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UNIVERSITY OF CALIFORNIA, SAN DIEGO
CALIFORNIA STATE UNIVERSITY, SAN MARCOS

K-12 Teacher Participation in Online Professional Development

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Education

in

Educational Leadership

by

Catherine Louise McNamara

Committee in charge:

California State University, San Marcos

Professor Katherine Hayden, Chair
Professor Jennifer Jeffries

University of California, San Diego

Professor Alan Daly

2010

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The Dissertation of Catherine Louise McNamara is approved, and it is acceptable in
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Chair

University of California, San Diego
California State University, San Marcos

2010

DEDICATION

This dissertation is dedicated to Teri Maxwell who made the completion of this dissertation possible with her constant belief in my ability to be successful and her unending daily support through the journey until it was accomplished.

I would like to thank every one of my family members for their patience with my schedule and for their enthusiasm for my academic endeavors.

I would like to thank Dr. Kathy Hayden, Dr. Alan Daly, and Dr. Jennifer Jeffries for their inspiration, support, and thoughtful guidance, but most importantly for making this experience the personal achievement I always dreamed it would be.

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ABSTRACT OF THE DISSERTATION

K-12 Teacher Participation in Online Professional Development

by

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Doctor of Education in Educational Leadership

University of California, San Diego, 2010

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Effectiveness in education is a national concern and reform efforts continue to be championed with the hope of stimulating improvement to more effectively meet the needs of all students. Many reform efforts include a focus on teacher professional development to strengthen teacher pedagogy and positively impact student achievement. Rapid expansion and increased use of technology have created

opportunities that never existed before to support teachers. Online, as an alternative to traditional face-to-face professional development, is currently underutilized in K-12 school districts. This study intended to investigate successful models of online professional development to inform district decision-making at the local level.

K-12 teachers from fifteen states, who participated in a successful online professional development experience, were invited to complete a survey to provide insight about how a professional development experience positively impacted their teaching, learning, and classroom. Of the 328 teachers who responded, three people were interviewed to learn more about their particular online professional development experience.

Study findings show that participants highly value online professional development because of the convenience, accessibility, and ability to self-pace and differentiate learning. Online professional development has the unique potential to foster reflection, deep thought, and analysis particularly when there is the potential to interact with an online professional learning community over time. A significant finding is that teachers thrive on the interaction and sharing of ideas between colleagues in job-alike situations. Additionally, findings show that when teachers participate with face-to-face school or grade-level teams online, they reap even greater learning benefits.

The majority of participants found that online professional development helped them improve their knowledge of curriculum and instructional strategies and improved their technology skills. They learned ways to improve their classrooms to meet the needs of diverse student populations and helped validate effective practices that were already firmly in place.

Educational leaders should consider online professional development as a strong viable option to improve teacher practice. Findings suggest that district leaders should recommend State Department of Education and commercial online learning opportunities that are subject-area focused and aligned to district/school goals. They should encourage teacher teams to participate together online and face-to-face to deepen learning. By recommending specific online learning experiences and encouraging teachers to participate together, districts will be well served by the effective online professional development offerings that are available.

CHAPTER 1: INTRODUCTION

At the start of the 21st century the educational community has been impacted by two significant external forces: (a) changes in information technology and (b) increased accountability for school effectiveness. Rapid development, expansion and increased use of technology have created opportunities that never existed before to support teachers in meeting the needs of all students. Meanwhile, ensuring effectiveness in education is a national concern at the federal, state, and local level. Teachers are facing increasing demands for results because of initiatives such as the No Child Left Behind Act (2001) and the resulting state accountability systems that have been put in place. One of the primary goals of the No Child Left Behind Act (2001) is to close the achievement gap by making sure that all students meet minimum performance proficiencies (Hirsh, 2005). To be more successful, students need teachers who are increasingly able to meet the needs of diverse populations (Garcia & Guerra, 2004). This is particularly challenging when teacher retention rates are low and new teachers are leaving the profession because they do not have the necessary support to be effective.

Advances in technology capabilities and infrastructure have provided districts with new and often less expensive alternatives to support teachers whose non-teaching time is scarce. In addition, the Internet has an enormous volume of online professional development opportunities, however, there are so many, it is difficult to know how to find high quality programs and resources. This study will investigate successful models for teacher professional development and document three case studies of models found to be successfully impacting classroom practice. Findings can be used to guide teachers

and district decision-making and in planning for effective teacher professional development delivered online.

