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Bridging the Digital Divide Were any Divides Bridged

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DePaul University
College of Education

Bridging the Digital Divide Were any Divides Bridged

By

Andrew R. Gibbs

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for the Degree of
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Abstract

The K-12 schools offer professional development (PD) and technology resources for teachers every year that cost schools billions of dollars. The tools provided in the PD to teachers are typically quickly forgotten, and the schools administration moves forward with other pressing issues. What if we were to look at schools several years after a PD program was implemented and the technology resources were provided to teachers, would we see any effect? This study looks at three schools that participated in a PD program that had an influx of technology resources placed in the school in 2002. The data collected demonstrates that there was a lasting effect because of the intervention. The impact of the resources provided to the schools varies in its effectiveness, but certainly there is evidence that the resources and effort originally dedicated to the schools are still apparent.

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Chapter 1 Introduction

Overview of the Study

The question this dissertation is attempting to answer is whether there were any long lasting effect of the Bridging the Digital Divide Program (BDDP)? The study focused on re-examining inner-city Catholic schools to observe the effectiveness or ineffectiveness of the professional development intervention on the enhancement and use of technology equipment funded by the grant in the school environment, after a 13 year period. This study has examined the current status of technology in the schools and to what degree the teachers are integrating this technology in their academic teaching. The research has assisted in determining what the schools have been able to accomplish since the original technology infusion. In looking at what the current technology situation is at each research location, the research can bring to light how effective the original BDDP is for each location and conclusions can be determined on how effective the technology infusion has been overall. The research has been collected by observations of technology use in the school, interviewing principals and surveying the teachers at the school. Since the *No Child Left Behind Act (NCLB)* was enacted in 2001, the educational community has been using professional development to train faculty (Bredeson, 2002; Guskey, 2009; Wayne, 2008). The research is looking at two distinct and different points on the school's timeline. One is what happened in 2001 to 2003 with the BDDP versus what insights have been determined from the research gathered in 2016.

The original professional development intervention was conducted from fall 2001 to spring of 2003. The focus of the professional development was to enhance the technology within the school and the teacher's knowledge and understanding of how to use this technology in their

curriculum. One of the goals of the original professional development was to increase the students understanding and use of technology (Gibbs & Dosen, 2008).

Statement of the Research Problem

The evaluation of professional development is typically an afterthought. Thoughtful and relevant professional development programs need to be evaluated to be more effective. It is important to see what is working and what needs improvement to be successful with disseminating professional development (Guskey, 2002). In order to determine the impact of the professional development on the institution or location that participated in the professional development, evaluations must be conducted (Ellison, 2004; Guskey, 2002).

The research focus of this study looked into the questions of what is the current status of technology and technology integration in classrooms in targeted Illinois Catholic ICC schools since original BDDP intervention more than 13 years ago? Have these schools been able to maintain and/or increase the technology in their schools? Are the teachers of these schools incorporating technology use in classroom pedagogy?

Significance of the Study

The 2001 – 2003 BDDP intervention equipped the schools with the proper technology and understanding of how to use the technology in an educational environment. The BDDP two core goals were (1) to increase the access of technological resources to students and teachers, and (2) to provide professional development on the new hardware that had been infused into their schools (Gibbs & Dosen, 2008). The “study demonstrates the efficacy of providing a coordinated integration of technology and professional development (in-service teachers at each of the five participating school) into a school’s academic program” (Gibbs, 2008, p. 25). During the original three-year period, Gibbs and Dosen found a significant increase of teachers’

knowledge with technology for the teachers who participated in the professional development programs (2008). The BDDP did include an evaluation of the effectiveness of the teachers training and knowledge of the new technological tools. By the end of the second year, the BDDP grew to encompass 15 schools.

This study will examine further how successful or unsuccessful the project was, the impact of the training, the use of the money and the considerable time and effort spent conducting the professional development focusing on technology, on the above aforementioned questions 13 years after the conclusion of the project.

Professional development is the main intervention for enhancing teachers' content knowledge (Darling-Hammond, 2009; Ellison, 2004; Supovitz, 2000). The professional development also allows the teachers to stay current with the best practices for educating their students (Guskey, 2010; Lock, 2006; Taylor, 2005). If we are spending billions of dollars in professional development programs, is this money at all being utilized properly (Bredeson, 2002; Guskey, 2009; Wayne, 2008; Zepeda 2008)?

Most evaluations of professional development are administered as an addendum, if ever, after the professional development has been completed. The evaluations should also be conducted several years after the conclusion of the professional development to determine long-term effectiveness of professional development (Guskey, 2002). Evaluations are typically never conducted more than a few years after the implementation (Guskey, 2002).

Operational Definitions

The terms and definitions used in this study include professional development, pedagogy and technology. A definition of *professional development* is needed. Darling-Hammond (2009) defines, "The most useful professional development emphasizes active teaching, assessment,

observation, and reflection rather than abstract discussions. Professional development that focuses on student learning and helps teachers develop the pedagogical skills to teach specific kinds of content has strong positive effects on practice” (p. 47). Supovitz (2000) references the definition of “professional development based upon intensive and sustained training around concrete tasks that is focused on subject-matter knowledge, connected to specific standards for student performance, and embedded in a systemic context” (p.963). Guskey (2000) defines professional development “as those processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students. In some cases, it also involves learning how to redesign educational structures and cultures. Professional development is an extremely important endeavor and central to education's advancement as a profession. High-quality professional development is at the center of every modern proposal to enhance education. Regardless of how schools are formed or reformed, structured or restructured, the renewal of staff members' professional skills is considered fundamental to improvement” (p.16). Wells (2007) defines as going “beyond the term “training” with its implications of learning skills, and encompasses a definition that includes formal and informal means of helping teachers not only learn new skills, but also develop new insights into pedagogy and their own practice and explore new or advanced understandings of content and resources” (p. 3). Torff (2008) states that, professional development “refers to a program of activities designed to enhance the professional knowledge of groups of teachers” (p.124). Bredeson (2002) defines professional development “as learning opportunities that engage educators’ creative and reflective capacities in ways that strengthen their practice” (p.662). Schlager (2003) states that the objectives of professional development are to “develop, implement, and share practices, knowledge, and values that address the needs of all students”

(p.205). Zepeda (2008) shares that “the message is that professional development is an inclusive, highly collaborative adventure in which a variety of site-based and central office personnel provides the leadership, imagination, support, and mechanisms to help school personnel grow” (p.2). Each of these definitions of professional development focus around improving and supporting teacher’s pedagogy, knowledge and skills with becoming more efficient instructors. Even though they all blatantly do not say enhance student learning, each definition has an undertone focused on students’ learning and improvement.

Schlager (2003) continues by indicating that the stakeholders for professional development are the “peer networks, local administration, teacher educators, and outside experts” (p.205). Schlager (2003) notes that professional development is a continuing process that will take place during the entire career of the teacher. With this understanding of the overall theme and definition of professional development it is possible to begin analyzing the impacts of professional development (Greenleaf, 2011; Supovitz, 2000). The definition of professional development that will be used for this study is context specific, guided by the standards for the school, focus on the students learning and develop around the teacher's own work goals.

Watkins (1999) starts off with a basic definition of *pedagogy* as “the science of teaching” (p. 2). Watkins (1999) continues and expands the definition to “any conscious activity by one person designed to enhance learning in another.” (p. 3). Gergely (2006), “treat any knowledge transmission, as long as it is based on explicit manifestation of knowledge, as evidence for pedagogy” (p. 6). Zepeda discusses that “Teachers know about pedagogy, the teaching of children. Because of this orientation, it is common practice to train and offer professional development using pedagogical models and approaches such as "sit and get" workshops dealing

with the latest best practices” (p.142). The definition of pedagogy that will be used here is the transmission of knowledge from teacher to student.

Technology has a wide range of interpretations and definitions. This study will look at technology through the lens of education (Ely, 1999). “When one refers to the field and uses technology as a description of an instructional process, the reference is most likely interpreted as the equipment that delivers text, moving images, graphics and the like” (Ely, 1999, p.308). Ertmer, (1999) discusses how the definition of technology has evolved over the past years from “teaching programming, to utilizing drill and practice programs, to building computer literacy, to participating in electronic communities, teachers' technology use, in general, has changed very little. Because many pre- and in-service teachers have had little, if any, experience with integrated technology classrooms they typically have few images or models on which to build their own visions of an integrated classroom... That is, teachers whose visions are directed toward using technology to improve what they already do are likely to achieve a different level of integration than those whose visions include using technology to meet emerging needs and satisfy new goals” (p. 49). Earle (2002) uses as a definition of technology “is concerned with improving the effectiveness and efficiency of learning in educational contexts, regardless of the nature or substance of that learning.” (p. 6). Zepeda uses technology focused on professional development “To the extent appropriate, provide training for teachers and principals in the use of technology so that technology and technology applications are effectively used in the classroom to improve teaching and learning in the curricula and core academic subjects in which the teachers teach” (p. 25). The definition of technology for this study is equipment computers PCs or Macs, iPads, chrome books, projectors, smart boards, routers, wireless routers and other

technological equipment used in the school to engage and enhance students understanding of the content knowledge.

These definitions allow us to frame our understanding of what is technology and how has it been Incorporated into the classroom. The definitions above will assist in determining are teachers incorporating technology use in classroom pedagogy with the use of professional development. With these understandings of technology, professional development and pedagogy it is possible to move forward with answering the dissertation questions.

Chapter 2 Literature Review

It is in the public interest to have an understanding regarding the importance to have highly qualified, well-paid, enthusiastic in-service K-12 teachers. It is of paramount importance that we enable our children to learn as much as possible to allow for America's growth in the future (Borko, 2004). For this to occur, the American population needs a highly educated and qualified group of educators. These teachers will want to enhance and improve their teaching styles. Teachers often modify their curriculum practices in order to enhance student learning outcomes over time. This modification could be classified as changes or reforms to their pedagogy. Traditionally, the different methods of reform have followed a typical course. The three typical paths teachers pursue are university classes, engaging in professional development offered through the school or district and self-directed personal learning. The one learning path that has the most opportunity to impact teachers, is widely infused throughout the career of the teachers and can vary the most from session to session is professional development (Supovitz, 2000).

When investigating professional development, one should give consideration to the wide range of potential topics into which professional development delves into and how each of these topics differs from one and other. The topics could be as varied as the needs of each individual school or district. Professional development typically consist of topics that engage the teachers in improving their content knowledge for the subjects they teach, assist the teachers with their classroom goals to improve student learning and demonstrate how these topics and goals can be implemented into their classrooms (Ellison, 2004; Supovitz, 2000).

The style and type of professional development needs to be as rich and varied as the participants who will be attending the professional development. The framework of professional

development needs to take into consideration the range of audience members who will be attending the sessions. The audience may consist of the newly minted beginning teachers to the individuals who have seen it all, the veteran teachers (Bredeson, 2002).

The K-12 education environment uses professional development to modify and improve teachers' pedagogy and to continue teachers' awareness of the new best instructional practices for their classroom (Glazer, 2006; Guskey, 2010; Wells, 2007). NCLB law mandated professional development be used to create teachers that will "become highly qualified and successful classroom teachers" and "increase teacher qualifications" (Public Law 107-110 SEC. 1119). NCLB and the need to improve teachers' knowledge and skills for the classroom has created an industry of professional development that results in billions of dollars spent on teacher training. Professional development is an industry in its own right and needs to be closely monitored (Bredeson, 2002; Guskey, 2009; Lumpe, 2007; Wayne, 2008; Zepeda, 2008). The professional development needs to be evaluated on its success or failure to disseminate the proper information to reform teacher pedagogy (Bredeson, 2002; Ellison, 2004; Guskey, 2002).

