling Ra aside. I asked him to help me understand what the students were doing. He wanted them to investigate a topic on foreign countries. The students needed to know about the geography, economics, flags, people, natural resources, language, etc... (May, 2006)

He would respond to questions and inquiry from the curriculum coordinator. The segment of the field notes above includes observations of Ra helping students complete an inquiry-based problem. For Ned, Ra used probing questions, helping him come up with the topics. However, he typed in the words for him. Ned did not practice his keyboarding skills, causing him not to be able to type fast. Ra sat at the computer to help him focus on solving the problem and not be hampered by poor keyboarding skills. Ned,

the brother of Will and Rich also needed help staying active. As a result, Ra sat with him, to help keep him on target. The curriculum coordinator also noted:

... I watched Ra and Ta work with the upper level students as they completed a geography lesson. While Ra worked with Ned, Ta worked with Josh as he used his PowerPoint to practice his speech. Josh was having problems pronouncing the Spanish names of some of the cities. Ta used this as an opportunity to work one-on-one with Josh helping him with pronunciation and vocabulary. He asked Josh the meaning of 'rio.' Using probing questions Ta had the boy connecting the meaning of the city to its geography. Ra came over, stood behind Ta and Josh to listen. He asked the student to get more information on the behavior of the practices of the people. He thanked Ra for helping Josh with the speech. I did not see the two teachers talking about the curriculum for this assignment. However, the smoothness used by both teachers as they moved around the space helping students suggest to me that they had spent some time sharing with each other what was expected. Both Ta and Ra were using similar language 'culture, geography, language, etc.' They both helped students across the curriculum also. Ta helped the student make a connection with the name and geography. I believe the two have worked on the curriculum (May, 2006)

The May, 2006 field notes Ra demonstrated an example of telling a student what to do "... asked the student to ..." He did not use probing questions to guide the student. From these notes, it appears both Ra and Ta were working as one, helping students along the way. Both of the teachers taught departmental classes. Ra only taught the older students in grades 5th, 6th, 7th and 8th grades. Ta taught Arabic and Spanish to all students. It appears the two gentlemen had dialogued as they planned out their lessons. The curriculum coordinator did not witness their meeting. They did not voluntarily reveal information.

As stated earlier in this chapter, Ra took advice from Alif to have the older students develop a student council magazine for the school, giving the students a voice in

the administrative duties of the school. This occurred on the side, not in a whole-group discussion. His collaboration demonstrated his ability to work in groups. His collaboration appeared to lead to his increased ability to fine-tune his instruction to match the needs of the curricula and the students.

Based on the evidence, it appears Ra was using two different methods simultaneously; use of technology to allow a student to research the topic by using probing questions and direct help as other students were able to start putting the presentation together. He also used one-on-one help with Ned and allowed individual work by others, coaching as needed. Based on the above analysis, Ra's was rated a five. Comparing his activities in January to his activities in May, he used more approaches in May, showing growth. There was evidence that he and Alif and Ta had been in dialogue. Thus, it appears his growth occurred as he engaged in dialogue with his colleagues. Earlier than January of the second year of the study, Ra did not individualize instruction. Field notes dated August, 2004 cited earlier in this chapter support he planned to have his students complete pages from the social studies text. He had no plans to gather information on students before making this type of decision, rating his initial level of individualizing instruction as zero.

Dal's Individualized Instructions. Dal, the gym teacher received a rating of three during informational sessions and a rating of one in whole-group discussions, his preferred method of instruction. His lesson plans were not made available to the curriculum coordinator. Field notes helped to suggest that Dal individualized instruction.

As an example, during instruction all students sat on a line in the gym receiving instruction from the teacher.

... When I got to the gym, some students were still getting dressed. Others had entered the gym and were running and playing on the floor. A few of the girls had huddled off to the side of the floor looking around. Dal was doing something with his grade or attendance book. After a few minutes he blew his whistle. All children ran in and stood/slid across the floor near him. After having all children sit on the floor in a straight line, he provided instruction for calisthenics. He called out the exercise. Some of the younger, quieter girls were not able to do the leg lifts right. He called on Nel to show them how to do the exercise. Nel went up in front of the class and demonstrated how to do the work for the others ... (November, 2005)

If students had difficulties, he used another student to model for the students how to perform a task. He had the entire class performing task at the same time. As an example, he had all of the students doing the same warm-up exercise, basketball activities and free play. The field notes continue:

... After working on calisthenics, he gave the students rules on playing a floor game. As he set up the plans for the floor game, the students sat on the line. He placed orange cones on the floor. Completed the instruction and had the students complete the task, which included running through the cones to a target and running back. Afterwards, the students had free play. Some wanted to play basketball. He sent them off to a small gym to the east of the gym he was working in. The students had to find a basket ball in a bin off to the side. Some wanted a football, others a rope. They all had to get the balls and ropes from the bins around the gym. Most of the students had to dig and find what they wanted, taking up some of the time from the free play. It appears he had not separated the equipment beforehand for them to use ... (November, 2005)

During the free play, the students asked for balls and ropes. He directed the students to the gym supplies. Dal did not anticipate student needs or characteristics. Thus, he did not have the gym tools out. None of his activities witnessed by the

curriculum coordinator showed adjustments or changes due to student abilities or weaknesses. When he called on students to model for others, it was to demonstrate how to do the activity correctly. The field notes did not indicate any signs of advanced work for those who could do more or less demanding work for students having difficulties with task. There was no evidence of individualized instruction for specific student needs. Field notes from classroom observations demonstrated Dal using three strategies – direct instruction, modeling and peer grouping. However, his strategies were not based on student characteristics. Instead he followed the one-size-fits-all approach. Thus, Dal's level of individualized instruction was rated a one.

Ja's Individualized Instructions. As mentioned earlier, Ja set the learning resources and environment for Hal, a student experiencing difficulties with written comprehension to be read to by an older, academically stronger girl in the class. Based on his observations, Hal did better when he heard stories or engaged in open dialogue.

... Ja said Hal was still having problems. He struggled with work and bombed the test. Ja had allowed him to work with Mary for some time, but stopped because all he was doing was sitting and listening to Mary without any evidence he was getting anything from the efforts. While in class today, I sat with Hal to ascertain his strengths and weaknesses. I asked him to explain to me the assignment in front of him. He did, correctly. Thinking about Ja's concerns his mother may be helping/doing his homework for him, I asked him to explain his homework to me. He did, correctly ... I asked Ja to explain what happens when he talks to him about his work. Ja's responses indicates Hal can explain what he had done. Based on this, I asked Ja to discuss how he would use this information for teaching Hal. He suggested having him explain the lessons to someone in the class, not Ja because he did not have time to sit and listen. However, he thought he could explain the lesson to Mary ... (January, 2006)

Earlier in the year, Ja had developed in his mind that Hal could not do the work of a fourth grader, as evidenced from the November, 2005 field notes referenced earlier in this chapter. The field notes provide evidence given by Ja that Hal was able to do fourth grade work at home with his mother. However, Ja did not see him doing this in the classroom. Ja was limited to thinking Hal had rehearsed the facts with his mom instead of actually learning the skills. The one-on-one conversation with Ja and the curriculum coordinator revealed the same observations, Hal was able to correctly explain his work, demonstrating he was able to do the work. This revelation, allowed Ja to add a reason for grouping Hal and Mary together again.

The above field notes help to support Ja's positive response to the curriculum coordinator's probing questions, designed to get him to change his vision of a student and provide another support for allowing a student to work in a group. Based on the rating scale for individualized instruction, Ja's behavior rates a one, for the use of limited grouping. Tha was not included in the count for the second year because she was not working at that time. Her individualized instruction activities were not rated.

Quantitative Analysis of Individualized Instructions

To compare the level of participation of teachers to their ability to learn to individualize instruction, a quantitative comparison of the mean level of participation and individualized instruction over the two years of the study were compared. Based on an analysis of the lesson plans and field notes, four out of five second year teachers (80% of

teachers), began to use several activities for instructional activity that were aligned with student characteristics/needs. Values used for this comparison are the qualitative ratings explained in this chapter for level of teacher participation and level of teacher individualized instruction, summarized in Table 14.