Context of the Problem

“The Web of Learning contains a plethora of educationally relevant and continually evolving resources, tools, and learning materials, many of which are increasingly open and free to the world” (Bonk & Zhang, 2008, p. 1). Technology infrastructure is growing rapidly with increases in bandwidth and information delivery speeds that allow computer users to access information in multi-media format and participate in collaborative environments using Web 2.0 tools. Blogs, wikis and Google applications have provided new meaning to communities of learners. The term Web 2.0 was first used in 2004 and became notable after the first O’Reilly Media Web 2.0 Conference, yet there continues to be a lack of consensus regarding what constitutes Web 2.0. According to Solomon and Schrum (2007):

Web 2.0 tools are free programs that could replace the traditional application suites for which schools ordinarily must pay. Some perform the familiar functions, such as word processors, spreadsheets, and presentation tools. While they may not have every single feature of Microsoft Word, Excel, or PowerPoint, there is an advantage to having software that is Web-based: people at different computers can use the software to collaborate on a single document or on sets of documents at the same time. Web 2.0 is an ever-growing array of tools that people use to aggregate and interact with information in ways that are useful to them. (p. 23)

Web 2.0 concepts have led to the evolution of web-based communities such as social-networking, photo, and video sharing sites. These tools move computer-using individuals from isolation to interconnectedness as users increasingly develop 21st

century skills such as sharing information, working collaboratively and creatively (Soloman & Schrum, 2007).

Policy makers and leading organizations are responding to innovation and national trends. The National Education Technology Plan, released by the U.S. Department of Education in January 2005, proposes seven action steps and one of them includes support for E-learning. On September 12, 2007, the North American Council for Online Learning (NACOL) announced their endorsement for the National Standards of Quality for Online Courses. Bill Thomas, Director of Educational Technology for the Southern Regional Education Board (SREB), stated the following:

The use of the Web (online learning) to provide academic courses is extremely important to students everywhere. For online learning to expand and grow, students, parents, and policy- and decision-makers need assurance that the online courses are of quality. If providers of online courses meet these standards, there is little doubt that online learning will grow rapidly (NACOL, 2007).

With the advancement of technological capabilities, enrollment in online courses has grown substantially. A study by the Sloan Consortium showed that 81% of higher education institutions offer at least one fully online or blended course (Allen & Seaman, 2003). According to Allen and Seaman (2007), nearly 3.5 million students were taking at least one online course during the fall of 2006. These students represented nearly twenty percent of all students in U.S. higher education and the volume of participants in online courses represented a ten percent increase over the number reported the previous year. A simple Google search in October 2008 elicited 134,000 results for “online professional development.”

According to Allen and Seaman (2007), sixty-nine percent of academic leaders

believe that the student demand for online learning is still growing and eighty-three percent expect online enrollments to increase over the coming years. The 2008 Net Day Speak Up survey findings also show that student interest in online learning continues to climb. The Speak Up National Research Project is an annual research project facilitated by Project Tomorrow that has been collecting the views of more than 1.5 million K-12 students, teachers, parents, and administrators on 21st century education and technology since 2003 using an annual online survey process. Data is shared with national, state, and local policy makers to improve education for all children. “In 2007 8% of high school students said that they had taken a class online and an additional 9% said that they had taken a class that had an online component in addition to traditional classroom time. Six percent of students in grades 9-12 said they had taken an online class outside of school for personal reasons. Additionally, 33% of high school students, 24% of middle school students, and 19% of students in grades 3-5 who have not had any previous involvement with online learning say they would be interested in taking an online class, with girls having a slightly stronger interest than boys” (p. 6).

Speak Up 2008 included 281,000 K-12 students from 50 states and significant findings show that as students are becoming more familiar with online learning, student interest in taking online courses is on the rise. Interest by high school students rose by 21% from 2007 to 2008, however, the more significant increase was for interest among middle school students with a 46% increase in a single year (2007 to 2008).

Institutions of higher education have determined that online learning is an important vehicle for adult learning and are offering more online courses annually. The CalStateTEACH program is a California State University multiple subject preparation

program for elementary school teachers. It is an online curriculum for both student teachers and interns to earn a teaching credential. The University of Southern California offers an online credential program and masters program, districts, however, have not created online professional development opportunities with the same voracity.