Barriers and Obstacles Confronting Professional Development

There are several barriers that the educational community is confronted with constantly in attempting to provide professional development to create highly qualified teachers. Lock (2006) concisely shows five design issues that consistently obstruct the teacher's ability to improve and modify their practices after engagement in professional development. "(a) one-shot and one-size-fits all workshops; (b) use of the transmission model from experts to teachers; (c) failure to address school-specific differences; (d) just-in-case training; and (e) system-wide presentations that do not provide sufficient time to plan or to learn new strategies to meet the reality of their own classrooms" (Lock, 2006 p. 667). These types of professional development have been

organized around events or periodic activities that are not context specific and in ways that do not allow teachers to reflect on personal experiences (Lock, 2006; Lumpe, 2007; Wilson, 1999).

The current structure of how professional development is implemented and developed is terribly inadequate (Borko, 2004). The current professional development efforts for the teachers are not showing any substantial or measurable improvement in student learning (Borko, 2004; Greenleaf, 2011; Watson, 2006). Professional development training is viewed as fragmented, disjointed, and superficial, and does not take into consideration what is known about how teachers learn (Borko, 2004). Schlager (2003) says that professional development programs are disconnected from the teacher's perspective and is often times delivered in fragmented and incoherent segments of training. Professional development programs, at times, are lacking in key pedagogical connections to the content for the participants they serve. Few of the professional development programs have the ability to support their participants over the long term and the capability to address the different stages of the teachers' career (Bredeson, 2002; Schlager, 2003; Schmoker, 2004; Wilson, 1999; Woo, 2016). When the teachers are provided professional development that does not meet their own teaching and learning goals, they do not implement the resources provided and they do not trust the material that is being provided. Schlager (2003) discusses the internal obstacles. The most prevalent obstacle at the school is the unwillingness for peers to have a dialogue that critiques their own work.

School districts are finding that attempting to implement a wide range of initiatives every year is counterproductive. A school district in the suburban San Diego typically had up to 60 different initiatives every year. The superintendent determined to reduce the number of initiatives back to only two per year. With this limited number of initiatives this allowed the principals to focus professional development on these two initiatives. With the professional

development time focused on particular initiatives the outcome is that the goals of the initiatives were able to flourish in the schools (DuFour, 2003).

The creation of a collegial environment takes time and effort by teachers and the administration. To allow for a proper relationship between mentors and mentees, an environment of trust needs to be created. Encouraging dialogue and proving to all individuals that their individual skills and contributions are relevant for the school can create the environment. The development of this collegial atmosphere does not happen immediately. All the relevant stakeholders will need to be brought together to have an open conversation (Bredeson, 2002; Davis, 2009; Ellison, 2004; Glazer, 2006).

Developing Teachers

The time allowed for professional development in the United States is fragmented, disjointed and haphazard (Darling-Hammond, 2005). The professional development of teachers oftentimes take place after school, on the weekends, or in disjointed professional development days throughout the school year focusing on multiple topics and subjects - if at all (Darling-Hammond, 2005; Ellison, 2004 Torff, 2008). This can also be taken to an extreme when looking at one particular school district. In Chicago, Mayor Rahm Emanuel has proposed the possibility of eliminating professional development days for Chicago public schools in an attempt to lengthen the school year (Spielman, 2011).

DuFour (2004) found that successful professional development was the result of persistent sustained effort over substantial time rather than short-term groundbreaking professional development. The abrupt nature of professional development with teachers is opposite of the type of steadfast commitment needed to infuse change within the school's overall culture. It can take a substantial time for any change to take root within any workplace

environment, especially schools. The proposed change is very fragile and may experience regression until the professional development ideas can stand on their own. The bare minimum of time necessary to see professional development goals implemented and allow change within the schools is a minimum of 3 to 5 years. During this time it is important for the staff to seek incremental pedagogical changes on their practices (DuFour, R 2004; Supovitz, 2000).

The best location for professional development is not a workshop, but in the workplace. Professional development should not be focused only on four or five days each year for the teachers, it should be a continuous process in ongoing every day event. The teachers need to have the time in their workdays to allow them to develop curriculum, develop common assessments, analyze results from assessments and help each other. When the teachers can do this they are engaged in a professional development that can improve student learning and enhance their own knowledge (DuFour, 2004).

Wells (2007) suggests that the current structure of professional development, when focused on any one particular topic (i.e. instructional technology), has significant benefits for long-term systemic change for the teacher's teaching style. The difficulty is when individuals expect long term change from a single professional development session. The traditional single-session professional development focuses on teaching discrete skills and techniques to teachers (Supovitz, 2000).

Single-session professional development does not allow for enduring change of instructional practices. This professional development will take place generally outside of the typical environment to which the teachers will not have day to day access to and the ability to take their students to this facility. A result of this type of professional development in a non-classroom environment will hinder the teachers from modifying their teaching with the

equipment to which they have access (Wells, 2007). When the training can be onsite with the materials and resources to which the teachers have access, it will be effective for the participants (Guskey, 2009; Penuel, 2007; Wells, 2007). When the support is available for the teachers to learn the concepts demonstrated in the professional development, this will enable them to help successfully integrate technology into activities for the students (Wells, 2007). It is abundantly clear that site-based professional development that can be incorporated into the teacher's daily routines will have a greater impact (DuFour, 2003; DuFour, R 2004; Guskey, 2009).

When the professional development is effective it will allow a staff to acquire new skills and knowledge. It will help catapult the staff to think in new creative ways. Teachers need to understand that hearing about new ideas is not enough they should start incorporating these ideas and working to gather as a community to build on new professional development ideas. Working together with other teachers is a key aspect in assessing the new strategies and how they have been implemented to accomplish their goals (DuFour, 2004).

Facilitation and Results of Professional Development

Teachers need to have the opportunity to increase their knowledge as well as refine and improve their instructional pedagogy. Professional development is an opportunity to improve instruction (Borko, 2004). The lawmakers have determined that all students should have a "highly-qualified" teacher in the classroom. NCLB Act of 2001 specifies that teachers must be "highly-qualified" in the subject area in which they are instructing (Borko, 2004).

To accomplish this, NCLB specifies that teachers have the opportunity to participate in high-quality professional development that increases their understanding and knowledge in specific content areas. High quality professional development can directly impact teacher's pedagogy to create creative influential teaching methods to increase student's knowledge

(Bredeson, 2002). The difficulty is that lawmakers never defined what “high-quality” really means (Borko, 2004; Public Law 107-110 SEC. 1119). The inability of individuals to determine high-quality professional development allows for multiple forms of professional development. The side effect of lack of clear definition is that teachers are forced to participate in multiple forms of professional development that do not serve their needs (Bredeson, 2002; Borko, 2004).

Administrators implement forms of professional development that are not working. Professional development can no longer be a one-shot, quick fix on whatever problem is making the headlines in the newspapers (Hill, 2009; Penuel, 2007). The design and the implementation of professional development should be interactive and engaging with the teacher’s pedagogy. Teachers need time to understand, assimilate, reflect and build on the information received in the professional development (Penuel, 2007; Bredeson, 2002; Servage, 2008; Schmoker, 2004; Wilson, 1999; Ellison, 2004). It cannot be mandated or expected that the teachers will instantaneously incorporate the information demonstrated from the professional development into their current lesson plans in the next school day. The teachers need time to modify the information for their individual students’ needs (Glazer, 2006). The “quick” professional development is on the decline while the long-term professional development is implemented more frequently (Boyle, 2005; Glazer, 2006).

The quick fix professional development is no longer a working alternative to long-term professional development. Long-term professional development is being implemented in school districts across the nation. The long-term professional development is impacting a wider range of teachers and allowing them to improve their pedagogy. The teachers participating with sustained professional development are growing and developing their skills in specific content area (Supovitz, 2000; Boyle, 2005; Watson, 2006; Lock, 2006). Long-term professional

development has been found to modify as many as two to three pedagogical practices in teacher classroom activities (Boyle, 2005).

The extended length of time spent in a particular professional development program, the more resources and materials the teachers possess to modify their pedagogy (Boyle, 2005). In developing and designing future professional development, the teachers need extensive access to the professional development tools over a longer period of time. Our current implementation style of professional development needs to be altered to positively reflect these new ideas (Feist, 2003; Schmoker, 2004; Woo, 2016). The time devoted to professional development needs to be used thoughtfully to positively impact the implementation of the professional development concepts into the teacher's pedagogy (Guskey, 2009).

Childress (2006) looked at two regional school districts one in San Francisco and the other one in Montgomery County. These district superintendents determined that it is necessary to develop a cohesive district-wide teaching and learning plan. The outcomes from the observation showed that varying strategies can exist within districts as long as these strategies focus on "strengthening teaching and learning, have clear objectives, and establish accountability" (Childress 2006 p.58). The primary success depends on how consistent the implementation of the teaching and learning plan is in the district and the number of years allowed to implement these initiatives. The redefined culture, structure, resources and stakeholders all need to meet the challenge as a cohesive group. (Childress 2006).

Lock (2006) discusses how a constructivist orientation to the pedagogy of the teacher can enhance student learning. When the constructivist orientation is used for professional development it provides the ability for the participants to make sense of the content through conversations and discussions. When implementing a constructivist approach, the teacher's

learning is based on constructing meanings from other interpretations and experience of the world through their social interactions and lenses. Further, teachers have the ability to articulate their understanding and interpretations of difficult situations as well as examine these difficulties from multiple circumstances and perspectives (Lock, 2006). The ability of the teacher to have a constructivist perspective allows them the ability to be better learners and knowledgeable and diverse teachers (Ellison, 2004).

Professional Development Communities

Borko's (2004) research presents evidence that strong professional development communities are essential contributors to instructional improvement and school transformation. The benefits of these professional development communities are the programs that allow the "establishment and maintenance of communication norms and trust, as well as the collaborative interactions that occur when groups of teachers work together to examine and improve their practice" (Borko, 2004, p. 6). These teacher communities will have particular conversations that will allow teachers the ability to collectively explore ways of improving new ideas as well as support each other as they began to modify their teaching style (Borko, 2004; Berkvens, 2012).

The professional development facilitators need to foster discussions that can assist teachers in establishing trust, expand communication norms that enable critical conversation, and preserve a balance between respecting individual community members and significantly analyzing issues in their pedagogy. To properly facilitate the professional development concepts into the schools there are still several other stakeholders that need to be consulted with since they are an integral part of the school community. The school administration, teachers, parents and the community at large need to assist in the facilitation of creating a tolerant community that

allows the teachers to consider and implement new concepts and modify their teaching practices (Borko, 2004; Bredeson, 2002; Schmoker, 2004).

Glazer (2006) discusses a strategy of creating a collegial atmosphere of constructing mentors that can assist in the sustainability of new techniques that have been learned in professional development. Teachers are retiring and changing career paths. If one key teacher leaves the school, an important educational resource may be lost to the school. If this key teacher has an apprentice who is a peer-teacher when the key teacher leaves there is someone to step in and continue. The communication skills between these two teachers will allow for the increase possibility of a sustained change within the institution (Greenberg, 2004). The peer-teachers have the responsibilities and the opportunity to transform from peripheral to central participants in their interaction with their peers to offer them contributions to the educational community (Glazer, 2006).

Developing a system of peer-teachers is a possible solution to the silo effect. The silo effect restricts the flow of communications between individuals (Taubitz, 2010). The silo effect is detrimental in schools because it hinders a dialogue of ideas between teachers and learners. Peer teacher interaction also can be understood in the role of mentor teachers. When the new teachers are brought into the educational community a senior individual can be assigned as a resource for the new teachers. The interaction between the new teachers and veteran teachers can develop a reciprocal interaction. The interaction between teachers can allow for the veteran teachers to pass on experiences and strategies that will familiarize the new teachers with the schools principles and goals (Glazer, 2006; DuFour, 2004; Bredeson, 2002).