Table 14

Ratings for Teachers' Participation and Individualized Instructions

Teacher	Level of Participation	Level of Pre Individualizing	Level of Post Individualizing
Alif	5	2	5
Ba	5	0	5
Ta	5	0	5
Tha			
Ja	2	0	1
Dal	1	0	1
Ra	4	0	5

An independent samples t-test compared the means of the first and second year individualized instruction ratings for each teacher (Pair 1 of Table 15). The mean rating score of the first year (mean = 0) and the mean rating score of the second year (mean = 3.20) are different; $p = 0.009$. In addition, a correlation test was used to compare the level of participation to the increased ability to individualize instruction. The correlation coefficient = 0.85, which suggests a high correlation between the participation level of each teacher during the PBD sessions and the evidence that they improved the level of individualized instruction over the two years of the study. Teachers appeared to have

changed from one-approach-for all students to making their lesson plans and class activities more individualized. Again, only five of the seven teachers completed the second year.

Table 15

Paired Samples T-Test of Individualized Instructions

Pair		Paired Mean	Std. Deviation	t	df	Sig.
1	Pre-Level of Student Centered Individualizing	3.33	1.966	4.152	5	.009
	Post Level of Student Centered Individualizing					

Note: $p < .05$, two-tailed

Thus, it appears that teachers who participated in instructional activities that match their preferred method of learning used the concepts presented in the lessons more, specifically individualized instruction aligned with curricula needs and student needs. Thus based on qualitative analysis of the means qualitative ratings and quantitative analysis of teacher performance during and planning instructional activities teachers individualized more during the second year of the study. Teachers, who had a high level of participation during preferred method of BPD delivery engaged in differentiating instruction more than the teacher who did not demonstrate a high level of cognitive participation.

Level of Participation and Use of PBL

As stated earlier, the third informational session held 2005 introduced PBL as a topic to teachers. Prior to this session, teachers were exposed to several of the tenets of PBL:

- 1) Bait's mission and vision including the development of critical thinking skills and using community to help students were introduced during the first informational session,
- 2) Use of inquiry activities to gather and use data on student characteristic and curricula content to help teachers design and implement student centered, meaningful instruction, was also introduced during the first informational session, and
- 3) Selection and use of themes to help students understand to use patterns for grouping prior concepts with new, was presented during the second informational session

In addition just before the third informational session, two teachers Alif and Ta learned about PBL by visiting Neigh and then co-developing ideas for a student handbook designed for completing PBL assignments. The following field notes reflect a small group dialogue between the curriculum coordinator, Alif and Ta during the Memorial Day observance, dated May, 2005:

... Today's meeting started with a review of the trip to Neigh. Alif was impressed with use of PBL problems that actually were designed by the students. She mentioned the business plan the students implemented to solve the ... She mentioned the students had been taught to work

independently. She felt the school was blessed with smart students to start with, to be able to work independently. I reminded her of some of the comments from the administrator at Neigh: 1) students work at their academic level on problems of interest to them; 2) teachers serve as coaches, helping students learn skills they can not pick up while working on the projects; and 3) assessments are built into the student projects, allowing teachers to develop a task analysis to identify the skills to be learned and the achievement level of each ... I used this opportunity to inform both Alif and Ta that PBL practices should be structured, identifying the academic skills to be learned at the beginning of the project, modifying the skills as the project progressed, as needed. I also mentioned the need to help students develop a task analysis and timeline for accomplishing specific parts of the timeline, to help keep the students on track. I reminded Alif and Ta that some problems may take more than one quarter, one semester even one school year. Creating a task analysis aligned with timelines, helps to identify which skills are to be assessed for each specific grading period ... Alif said this was fine. However, she has to teach multiple levels. She thought it would be helpful if she could examine several objectives for several grade levels at a time, helping to save her time. Ta mentioned having the skills already available for people to see without having to look them up. They thought it would be helpful if teachers and students could have the objectives written in layman's terms for easy access and easy understandings ... I used their suggestions to develop an objectives table with all of the skills for each developmental level ... (May, 2005)

Neigh is the pseudonym for a private high school in a neighboring city, which uses PBL practices to teach high school students, who have demonstrated academic difficulties. During the visit to Neigh, the curriculum coordinator, Alif and Ta sat with an administrator from Neigh to layout key components of PBL for a handbook designed to help students learn PBL skills. After their meeting, Alif and Ta met with the curriculum coordinator to examine the feasibility of using PBL with Bait students. Both Alif and Ta interjected by discussing ways to simplify the guidelines needed to develop the PBL

tenets. From the discussion with the two teachers the curriculum coordinator developed a handbook for teachers and students.

To measure the effectiveness of helping teachers use PBL skills, an example of inquiry-based learning, teachers' participation level during their preferred method of delivery was compared to their use of PBL activities. The following is an excerpt from field notes:

The school wide themes included: science fair, geography of the earth and rights of passage. The students at the lower level (grades two through five) completed their projects as directed by the teacher. The teacher allowed the students to select how they would address each theme, which project they would do that aligned with the theme. Initially, as students prepared their projects, teachers provided them with a lot of guidance and support. The students had to perform specific task according to rigid timelines. As time went on the teachers began to wean themselves away by relaxing the guidelines. Relaxing the project timelines included not being as restrictive and rigid in how the students completed the assignments (June, 2006).

Each teacher used the school wide themes to teach the students how to use themes to learn content. The following rating scale was used to evaluate the degree to which teachers used knowledge of PBL practices to guide instruction. Field observations to evaluate academic practices and lesson plans demonstrating the use of student centered theme, selected by students and adults to match student interest were rated a five. Academic practices and plans demonstrating use of student centered themes as well as themes aligned with the school's curriculum and text were rated as a four. Teacher activities and plans demonstrating some student centered themes aligned with Bait's curriculum were rated a three. Teacher activities and plans including Bait themes were

rated a two. Teacher activities and plans including text book based themes were rated a one. Teacher activities and/or plans that have on themes were rated a zero.

In addition to having themes, PBL requires teachers to select themes that are student centered. The rating scale used to measure the academic activities and plans that use student oriented reflective problems to teach multiple academic skills were rated a five. The use of student oriented problems to teach multiple academic skills as evidenced by instructional activities and plans were rated a four. The instructional activities and plans including student centered problems to teach a skill were rated as a three. Teacher oriented problems found in instructional activities and/or plans used to teach themes are rated a two. The use of teacher projects to solve teacher selected problems, not aligned with themes used to teach skills were rated a one. Teaching activities that have no PBL concepts or problems were rated as a zero. A summary of the ratings used to analyze instructional activities and plans for the use of themes and the use of themes to teach academic skills are included in Table 10 in Chapter III. The following sections compare the performance of teachers during the BPD sessions and the analysis of academic practices of Bait teachers as they implemented an example of an inquiry-based curriculum, PBL.

Alif's Use of PBL. As mentioned earlier, Alif was cognitively engaged in all informational sessions, whole-group dialogues and small group sessions. She rated a five during all sessions, as evidenced earlier in this chapter. Field notes including observations gathered during each month of the first year of the study from August 2004,

through May, 2005 of Alif's participation during professional development sessions indicated she gave advice to teachers on how to use school based themes. During the second informational session, in September, 2004, she provided advice to other teachers on how they could use themes in their lessons. During this session, she told the gym teacher, Dal how he could use themes when teaching health lessons. She demonstrated for Ba how she could use history related themes when teaching social studies. The themes she suggested during a small group dialogue with teachers were monthly themes aligned with Bait's overall curriculum.

In addition to helping teachers see how they could use themes for the first year, she helped to write a grant proposal for funding a PBL component for Bait's curriculum. In order to do get information on what PBL was about, she met with the curriculum coordinator during an announced field visit:

Today Alif and Ba met with me to discuss the PBL grant proposal. Alif started by showing us the proposal's guidelines and the parts that she would be helping Bait's administrators complete. The next step was to develop the curriculum section, including how problem-based learning practices were to be implemented ... After explaining the components of PBL to her, she began to toss out concerns about using the program with the Bait students, noting that the students had so many academic and behavioral problems, referencing Ned and his brothers, Sara ... After some discussion, Alif began to mention ways that an alternative approach to instructing students might work. However she wanted to start slow ... She mentioned that we had an invitation to visit a school, Neigh that was using the PBL approach to get an example of how PBL works with problem children ... (April, 2005)

In the car today as we were returning from the meeting with administrators in Wisconsin, Alif mentioned an interest in forming PBL activities for the older students (Ned, Nel, Josh, etc) ... She did not want to jump in right away, Ned and others had too many remedial skills they needed to learn ...

despite hearing about how PBL curriculum allows students to enrich strong skills and improve weaker skills ... she did not show comfort allowing students to academic difficulties to jump full fledged into a PBL curriculum ... Alif added maybe the school could adopt PBL fully in a few years after strengthening the academic needs of the current student body ... (May, 2005)

Based on her knowledge of using themes early in the first year, before she learned PBL tenets in April, 2005, Alif's lesson plans in September, 2004 included themes. She merged the idea of themes with her knowledge of the health and primary social studies curriculum, demonstrating her ability to generalize connecting skills introduced during the second BPD informational session to the curriculum of others dated September, 2004.