It will be important for districts to consider making online staff development a priority since opportunities for student online courses are expanding at extraordinary rates. An estimated one million high school students are participating in online classes (Rice & Dawley, 2007). Nearly every state has some form of virtual or online school operating with 44 states having either state-led online programs, policies informing online education, or both (Long, 2004; Watson, Gemin & Ryan, 2008).

The National Education Technology Plan reported that about 25 percent of K-12 public schools offer some form of virtual instruction today and there is a move toward more digital content for curriculum in K-12 schools. Experiencing online learning and modeling of exemplary online teaching practices and knowledge for virtual courses are important elements that need to be included in K-12 teacher education.

In 2006, Governor Jennifer Granholm signed the Michigan Merit Curriculum into law. This legislation requires all high school students to take at least one online learning course or participate in an online learning experience as defined by the Michigan Department of Education (Fisher, 2006). With all students learning online, it will be vital for teachers to experience the online environment as a learner themselves, to be more proactive and responsive to students needs.

Online professional development (in course form and in many other forms) is becoming increasingly available on the World Wide Web and opportunities abound to

replace or augment traditional professional development offerings. Online professional development opportunities should be considered, not only because teachers benefit from participating in these experiences, but also because they are often less-expensive alternatives that are oftentimes funded or created outside of the district, and they are quickly and easily available and accessible.

Teachers are also increasingly interested in participating in online professional development. Net Day Speak Up 2007 survey results showed that from 2006 to 2007 teacher interest in taking an online course for their own professional development rose 29% with nearly 33% saying they would be interested in taking an online class and 26% saying that online learning was now their preferred method for professional development. The rationale for this increased interest included scheduling concerns (66%), time savings (40%) and the ability to control the learning pace (41%). The World Wide Web has knocked down the teaching and learning walls. Teachers are able to do their learning anytime and anywhere and educational leaders need to reconsider traditional professional development paradigms and embrace these new models.

Expanding teacher professional development options is important because teacher effectiveness must continue to improve to meet the needs of increasingly diverse populations of students. Educational leaders are in a vice with the pressure to improve student achievement combined with a new-teacher attrition rate of 50% in the first five years of classroom teaching (Dede, 2005). In California, public schools face the persistent teacher shortage more intensely in schools with higher concentrations of minority and poor students (Haycock, 1998). In his 2005 survey of teachers who left the education profession, Futernick (2007) found that 21% of teachers had not completed

their teaching credentials and 15% of high school English and mathematics teachers were teaching out of their subject area of expertise. Teacher turnover more intensely plagues high-poverty schools as 10% of teachers transfer away from students they may perceive as harder to teach and are replaced with teachers with minimal experience and training.

While the challenges are many and difficult, policy makers and educational leaders must embrace new opportunities and learn ways to maximize efficiency and effectiveness. Effectiveness in schools is heavily dependent on the strength of individual teachers. Haycock (1998) affirmed that teacher effectiveness is the single most influential variable that impacts student achievement. Haycock looked at teacher effectiveness in Texas and Boston, and found examples of teachers having a direct impact on achievement. Not only did she find that an effective teacher has an impact on achievement, she found that the difference that the teacher makes is sizeable, cumulative and long lasting.

Sanders and Rivers (1996) studied longitudinal data in Tennessee that grouped teachers into quintiles based on their effectiveness in influencing student achievement. They concluded that differences in student achievement vary as much as 50 percentile points as a result of three-year teacher sequences when students are assigned effective teachers three years in a row. They also concluded that varied student populations respond equivalently when taught by like effectiveness groups. The effects of the classroom teacher on low-achieving students are dramatic. On the average, the least effective teachers demonstrate 14 percentile point gains while the more effective teachers show gains of 52 percentile points with these students. The cumulative effects

of strong versus weak teachers are even more dramatic. Over a three-year period, students with three ineffective teachers demonstrated an average of the 29th percentile on fifth grade math scores. Students who were assigned to effective teachers for three years boasted an average of the 83rd percentile on the same assessment.