Another technique that has been found to be beneficial in conveying knowledge is coaching. The exemplary teachers use coaching as an instructional practice versus average to low

teachers that use telling (Taylor, 2005; Penuel, 2007). The coaching allows individuals to interact on a common level during the professional development. The discussions and interactions that take place during professional development are better received by the professional development participants (Taylor, 2005; Wilson, 1999; Zepeda, 2008).

Collaboration

The factors that have been identified by Lumpe, (2007) that impact professional development: “effective feedback, cooperation, collegiality, practice-oriented staff development, a culture of shared beliefs, and relationships” (Lumpe, 2007, p.130). These important factors need to be incorporated into the overall culture of the school. If these can be infused into the school culture, then the professional development will have the impact of these aforementioned factors. Professional development needs to be framed in a collaborative structure. With professional development being focused around a collaborative atmosphere, individuals can get a sense of collective efficacy, thereby creating a positive working environment (Lumpe, 2007; Bredeson, 2002; Schmoker, 2004; Berkvens, 2012; Greenleaf, 2011).

If professional development is to be substantial and able to transform teachers’ long-term pedagogy, it must have the ability to “explore, articulate, negotiate, and revise teachers’ beliefs about themselves, their students, their colleagues, and their schools” (Servage, 2008 p.66). The unfortunate nature of professional development that focuses on collaboration is the short term memory of the administration and its need to see immediate reform in students test scores. It is a messy process to implement a proper collaborative atmosphere and then to change a teacher’s pedagogy. Teachers can find themselves stuck in a continuous pattern that cannot be broken with an inability to reform their pedagogy (Schmoker, 2004).

DuFour (2004) has recognized teachers collaborating and working as a team can best assist and teach the students who are not only failing but the students who are also succeeding and surpassing expectations. This collaborative team effort allows for an individual focused teaching that better impacts all students. When the teachers have the time to discuss and reflect on their instructional methods amongst fellow teachers they can see what is working for different segments of their own classroom. It is important that teachers have adequate sensitive data that allow them to immediately see the impact or the lack of impact they are having with the students education (Servage, 2008; DuFour, 2004; Schmoker, 2004; Ellison, 2004; Berkvens, 2012).

Technology Integration into Professional Development

O'Bannon (2004) gave a list of reasons why technology is not being used in the classroom “including limited or outdated access to hardware and software, inadequate skills, minimal support, time constraints, and lack of interest or knowledge” (p. 208). O'Bannon shows that in 1999, 79% of teachers do not feel prepared to incorporate technology into their classrooms. Of all the teachers surveyed only 20% in 1999 felt prepared to incorporate technology into the classroom. The U.S. Department of Education funded the Preparing Tomorrow's Teachers to Use Technology in response to the percentage of the teachers who are not prepared to incorporate technology into the classroom. The project focused on 10 objectives that need to be met in every phase of teacher preparation in order to implement technology. These factors are “shared vision, access, skilled educators, professional development, technical assistance, content standards and curriculum resources, student- centered teaching, assessment, community support, and support policies” (p. 209). The study took place in Tennessee with five K- 8 public schools. The five public schools have both rural and urban schools in the sample.

The schools' population was approximately 1900 predominantly white students, and 60% of the students qualified for free or reduced lunch (O'Bannon, 2004).

The study conducted by O'Bannon (2004) found that teachers needed more than just one session at professional development when related to technology. The study goes on to say how professional development training should be spread out over time. The teachers need to have the ability to incorporate the use of technology into typical real-world daily activities for the classroom. The teachers should feel comfortable incorporating the technology. O'Bannon (2004) continues that professional development becomes the first stage, in a 10 objective program of successful implementation of technology in a classroom setting (O'Bannon 2004; Schmoker, 2004).

Li & Irby state there are currently a substantial amount of computers in schools today. Nationwide, most schools have computers for students to use for their coursework. The student to computer ratio for the nation shows “after years of sharp declines, that ratio leveled off around 2002, and stood at 3.8 students per computer in 2006, down from 6.3 in 1998, according to data from Market Data Retrieval. The ratio of students to computers with a high-speed Internet connection was 3.7, a slight improvement over the previous year” (Li & Irby, 2008, p.13).

Definitions of access now also account for whether the computers exist at the classroom level (the location of the computers in the school—classrooms vs. computer lab), whether the computers have an Internet connection, information technology (IT) capabilities such as speed and bandwidth, the types of software available, the existence of safety precautions such as extensive firewalls and blocking software, and the ratio of students to computers (Dolan, 2016, p. 21).

The earlier research has shown teachers can be more successful when they incorporate technology into their classroom activities. Technology is “more adaptable to circumstances, more amenable to change, and one that is available to all, regardless of age, gender, economic or social condition, or geographic location” (Apple and Bromley, 1998, p. 199). Becker (1999)

found that teacher use of technology was related to different issues and one of these issues was whether teachers participated in professional development around issues of technology.

Hoffman (2000) outlines a model of professional development focused on technology. The model has two key aspects of its implementation, one is the facilitator and the second is the online portion of this professional development. The facilitator is a local individual who has gone through intense training. The facilitator will train the teachers for 7 to 10 professional development sessions. The sessions will last from one to two hours and they are broken up over a period of several months. The second portion of the professional development is the online section. The online section has materials for the teachers to use and refer to in between the facilitated professional development. These resources incorporated the state standards in lesson plan examples. The individual school districts were able to choose what materials were in the professional development. This allowed the teachers to focus on the material that was most relevant for them in their school environment.

Baylor (2002) focuses on the study from the President's Committee of Advisors on Science and Technology (PCAST) and says that teachers currently are not adequately supported with any technical training, pedagogical, or administrative support. The PCAST looks at how morale affects the incorporation of technology. When teachers are provided with knowledge and skills base through professional development this will lead to high morale. The PCAST found that teachers are not being provided quality professional development in the areas of technology and pedagogy and this is leading to low morale (Baylor, 2002).

Institutional Behavior

One goal of professional development programs is to modify institutional behavior to allow the new teacher learning to become pervasive in the institution's pedagogy for a long-term

systemic change. To accomplish this reform there are barriers that need to be acknowledged and confronted. The barriers come in multiple different forms. The barriers range from altering the school's pedagogy, having the proper resources and equipment as well as convincing the stakeholders to alter the instructional practice. The stakeholders range from other teachers, parents, administrators and community individuals. A major obstacle is in convincing the stakeholders to modify how a task has always been accomplished. Each of these individual barriers needs to be confronted and overcome to allow for an institutional behavioral change (Bredeson, 2002; Cobb, 2003; Ellison & Constance, 2004; Pincus, 1974; Putnam, 2000; Schmoker, 2004; Windschitl, 2002).

When confronting the above issues, other problems that come to light. These problems can be viewed as subcategories that are based in each of the above mentioned barriers. Examples of the subcategories include: how is the reform going to be measured, are the stakeholders going to be able to communicate the difficulties and barriers to each other, is there going to be a consensus with the vision of the institutional behavior and are the reforms going to be topic specific (Putnam, 2000; Cobb, 2003; Wayne, 2008; Windschitl, 2002).

Another problem is that those in authority demand to see substantial improvement immediately when resources are given to the schools (Pincus, 1974, Schmoker, 2004). The individuals in power will continue to modify the institution's pedagogy on a regular basis no matter if they receive negative or positive results from the reform. The schools will continue to cycle through professional development and throw out everything, not allowing any beneficial concepts to be implemented in the classroom. It will not matter if one part of the training is working, they will modify everything no matter what the consequences will be for the students (Pincus, 1974).

The modification of instructional practices can be measured in multiple ways. Modification of instructional practices could be measured with: Did the teachers report a modification in their instructional practices from the professional development content (Wayne 2008)? Were the teachers able to continually modify their instructional practice over long term or did they try once and never go back to the new teaching method again. The most important measure should be the success of the students in the classroom. Is this success ever measured or are we constantly failing students? A disadvantage the school environment faces in measuring the success or failure of a modification is that the modification may never be accurately measured because of lack of proper communication between the stakeholders (Wayne 2008; Cobb 2003).

There are typically disconnects in the communication from one stakeholder group to the other stakeholder groups. In attempting to rectify the communication problem Cobb (2003) has identified specific individuals he refers to as “brokers.” The brokers are there to facilitate and enable the different groups to communicate and move in a positive direction into implementation of new pedagogy to reform the institute's behavior. The brokers are individuals who come from one stakeholder group and are allowed to connect with one of the other stakeholder groups. An example of a broker is a teacher that begins joining the administration in a small number of their meetings. This teacher, or broker, begins the open and free flow of communication between the two stakeholder groups. If there are no individuals that can be defined as a broker, this will be apparent in a lack of communication between the different stakeholders (Cobb, 2003).

After the general communication has been improved with the different stakeholders, a vision of institutional behavior needs consensus. There can be no disparity of vision “that exists separately from beliefs about learners, beliefs about what characterizes meaningful learning, and

beliefs about the role of the teacher within the vision” (Windschitl, 2002 p.203). The vision should be clearly articulated to all interested stakeholders in a conversation. The public conversation needs to start in an open atmosphere if the modification of the institute's behavior is to occur (Windschitl, 2002; Bredeson, 2002). The importance of having the school stakeholders convinced and aligned with a similar vision, on protection of this professional development time and higher levels of learning for the teachers and students if professional development is implemented properly, cannot be overstated (DuFour, 2002; DuFour, 2004; Guskey, 2009).

The conversation in modifying the institution’s behavior needs to begin with a specific topic, for example technology. This conversation does not need to revolve around one single aspect of this modification. It needs to begin by looking at everything and not excluding anything. The stakeholders need to clearly understand how the technology will help facilitate the increase learning of everyone within the school and the educational benefits that go with understanding how to use the technology in the school (Windschitl, 2002).

Our current institutions are doing only enough modification of their practices to demonstrate that they have attempted to incorporate these new ideas in their pedagogy. They are unwilling to put forth the money and effort to completely integrate these new reforms in their institutions (Guskey, 2002; Pincus, 1974). Therefore, they are unable to make any substantial growth reforming and improving student learning. They will only adopt the changes that require the minimum amount of reform in their instructional behavior. The school districts do not see the benefit of this type of reform for the teachers’ teaching style (Pincus, 1974). The districts see the reforms as trends, something that will not be here in five to ten years.

The above challenges can appear to be too overwhelming when confronted all at one time. The solution is break things up into manageable problems. Instead of confronting

everything at once begin by altering several portions gradually. It is feasible to begin by altering the institution's behavior with the modification of the communication skills between the different stakeholder groups to encourage reform and improve the decision process (Cobb, 2003). The communication skills will be an essential piece to allow the reform to move forward in assisting institutions in improving their teaching styles and methods (Greenberg, 2004).

The institutional reform will not take place solely in meetings and professional development sessions. This institutional reform will need to be expressed and implemented in different ways to allow the teachers to understand it and make it their own. The teachers will have a host of informal ways in which teachers learn the new reform (Windschitl, 2002). These teachers will need to be properly supported throughout the entire process with the reform (Davis, 2009; Wilson, 1999).

Professional development is still seen as a critical component to implementing new important efforts in reforming education. Policymakers see professional development as a effective tool for the current educational staff to reform their individual pedagogical practices. When professional development is focused on activities, these programs are not as effective as when the professional development is focused on explicit learning outcomes. Professional development that uses the participants' reflective capacities and engages their creative learning has been found to be more helpful and used in the teacher's pedagogy (Bredeson, 2002; Supovitz, 2000).