In addition, she helped the curriculum coordinator and Ta develop ideas to incorporate into the student handbook, as evidenced in field notes dated December, 2005, demonstrating an understanding of how PBL lessons involved using multiple academic skills. However, the field notes above, dated May, 2005 suggest she did not internalize how student engagement in PBL practices does not prevent students from strengthening weak skills. She felt the students needed to be strong in all skill areas used during PBL activities.

After the visit to the school using PBL practices, where the administrators showed Alif and Ta how the school included classes to teach basic skills when the PBL projects did not directly teach required skills, she still had reservations about letting students with weaker academic skills engage totally in PBL lessons. She felt that PBL would work if the school waited, removing weaker skills and having students who were academically stronger.

In the classroom, Alif demonstrated some level of using themes and PBL projects. As per her lesson plans for the first school year, Alif did not write plans for having any student working on PBL type problems. The first year lesson plans all contained textbook page numbers for each academic subject. Her lesson plan dated September 13, 2004 included themes for each month. These themes were written into the lesson plan just after the second informational session. Her themes included:

September – Who Are We?
 October – Honest Better Safe Than Sorry: Responsibility
 November – Giving Thanks: Thanks And Gratitude
 December – Harvesting Our Best: Obedience
 January – A New Year: A New Year Of Faith
 February – A Heritage Of Excellence: Strength And Courage
 March – Balance And Order: Justice And Fairness
 April – Spring Has Sprung: Growing, Creativity
 May – Staying Fit: Sportsmanship
 June – Rites Of Passage

She planned for school or classroom based themes. However, there is no evidence that she consulted with students to plan what themes to use or to assign to given months.

Examining Alif's behavior in the class, the field notes dated November and December, 2004; January, 2005; October, 2005; February; 2006 and June, 2006 were used. The curriculum coordinator observed Alif's class in operation on days reflected in each of these field notes. The only field notes demonstrating any level of theme usage was February, 2006 where she had all of the students working on graphs. Her lesson plans for this period, also included graphs for each grade level. The informational session dated September, 2004 introduced the use of themes. The informational session

dated November, 2005 introduced the idea of using problems to each academic skills.

Her graph lesson was a few months after the third informational session. The use of graphs helps to support that she was at least using curriculum based themes. Alif's use of themes was rated a one.

Field notes dated in May, 2005 include Alif giving advice to Ra about using the student council activities to help Nel:

... She is a girl having problems trusting authorities. She encouraged Ra, the social studies teacher to allow Nel and Josh, 8th graders to identify problems with the school, prioritize the problem, selecting the most important one and present it with a possible solution for administration ... allowing the student council to help administration take care of school-wide concerns they recognized ... (May, 2005)

This visit occurred one month after the initial meeting to work on the grant proposal, where the curriculum coordinator provided information on the basics of PBL curriculum. This was a day after the visit to the model PBL school in a neighboring city. The fact that Alif allowed her knowledge of PBL to help her dictate a suggested problem for Nel to use to get over her social needs is an indication that she did cognitively pick up one objective of PBL lessons, to teach students skills as they are engaged in problem solving. However, she suggested to Ra which problem to use, instead of coaching Nel as she decided on the problem to solve. Her knowledge of Nel's background allowed her to select a student centered problem.

In the January, 2006 field notes referenced earlier in this chapter, Alif provided Ra with guidance that coming up with a solution is not as important as the process of solving the problems. She suggested that the steps involved in solving the problems

helps to develop skills. This statement was made two months after the third informational session, where PBL was the actual topic. Her ability to share this knowledge with Ra suggests that she was able to take the concept and use it to help Ra understand the objective of PBL lessons.

Based on the analysis above, Alif did learn the objectives of PBL as witnessed by her helping other teachers. However, she did not use all of the practices in the classroom. The field notes provide evidence that Alif used PBL objectives only at a rating of one, using curricula guided, teacher oriented projects, including a teacher selected problem to teach specific skills. Based on her statements to Ra, she has knowledge that PBL activities can be used to teach multiple skills and they allow students to reflect on other areas of interests, such as trusting adults that are not directly part of original problem being addressed. Thus, her knowledge of PBL rates a four.

Ba's Use of PBL. Ba provided her method of selecting themes during her final reflection:

... When selecting themes for the science fair this year, I decided to stick to one theme instead of letting the children select anything they wanted. I had to do that to make it easy to teach the children how to do science fair projects. I talked to one parent who had some information on science fairs. We found several good projects. I made copies of the instruction on how to do each one. I sat with the first grade students, showed them each set of instruction. I asked them what they wanted to do.

After, getting an idea from the older students, I looked at the instruction and matched each kindergartner based on what I noticed they were able to do. Afterwards, I spoke to Lynne, showing her the copies of the different instruction. Knowing what I know about my students, what the parent knew about science and what Lynne knew about making modifications, I came up with one project per child. The students did very, very well.

This year was easier because the students had projects to do that matched what they needed.

One parent took the instruction and decided that it would be better to make modifications. She had access to some materials that were not found in the instruction. The way she and her son changed things worked better for the student. Working with everyone helped me match the projects to the students, with success ... (August, 2006)

Ba's comments suggest she started out using the same theme for everyone. She believed that was necessary to help the students learn the basics of doing projects. However, as she got help from a parent, she decided to allow the students to work on multiple themes. This suggests she may have been selecting one theme to make it easier on herself. As mentioned earlier in this chapter, she felt overwhelmed with all the work she had to do. Ba's reflection does indicate that she realized the role of parents in the process of helping the students. She recognized the need to have additional resources when working with students. Her next statement "helped me match ... with success," indicates her acknowledgement that help comes from multiple sources, "everyone." Ba demonstrated the ability to select themes by collaborating with teachers, parents and the child as she collected themes for the students. None of Ba's lessons plans or classroom behavior as evidenced by field notes indicates that she used problems to help students learn any skills. Based on the analysis, her knowledge of PBL practices as evidenced by her use of themes is rated a four. Her use of PBL objectives is rated zero.

Ta's Use of PBL. As discussed earlier in this chapter, Ta did not engage in dialogue during the three BPD information sessions. However, he did engage in discussions with the curriculum coordinator, dated March, 2005 and his colleagues, dated

November, 2004, May, 2005, January, April and May of 2006. His conversations provided comments on how he could allow the students to use multiple ways of presenting what they know. He did not make the suggestions on his own. He made them after being prompted by probing questions from the curriculum coordinator. When working with the students, as evidenced in the field notes dated May, 2006 Ta walked around the room, allowing the students to develop skills as needed. He would provide students with individual advice and feedback as needed. However, there is no evidence he was responsible for allowing students to select the themes. He would allow them to select how to present the themes as per the May, 2006 field notes. Based on the evidence provided in this study, Ta's use of teacher oriented themes rates a two. Ta's use of PBL objectives rated a zero.

Ra's Use of PBL. Ra made verbal comments during BPD information sessions to indicate that he was transferring the information to actual students, skills and themes as evident by field notes presented earlier in this chapter dated: May, 2005; January, 2006; and May, 2006. May, 2005 field notes provide evidence that he took advice from a colleague of using a student centered problem to help Nel. However, he did not coach her to select the correct problem. The January, 2006 field notes provide evidence that he expressed concern using themes and problems to help students learn skills. He said during a small group dialogue he was concerned because students wanted to have direct instructions for doing assignments. He however could not produce any direct guidelines for working on PBL activities. Instead, he had placed the PBL guidelines on

a table, allowing other papers to be stacked on top. He was not using them and did not give them to the students. The May, 2006 field notes provide evidence that he allowed Ned to select research topics to address a teacher oriented theme for social studies.

Based on this evidence, Ra's use of themes was rated a two, using Bait themes such as investigating Central American countries. His use of PBL objectives rated a two. Even though the problem selected for Nel was student oriented, he used it after Alif made the suggestion, not based on what he knew about Nel.

Dal's Use of PBL. During the information sessions both Dal and Ta used verbal matches between PBL practices and the content of their curricula. The two implemented PBL strategies differently. Ta is analyzed above. Dal had the students engage in thematic activities, such as sports themes as evident in field notes presented earlier in this chapter, dated September, 2004. Based on this, his use of PBL objectives is rated zero. His use of themes is rated a one.