Futernick (2007) found that more than half of the teachers who left the classroom did not feel that they had adequate planning time or professional development. There is evidence that professional development implementation is flawed. According to Lieberman and Mace (2008), “Professional development, though well intentioned, is often perceived by teachers as fragmented, disconnected and irrelevant to the real problems of classroom practice” (p. 226). More than half of National Board-certified teachers are dissatisfied with the quality and quantity of professional development available at their school. (Leadership Survey: National Board for Professional Teaching Standards, 2001).

To improve effectiveness and increase teacher retention in the profession, educational leaders need to take steps to develop the strengths of existing staff members. Haycock (1998) affirms that teacher effectiveness is not fixed and that well designed professional development *can* improve a teacher’s ability to impact achievement. In New York City, for example, where Tony Alvarado was the Superintendent of Community School District #2, the district focused resources on teacher development and students demonstrated increased achievement over a ten-year period (Haycock, 1998).

If professional development positively impacts teacher effectiveness, which in turn, positively impacts achievement, then it is important to understand how

professional development should be constructed to be effective. Traditional face-to-face professional development has been well researched and there have been many lessons learned.

Understanding the differences between effective and ineffective teachers has contributed to researcher's understanding of how professional development can be shaped to support teachers. Haycock (1998) correlated ineffective teachers, who predominantly staff poor and minority schools, with low expectations, low-level curriculum standards, and poor achievement. These patterns of behavior and belief systems must be challenged and professional development has the potential to meet that challenge.

To address low expectations teacher beliefs must be reshaped. There is evidence that professional development is more effective when teacher's long-held beliefs and assumptions are challenged to illuminate new understandings (Hirsh, 2005; Johnson, 2006). Researchers in school districts across Arkansas, Louisiana, New Mexico, Oklahoma and Texas showed that teacher participants were able to question and reject previously held inaccurate views about culturally/linguistically diverse (CLD) students and were more able to embrace their role in influencing student learning when their beliefs and attitudes were transformed (Garcia & Guerra, 2004). We must recognize the importance that individual beliefs play in continuous improvement. When change is proposed and beliefs are in alignment, implementation of new practices will expand and when new practices contradict long-held beliefs of participants, implementation will be slower or non-existent (Haycock, 1998; Hirsh, 2005).

To address low-level curriculum, professional development should strengthen

verbal and math skills, deep content knowledge, and teaching skill, the shared strengths of effective teachers (Haycock, 1998). Joyce and Showers (2002) concur with the premise that professional development must prepare teachers to learn new knowledge and skills and apply that knowledge in classrooms. Additionally they suggest that teachers need to heighten their awareness of their own learning of educational theories and practices, new curricula, or academic content.

The content of professional development is an important consideration but how professional development should be conducted is of equal importance. The premise of Brown, Collins, and Duguid's (1989) theory of *situated cognition* and Lave and Wenger's (1991) *situated learning theory* is that engagement and active participation are viewed as inseparable for learning in physical and social settings. According to situated learning theorists, knowledge is "situated" in real contexts, and interactions between individuals in the context lead to development of meaning and understanding.

These theoretical frameworks contribute to our understanding of how people learn and have important implications for the design analysis of professional development that may or may not have included active learning in a community of practice within real-life contexts. To understand teacher learning in the online environment it is important to understand the context and the activities that teachers engaged in that were considered meaningful and applicable to the classroom.

While the research on professional development has informed educational leaders well, these best practices have been challenging to implement. Birman, Desimone, Porter, and Garet (2000) assert that districts simply do not have enough time or money to plan professional development well. They estimate that it costs an average

of \$512 to give a teacher a high-quality experience, which is twice the amount districts usually spend. To support teachers with professional development within their busy schedules, to maximize resources and draw from local and non-local resources, some districts have turned to online professional development in the hopes that it is an effective alternative to face-to-face professional development. Online learning, done any time anywhere, offers obvious advantages such as convenience, efficiency and autonomy, when compared to face-to-face learning. Learners may be even more free to learn actively, work at their own pace and review materials more often than with face-to-face classes (Leh & Jobin, 2002). Online learning has the potential to be real-time, ongoing, collaborative, active, and content focused depending upon the design. Online professional development is an important trend that has led to school improvement and may potentially ease the inequity in the distribution of teachers to students while increasing innovation. Virtual schooling bridges the traditional classroom and 21st century education by linking high quality teaching and high quality courses with the collaborative, networked, information-rich environments that are a hallmark of the information age (Davis & Rose, 2007).