Evaluating Professional Development

Guskey (2000) outlines five areas of measurement/observation to see whether or not the professional development is successful. The five measurement/observation are "(1) participant reaction; (2) participant learning; (3) organizational support/change; (4) participant use of new

knowledge and skills; and (5) student learning outcomes” (p.48). During the evaluation, if you are able to see any movement within all of these five key areas, then, the professional development has been successful in its implementation and change of teacher’s pedagogy (Guskey, 2000).

The initial survey teachers fill out about the professional development can give a very general overview of the professional development and whether or not they are happy with attending this professional development. This evaluation is not measuring how effective the professional development was in improving teachers’ pedagogy (Guskey, 2002). When the evaluation is completed properly, it can be used to influence the policy, academic, and practice of all aspects of the educational communities. The educators can use this initial survey to inform the continuing professional development process (Bredeson, 2001; Supovitz, 2000).

Elmore (2006) has seen a trend between wealthy school districts and poor school districts with a considerable difference in how students are challenged in the classrooms. Lower socioeconomic status students’ education consists primarily of factual recall and procedural knowledge. There is no reflection, analysis or understanding of the materials. The teachers are only demonstrating material that is "easy to teach". These teachers are not challenging their students. (Elmore 2006; Supovitz, 2000).

Elmore (2006) suggests that we focus on high poverty schools that are making improvements with their students’ knowledge. These high poverty schools are reviewing their practices and focusing on individual children and how they learn. It will be beneficial and interesting to review these low performing schools and see how they are making improvements compared to wealthier schools. The discrepancies in the schools should inform how we develop

professional development goals, content, practices. The review should start with focusing on low income high-performing schools (Elmore, 2006).

Conclusion

The negative aspects of professional development affect all classroom teachers. Professional development is a continual process that occurs throughout the entire career of the teacher (Schlager, 2003). Current practice in professional development is fragmented, lacking in key pedagogical connections and incapable of supporting participants throughout their career (Schlager, 2003; Wilson, 1999). Professional development is presented as one-size-fits-all. This type of professional development does not take into consideration any differences among communities and schools (Lock, 2006).

Teachers need a solid pedagogical knowledge of incorporating materials into the classroom activities that the teachers are not receiving from the professional development (Ertmer, 1999). Current professional development does not allow for long-term systemic change in the teaching style of the participants. The traditional single-session professional development does not allow for enduring change in instructional practices for teachers (Lock, 2006; Supovitz, 2000; Wells, 2007).

The morale of the teachers can affect whether they are successful in implementing professional development concepts and technology into the classroom (Baylor, 2002). If a teacher's morale can be sustained over several months the material has a better opportunity to be infused into the teacher's curriculum. Teachers will need five to six years of high quality professional development as well as the support and collaboration of fellow teachers and the administration to properly integrate new pedagogical concepts into the classroom (Baylor, 2002; Lock, 2006; Supovitz, 2000). The professional development will ideally affect the institutional

behavior on pedagogy over the five years of its implementation (DuFour, 2004). However, it will need to be evaluated to see what long lasting, positive effects it may have on the school (Guskey, 2002).

There are positive ways of creating environments that allow individuals to trust each other. These can begin with professional development. The professional development will typically take place over several years. When we start to create opportunities for teachers to grow we are investing in them. “Investing in education means investing in the continuing professional development of teachers” (Day, 2000, p.109).

Past professional development practice has been shown to be ineffective in changing teachers’ pedagogy. If a pedagogical reform is supposed to take place in the professional development program this then means the design of the professional development can no longer be a one-shot deal. The teachers need the support and benefit of multiple professional development programs to implement any new pedagogy for the classroom (Guskey, 2009; Hill, 2009; Lock, 2006; Penuel, 2007; Supovitz, 2000; Wilson, 1999; Zepeda 2008;).

These shortcomings of professional development are the prime reasons why administrators and principals do not see the need or benefit in having their teachers go through these programs. The reason for developing, creating and having teachers go through professional development programs is to improve their teaching. The educational community has devoted time, effort, and millions of dollars in professional development that may not be at all benefiting students. These programs are continuing to move forward without any quantitative or qualitative justification of improving students learning (Guskey, 2009).

Chapter 3 Methodology

Overview

This chapter discusses the methodology used in the study: the sample selection process, demographic information, instrument considerations, procedure, statistical analysis and conclusion. The study looked at three schools to determine long lasting effect on these schools of a previous technology infusion intervention. The study focused on re-examining these inner-city Catholic schools to observe the effectiveness or ineffectiveness of the professional development intervention on the enhancement and use of technology equipment funded by the grant in the school environment after a 13-year period. This study has examined the current status of technology in the schools and to what degree the teachers are integrating this technology in their academic teaching. The research has assisted in determining what the schools have been able to accomplish since the original technology infusion. Observations of technology in the school, interviewing principals and surveying the teachers at the school are intended to strengthen the data.

Schools are making a monetary and time commitment to professional development. These schools do not always see an immediate impact of this professional development (Schmoker, 2004, Guskey, 2002).

Sample & Selection Process

The initial sample included schools that participated in the BDDP during the academic school years of 2001 to 2003. Each of these schools received a letter inviting them to participate in this study. The letter was addressed to the principal or the administrator of the school. Each school received a follow-up phone call asking the principal to participate in the research. Three schools agreed to participate in the research and allowed researcher access to the teachers at the

school. The schools will be referred to as High School A (HSA), High School B (HSB) and Elementary School (ES). The teachers were sent an online survey for them to complete. The principal or the administrator participated in an individual interview. The schools underwent a school wide observation.

12 out of 48 possible teachers completed the survey. The teachers received an email with a link to a survey on survey monkey. This survey was active for a little longer than one month. The survey contained 56 questions. The questions can be located in appendix B. The survey questions were gathered from the original BDDP questionnaires. The survey location was designed to allow the participants the ease of completing the survey on their own time schedule and in the location of their choosing. The teachers are employed at the individual school locations.

All three sites' principals or administrators were interviewed. They were asked to participate in an interview. The interview was in a location of the principal's choosing to ensure a minimization of the adverse impact this may have on the principal's busy schedule. The interview length was limited to one hour. The interview consisted of asking questions of the principal to relate their observation of their staff incorporating technology into the classroom. These questions are located in appendix C.

The primary researcher conducted the observations that occurred at the schools. This research method consisted of the researcher walking around the school to observe any and all technology integration into the classroom activities. The researcher took notes describing the technology integration of all relevant individuals. The observation consisted of looking into the classroom windows so as to not disturb the instructional time for the students and to minimize

the interference an outside individual may have on student learning. The observation required the researcher to be on-site for 60 minutes to 90 minutes at each school location.

Demographic Information

The participants all came from parochial schools located in a major metropolitan city within the United States. The participants are teachers and administrators that work in the three different school locations. The three schools all are found within ethnically similar locations.

Table1

School Statistics

	Enrollment	Free and Reduced Lunch	Hispanic	African Amancan	Bi-Reactio	Caucasian
HSA	565	80%	100%			
HSB	103	85%	40%	40%		20%
ES	333	70%	83%	5%	11%	2%

Content collected from www.greatschools.org and personal correspondents with Archdiocese of Chicago Catholic Schools. The statistics are from the academic year of 2015-2016

The distance between the three schools was approximately 22 miles. The teachers and administrators have varying backgrounds in education, social and economic status, as well as work experience. Teachers and administrators at all there schools met the minimum standards described on the Illinois State Board of Education website <http://isbe.net/> . The teachers in the schools ranged from new teachers with three years of experience to seasoned veterans.

Instrument Considerations

The instruments consisted of a survey given to the teachers, interview of the principal or administrator and an observation of the different school locations. The survey consists of questions that were previously given and distributed to the participants of the BDDP. The questions can be located in Appendix B. The baseline questions are the exact same as the

original study conducted during 2001 to 2003 school years. The survey had an additional question that assisted with the identification of how technology was utilized in the classroom. The interview questions focused on the principal's observations of their teacher's use and incorporation of technology into the teacher's classrooms. These interview questions can be located in Appendix C. Each question the principals were asked was designed to convey a story. The questions parallel the survey questions that the teachers are receiving. The interview is used as a confirming factor for the results of the survey. The observation document consists of questions and measurable statements that the original BDDP looked at during the visits at the school locations. The observation document can be located in Appendix D. This is a further validation of the principal's interview and the teachers' survey results.

Procedure/Steps in the Data Collection Process

The schools received a form letter asking them to participate in the research project. All schools that agreed to participate in the research project allowed access to the teachers at the school. The school administrator sent an email to their teachers. This email contained a link to the online survey for the teachers to complete. The principal or the administrator were asked to participate in an individual interview. The interview took place at each of their school locations. The schools underwent a school wide observation conducted by the researcher.

A total of 12 teachers participated in the survey process. That corresponded to a survey return rate of 25% from all 3 schools. The teachers received an email with a link to a survey on survey monkey. The survey was intended to only be active for one month but due to scheduling conflicts with one school, the survey remained open for two months. The survey time and location is designed to allow the participants the ease of completing the survey on their own time schedule and in the location of their choosing. The survey monkey platform was an attempt to

increase the completion rate for the survey. The survey questions allowed the researcher to gain an understanding on the perception of the teachers' own use of technology in their classroom and the school. The teachers received one other email asking them again to fill out the online survey. The second email was a reminder and not an attempt to force anyone to participate in the research. The online survey was an opportunity for the teachers to depict their perception on how effectively or ineffectively technology is being incorporated into the classrooms. The teachers also have an opportunity to convey their knowledge or lack of knowledge of the BDDP.

The principals or administrators were asked to participate in an interview. The interview was in a location of the principal's choosing to minimize the adverse impact this may have on the principal's busy schedule. Each principal or administrator had the interview take place in their office. The interview did not exceed the imposed time limit of one hour. The interview consisted of questions of how the principal observed their staff incorporating technology into the classroom and their perception of the quality of technology in their school. The interview with the principal was a cross check of the survey answers completed by the teachers working at the school location. The interview was also an opportunity to ask more probing questions about the observation at the principal's school. The interview assisted in validating the survey results. This qualitative data obtained from the interview with the principal who had an in depth knowledge of the teacher's pedagogy was invaluable to fill in any possible gaps with the survey information. The interview was taped and transcribed after the interview.

The school observation was conducted by the primary researcher. This research method consisted of the researcher walking around the school to observe any and all technology integration into the classroom activities. The researcher took notes describing the technology integration of all relevant individuals utilizing technology. The observation consisted of looking

into the classroom windows. The reason for observing from the classroom windows was in an effort to not disturb the instructional time for the students and to minimize any possible interference the researcher may have had on student learning. This observation was a tertiary check on the validity of the principal interviews and to confirm that the teacher surveys reflect accurate and correct information contained within them.

Chapter 4

Analysis of Results and Research Findings

The research allowed for a determination of the schools' accomplishments since the original technology infusion of the BDDP. In order to better understand this context, it is important to briefly recap what the BDDP professional development provided each of the three schools and the technology resources available to the schools after the intervention. On-site at HSA, the resources the staff had at the end of the BDDP 2003 two year intervention were 4 Servers, one faculty room computer, 1 Cisco Router and 3 Switches, five network labs with a total of 50 computers and one computer in each classroom. On-site at HSB, the staff had 3 Servers, 6 Cisco Routers and Switches, 1 lab in the library with 10 PCs and 1 LCD Projector. The BDDP also provided Internet cabling throughout the school at HSB. On-site at ES, the staff was left with 16 Macs, 1 Sonic Wall and the BDDP also provided Internet cabling throughout the school. Each school location was provided approximately the same amount of monetary funds for equipment. The schools were all provided a similar opportunity to participate in professional development focused around technology. Each school availed themselves of these different opportunities to slightly different degrees. The approximate time that each teacher spent in professional development was on average 50 hours over the course of two years with the BDDP.