Quantitative Analysis of PBL Practices

To analyze the possible relationship between teachers' use of themes and PBL practices, the quantitative ratings of teacher behavior during their preferred method of delivery and the quantitative ratings of teachers' use of themes and PBL objectives were compared. A correlation analysis completed to compare the teachers use of themes and their level of engagement exhibited by the teachers. The correlation coefficient = .22, indicating a weak correlation between the two. Observations and evaluations of the material completed by teachers indicate several teachers did have some difficulty

applying student generated themes to the curriculum. The teachers appeared to understand what to do, as evidenced by several teachers who helped develop the PBL program and write the grant proposal. However, the archival data collected does not indicate the teachers incorporated the skills within the fabric of their classes.

In addition to the use of themes, BPD also included modeling and guidelines from the curriculum coordinator for teachers to learn how to use problems to teach and reinforce skills taught during various lessons. Evaluating the impact on the level of teacher participation during their preferred method of delivery and their use of PBL practices, the correlation coefficient = 0.27. This coefficient suggests a weak relationship between what cognitive engagement during the BPD sessions and the use of this skill also.

Teachers did incorporate projects into their lessons. The projects were all suggested or developed by the teachers and not by the students. Therefore, the archival data does indicate the teachers did start the process of incorporating the idea of using thematic units to incorporate skills and concepts from the curriculum with real-world activities.

Level of Participation and Use of Shuraa Baynahum Activities

To measure the relationship between each teacher's level of performance during the BPD sessions and their level of Shuraa Baynahum, mutual consultation activities when planning and instructing students, several behaviors were evaluated. Mutual consultation is an example of sharing, leading to the construction of knowledge. Inquiry-based instruction should include constructive dialogue or mutual dialogue. If teachers are

to teach inquiry-based skills, they should know how to use inquiry-based practices, including mutual consultation.

To analyze the use of inquiry-based practices, lesson plans and field notes of teacher-behavior was rated in the following categories: use of thematic instruction, reflective decisions and individualizing instruction, and use of collaborative discussions with other teachers and students to coach and/or give students feedback.

Ratings used to determine the level of knowledge of Shuraa evidenced in teacher behavior and the level of teacher collaboration during the two years of the study are summarized in Table 11 of the Methods Chapter. To measure demonstration of each teacher's knowledge of Shuraa Baynahum, reflective statements providing rationale for decisions was rated a five. Examples of reflective behavior in some of the teacher's actions was rated a four. Examples of consulting with other teachers at times when making decisions was rated a three. Teacher activities including collaboration when prompted was rated a two. Teacher activities when Shuraa is mentioned but not practices is rated a one. No evidence of collaborative efforts with self or others is rated a zero.

To evaluate a teacher's ability to consult with adults and children when guiding students to select instructional themes was rated five. Evidence of teachers guiding students to select instructional themes was rated four. Evidence of teachers collaborating together as they selected student themes was rated three. Evidence of teachers occasionally working with students to identify themes was rated two. Teacher behavior

supporting the use of themes across subjects was rated one. Evidence indicated that there was no sharing of ideas for developing lessons or ideas to teach was rated zero.

Shuraa Baynahum as Evidenced by Alif's Behavior. Alif brought the idea of PBL as a mandate to the staff for the second year of the study, by introducing a request for a proposal for a small grant to help students learn how to engage in project based learning. When she began working with the curriculum coordinator, she began to make connections with the concept of Shuraa and segments of project based learning:

... In a discussion with Alif about the grant proposal, she mentioned how we needed to have an advisor for the high school students as well as group consultants. She went to explain how the consultants would be used to coach the students as they developed their projects. They could help the students get information about their topics. In addition, they could help the students by judging their projects, helping to critique the projects. We need to pull the experts from the field to help the students learn more about the topics of their projects, Alif proposed ... She offered to use the grant money to have 'expert' help the students form their ideas, expand on them and complete the projects. She even gave the names of some experts who could help the students with some of the things they had already shown an interest in. Alif took it one step further. Prior to submitting the grant proposal, she redid the schedule for the older students, giving them a chance to work with an expert in the field (shadowing) to gain experience in a specific area. She allowed the parents and students the opportunity to select the expert ... (May, 2005)

Her mentioning of the consultants required to work with the older children provides support for her knowledge of mutual consultation or Shuraa Baynahum when helping them develop themes and finish PBL projects. The field notes were written just after the return trip from Neigh, the model PBL school. She only used themes in a limited way as evidenced earlier in this chapter. However, during the small group dialogue with Ra, Ba and Ta, Alif provide evidence of her ability to develop themes for

other teachers. However the evidence presented earlier did not indicate the use to consultation, a two way dialogue between teachers when she made the suggestions. The teachers were quiet listening to her. Ra did not pose counter themes and or support for the themes which Alif proposed. In other words the conversation was a one-way consultation, not mutual consultation. Based on the analysis above, Alif's knowledge of Shuraa was rated a three. Her collaborative behavior was rated a one.

Shuraa Baynahum as Evidenced by Ba's Behavior. Ba used parents and student interest to help identify themes for completing science projects, as demonstrated earlier in this chapter. She also used her colleagues and parents to make other decisions that were not academic. The following represents a segment for the field notes one month after the third information session addressing the use of PBL practices:

Ba demonstrated strong Shuraa practices during the private discussions, interjecting ideas as we discussed things that she felt strong about. She always started the conversations off with what she knew. During discussions with Alif and Ba together, I noticed Ba taking comments from the discussion and apply them to the students in the classroom. Today, we had a discussion about the homework patterns of the children from one family. Alif commented on how smart the two boys are that she is teaching. Ba mentioned that she noticed the same thing. Discussing the strengths of the students, Alif noted the leadership skills of the two that she taught. Ba recognized her student's desire to please the teacher. She also noted that she feels he has organization problems (causing him to loose his homework, glasses, and a folder). Alif identified that she had the children using their leadership skills to help others. Ba thought to have the older boys help the younger boy with organization . . . (December, 2005)

At this point, Ba had begun to merge what she knew of the older boys with her need to help their younger brother – which did not work. The younger brother would still

loose things. A few weeks later, Ba shared her intentions with the curriculum coordinator:

To address her student with organization problems, Ba stated that she was going to try to help the student become more organized in class. She spoke to his mother. She mentioned that the mother explained that there were some family concerns that left the structure of the family in peril. She did comment that she would try to help her son remember to bring his supplies and do his homework. Today, she mentioned that she did not see a change. Therefore, she decided to have the student do his homework in school, before class started or during anytime that he was not engaged in other activities. Another outcome of him not being organized is the constant loss of his glasses. Ba offered to get him a pair of glasses that would stay at school. Realizing that this may cause a conflict with the pride for the parents, she did not.

She began to make concessions about doing everything for the student herself.

She made these concessions towards the end of the first year, after taking in the concerns of the parents. She did get a magnifying lens for all students to use, taking the stigma off of the child who actually needed to use the lens. This is different than when school first started. She would give the student the low grade for not having whatever they needed.

Based on field notes analyzed above, Alif, Ba, and Ta used inquiry skills when planning and instructing students.

Alif and Ba were making decisions about several students. They spent a lot of time discussing one student – Sara. The two teachers agreed Sara had difficulties that warranted attention. Ba noted she had problems answering questions on the entry level test. It was hard to see actually where she had difficulties and where she was strong. Her entry level score was .06 lower than her entry-level grade. This was one of Ba attempted to decide what to do for this student. As part of the discussion, she mentioned that the student was learning sporadically, instead of consistently. She would do okay on one day and poorly on the next. Alif encouraged Ba to work with the parents . . . (October, 2004)

It appears clear, Ba is gathering data. She noted the students entry level scores, classroom observations and student grades.

The field notes further support Ba's level of feedback demonstrated her reflective collective knowledge of the students:

When providing her students with encouragement, Ba would select the method of feedback that matched her students. She found that many students required constant upliftment. She would give them verbal and written praise as needed. Other students were self-motivated and required less. She spent her time encouraging students by focusing on their strengths.

Ba's knowledge of Shuraa became clear prior to school opening. She was actively involved in designing the academic program for Bait. Several individuals participating in this study were among the design team, Alif, Ba, Ta and the curriculum coordinator. Collectively, each member of the design team put ideas on the table. In addition, each member received information from the group. Based on the evidence in this section, Ba's knowledge of Shuraa as evidenced by her ability to use Shuraa principals was rated a five. Her ability to collaborate was rated a three.