Currently, there is a range of online professional development offerings serving a myriad of K-12 teachers. There are opportunities that focus on skills and instructional practices, assessment, organizational culture, the school/community connection, reform and changing belief systems and/or content areas such as language arts and science. Most experiences can be categorized by the following four models: (a) courses or certificate programs, (b) professional learning communities, for example, discussion forums or lesson studies in which lesson plans, student work, and videos are discussed,

(c) presentations, for example, webcast keynote speeches or videos of presenters speaking to an audience, and (d) tutorials with self-paced step-by-step directions. While most online learning experiences fit within these models, the vast number and myriad of experiences make it difficult to know the effectiveness of each.

Purpose of the Study and Rationale

Universities and community colleges have added online courses to their repertoire of offerings and many students are familiar with online learning environments as a result. Many K-12 districts, however, have been reluctant or unable to design online learning experiences to be a part of their district's professional development offerings. This reluctance may stem from a lack of capacity to design online professional development, the way colleges and universities have. It may also stem from an inability to sort through the existing online professional development opportunities without a mechanism to determine whether the professional development will effectively support teachers. Designers of conventional professional development, educational leaders, and policy makers who are considering online solutions as a new alternative would benefit from research findings that inform them about how to utilize the wide array of types and designs for online professional development that have been found to be effective. The research base, however, is currently thin.

As stated, there are many online courses offered by colleges and universities and studies are emerging that compare face-to-face classes that have been converted into online courses. While the higher education online learning research is in its' infancy, the K-12 professional development research is lacking even more. There is little strong empirical evidence and few, if any, large scale studies that inform K-12 professional

development leaders. Most of the research studies tend to be case studies of small numbers of convenience-sampled groups. For example, groups of K-12 teacher “students” engaged in professional development with a professor of higher education in an online course or a study looking at a particular course design or content.

Typically studies are conducted to look at the results of certain types of professional development designs. For example, studies that compare two types of online courses, or similar content delivered in two different ways. What is missing from the literature is research about the variety of ways that teachers have found to construct their professional development experiences on their own (or in teams) using the World Wide Web. How are teachers using archives of videos of classrooms and other teachers as mentors? How are they learning in formally constructed and informally constructed ways? How are educational forums and discussions shaping professional development and teacher learning? When, and under what circumstances, does knowledge transfer to the classroom? How might educational leaders influence teachers making the transfer to classroom practice stronger?

The Internet has an enormous volume of online professional development resources, however, it is difficult to know how to find high quality programs, and resources. This study will inform teacher and district decision-making by uncovering how teachers access and effectively utilize online professional development.

Designers of conventional professional development, educational leaders, and policy makers who are considering online solutions as a new alternative would benefit from research findings that inform them about successful models found to be successfully impacting classroom practice.

Research Questions

The teaching stage is set with intensity of demand for performance, complexity and challenge in the work itself, and high turnover rates. It is unlikely that the demand for performance will lessen and, with increasingly diverse students flooding our schools, it is unlikely that the complexity or challenge of the teaching profession will lessen. Addressing teacher quality and arresting teacher turnover, however, is within the locus of control for educational leaders and it is an important area of focus. As an Assistant Superintendent with close involvement in hiring and in charge of professional development, this is a field of keen personal interest to the researcher.

The following research questions are proposed in the study:

1. How do K-12 school teachers participate in online professional development?
2. How do these teachers describe online professional development experiences that positively impact their learning?
3. In what ways do these experiences positively impact their effectiveness in the classroom?
4. In what ways did the online experiences strengthen participant technology skills?

K-12 teachers will be invited to complete an anonymous online survey hosted on Survey Monkey, a password protected web-based tool. A survey link will be sent to teachers who have been recommended as participants by leaders from affiliates of the International Society of Technology in Education (ISTE). Three survey participants who provide contact information and consent, will participate in interviews to give

further insight for their particular online professional development experiences. Additional interviews will be conducted with two facilitator and/or administrators associated with each of the three professional development models selected to document three case studies. It is hoped that insight into positive online professional development experiences will help inform districts by providing direction for future use of online professional development resources.