The following chart shows the technology available at each school after the conclusion of the BDDP in 2003.

Table2*Equipment Infrastructure within the School 2003*

	HSA	HSB	ES
Servers	4	3	0
Cisco Routers	1	6	0
Cisco Switches	3	6	0
Sonic Wall	0	0	1
LCD Projector	0	1	0
Computers for Student Use	111	55	16
Internet Cabling	School had been Previously Cabled for Internet	10 Wireless Access Points in Hallways	In Every Room

The following chart is a summary of all of the equipment observed in the school or discussed with the participants during the collection of data in 2015.

Table3*Equipment Infrastructure within the School 2015*

	HSA	HSB	ES
LCD Projectors	22 Promethean Boards	5	8
Computers for Student Use	134	75	114
Internet Connectivity	Wi-Fi Point for Students and a Wired Docking Station for Teachers in Each Classroom	7 Wi-Fi Working Points and 4 Wi-Fi Not Working for Entire School, Original Infrastructure from BDDP	Newly Upgraded Bandwidth for Entire School, Original Infrastructure from BDDP

Data Analysis

The research looked at each school location and examined their current technology situation. The efficient way to discuss the results is to examine each data collection method individually. The research will be subdivided for each school location. The order of the three sections follows the order in how the research was gathered with observations, interview and surveys. Each segment of the research needs to be addressed individually prior to combining the results of the research findings. Addressing the analysis of the results individually has assisted in describing each school and their particular situation.

Analysis of the Observations

The observations were an opportunity to observe what type of technology was located in each school. The observations were a very general overview of what types of technology the schools had. A baseline of information was yielded for each school location. The observation in each school location was the first research collected.

The observations started with ES location. The observation took place in the morning for an hour and a half. The time on site allowed the researcher to observe multiple classes during the school morning. There were 12 classrooms with students. Each classroom contained a computer for the teachers to utilize. There were eight carts with LCD projectors in the computer lab. The computer lab consisted of 30 workstations with Mac computers at each workstation. The school had two laptop carts, each cart held 25 laptops that were available for teachers to utilize in their classroom.

Observations left the researcher with the belief that the technology has been purchased in intervals. Examples of this were 20 Mac computers all with a similar model year and type

comparatively to 10 Macs with a different model year and type. These were the computers that made up the entire computer lab equipment.

The most notable technology was in a classroom with a work station with three iPads connected to headphones for students to use in classroom activities. The second interesting observation was a quick response (QR) code activity. There were QR codes located throughout the second floor and computer lab. These QR codes were attached to a wide range of different resources from equipment to signs on doors and walls.

During the observation at the ES location the researcher identified two separate situations that teachers were utilizing the technology. The first was a class that was visiting the computer lab during their scheduled lab time. The second was a teacher projecting the laptop screen through a LCD projector during a lecture. The rest of the observations yielded teachers instructing students through the standard chalkboard and chalk.

The second observation took place at HSA. During the observation, an administrator accompanied the researcher. This accompaniment allowed for a greater verbal description of types of technology. The duration of the observation was for approximately one hour.

Each classroom had a Promethean board for the teachers to utilize during their instructional time. Each teacher had a laptop or computer to be utilized in the classroom for instructional purposes. During the observation there were five teachers using the Promethean boards for instructional purposes and engaging students. One classroom, in particular, had students answering questions and identifying information utilizing the Promethean boards.

The school had multiple computer labs. The facilities were broken up into two classroom labs and with an additional lab in the library. The library has 19 computers. The larger of the two computer labs has 30 computers, and the second lab has 10 computers. There also are three

laptop carts with 25 Microsoft surface pros available for teachers to utilize. The researcher observed a small group of students utilizing the smaller computer lab. These students were participating in classes offered through Jesuit Virtual Learning Academy.

As described by the administrator the Jesuit Virtual Learning Academy is an opportunity for the students to participate in specialty learning. The Academy offers a wide range of advanced placement courses, foreign language, sciences, technology, mathematics and English courses. During the observation it appeared as though all of the students were engrossed in their learning in the smaller computer lab with the content from Jesuit Virtual Learning Academy.

HSA offered multiple atypical technological resources for the students to interact and engage with in their learning. Students have access to online radio station equipment to a \$700 camera. According to the administrator's verbal overview, the technology resources are available to be used alongside the educational content. The school has an additional resource to assist in afterschool activities. The students are allowed to check in electronically for study halls and afterschool clubs. The students are able to utilize other resources in the school without direct supervision due to this check-in ability. Staff is still aware of where students are and what they are doing but one staff member can manage multiple students.

The HSA had a technology room that had a wide range of servers, routers and switches. The room appeared to be the backbone of the technology for the school. The room had two staff members working on the equipment. These two staff members comprised the entire IT department responsible for making sure all technology in the school was functional.

The third observation took place at HSB. The observation took place in the morning for an hour and a half. The time on site allowed the researcher to observe multiple classes. The time

during the observation afforded the researcher to see if teachers would use technology during two different class sessions.

HSB had computers for each teacher in the classroom. They were limited on the number of LCD projectors to only 5 for the school. This five equated to half of the teachers. During the observation no teachers used the LCD projectors in their classrooms.

The school did have Mac laptops that can be utilized in the classrooms and one teacher was observed using these during their instructional time. A second teacher for one class session took his students to the computer lab. The students in the computer lab appeared as so they were typing up a paper or creating a presentation for the course assignment.

HSB art department appeared to have two relatively new Mac computers that could be used for students to complete art assignments. HSB was contained on three floors. The school appeared as though they were using wireless routers for their Internet connection. The first floor appeared to have two working routers and one not working. On the second floor there were two working routers and three disconnected routers. On the third floor all three routers appeared to be working.

When walking through the library, it was noted there were three computers disconnected and off to the side. Upon closer observation it appeared as though there were several wires missing indicating it would be impossible to properly connect all of the components of the computer together.

Analysis of the Interviews

The interviews were conducted with two principals and one administrator. These interviews all took place on school grounds in the referenced interviewee's office. The interviews all took place after the school observations.

The interview that took place with the principal of ES focused initially about what has happened since the original BDDP. According to the principal, prior to the original BDDP the school did not have any technology infrastructure. The school was “going from having virtually no infrastructure nothing in place” with computer equipment. The school viewed this as its baseline and the administration saw a need for technology assistance. The “emphasis for this principal” was the PD and integration of equipment as a “kick starter for the technology overhaul” in the school.

The ES principal reported that today, the integration of technology is “virtually in all classrooms” and some classrooms do more technology integration than others “for example, we have a one-to-one iPad program now for fifth and sixth grade.” At the end of the science fair all the junior high students use the iPads to create thank you videos for the judges with what they had learned. The incorporation of technology continues “in the early childhood classrooms, on this first floor all” of the “kids have a designated center using iPads”. The iPads are a “daily part of their center’s rotations”.

The ES interview yielded more descriptive narrative about today’s integration of technology for the school. For example, the junior high incorporates technology when they take a research field trip to a park. All resources, such as documents, maps, diagrams and a camera, are incorporated into the iPad that the students use on the trip. The students will use the iPad to gather all of the data during the field trip. Examples of types of data that they will collect are the diameter and height of a tree along with other pertinent information. After the field trip, students take two or three days in the classroom writing up their results and methodology. After compiling all the information the students will put together an iMovie to present to the entire school about what their findings were during the research field trip.

According to the principal, the ES has “no set plan on renewing technology we do not come across a situation or schedule and say five years is up and now we need to purchase new technology”. The school will lease computers over a three-year term. Typically they have the option to purchase the computers at the end and for the last several years they have chosen to purchase the computers.

The technology budget for the school is determined year to year with no set amount and the technology teacher guides the principal in what needs to be replaced or purchased to meet the adequate needs of the school. The principal cannot remember a situation where the technology teacher requested any resources that he was unable to grant. On average the school spends approximately \$10,000 on their technology needs in purchasing or replacing of equipment. This does not include their Internet access as this is a separate item and other funds pay for this Internet access.

The principal further explained that the Internet access was not adequate at one point for all of the equipment on the school grounds. The school had continuously upgraded and added more equipment but never increased the bandwidth for their Internet access. This eventually reached a tipping point when they were unable to accommodate all of the equipment adequately. They then increased the school’s bandwidth. The infrastructure that was recently increased dated back all the way to the original BDDP. After the increase of the bandwidth was completed the devices ran more effectively. Typically infrastructure projects do not always receive the same attention or focus compared to purchasing new iPads for the students. The principal gave this as a reason why they had not updated the bandwidth earlier.

Discussing professional development, the principal explained that the current professional development model at the school has teachers self-determining what they need to

learn to increase their own pedagogy. The principal has not had any circumstances where he declined a professional development opportunity brought forth by the teachers. After participating in the professional development the faculty report back what they have learned during their professional development time to the entire faculty. The professional development has not been implemented with a school wide theme. “There has not been all staff professional development for several years focused on one topic... There is not a plan in place that mandates all teachers. For example, the second or third-grade teachers do not need to participate in particular professional development.” The school implements a professional development focus around a general theme. These themes change each quarter for the professional development. An example of one quarter’s theme was “internal observations”. The justification for not focusing professional development school wide was the possibility for a high turnover rate with the staff. The principal stated “if there are 20 people attending this particular class that maybe 12 of these teachers will not be here five years from now”. An extreme example of the drastic school turnover rate was in 2001 to 2002 when 70% of the staff parted ways with the school. The principal does not see a benefit of mandating schoolwide professional development due to the lack of possible interest from one or two participants. The principal would much rather allow the staff to grow individually focused on their own personal needs. The principal understands that this opens the door to possibly investing professional development dollars in a staff member who may leave at the end of the year. The school may not see any long-term benefits from this method of professional development but as the principal stated “at least they report back what they learned and they are enthusiastic about this new knowledge”.

The interview with the administrator at HAS again focused initially about what has happened since the original BDDP. Prior to the original project, the administrator remembered

having only four desktop computers in one room for the entire faculty of 40 teachers. The current status of the technology is a one to one laptop ratio for teachers. All of the classrooms have Promethean boards for the instructors to utilize. During lecture in a history class if a student asks a question the instructor can immediately go to a reputable source and quickly look up the answer.

The administrator of HSA states the school is not a true one-to-one school. The HSA administrator goes on to say if each student in the school wanted to use a computer there would be more than enough laptops, iPads or desktops available. However, the students do not have access to one specific device. There are classrooms that have a dedicated laptop cart or iPad cart for the teachers to utilize at any time. Occasionally there is a situation where the instructor will incorporate the use of this technology to assist in supplementing the lesson plan for the day. The difficulty arises when the technology suddenly fails, and the Internet may go out. In some circumstances it has taken 5 to 7 minutes for the instructor to work through the precise problem. This is valuable class instruction time that has been lost, according to the administrator.

The administrator reported that the technology support team is a resource that teachers utilize to solve their classroom technology issues. The technology team receives email submissions with issues and they will respond immediately. Even with the difficulties utilizing technology the teachers see the importance of incorporating the technology and “there is no resistance to technology as long as it enhances instructional experience.”