Shuraa Baynahum as Evidenced by Ta's Behavior. Ta had concerns about collaborating with others at the school. When he first started working for Bait, he was in the last year of finishing his bachelor's degree. Many times, he held back his statements because he felt that he did not have a lot to offer. If he was called on, he usually gave very good input. He rarely volunteered during group sessions. The following segment of his final reflection shows how he listens and learns in every environment:

Working with people with titles can sometimes make you nervous. Two females, I was the only male at that time. I sometimes felt intimidated. There are two doctors working at the school. There were a lot of things I was not able to do, like the paper work, typing computers. I am now taking computer classes. I feel as though I was lacking in those things. In this day and time with modern technology you have to be abreast with what is going on. In terms of Spanish, I feel real confident. At this present time, I am teaching three college students Spanish 101, 102 college level. All of the students that I am teaching now are getting A's and B's. That is how I measure my progress, by how the students turn out. If the students say they are pleased with me, then I am pleased with me ... (July, 2006)

He does not make suggestions easily, because he does not consider himself an expert in education. However, he does consider himself an expert in Spanish. He feels he knows the subject matter well enough to be able to have input. He brought Spanish into several conversations, because it represents a level of comfort for him. Ta did identify his actions as an example of Shuraa:

... During our discussion, Ta noted that what he was doing with the students was an example of Shuraa. The conversation was an introduction into PBL. He said that he learned by doing. He always learned language by speaking the language, engaging in conversations. I informed him that each teacher was to engage in conversations with the students about what they wanted to do, what they had done and what else they wanted to do. I immediately followed up with "... do not have a one sided discussion." Use probing questions to help the students develop their thoughts. Let the discussions come from them (the students). He immediately introduced the concept of Shuraa Baynahum as part of what I was discussing. He said that this is like using Shuraa to teach lessons ... (July, 2006)

Even though he did not use Shuraa in every decision with the upper level students, he did recognize how Shuraa could be used. Based on the analysis of Ta's

behavior, he demonstrated knowledge of Shuraa without using it, rating a one. However, the next section, he did use Shuraa with colleagues, rating his Shuraa behavior as 3.

Shuraa Baynahum Between Several Teachers. Throughout the study, Ta did not release the reigns as quickly as Alif and Ra. He held on all of the way to the final project – the Central America project mentioned earlier in this chapter. He did not see that the upper grade students were ready to do things without explicit guidelines. He did share his concern about the motivation level of the older students. He felt the older students needed more coaxing than the younger ones. Alif felt that they were not as motivated to research or develop concepts independently, on their own. In addition, Alif, Ta and Ra also provided their students with feedback, reflecting their knowledge of students:

... Not only did the teachers give the students warnings, they also gave them praise. The strength of the student was used to help the teachers get through to the students. One student was an excellent writer. He was encouraged to write, by several teachers (Alif and Ra) as a means of dealing with some of his difficulties ... Several of the younger children (grades 3 and 4) had self-esteem issues. Considering that the students had the need to feel good about themselves, the teachers would give them constant positive feedback. Similar to the older students, student strengths were used to help the student improve in an area of weakness ... Ta suggests students needed to be shown how their decisions affected their future. He along with Alif and Ra hold interactive discussions about real world issues when trying to motivate the older students. Alif suggested that the older students needed compassion and toughness. Recognizing that the students had rough experiences, she saw the need to encourage them that they could succeed. However, when she saw that they were slipping, she became very stern with them. When Alif, Ta and Ra found that the older students had not done their assignments, they held discussions with the students. Many of these discussions ended with verbal and/or written agreements on what the teachers and students had to do in order for students to move forward (to the next lesson). The

contracts included rewards and punishments as the contracts were followed ... (April, 2006).

The verbal contracts varied based on student characteristics/needs. The teachers collaborated with students and other teachers as a means for addressing academic and behavioral needs. The contracts were established as a result of mutual consultation between student(s) and teacher(s).

Shuraa Baynahum as Evidenced by Ra's Behavior. Ra, a part-time teacher did not use the word Shuraa directly, but he did allow the older students to engage in dialogue, as he coached them on what to do and how to do it. He allowed the children to bring in their ideas. However, he engaged in more of a one-way flow of instruction.

Field notes after the third informational session addressing PBL instructions follow:

I asked him, how did the students pick their topics? He responded with, I gave them the idea on a magazine. I asked what they wanted to put in the magazine. They mentioned that they had songs and things they had pulled from the internet to put in the magazine. "I kind of wanted them to put the papers they were doing on the history of hip-hop in the first edition," he said. He mentioned that he had gotten the idea from talking with Alif about what they could put into the magazine ... December, 2005)

Here, he demonstrates his ability to work with a colleague and work with students. He allowed the students to express their interest or what to put in the magazine. However, the idea of a magazine was his. He used what he know of the curriculum and the students interest to encourage the students to complete a history project, examining "... history of hip-hop."

Ra used coaching as he gave the students guidelines to follow. Based on field notes, he did not appear to have students designing their activities. He basically gave

them advice based on what should be next. There was very little student centered individualizing. Based on the evidence presented, Ra's Shuraa behavior was rated a three. His collaborative efforts were also rated a three.

Shuraa Baynahum as Evidenced by Ja, Dal and Tha's Behavior. Two part-time teachers, Ja, Dal demonstrated collaboration at level one, using themes across multiple subject without selecting the themes based on knowledge of students. These two teachers also demonstrated that they knew a little about Shuraa principals, sharing and giving and receiving information to and from other teachers. The curriculum coordinator writes about Ja:

Examining his [Ja's] ... There was no evidence of strategic changes based on students preferred method of learning. At the time students were writing, everyone was writing. When one was reading silently, everyone was reading silently. He did use multiple strategies within his lesson plans. However, he used the strategies one at a time ... There was some level of facilitation/coaching . Enrolled in his class was a student functioning two grade levels behind. The other students were working at grade level or above. Ja provided this student with one-on-one instruction. He would re-teach a lesson if necessary. In addition, Ja recognized that this student also needed constant reminders to stay on task. He made a point to remind the student when needed to stay focus by continuing the assignment. In addition, he sat the student in strategic spot to monitor his focus regularly. There were several modifications for the student who was off task. However, he did not do the same thing for the other students. I did not see any signs of him making accommodations for each student, changing strategies as needed (November, 2005).

Based on the notes, Ja appears to have made some modifications, moving a student's seat to help the teacher keep him on task. He did re-teach and provide one-on-one for the student needing remedial assistance due to academic needs. However, he did

not indicate that he made modifications based on learning styles and or academic strengths. He did not discuss his decisions with anyone.

Being an athletic coach, Dal was familiar with coaching. He discussed his coaching during a collaborative dialogue with several colleagues during one BPD information session. However, his lesson plans did not indicate any evidence of unique coaching based on specific needs and/or characteristics of students.

The other teacher, Tha, was the Arabic teacher who left prior to the end of the first semester of the first year. During discussions with Tha, she demonstrated that she had one way of teaching, which is the way she learned Arabic. She used the themes her instructor used. Tha did not see any need to deviate from her instructor. However, she did add comments during initial meetings, sharing what she knew about Islam and language, specifically Arabic usage. She included the fact she studied overseas – where she learned Arabic concepts that helped her teach the subject. She did not give details about what she learned, how she made decisions when planning and implementing instruction. Thus, there was no two way conversation with teachers and or students. She also did not use themes or engage in dialogue about the use of themes.

Tha, Ja and Dal's Shuraa behaviors were all rated zero. Tha and Ja's collaborative data was also rated zero. Because Dal did use themes, his small group dialogue rated a two.

Student Performance

In an effort to evaluate the effect of the BPD program on achievement, the student performance data from standardized achievement test was analyzed. Table 16 tabulates the entry level scores, the cognitive grade equivalence scores for the first and second years. The seven students represented on this table reflect those students that were enrolled for both years.

Over the two years, Sara and Ned made the least amount of growth of the seven (1.2 years) over the two years. The cognitive growth of student Martha represents the largest increase over the two years (4.1 years). Comparing the cognitive growth of students at the end of the first year (mean = 2.9 years) against their cognitive growth after the second year (mean = 4.2 years), there was a mean difference of +1.3 years.