Organization of the Study

Chapter 1 has described the context of the problem, purpose of the study, rationale, and research questions. Chapter 2 is a review of the literature on professional development and online professional development. Chapter 3 describes the methods used in conducting the study. Chapter 4 describes the quantitative and qualitative data results and analysis. Chapter 5 provides a concluding summary and discussion of the study.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter presents an overview of the significant literature and theoretical frameworks relevant to a study of face-to-face professional development and online professional development. First, the last twenty years of professional development literature will be explored to clarify the elements of effective professional development specifically how effective training is designed to support adult learners. I contend that the models of professional development have an impact on the effectiveness of the professional development to change teacher beliefs, encourage professional growth, change classroom practices, or support K-12 teachers to be more effective.

Second, professional development literature is synthesized to inform a more specific review of the literature about online learning as a newer form of professional development. Relevant studies will be explored to reveal commonly used theoretical frameworks to understand and inform current and future research. The online professional development research will be presented to show the similarities and differences between face-to-face and online professional development. Years of research have revealed the importance of the form of professional development, who is participating, and how activities are coherently designed to support learning goals. The online environment research strengthens and supports face-to-face professional development findings stressing the same important areas with adaptations because of the unique online environment.

Online professional development is a relatively new field of study and is proliferating the World Wide Web with courses and certificate programs, a variety of online learning communities, tutorials, and a myriad of teacher support tools and

resources. Professional learning communities include discussion forums in which teachers congregate online to learn about and discuss topics of interest. They also include sites in which lessons are studied with the ability to review lesson plans, student work and even classroom videos. Online professional development also includes keynote presentations, for example, from renowned speakers such as differentiation specialist Carol Ann Tomlinson. The Internet houses videos of presenters teaching about particular topics and even videos showing speakers presenting to a participating audience.

The scope of the literature review is limited primarily to peer-reviewed articles from scholarly journals and books that are frequently referenced by peer-reviewed articles from scholarly journals. Databases that were used primarily included PsycINFO, Education Resources Information Center (ERIC), and Education Full Text (Wilson) in which the following search terms were used: staff development, online learning, communities of practice, networks, adult learning, and K-12 education. Studies were used for inclusion when they provided an influential theoretical model or historical background relative to the history of face-to-face or online professional development. Studies were also included when they provided empirical evidence to inform the reader about professional development design. Design elements include content, instruction, mode of delivery, communication, program models, and best practices.

Theoretical Frameworks

Brown, Collins, and Duguid (1989) assert the premise with *situated learning theory or situated cognition*, that engagement and active participation are viewed as

inseparable for learning in physical and social settings. Thinking and construction of knowledge is “situated” in real contexts, and interactions between individuals in the context lead to development of meaning and understanding. Situated learning advocates further contend that learning is not the acquisition of knowledge in the mind but a collaborative endeavor; therefore, learning occurs when teachers engage in *communities of practice* (Lave & Wenger, 1991). Communities of practice are defined as self-organizing, evolving, entities that have their own emergent organizational structure and norms of behavior (Lave & Wenger, 1991; Schlager & Fusco, 2003). In situated learning theory the concept of *situatedness* involves people being participants in an activity and in generating shared meaning from that activity. Lave’s and Wenger’s focus on learning as social participation is defined by belonging to a community that is actively engaged in a practice in which participants make meaning from the actual experience.

While the theoretical framework for communities of practice significantly overlaps with the attributes of situated cognition, Brown, Collins, and Duguid (1989) emerge with a unique epistemology to guide educational practice. Conceptual representations, and their relation to objects in the world, are inappropriately placed in priority over situated activity and perception. It is a challenge for educators to determine what should be implicit in teaching and what should be explicit without over-reliance on the latter. “A theory of situated cognition suggests that activity and perception are importantly and epistemologically prior – at a nonconceptual level- to conceptualization and that it is on them that more attention needs to be focused” (p. 41).

These guiding frameworks help us to understand professional development, in the face-to-face environment and online, however, a complete explanation of a community of practice can only be developed if the participants in the experiences are also understood. When a teacher participates in professional development, their classroom is the same, their questions and learning interests are the same, and the teachers they work with at the school are the same. Typically, the teachers at the school are the community of practice, however, now that online communities exist, teachers may be participating simultaneously in two or more communities of practice. Teacher learning in these communities is likely experienced with different levels of intensity of interaction, reflection and participation. This study will explore the notion of parallel or intersecting communities of practice that exist when teachers are working in face-to-face classroom situations with the potential to interact with other teachers in a community of practice, while simultaneously participating in an online professional development experience in which they may interact with teachers in that community of practice as well.