The administration reported that he believes he has created a culture of trust in collaboration. To assist in the establishment of this trust the administration is not afraid to try new techniques. The administration has taken the standard one observation for the teacher and altered this procedure. Instead of observing one class session for approximately an hour, the

administration has determined to do drop in for 10 minutes each. This created an “open door environment” where no one is ashamed of what is happening in the classroom because they are open to suggestions and collaborations. The “principal can see the breadth - we see the good days, we see the bad days” and there is “encouragement to take risk here in the school.” “I think that filters down into the technology.” The administration is “big believers in buy in” to exploring new ideas. The administration does not take the belief in forcing change upon the faculty.

Describing the school’s professional development, the administrator stated that professional development the school has a “technologies showcase” and also has “call tech talk at faculty meetings - it’s very informal, that is where teachers talk about the problems and what they struggle with.” The teachers are not afraid to discuss what failed in their lesson plan or what succeeded. The teachers will share failures and ask how other teachers were able to get a resource to succeed. This assists with the success of technology implementation because challenges are identified and addressed as they arise. The school also has the opportunity to offer Microsoft training to the entire staff at any time it is needed. Through the school district there are multiple opportunities to have district wide professional development training on technology. The school has sent the technology director to national conferences in other states. The school had a whole staff professional development day focused on technology integration and use of this technology in the classroom. The professional development took place immediately after the school invested a large sum of money in new technology resources. One such resource was Promethean boards. The technology coordinator at the time set up several different types of professional development activities to demonstrate how the Promethean boards worked along with integrating other technology staff have at their disposal. The administrator

conveyed at the beginning of the professional development the staff was a little apprehensive on devoting a full day towards technology but by the end of the day the majority of the staff enjoyed and appreciated the focused professional development. The technology coordinator also had an opportunity to have follow-up professional development. The sessions were throughout the year and this gave the ability to assist the teachers in reviewing the content covered in the all-day professional development session. The technology coordinator position also allows individual teachers to address any issues or difficulties they are having immediately with this individual.

The administrator reported that the school is hiring a new dedicated director of technology. “Something I said to the director of technology - your challenge is more to create relationships rather than introduce technology. You need to find out what the needs are rather than forcing something down their throat.” The technology resources for the school are Promethean boards in every classroom digital cameras, docking stations, three laptop carts, five surface carts, 30 computers in the computer lab, 10 computers in a small computer lab and 19 computers throughout the library. The school budgets 12% of the overall budget on an annual basis for technology. This 12% equates to approximately \$700,000. The school is on a four-year recycle rate for the technology in the school.

The interview with the administrator further yielded that the school is close to a one-to-one computer ratio for their students. The school will not be going to a true ratio due to the economic factors restricting the students from having proper Internet access at home. The “kids come from marginalized communities, low income communities and often from underperforming schools.” The school has resources to provide their students low cost, virtually free computers but families are more concerned with keeping the power on in the house than having a free computer. In a semester it is not uncommon for 1 to 2 students to not have power

at home for a period of time. Through a grant the school can provide “30 Internet hotspots that students can take home” but these resources have not been fully utilized.

An example that was shared - The mathematics teacher uses an online homework resource that can be “differentiated with the actual daily assessments.” This way if you get certain questions correct the assignments slowly get more difficult and if you need more work on a specific topic the database gives you more questions on that topic. Other instructors use “online quizzes to grade the assessment online”. This allows for immediate feedback to the students and they can focus on whatever topic they may not have a thorough grasp on instead of waiting one or two days to get the quiz back and then reviewing the material. The technology access has allowed for little to no interruption for cold and snow days. The teachers use the technology, specifically the resources on www.edline.net. The teachers will prepare assignments that can be accessed through the Internet. The students will have an opportunity to complete these assignments on www.edline.net during the snow day to make up for the lost instructional time from missed in class time.

The interview with the principal at HSB again attempted to focus initially about what has happened since the original BDDP. The current principal had only been in his position since July 1, 2015. He was unaware of the program and any resources or professional development that was provided by the BDDP. The principal was able to describe what resources the school currently utilizes with technology. The school is currently on a mandated improvement plan. The school’s resources and efforts are “devoted exclusively to our school improvement plan.”

Principal reported that the technology to which students have access include chrome books, laptops or PCs, in the classrooms are primarily being utilized for “formative assessment based edits for really quick checks for understanding some research.” The principal “would not

say a totally authentic one-to-one exists because chrome books stay here” at the school.

Primarily, the principal sees technology best being utilized “when the tools are being used for assessment purposes you can get a *lot* quicker feedback.” Approximately half the teachers have LCD projectors in their classroom.

The school is mandated to take online assessments every year and in the past years the access to this assessment has been “very slow” due to failing wireless equipment. The school started to install “new access point routers” and there “was a lightning speed upgrade”. The plan is to replace the wireless routers “over probably the next 6 to 18 months”. The school has a budgetary line item for technology that is approximately 2% of the overall budget.

The interview yield further goals and intentions about technology from the principal. Infusing technology into the teacher’s pedagogy and focusing the professional development at the school “is not something we can tackle this year we do not have the time” and “it is not high enough on the priority list” at this point in time. The principal has a future goal of incorporating technology at the school “for enrichment not remedial purposes”. The principal has determined to focus the professional development solely on the improvement plan. The staff does participate in school wide professional development focused on specific topics to accomplish the improvement plan. The principal states “I think our test scores show in reading and English we are increasing our learning, which is why we haven’t jumped full force into technology yet.”

Statistical Analysis of the Survey

There were a total of 12 responses to the survey, four from HSA, three from HSB and five from ES. The survey contributed to determining impact and perception of technology from the teachers’ perspective. To assist in determining whether teachers were using technology efficiently and effectively it is important to look at the background of each teacher. The teachers

surveyed had a minimum of eight years of experience teaching in the classroom. The similarities between the teachers from each of the three locations were that the teachers all have a computer and Internet access at home. All the teachers state they used technology in their classroom lesson plans to some degree. The grade level ranged from preschool to 12th grade and the subject areas ran the gambit from math, science, English, social studies, reading, history, art and included teachers who taught all subjects. All teachers considered themselves familiar with basic computer technology and functionality.

The teachers had some unusual responses to the survey. Analysis follows of a variety of questions and the responses from the teachers. When asked how long have you had the current computers in your classrooms, 50% of the respondents said they do not have computers in their classroom. In contrast, one of the respondents stated that the computers have always been in the room and this respondent has taught classes at the school for 11 to 15 years. 25% of the respondents stated the computer had been in the classroom for two to four years. 45% of respondents had increased the level of technology integration in their lesson plans since a year ago. 55% of respondents had increased the amount of technology-integrated assignments given to their students from last year to this year. 100% of participants responded by stating that the level of technology integration in their lesson plans compared to a year ago either stayed the same or increased.

An open-ended question was asked of the participants about what effect the use of technology has had on teaching. The respondents had a range of responses, including statements such as “makes things a bit easier,” “blending instruction has opened up class time for more individualized instruction and targeted assistance.” One respondent said “I think that course management software has put a lot more burden and responsibility on students to stay organized

and to keep track of their assignments. I think that having students do multimedia presentations allows them an opportunity to synthesize and clarify information in a way that is more interesting and engaging for them.” Another commented “The use of technology has forced me to step out of my comfort zone in order to address the needs of different types of learners.”

The teachers were asked, “If you give your students assignments that integrate the use of technology, please mark the statements below that most accurately summarize any learning affects you have observed with your students.” All respondents indicated that they find that integrating technology enhances learning, or they find that by using technology, students are engaged and attentive to subject matter. None of the teachers responded that they find integrating technology has no effect on learning, that integrating technology hinders learning, or that using technology has no effect on student engagement or attention to subject matter.

Chapter 5 Discussion

Research Findings /Summary of Findings

When considering the use of technology in the schools themselves, each school has taken a different approach on maintaining and updating the technology. The schools are examined individually in the following paragraphs.

The school that has made the most improvement from the original project is HSA. The HSA School has added a designated budget for technology and has administrators who have supported technology integration in the classroom (O'Bannon, 2004; Zepeda 2008).

The school that has made the least progress in technology integration is HSB. The HSB School has had to focus on an improvement plan at the time of the research. This improvement plan does not incorporate the infusion of technology. There has been a major disconnect within the school, most likely due to issues outside the purview of this research project (Cobb, 2003).

The ES school has made an intermediate, or an as needed, increase in technology by slowly incorporating new technology when the budget allows. The principal would always prefer to purchase a new iPad carts for the students but occasionally the funding must go towards a new water heater for the school or a new roof on the school. The ES principal would like to make more technological advances, but resources have been targeted for essential maintenance, such as fixing a leaking roof and having a working heating and cooling system, which has taken priority over buying a new set of computers. The school had a strong technology coordinator that advises the principal on technology issues, and has made incremental changes in the technology over several years (Cobb 2003).

Unfortunately, immediately prior to the gathering of this research the technology coordinator and teacher for ES suddenly left the position after several years. The principal stated

he was in need of a strong replacement, an advocate and an individual that understood all of the necessary guidelines for the school for technology (Cobb 2003). The principal was not confident that he would be able to find an individual that could meet his needs for the position. This may have a large impact on future technology integration, as the school needs this position to guide the principal on the school's technology needs.

Professional Development

The incorporation of professional development differs in each of the three school locations and may be a contributing factor to how successful the school is in incorporating new ideas regarding technology. For each of the three schools they all have a slightly different implementation technique for professional development. Each administration sees the importance of professional development, but there are no uniform implementation techniques that are standardized within each location.

HSA is the location that is closest to incorporating best practices for professional development (Zepeda 2008). The school allows the teachers to self-determine their professional development. Even though this professional development is individually based, the resources are available to go back and refresh their knowledge on any particular professional development topic. The professional development that is focused on technology is implemented very specifically. The administration attempts to incorporate the knowledge and resources teachers will need to utilize the technology in the professional development sessions (Torff, 2008). These sessions have typically taken place in the beginning of the school year for the entire school. The school then offers follow-up sessions to continue the learning focused on the original topic. The school also has staffing resources that are readily available on site to immediately address issues when they arise. These staffing resources are highly qualified trusted individuals that can

immediately diagnose and assist with issues that teachers may have with integrating the professional development topic (Bredeson, 2002; Ellison, 2004; Glazer, 2006; Davis, 2009).

The most notable example of how this professional development situation unfolded was with the incorporation of Promethean boards. The integration of Promethean boards started with a professional development at the beginning of the year and subsequent follow-up sessions throughout the year. The coordinator and developer of the professional development sessions was also a staff member that teachers could ask for assistance at any time during the school year. This example best follows the ideal incorporation of new content through professional development (Lock, 2006; Taylor, 2005; Guskey, 2010). HSA has had continuity with the professional development over time because of the position of the technology coordinator. This led to an emphasis being placed on the importance of professional development.

ES did not have a firm focus or direction when it came to incorporating professional development at the school, here focusing on technology integration. The teachers were given resources in the form of time and availability to participate in professional development. The downside was the school did not have a uniform direction to follow. Teachers may go through professional development in small groups of two or three teachers. This did not allow for successful follow-up sessions that would re-emphasize a set of professional development topics throughout the school year. The professional development small group topics were so varied in focus that this did not allow for reoccurring professional development on the specific topics (DuFour, 2003; Supovitz 2000). A second detriment to professional development was not having a staffing resource to address any issues or needed clarification on specific topics. This seems to be detrimental to the effective implementation of the professional development topics within the school (Childress 2006).