Table 16

Cognitive Growth of Students Enrolled for Two Years

Student #	Entry Level Score	Entry Grade Level	First Year Cognitive Equivalent Score	Second Year Cognitive Equivalent Score	2 Year Cognitive Growth
Martha	0	K	0.8	4.1	+ 4.1
Sara	0.3	1	0.4	1.5	+ 1.2
Rich	0.3	K	1.0	2.1	+ 1.8
John	1.8	2	3.7	4.2	+ 2.4
Will	1.8	2	3.9	4.0	+ 2.2
Ned	4.0	3	3.1	5.2	+ 1.2
Josh	5.0	8	7.4	8.5	+ 3.5

In addition to the cognitive scores, the academic achievement scores were also evaluated. An Independent Samples Test analyzed the first year math and reading achievement scores and the second year math and reading achievement scores (see Table 17). The results of Table 17 suggest a difference between the students' entrance exams and mean student achievement at the end of year one (reading: $p = 0.010$ and math: $p = 0.002$) and the second year (reading: $p = 0.011$ and math: $p = 0.005$).

As a result of the information found in Table 17, there appears to be a growth of student performance as measured by achievement and entrance scores for students taught by teachers who engaged in the BPD program.

Table 17

Independent Samples Test – First and Second Year Student Performance

	N	Mean	Mean Difference	SD	Df	t	Sig.
Reading Grade Equivalent Scores1	14	5.421	4.736	3.064	12	3.030	.010
Math Grade Equivalent Scores1	14	5.729	5.000	2.862	12	3.855	.002
Reading Grade Equivalent Scores2	17	3.229	3.156	2.678	15	2.889	.011
Math Grade Equivalent Scores2	17	3.382	3.139	2.465	15	3.277	.005

Note: $p < .05$, mean of entry level scores = 2.975

In addition, there appears to be an improvement in cognitive test scores as measured by comparing first and second year cognitive test scores of students in attendance for both years of the study. Based on these results students appeared to have improved.

Impact of Teachers' Participation on Student Performance

To examine the relationship between teacher participation during BPD and its impact on the student performance, teacher behavior was qualitatively compared to student growth. To analyze the relationship a comparison of the results of teacher participation during BPD sessions (see Table 7) and quantitative analysis of student work (see Tables 17 and 18) was analyzed and compared to the results of the previous section.

Five out of seven teachers (Alif, Ba, Ta, Dal and Ra) did show a high level of involvement (ratings of 4 or 5) during their preferred method of BPD. Overall, students' cognitive scores showed a mean increase of 2.3 years (see Table 17). Overall, student performance in reading and math scores also showed a significant difference from each student's entrance exam scores.

Examining Dal's scores did show an improvement when comparing his behavior during the whole-group – informational sessions (rating = 2) and small group (rating = 2) performance and his performance one-on-one with the curriculum coordinator (rating = 4). Based on Table 13, Dal is the only teacher who did not show increased interactions during BPD while participating in his preferred method of instruction, scoring a 3 for informational sessions and one for preferred method of BPD. As stated earlier, he was the gym teacher, and theorized that he was not directly responsible for teaching academic classes (i.e., reading and math).

CHAPTER V

DISCUSSION AND SUMMARY

Whole-group lectures professional development sessions are beneficial at disseminating large quantities of knowledge (Fosnot, 1996; Sparks & Loucks-Horsley, 1989). However, these programs have been found to be ineffective with implementing teacher change (Lieberman, 1995; Sparks & Loucks-Horsley, 1989). To increase the ability of teacher to implement practices taught during the professional development programs, teachers should be more cognitively active during the professional development sessions. This study examined data comparing teacher behavior during the whole-group sessions and cognitively engaging group sessions and teacher follow-through, as measured by the ability of the teacher to implement concepts learned. Several indicators of effective follow-through were compared to teacher participation levels; ability to reflect, use inquiry-based concepts, engagement in mutual consultation and impact on student performance.

Teachers' Participation

This study investigated the effectiveness of the inquiry-based professional development program – BPD. Effectiveness was evaluated by comparing the level of participation during the professional development program with four indicators of effectiveness: teacher reflections, use of concepts learned (inquiry), use of concepts shared (Shuraa Baynahum), and student performance. The results indicated five out of

six teachers who participated in BPD activities aligned with their preferred method of instruction demonstrated a high level of cognitive and physical involvement during their preferred method of delivery. Three of the five also demonstrated the ability to synthesize new lessons and generalize skills to other academic situations. One out of six teachers, the gym teacher did not show active – cognitive engagement during BPD sessions. Considering that effective professional development programs should provide measurable outcomes, results of this study indicates that eighty percent of the teachers who engaged in the BPD program for two years increased their cognitive engagement while participating in their preferred method of instructional delivery. Teachers demonstrating a high level of learning can help students achieve at a higher level (Garet et al., 2001).

Effectiveness Based on Teachers' Reflections

Analyzing the comparison between teacher participation and teacher reflections indicate teachers who did submit reflections were actively engaged during the BPD sessions. Two of the six teachers voluntarily completed reflections, expressing positive results from their experience with the curriculum coordinator. Both teachers remembered specifics about how they were helped by their encounter with the curriculum coordinator. In their statements, both Ba and Ta mentioned skills they could not do before engaging in the study that they are able to do after the study. Regardless of the fact that they were novice teachers, each concept taught during the two years of the BPD program was introduced during or re-enforced during the whole-group, informational sessions. Observational notes collected by the curriculum coordinator do not indicate evidence the

teachers used the skills prior to the group discussions or small group sessions. In the two teacher reflections analyzed, each teacher referenced one-on-one conversations with the curriculum coordinator that assisted them in implementing the practices.

Comparing the behavior of each teacher during the informational sessions and their preferred method of delivery, both Ba and Ta received a rating of five (the highest possible rating) during the sessions aligned with their preferred method of delivery. Ba's participation level was rated four out of five during the informational session. Her comments regarding what she gained from the BPD sessions and what she gained to help her educate her students was from sessions aligned with her preferred method of delivery, not the informational sessions. Ta's behavior during the informational sessions rated three. All of his comments during his reflections represented actions during his preferred method of delivery, not the informational sessions.

The reflections of both Ba and Ta rated four, demonstrating their ability to recognize their growth and behavioral changes during the time they participated in the BPD activities. In light of the participation rating of five and the reflection rating of four, the two teachers who did reflect remember the experiences and cognitively recognized observable changes in their behavior.

Because reflections represent a higher level of thinking than retention and application, it appears these two teachers learned skills at a higher cognitive level, synthesis and generalization (Bloom, 1956). Developing reflective skills helps teachers become cognitive doers instead of passive recipients (Ngeow, 2001). The teachers became active learners during the BPD process. As teachers become more cognitively

active in their professional development activities, they shift from habitual performers, responding to the stimuli and more proactive critical thinkers (Cary, 2002; Lortie, 1975). Teachers can only teach what they understand (Oakes et al., 2000). Teachers in this study developed the ability to use critical thinking skills, suggesting an increase in their ability to help students become critical thinkers.

Effectiveness Based On Inquiry-Based Curricula

Data gathered from field observation as teachers collaborated with each other, used information from parents, students' grades and other resources to inform their instruction helps to demonstrate the ability of teachers to use inquiry-based skills. The field observations reveal teachers used the results of their conversations with each other, their observations of student behavior and achievement and information gathered from the BPD sessions to develop their lessons. Specifically, Ta and Ja used knowledge of the social studies and Spanish curriculum and knowledge of how the upper grade students worked to develop strategies for teaching the students about social issues in Spanish speaking countries. Alif provided her knowledge of a student's past experiences, and knowledge she had gained from teachers to help suggest a thematic assignment to help a female student to trust leadership. Alif also shared her observations with the girl's teacher, Ja to help him develop an inquiry-based unit to teach the student coping skills.

Alif, Ta, and Ja all had connections with teaching the older students. There was evidence to support each was engaged in thematic problem-solving activities. Ba also used themes such as the science fair to structure her curriculum around one common theme. Comments from her reflection, included in Chapter 4 indicate she used multiple

members of the school family and resources to help her develop themes aligned with her curriculum goals, not the characteristics or needs of the children. Ba's comments and field notes do not show her utilizing PBL activities at all.

The participation level of Alif and Ta were evaluated as five during their preferred method of delivery. Ja rated four. Each taught and/or interacted with upper level students and helped to structure the PBL framework for the curriculum. Ta did use inquiry when selecting themes and individualizing instruction. However, he did not use the PBL tenets. He selected the problem for all students.