Sociologists use theories about *Social Capital* that may help to explain the differences between two parallel or intersecting communities of practice. Adler and Kwon (2002) define social capital as “the resources available to actors as a function of their location in the structure of social relations” (p. 18). Social Capital represents that teachers’ potential to be able to access the resources or the benefits of their social network(s). Teachers in two separate or intersecting communities of practice are likely to have increased resources because all social relations and social structures facilitate

some form of social capital whether the social relations and interactions are weak or strong (Adler & Kwon, 2002; Coleman, 1988). Coburn and Russell (2008) suggest:

When applied to education, social capital theory foregrounds the resources that are available to a teacher through social interaction with colleagues, and it posits that particular features of social relations are more or less conducive to accessing appropriate resources and creating a normative environment that enables change in classroom practice. (p. 205)

Social capital increases as access to increasingly high quality information is shared and available to actors in the social situation. Researchers suggest that social capital has important consequences for knowledge development, innovation, problem solving, and transfer of complex information (Adler & Kwon, 2002; Coburn & Russell, 2008). Adler and Kwon (2002) assert that there are at least four dimensions of teacher social networks that are the sources for the development of social capital: structure of ties, access to expertise, and content of interaction. It is important to attend to the way individuals are situated in social networks and how social relationships enable individuals to access valued resources (Coleman, 1990).

Social capital theorists draw on a methodological process called social network analysis as a means to investigate the social and meaning-making aspects of adult learning by focusing on frequency of communication and interaction as well as the strength of communication and interactions. Networks are groups of individuals joined together, in effect, as communities of practice that have a particular identity, engage in purposeful tasks or practices, and make meaning from their shared experiences. Scott (1991) describes individuals in networks in relation to each other. Participants are “central” when they have or give or receive more information and knowledge than other

participants. This notion of *volume* contrasts with the *frequency* of interactions between members referred to as density. Teachers, therefore, are stronger in the community of practice when they experience more interaction and communication. Professional development has the potential to provide increased interaction and communication.

Researchers suggest that change in organizations is socially constructed (Hubbard & Mehan, 2006), which means that professional development is an important foundation for change to take place. Furthermore, opportunity for social construction is an essential component of the design of a professional learning opportunity.

Specifically, if change processes rely on the interpersonal relationships of the participants then change occurs through their interactions (Mohrman, Tenkasi, & Mohrman, 2003).

Reeves (2006) suggests that change leaders should design their use of socially constructed networks to facilitate the accomplishment of organizational goals. He describes strong, influential, key personnel in the network as *hubs* and *super hubs*. Reeves argues that using these people strategically in the support of organizational change will increase the probability of the organizational change effort being successful and that lack of attention to their socially constructed power could lead to unanticipated difficulty and resistance. This body of research challenges the notion of conventional professional development design that is typically disconnected from social networks and everyday practice and suggests that the design of the participants networked in the professional development experience is critical.

Situated learning theory provides the theoretical framework to understand how people learn and how knowledge is constructed, which has critical implications for how

professional development is designed in face-to-face and online environments.

Understanding social networks supports this theoretical framework while encouraging us to further analyze *who* is socially constructing knowledge together as participants in professional development.

Professional Development to Meet the Needs of Diverse Populations

Effective professional development that has the potential to transform beliefs and change practices must be designed with certain components and characteristics.

Birman et al. (2000) provide a conceptual framework to explain the components of effective professional development. To identify these components they surveyed a nationally representative probability sample of over 1,000 teachers participating in the federally sponsored Eisenhower Professional Development Programs. Researchers determined that there are three influential structural professional development features: (a) form, (b) duration, and (c) participation. Three core features that characterize strong professional development are: (a) active learning, (b) content focus, and (c) coherence. It appears that districts will have stronger professional development programs that are more likely to close the achievement gap if they attend to these factors when designing adult learning.