HSB is playing a catch-up game with the use of professional development at the school. Currently, all of the professional development time is focused on the improvement plan for the school. It is difficult to understand how the school can effectively grow from a technology standpoint when the resources, time, money and effort are being spent on maintaining the baseline. In other words, instead of being able to focus on implementing new technology, it appears their vision is limited because their focus is on an improvement plan necessary to survive, void of technology integration and apparent resources to support improved integration. The principal mentioned more than once that he would be interested and wants to incorporate varied resources for the staff but he was more concerned with the improvement plan. He needs to capitalize on this opportunity to utilize the improvement plan and then determine a few stretch goals above and beyond what the plan mandates. HSB professional development has no perceived continuity over time due in part to the administrations' emphasis on the improvement plan. An example of this is the principal's focus on increasing the test score average for his students rather than building a foundation through professional development that promotes a continued emphasis on implementation of critical thinking skills and moves away from teaching to the test (Baylor, 2002; Zepeda, 2008).

Limitations of the Study

The study had several limitations due to the implementation technique. The time constraints were an overarching limiting factor resulting in only one visit per school location, one interview per location and limited faculty participation with completing the survey. Another major limitation was the inability to collect data on so few of the BDDP locations. There were 15 schools total that received resources and only three schools participated in this research. The data collection for the research was also restricted due to not having greater faculty participation

from the three schools. The faculty decision to participate was completely independent and no incentives were provided to increase participation. There was approximately 25% participation from the faculty in the survey that is statistically relevant. The interview with the principal or administrator did allow for in-depth data collection. A follow-up interview could have allowed for more probing and specific questions that could have been answered from the principal or administrator.

Conclusions

The research question asks is there any long lasting effect of the BDDP? The immediate answer is yes; there has been a sustained effect from the initial BDDP technology infusion and professional development, especially considering that there was little or no technology integration prior to the BDDP. To thoroughly delve into this question, it is important to start examining each of the three schools. The three schools can be classified in completely different classifications.

Consider the three schools HSA, HSB and ES in the context of their technology status being equated to a letter grade from A+ to F, allowing for pluses and minuses. On this arbitrary scale and A+ would be each individual in the school having a laptop and every lesson instructed to the students would incorporate the use of engaging technology. The letter grade of F would stand for zero change in the school environment. HSA would be an A-, HSB would be a D and ES would be a C+ or perhaps, on a good technology day, a B-. To understand how these schools received their letter grade we must explore each school individually.

HSA is almost a perfectly integrated school in relation to their resources they provide to the faculty and students. Teachers have resources available to them at any time to assist them in the integration of technology. The technological resources of Promethean boards, iPads, laptops

and a laundry list of other equipment available to the school to utilize in increasing learning through technology provides a wide range of choice for teachers and students to use. These resources are funded by a designated budget line in the overall school budget. The magnitude of the technology budget demonstrates how important and essential the administration sees technology in their school. Budgets are always tight and extraneous costs are typically quickly eliminated, however 12% of this school's budget is dedicated to technology integration (Zepeda, 2008).

The administration has determined to continuously train/provide the faculty professional development on a wide range of topics, never forgetting to include technology in some form. The faculty spends 10 to 20 minutes every faculty meeting discussing what is working and what is not working, collaborating with each other. This typically focuses on technology aspects of lesson plans. This provides the ability to remove some apprehension around incorporating technology. The administration has encouraged the faculty to incorporate new learning methods. The administration continues this encouragement by allowing faculty to "fail" with the caveat that if there is a failed experiment it is expected they will collaborate with colleagues to see how to improve. This can be equated to a child first learning how to walk. The child will stumble and fall down and fail a few times in the process of learning. If the parent is always there to stop the child from falling the child will struggle to learn how to walk. The teachers are permitted to experiment in a trial and error system that leads to failure at times, but then encouraged to pick themselves back up and go back to the drawing board. The administration does not always stop faculty from pursuing new ideas even if they are concerned that these experiments may fail. This has created a focus on innovative and creative thinking that has led to the development of more engaging technology integration (Supovitz 2000; Zepeda 2008).

ES received a letter grade between a C+ and B-. The major factor that affected their overall grade is the lack of a recurring budget line item for technology. Due to limited financial resources to spend on technology, the administration faces a difficult balancing act. Although the administration and faculty see how technology is essential in the students' learning, they often face budgetary restrictions that limit technology integration. The teachers do have activities for the students that utilize the technology available in the school. The school has found ways to update their technology, but every few years they must hunt to find resources to refresh their technology. The principal stated he had never denied a legitimate request for resources when it has been essential for student learning. The problem is he has to find these resources and the school may not have the opportunity to incorporate the necessary equipment when needed immediately (O'Bannon 2004).

The professional development time at ES is limited and sought after for implementable solutions that can resolve classroom instructional issues. ES does provide their teachers every professional development opportunity. Unfortunately, time and budget constraints restrict the time teachers can spend in professional development, the depth of the content covered in the professional development and the ability to have everyone participate in the similar professional development. The school does not have the extraneous resources to provide each teacher the opportunity to pursue professional development designed around best practices for professional development (Lock, 2006; Taylor, 2005; Guskey, 2010). ES is similar to other schools that are confronted with these struggle and restrictions. The administration and faculty accomplish what they can with limited resources just like thousands of schools in the United States(O'Bannon 2004).

HSB has received a letter grade of D. HSB is currently confronted with an improvement plan that does not effectively incorporate implementing technology in the classroom as one of the goals. The principal is not completely convinced that technology will improve his students' learning. The most common form of integration of technology in the classroom he has noticed is just as a supplemental resource. The students may have access to a book online and in his opinion there is little difference between the online book and the hardcover book. The school has only updates their technology when confronted with an urgent situation. They are attempting to provide technological resources for the students but the teachers do not always use these resources effectively (Schmoker, 2004).

HSB is implementing an improvement plan and due to this they are limited in professional development opportunities. The administration is concerned about the "test" and performing well on this arbitrary assessment. If the administration had more strongly encouraged using the technology available perhaps they would have seen more positive returns on their initial investment (Schmoker, 2004).

One clear conclusion that can be drawn is that if the administration of the school emphasizes technology incorporation by focusing on professional development, financial resources and collaborative communication over a sustained timeline and on a recurring annual basis then there is a distinct return on investment in technology (Baylor, 2002; Darling-Hammond 2009; Lock, 2006; Supovitz, 2000; Zepeda 2008).

In conclusion the time, effort and work put into the original BDDP did have a lasting impact, to some degree, with every student who has had the opportunity to be instructed in these schools. When the occasion arises to make a substantial impact on schools, as the BDDP had, it is of utmost importance that every stakeholder advocate, support and be the champion of such

programs. When schools invest in programs that require drastic changes and they are appropriately supported with resources and properly implemented professional development, there is a lasting impact (Cobb, 2003; Wells, 2007; Zepeda, 2008).

Suggestions for Future Research

Future research needs to involve following up in one year intervals with the principal and including a walk-through to follow the school's progression in an effort to better understand the implication of technology integration or lack thereof. This would be true for all of the schools that participated in the research, but especially HSB. It would be conducive to check in with HSB over the next several years to see how their improvement plan is progressing. They have the framework to increase the quality of technology integration, but their efforts are focused elsewhere currently. If they can resolve other issues within the school, perhaps they can address their technology gap in the near future.

A walk-through assessment of all of the facilities that participated in the original BDDP would facilitate a more precise depiction of the successfulness of the program. It seems as though in order to get the most out of investing in technology curriculum, a school must consider a long-term strategic plan for technology integration and continuing professional development at the time of the initial investment. However, more research is needed to confirm this and ultimately help provide schools with a clear pathway to successful technology integration.

In the short run, the BDDP could be seen as a success (Gibbs & Dosen, 2008). The long term success of the project seems to be contingent on the administrator's support of the project and their providing the resources of both time and finances to continue developing the program. Administrative support, teacher buy-in, and a clear and consistent focus have provided

success to schools HSA and ES. These are the building stones of cohesive Professional Development.

Appendices

Appendix A - Original BDDP vs. Current Research

<p>An issue to be examined is how successful is professional development for in-service K-12 classroom teachers? The specific focus of interest of professional development implementation is can it modify instructional practices and reform the institution's behavior in the classrooms?</p>	<p>This is a sub questions that may be able to be inferred from the evidence gathered during the investigation o f the BDDP schools.</p>
<p>A view of the possible way the modification of instructional practices could be measured is: Did the teachers report a modification in their instructional practices from the professional development content (Wayne 2008)?</p>	<p>The principal interview should allow for the principal to demonstrate how teachers have improved their use of skills learned from professional development.</p>
<p>Time and effort is being put into professional development. The question needs to be asked, is there any evidence that can demonstrate students are achieving at higher levels (DuFour, 2004)?</p>	<p>Unfortunately this question is outside of the scope of the inquiry. No data is being gathered on students or student achievements in the classroom.</p>
<p>Were the teachers able to continually modify their instructional practice over long term or did they try once and never go back to the new teaching method again?</p>	<p>The survey questionnaire will show how the original participants answered to the questions and this can be compared to the teacher's response with the current survey evaluation. If they have modified their instructional practice then results from survey given in 2015 should be the same or better than the original BDDP.</p>
<p>With evaluating professional development a few general questions need to be asked before looking at specific teacher's success or failures. Did the professional development lead to changes in all levels of schools and district? Were these changes supported by all stakeholders? Were resources such as substitutes, time and collaborative meetings provided to properly implement the professional development? If these questions cannot be answered in the affirmative it will be difficult to see positive impact of the professional development in multiple classrooms.</p>	<p>The original data from the BDDP shows that these questions can be answered in the affirmative. The new data will either uphold the original BDDP program findings or reject these findings several years later.</p>

<p>Has technology integration been sustained/developed in target Illinois Catholic ICC schools sense original Bridging the Digital Divide Program (BDDP) intervention more than 13 years ago?</p>	<p>The principal interview questions will frame the current technological environment of the school. The interview will allow the principal to discuss any improvements that have taken place since the BDDP. The observations will allow a compare contrast from the BDDP in 2001-2003 against the observations from today in 2015.</p>
<p>Have these schools been able to maintain and increase the technology in their schools?</p>	<p>The principal interview is an opportunity for the principal to discuss when the most recent technology has been incorporated into the school. The observations will allow a compare contrast from the BDDP in 2001-2003 against the observations from today in 2015. The observations will look at the technology being used in the school. From these observations a determination can be made on how old the technology is in the school.</p>
<p>Are teachers incorporating technology use in classroom curriculum because of the professional development they have received?</p>	<p>The principal interview will be an opportunity for the principal to highlight past experiences and occasions that the teachers incorporated technology into their curriculum. The observations will give the researcher a first-hand glimpse on what the teachers used during typical learning activities. This will or will not show teachers incorporating technology into classroom activities. The survey questions allow the teachers to self-report their use and familiarity of technology in their classrooms.</p>
<p>Did the professional development have any long-lasting impact on teachers' pedagogy?</p>	<p>The principal interview will allow the principal to discuss past professional development trainings focused on technology. How today's teachers answer the survey questions will be compared to how teachers answered the questions during the BDDP.</p>
<p>Are professional developments only beneficial for the current school year or does the training have a longer duration of impact on the school?</p>	<p>Compare contrast survey answers from the original project in 2003 against survey questions from 2015. This will see whether the original program objectives have still been achieved several years later.</p>

Appendix B - BDDP Survey Questions?

Questions asked of the teachers throughout the bridging the digital divide program workshops. The below questions are the survey completed by participants in follow-up research conducted in 2015.