Alif did not use PBL tenets with her own students. By using what she learned about PBL, she demonstrated the ability to help Ra decide what PBL activity he was to use with one of his students. Of all of the teachers in the study, Alif's PBL rating was four out of five. None of the other teachers demonstrated strong PBL skills. However, teachers combined knowledge of students and curricula with the content of BPD sessions to develop individualized lessons, teaching specific skills and using specific methods to match student characteristics and needs.

In addition, the BPD sessions were informed from results of field observations gathered from teachers and the mission and vision of the school. The use of inquiry skills was not evident during the beginning of the study as evidenced from field observations and initial lesson plans. At the beginning of the study, the teachers followed the teacher manuals or the sequence of lessons found in students' texts. Despite student needs, the teachers had the students engaged in 'rote memory,' repetitive type work. Teachers developed inquiry skills over the course of the study. After the teachers began to engage

in the BPD activities, field observations demonstrating teachers talking to each other about Sara, Ned and his siblings and other students help to support the teachers did use inquiry skills to gather behavioral, academic or social characteristics of students to become more facilitative, reducing their level of disseminating knowledge to students.

Effectiveness Based On Use of Shuraa Principals

Shuraa is established from the root word meaning to open, enlarge, or expand a situation to allow one to examine it. However, with Shuraa only the best, the honey is extracted, not the fluff or extraneous information. Thus, collaborating with others using Shuraa as a guide allows the educator to place all of the knowledge on the table and only take what is adequate for the situation. Bait teachers were shown how to take all of the resources presented and only take from them what was pertinent to the instructional activities.

Over the two years of the study, three teachers, Alif, Ba and Ta mentioned Shuraa by name. Ba's Shuraa behavior rated higher than any other teacher. Throughout the study she demonstrated her use of student characteristics and curricula content to guide her practice. She took comments from colleagues and curriculum coordinator to make decisions. She also contributed to conversations of with Alif and Ta, increasing the mutual nature of the conversations. Therefore, she appeared to use Shuraa principals. She was very outgoing and engaging in dialogue regularly.

Alif was very helpful with others. However, she rarely placed things on the table for others to help her. Her personality was that of a leader. Her behavior during all of

the BPD sessions rated five. Her active behavior during the collaborative sessions appears to have increased her ability to learn concepts.

Ta was quieter, not actively engaged in large or small group discussions. He was the Arabic teacher and the first to recognize the tenets of Shuraa Baynahum matches the tenets of PBL requiring coaching, feedback and collaborative dialogues and members of the learning community: parents, colleagues and students. He was cognately engaged in all BPD sessions, more involved in the one-on-one sessions. His reflection and performance demonstrated a change in his behavior demonstrating the effectiveness of the BPD program on helping him develop inquiry skills. Based on the results presented in Chapter IV, teachers having knowledge of Shuraa helps teachers engage in more inquiry-based practices. However, everyone does not have to outwardly engage in collaborative dialogue to learn from each other.

Effectiveness Based on Students' Performance

The quantitative and qualitative analysis of teacher behavior during the BPD program suggests a positive relationship between teachers' level of participation during the professional development activities and student performance. All teachers actively engaged in the BPD sessions aligned with their preferred method of instruction taught students who made substantial growth within the two years. Again the students did much better during the second year than the first year. After teachers learned more, they were able to directly help the students. Field observations to support teachers were constantly learning is evidenced in several ways. For example, Ja did not state directly that he benefited from the collaboration of his peers or the curriculum coordinator. However,

statements paraphrased by the curriculum coordinator about his willingness to try new strategies with students indicated that he changed. His classroom behavior based on field notes support the change. In addition, later during a one-on-one session, he did admit that his problem student was performing better in class and on homework. Ja taught that specific student math and language arts. All of his students scored well on the standardized achievement test for the second year. However, the student who was with Ja for two years (Ned) only made a 1.2 year gain in cognitive scores over the two years.

The one teacher who did not demonstrate cognitive engagement during BPD taught gym. It is not clear why he did not demonstrate cognitive engagement. However, his behavior may not have directly affected student performance on the achievement test because he did not teach an academic subject evaluated by the exam. However it may have indirectly affected the results because learning is a dynamic process, occurring throughout every aspect of one's life. Students are learning how to learn or study when they go to gym as well as when they are sitting in a core subject course, such as reading, math, science or social science.

Based on first and second year standardized cognitive scores, all of the children taught by BPD teachers who were actively engaged in the inquiry-based BPD sessions demonstrated cognitive growth over the two years. Half of those children demonstrated an increase in cognitive skills exceeding two years. Martha, a kindergartener, who had not attended school prior to attending Bait demonstrated more than a three year growth in cognitive skills during the second year of the study. Some of the students demonstrated very low entrance scores. Transfer records of 4 of the seven students attending Bait

during both years of the study indicate academic deficiencies and/or difficulties prior to enrolling in Bait. The cognitive growth for the second year was higher than the first year. Based on the analysis of the findings, it appears the teachers did something that helped the students make a positive cognitive gain.

In addition to the cognitive growth, the students also improved academically (based on math and reading achievement scores). The analysis shows a statistical difference between the first and second year math and reading achievement scores. Therefore, there is a relationship between the level of a teacher's participation during the BPD activities and student achievement. Teachers cognitively engaged in professional development programs positively affect student scores.

Effectiveness of BPD

The overall data suggest teachers were more cognitively engaged during the BPD sessions aligned with their preferred method of delivery. The data suggest those teachers more cognitively engaged were able to use inquiry to individualize instruction, which appears to have a positive impact on student cognitive and academic achievements.

In addition, teachers who were cognitively engaged during the professional development sessions and had knowledge of Shuraa concepts as evident in their conversation and behavior readily participated in collaborative group consultation to share what they learned during the BPD sessions. In addition to sharing with others, teachers who were cognitively engaged in the BPD sessions also helped others construct understandings of the contents presented during the whole-group, instructional sessions.

Of the two teachers who reflected, both were able to discuss their growth and understandings in areas expanded upon during the collaborative BPD sessions. None of their reflective statements mentioned concepts introduced only during the informational sessions. They remembered and gave specifics about their interactions with other teachers and/or the curriculum coordinator.

Based on the results of the study, all of the children who had been enrolled in the school during the length of the study demonstrated higher than average growth on the standardized exams used to measure end of the year progress. The end of the year exam included a section on cognitive growth, reflecting the thinking skills of the children.

Significance of Study

The goal of this research study was two-fold: 1) to examine the impact of each teacher's participation level and their ability to utilize concepts learned; and 2) examine the effectiveness of the inquiry-based professional development program as measured by student performance. Examining the use of Shuraa is a way to begin to look at how prior knowledge may or may not impact development and/or implementation of inquiry-based activities.

The findings of this study may be helpful for all educational programs, even though the study involved a faith-based school. Since, the content of the professional development program was designed around the needs of the school, the educators and the students. Therefore, the nature of the inquiry based professional development program is flexible, allowing it to be used by any school and or school district. Therefore, charter schools, public schools, large schools, small schools, day schools, etc. may all learn from

this format for developing and improving the skills of the teachers. The design of the BPD program may be applicable for new, start-up schools because the program allows the content and method in instruction to match the unique characteristics of the school, the faculty and the potential students.

Researchers may want to conduct a further study with a larger sample size. In addition, research could closely examine the comparison of Muslim teachers adhering to Shuraa Baynahum with teachers from other denominations that are/are not practicing a similar ideology. Finally, the results of this study can lead to research comparing religious concepts and the ability to learn and utilize key academic skills.

Delimitations of Design

The focus of this study was to elaborate on what happened with specific teachers in a specific school as they engaged in a particular professional development program. This study is not designed to establish theory, to directly guide policy, or identify general statements about professional development or inquiry-based learning. Archival data on six subjects was analyzed. Thus, this study was not designed to generalize or find the statistical significance (Giangreco & Taylor, 2003). The design of the study involves collecting archival data. This reduces the chance of having a treatment and control group. The design of the school and classroom activities hampers the collection of data to account for every event. Data analysis only included data that was available.

Limitations of Study

Results of this study should be utilized cautiously due to the various research based limitations. To begin, the data was collected from only one school representing

only on geographic area in the United States of America. The school was not randomly selected. Instead, the school location and administration had a working relationship with the researcher. The school used for the study was small, having less than 50 students and only six teachers. There was a homogenous ethnic group of students and teachers. The sample closely represents inner-city African American students having academic difficulties in schools. Prior to attending Bait, all but one student had attended a local public school in the nearby large metropolitan city. All of the students, who had attended the public school prior to enrolling in Bait, had exhibited some level of learning difficulty. Therefore, the data can be moderately generalized to students who fit the above characteristics.

All of the teachers had a history of prior post-secondary academic experience. None had attended a teacher certification school. However, as stated in the review of literature found in Chapter II, prior experience and knowledge affects how adults construct understandings. This study did not include any pre or post surveys to gather and analyze any impact prior experience or knowledge may have had on the outcome of the results.

Archival data was analyzed. Thus, the analysis did not lend itself to member checks on all of the teachers, or on-going reflections from the teachers or the students. The only data on the students was quantitative. This limits the ability to evaluate the benefits of the BPD program on student achievement not evaluated by the standardized tests.

As stated earlier, inquiry-based instruction (for professional development or classroom use), is not straight forward (Shank, 2002). What the participant got out of the situation was based on the cognitive framework of that individual. This study does not include any vehicle for tapping into prior knowledge or prior cognitive constructs.

In addition, participatory accountability procedures were used to address the inner biases of the analyzer (Shank, 2002). The researcher is a constructivist, using inquiry-based instruction when teaching. The researcher is a Muslim, using Shuraa concepts when making major decisions. Having a bias towards the constructivist paradigm, the researcher does recognize that there are specific reasons for use of a constructivist strategy verses a behaviorist strategy when teaching.

Considering the biases, the ratings listed in Chapters III and IV were used to analyze the data objectively. Member check was limited to only two teachers. Including member checks helps to increase the validity of the analysis by having each teacher read over field notes collected by the curriculum coordinator during professional development sessions to provide content credibility (Rudestam & Newton, 2001).

Summary

The intent of this study was to explore the relationship between the participation level of teachers engaged in a two year professional development program and their ability to cognitively reflect on their growth, utilize skills learned, participate in mutual consultation and impact student achievement. Based on the qualitative and quantitative results, it is concluded teachers engaged in the inquiry-based professional development program matching their preferred method of delivery were more engaged in learning. As

a result of their increased cognitive engagement during the BPD sessions allowing teachers to construct understandings while addressing the academic needs of current students, the teachers were more apt to perform skills taught. The results of this study demonstrates cognitively engaged teachers participating in the BPD sessions learned skills necessary to individualize instruction and implement some of the ideas presented during the collaborative sessions. The results also indicate teachers discussed the tenets of Problem-based learning. However, none of the teachers developed the skills well enough to completely use PBL by the end of the study. Several of the teachers did incorporate inquiry based projects within their curriculum, demonstrating some of the tenets of Problem-Based Learning. Specifically, the teachers used projects to guide their instruction and re-enforce skills taught. Based on this, it appears the teachers were making an effort to incorporate the tenets of PBL.

The results of this study indicate the level of teacher participation during the preferred method of delivery correlates with a teacher's use of student centered instruction, matching student needs and learning styles. Participant teachers who chose to use strategies that develop critical thinking skills in students experienced an increase in student learning, increasing critical thinking skills of students higher than what is expected from maturity (growth of more than one academic year).

As teachers in this study demonstrated, reflecting and/or socializing during the BPD professional development activities, helps teachers construct a cognitive roadmap used to address similar academic conditions later. There are some programs already in existence that encourage teachers to reflect on their practice. One such a program is

cognitive coaching (Costa & Garmston, 1994). Cognitive coaching allows teachers to collectively reflect on their practices with other teachers or administrators in an effort to merge together thoughts and ideas in an effort to plan, observe and reflect on instructional practices. The content of the discourse may or may not include new concepts and ideas that are being focused on. However, the cognitive mapping can help teachers gain a deeper understanding of current behaviors or concepts, which allow teachers to gain a better understanding of why they do what they do.

Shuraa Baynahum is an Islamic principal suggesting that collaborative socialization helps participants make informed decisions. Excluding whole-group sessions, each BPD session allowed teachers to be a contributor to the conversation. The curriculum coordinator did not take the role as the expert. Teachers were allowed to use concepts learned from their students, from prior knowledge and experiences to help address the concerns of their colleagues and the school at large. If teachers already use Shuraa principles, they have the prior knowledge needed to construct analytical, problem solving practices required to analyze the difficulties faced when educating others. As a result, the teachers who are familiar with Shuraa Baynahum practices may be more apt to engage in inquiry-based practices, such as PBL.

Another example of collaborative effort that can provide teachers and pre-service teachers with a foundation for collaborative groups is Community of Learners. Community of Learners (Astuto et al., 1993) is a current professional development program used by educators that has similar features as Shuraa Baynahum. The Community of Learners program is designed to help implement school change by having

teachers and interested parties come together as a vehicle to design institutional change. During the professional development sessions, educators and possibly administrators bring their ideas to the table and make decisions based upon what has developed from the discussions. At the community of learners' programs used by professional developers (Astuto et al., 1993), the focus is on the problem or concern being addressed. Therefore, this is an example of using inquiry to help address a concern.

In line with literature based practices for effective professional development programs, the informational sessions of the Bait Professional Development program attempted to match the curricula needs of the school and the developmental level of the teachers (Biswalo, 2001; Darling-Hammond, 1998; Dutro et al., 2002; Lee, 2001; Riley, 1994; Shepardson et al., 2002). By participating in the design of content for the third informational session, two teachers, Alif and Ta increased their buy-in to learn the content of the session. In addition, since they had already began teaching the teachers had actual student characteristics and curricula content during the second and third informational sessions, allowing them to make direct connections to real students and lessons. In line with literature reviewed for this study, allowing teachers to relate BPD content and personal experiences with students and curricula increases the effectiveness of the professional development lessons taught as teachers made cognitive references to concepts introduced and explained during BPD activities. To increase the teachers' ability to make the cognitive references during the second and third informational sessions, the curriculum coordinator modeled how to use characteristics of specific Bait students and previously taught lessons to create examples of individualizing instruction.

Matching the developmental level of teachers; engaging teachers in the design of segments of the BPD program; and increasing teacher cognitive engagement, based on literature may have helped to increase the meaningfulness of the informational sessions for teachers.

Analysis of teacher behavior during their preferred method of delivery indicates that all teachers participating in both, the whole-group, informational sessions and another method of delivery were more cognitively engaged during their preferred method. Based on the review of literature section of this study, programs including teacher voices in the design and implementation are more meaningful, increasing effectiveness (Prince, 2004; Slavin, 1994; Tillotson, 2000).

Teachers engaged in effective professional development programs are more willing to implement new practices in their classroom. The use of many skills in pre-assessing, teaching and post assessing students over a two year period provides proof of follow through. Considering this, it is concluded that positive teacher experiences helped teachers implement the practices more effectively, thus leading to higher student achievement.

Finally, considering that many teachers teach the way they were taught, those who receive general information of PBL during a traditional professional development session and do not participate in engaging PBL practices will have more difficulties selecting and implementing PBL practices than those who receive general information and engaged in coaching activities. The participation level of the teachers during the professional

development program affects the teacher's use of student centered instruction to match student needs and learning styles.

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VITA

Lynne Beyah Muhammad is the eldest of nine children born to Karriem and Grethel Beyah in Chicago, Illinois. She currently resides in Chicago with her husband, Nafis Muhammad and youngest son, Khalid. She has two older sons, Musalih and Ismael El-Amin; one step son, Nafis, II; two daughters, Saadiqa and Sabreena El-Amin; two daughters-in-law Rachel and Camille; three step daughters, Samaiya, Daimah and Kameela; three grandchildren, Lynnette Aneera, Sophia Lynne and Ameer.

Lynne Muhammad completed kindergarten through twelfth at the University of Islam of Chicago, graduating at the age of 14. In 1979, she earned a Bachelor of Science degree in Biological Science from the University of Illinois, Chicago. She earned a Master of Science Degree in Special Education from Chicago State University in 1996.

Lynne Muhammad has worked in the field of education for over 33 years. She began at the Clara Muhammad School in Chicago, Illinois teaching elementary and high school math and science classes. In 1988, she co-founded Muhammad's Developmental School, located in her home. She taught classes, developed the curriculum and conducted professional development classes until the school closed due to personal concerns. After earning Type 9 and 10 teaching certificates, she began working for the Chicago Public Schools, currently teaching honors biology at Whitney Young Magnet High School.

Lynne Muhammad has served as guest lecturer at numerous local universities; University of Illinois, Northwestern, East-West, and Chicago State Universities. She has serviced the Muslim Community of Chicago for over 40 years.

DISSERTATION COMMITTEE

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