Please provide following information,

Subject Area; _ Grade Level:

Years of teaching experience (check one):

_0-3 years _11-15 years _26+ years

_4-7 years _16-20 years

_8-10 years _21-25 years

Years at your current school (check one):

_0-3 years _11-15 years _26+ years

_4-7 years _16-20 years

_8-10 years _21-25 years

Yes No

Do you have a computer at home? _

Do you have internet access? _N/A_ Yes No

1. Do you understand the difference between hardware and software? Yes No
2. Do you know what a modem is? Yes No
3. Can you use the mouse correctly? Yes No
4. Can you open a file (e.g., Word document, e-mail attachments)? Yes No
5. Can you open multiple windows on your desktop at the same time? Yes No
6. Can you maximize and minimize windows on your desktop? Yes No
7. Can you print a document? Yes No
8. Can you copy and paste information (e.g., text or pictures)? Yes No
9. Can you successfully save a document? Yes No
10. Can you enter data into an Excel spreadsheet? Yes No
11. Can you highlight (select) multiple data cells in a spreadsheet Yes No
12. Can you cut and paste Excel data? Yes No
13. Can you cut and paste Excel data in another MS Office program such as Word Yes No
14. Can you generate a formula in Excel? Yes No
15. Can you cut and paste formulas within an Excel spreadsheet? Yes No
16. Can you convert data entered in an Excel spreadsheet into a graph or chart? Yes No
17. Can you use the cell-formatting feature in Excel (e.g., adjust decimal places)? Yes No
18. Do you know the importance of saving all work to disk or your hard drive? Yes No
19. Do you know how to change text format in a Word document (e.g., change text color, bold or italicize)? Yes No
20. Do you know how to change text alignment in a Word document? Yes No
21. Do you know how to create bulleted or numbered lists in Word? Yes No
22. Did you use any of the tools you learned during this workshop to complete any school related tasks (e.g., calculating student grades, preparing handouts)? Yes No
23. Do you know the difference between specific Internet search tools such as directories (e.g., Yahoo), search engines (e.g., AltaVista) and meta-search engines? Yes No

24. Do you have a favorite Internet search tool? Yes No
 25. Did you activate any e-mail filtering programs? Yes No
 26. Do you know the importance of screening attachments? Yes No
 27. Do you know what a virus is? Yes No
 28. Do you know what to do if you receive an infected e-mail attachment? Yes No
 29. Have you integrated the use of technology into your lesson plans this year? Yes No
 30. If you answered yes in question 29, please go to question (a), if you answered no please go to question (b).

(a) Please indicate the level of technology integration in your lesson plans since a year ago.

- Increased
 Stayed the same since last year
 Decreased

(b) Please tell us why you do not integrate technology into your lesson plans:

31. Do you give your students assignments that integrate the use of technology? Yes No

32. How many technology integrated assignments did you give your students this year, in comparison to last year?

- About the same amount I do not give my students assignments that require the use of a computer (Skip to question 20)
 More than last year
 Less than last year.

33. If you give your students assignments that integrate the use of technology, please mark the statements below that

most accurately summarize any learning effects you have observed with your students

- I find that integrating technology enhances learning
 I find that integrating technology has no effect on learning.
 I find that integrating technology hinders learning.
 I find that using technology, students are engaged and attentive to subject matter
 I find that using technology has no effect on student engagement or attention to subject matter.

Please use the following scales to describe your current ability level on the computer. Circle your response.

34. How would you rate your computer use?

1	2	3	4	5	6	7	8
9	10						
I do not use a computer			I can run a few pre-loaded programs			I can troubleshoot computer/printer problems	

35. Word Processing [Microsoft Word, WordPerfect, etc.]

1	2	3	4	5	6	7	8
9	10						
I do not know how to use a word processing program			I use a word processing program to type simple documents.			I can edit, spell check, conduct mail merge and change the format of a	

								document.
--	--	--	--	--	--	--	--	-----------

36. Spreadsheets

1	2	3	4	5	6	7	8	
9	10							
I do not know how to use a spreadsheet			I understand the use of and can create spreadsheets and charts.			I can use labels formulas, cell references and formatting tools		

37. Databases

1	2	3	4	5	6	7	8	
9	10							
I do not know how to use databases.			I create my own databases. I can define fields and choose layouts to organize information			I can use my database to run queries and answer questions about my data.		

38. Graphics

1	2	3	4	5	6	7	8	
9	10							
I do not use graphics with my word processing or presentations			I open, create, and place simple pictures (e.g., clip art) into documents.			I edit and create graphics; place them in documents to clarify/amplify my message.		

39. Email

1	2	3	4	5	6	7	8	
9	10							
I do not use e-mail, nor do I have an e-mail account			I send e-mail-mostly to colleagues, friends and family.			I use e-mail to request and , send information for research.		

40. Research Information- Searching

1	2	3	4	5	6	7	8	
9	10							
I am unlikely to seek information when it is in electronic formats.			I conduct simple searches with electronic encyclopedia and library software.			I know how to use a variety of search strategies on several search engines/programs		

41. Technology Presentation

1	2	3	4	5	6	7	8	
9	10							
I do not use computer presentation			I present information in a single application program (e.g., word			I present information and teach classes using		

programs	processor, PowerPoint)	multimedia presentation software.
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42. Internet

1 9	2 10	3	4	5	6	7	8
I do not use the Internet		I use the Internet to explore educational resources.			I contribute to my school or district website		

43. Technology Integration

1 9	2 10	3	4	5	6	7	8
I do not blend the use of computer- based technologies into my classroom learning activities.		I occasionally invite students to use computer technology in completing course assignments.			I model and teach my students to employ computer- based technology for communication, data analysis and problem solving.		

44. How do you most frequently incorporate technology into the curriculum?

45. Which areas of your content/curriculum do your students have difficulty learning that can be supported with the use of technology?

46. Which technological skills are you interested in developing?

47. What effect has the use of technology had on your teaching? Please explain.

48. Do you know how to match software to your instructional strategies? Yes No Please explain.

49. Are you aware of or did you participate in the Bridging the Digital Divide Program in 2001 to 2003 Yes No

50. What is the purpose of the study?

51. What are the benefits associated with being in the study?

Appendix C - Principal Interview Script and Interview questions

Hello (insert name) and thank you for meeting with me, I appreciate you taking the time out of your busy schedule. Can you please read and sign a consent form if you give consent to participate in this research?

This conversation is being recorded for research purposes. Please let me know now if you do not agree to being recorded. You may request that the recording stop at any time.

I am researching the long-term possible impact the bridging the digital divide program that took place at your school during the 2001 to 2003 school years. This sit-down should not take any longer than one hour. Let's begin

Questions:

Do you remember the bridging the digital divide program from 2001 to 2003?

Have you been able to build on the framework the program left at your school? Can you explain how?

Has there been any infusion of technology in the school after the Bridging the Digital Divide (IF NO BDD) Program or any infusion of technology since you've been here at (insert school name)? Please tell me how you were able to accomplish this?

If so can you describe what type of technology and what technology this replaced or built on?

In your observation of your teachers at your school, how effective or ineffective our the teachers with incorporating technology into their classroom curriculum?

Can you tell me any stories that demonstrate this?

How often do you find your teachers encouraging students to use computers?

Can you tell me any stories that demonstrate this?

In your observations how often do you find teachers assigning assignments that require technology?

Do you have one or two teachers using technology more so than your entire staff?

Can you tell me any stories that demonstrate this?

Do you have very many teachers who are fearful of using technology in their classroom?

Can you tell me any stories that demonstrate this?

Are you finding that the students are engaged in higher-level learning when they used technology?

Can you tell me any stories that demonstrate this?

Do your teachers attend professional development training focused around technology integration into their classroom pedagogy?

Do you offer this PD here at your school or at a different location?

If so how often do they attend these trainings, how long are the trainings and do you see any noticeable impact/infusion of technology after they have attended these trainings?

Debriefing information

Do you have any questions for me about my research after participating in this interview?

Thank you again your answers have been informative and will assist me in my research.

Appendix D - Observation Instrument

Observations of K-12 Students and Teachers in their classroom. School Name _____

Date _____

According to your observations at Bridging the Digital Divide project schools, please use the scale below to rate students and teachers at the school on the following characteristics.

1. What percent of the K-12 teachers used technology in the classroom? 12345678910
2. What percentage of K-12 students' time was spent using technology (e.g., computers, tablets, smart boards and interactive devices)? 12345678910

	%		%
Room 1 GR _____		Room 5 GR _____	
Room 2 GR _____		Room 6 GR _____	
Room 3 GR _____		Room 7 GR _____	
Room 4 GR _____		Room 8GR _____	
....			

SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; and SA = Strongly Agree.

Mark your response.

3. Students were actively engaged in the learning process. SD, D, N, A, SA

	SD	D	N	A	SA		SD	D	N	A	SA
Room 1 GR _____						Room 5 GR _____					
Room 2 GR _____						Room 6 GR _____					
Room 3 GR _____						Room 7 GR _____					
Room 4 GR _____						Room 8GR _____					
....											

4. Students displayed fear of using technology. SD, D, N, A, SA

	SD	D	N	A	SA		SD	D	N	A	SA
Room 1 GR _____						Room 5 GR _____					
Room 2 GR _____						Room 6 GR _____					

Room 3 GR _____						Room 7 GR _____					
Room 4 GR _____						Room 8GR _____					
....											

5. Students were actively engaged in independent activities on computers. SD, D, N, A, SA

	SD	D	N	A	SA		SD	D	N	A	SA
Room 1 GR _____						Room 5 GR _____					
Room 2 GR _____						Room 6 GR _____					
Room 3 GR _____						Room 7 GR _____					
Room 4 GR _____						Room 8GR _____					
....											

6. Students appeared to be self-motivated. SD, D, N, A, SA

	SD	D	N	A	SA		SD	D	N	A	SA
Room 1 GR _____						Room 5 GR _____					
Room 2 GR _____						Room 6 GR _____					
Room 3 GR _____						Room 7 GR _____					
Room 4 GR _____						Room 8GR _____					
....											

7. Teachers displayed fear of using technology. SD, D, N, A, SA

	SD	D	N	A	SA		SD	D	N	A	SA
Room 1 GR _____						Room 5 GR _____					
Room 2 GR _____						Room 6 GR _____					
Room 3 GR _____						Room 7 GR _____					
Room 4 GR _____						Room 8GR _____					
....											

8. Teachers encouraged students to use computers. SD, D, N, A, SA

	SD	D	N	A	SA		SD	D	N	A	SA
Room 1 GR						Room 5 GR _____					

_____						_____					
Room 2 GR						Room 6 GR _____					
Room 3 GR						Room 7 GR _____					
Room 4 GR						Room 8 GR _____					

....											

9. Teachers Incorporated technology into their lesson plans. SD, D, N, A, SA

	SD	D	N	A	SA		SD	D	N	A	SA
Room 1 GR						Room 5 GR _____					
Room 2 GR						Room 6 GR _____					
Room 3 GR						Room 7 GR _____					
Room 4 GR						Room 8GR _____					

....											

10. Other room set up in standard rose or workstations.

	Standard Rose		Workstations			Standard Rose		Workstations	
Room 1 GR					Room 5 GR				
Room 2 GR					Room 6 GR				
Room 3 GR					Room 7 GR				
Room 4 GR					Room 8GR				

....									

11. Students were interacting with technology.

	Yes		No			Yes		No	
Room 1 GR					Room 5 GR				
Room 2 GR					Room 6 GR				
Room 3 GR					Room 7 GR				

Room 4 GR			Room 8GR		
.....					

12. Technology was available to students in the classroom

	Yes	No		Yes	No
Room 1 GR			Room 5 GR		
Room 2 GR			Room 6 GR		
Room 3 GR			Room 7 GR		
Room 4 GR			Room 8GR		
.....					

Observer/primary researcher

13. When you were in the school, what did you observe students learning? How were they learning it?

14. Based on your experiences in the school, what do you think are the students' most urgent Needs?

15. List other comments you would like to provide?

16. The teacher's doors are closed and there are no windows into the classroom.

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