Structural features

Form. Teachers who leave the teaching profession frequently point to lack of collegial support and an inadequate support system as reasons for their dissatisfaction (Futernick, 2007). Supporting the theoretical framework that knowledge is co-constructed in communities of practice, teachers need to work in strong collaborative

mutually supportive teams. Joyce and Showers (2002) suggest that an essential element of professional development that will significantly affect student achievement requires, “A community of professionals coming together who study together, put into practice what they are learning, and share the results” (p. 4). Researchers show that professional development activities should be structured for collaborative learning, for example, through study groups, coaching, internships, action research, committees, teacher networks, or mentoring situations (Birman et al., 2000; Conway, Hibbard, Albert, & Hourigan, 2005; Glazer & Hannafin, 2006; Johnson, 2006; Joyce & Showers, 2002). In three El Paso school districts a teacher-coaching model of professional development led to increased achievement (Haycock, 1998). Achievement is improved when teachers work in professional learning communities in which collaboration is a central feature (Dufour & Eaker, 1998; Schmoker, 1999).

Duration. Traditional professional development workshops and conferences are criticized for being brief and sporadic. They do not have the positive impact that longer training has particularly when ongoing follow-up and continued learning over time are built into the professional development design (Birman et al., 2000; Haycock, 1998; Johnson, 2006; Moore & Barab, 2002). Professional development is stronger when interactions are on going over continuous periods of time. In the past 20 years progress has been made in this area and the duration and intensity of training events has greatly increased. The essential training components that are required to positively impact student achievement require long periods of time with multiple professional development opportunities imbedded to study a theory, observe its demonstration,

practice in the classroom, and receive coaching for maximum transfer of the new learning into the classroom (Joyce & Showers, 2002).

Participation. Groups of teachers from a grade-level, department, or school benefit from professional development activities in real-life contexts (Birman et al., Duncan, 2005; Glazer & Hannafin, 2006). Professional learning is a social enterprise and is improved when school teams work together to consider innovative practices in a common environment and for similar students with the same curriculum (Glazer & Hannafin, 2006). Schools with the right team members at the training, the time, and the desire to work collaboratively have the right structural features in place to begin developing processes for effective professional development.

These three structural features of form, duration, and participation define the recommended configurations and organization of professional development i.e., who participates, when, and in what ways. The core features of active learning, content and coherence are the elements of the substance of professional development. They include how teachers learn together and, more specifically, what they learn.

Core features

Active learning. Building on the notion that the best form for professional development is teachers working directly with teachers, the design of professional development is best when teachers are engaged in meaningful activities that reinforce analysis of teaching and learning and communication about job-imbedded practices. Active learning experiences include sharing opinions, reviewing student work, planning, observing teaching and being observed (modeling) and peer coaching

(Birman et al., 2000; Darling-Hammond, 1998; Hur & Hara, 2007; Joyce & Showers, 2002). Japanese teachers make it a priority to pass along their collective knowledge to beginning teachers with intensive ongoing support. Beginning teachers in the United States typically are given difficult assignments such as combination classes and struggle to penetrate the walls of isolation between them and their colleagues (Darling-Hammond, 1998). The more complex the task the more essential peer coaching and collaborative planning becomes to transfer the training to the classroom and facilitate the development of new group norms, the spirit of experimentation, flexibility, and persistence (Joyce & Showers, 2002).

Research demonstrates that educational leaders need to create opportunities for active engagement in meaningful collaborative activities that will transform instructional practices. The structural and core features of effective professional development are often overlapping or intersecting, for example, when the content is designed with the characteristics of the participants taken into account.

Focus on content. Joyce and Showers (2002) suggest, “Only content dealing with curriculum and instruction or the overall social climate of the schools is likely to *considerably* improve student learning” (p. 11). Other researchers agree upon the curriculum focus, however, they suggest that professional development goals should focus specifically on improving and expanding teacher’s content knowledge in their subject area (Birman et al., 2000; Conway et al., 2005; Haycock, 1998, Hirsh, 2005). In Community School District #2, Tony Alvarado focused on the content area of reading then mathematics and primarily used on-site coaching from experts for collaboration and active engagement which led to student achievement gains (Haycock, 1998). Cohen

and Hill (1998) also demonstrated that professional development focused on curriculum content has a direct impact on achievement. Joyce and Showers' (2002) suggest that training should include developing content knowledge, however, they also contend that teachers must explore theory to understand the concepts behind deployed skills and strategies. They contend that content knowledge should be a sub-goal within the larger goal to become a more effective teacher.

Coherence. Coherent professional development involves systematically sequencing adult learning toward intended results and standards of practice. Activities should ideally connect from one to the next over a period of time with opportunities to apply new learning in the classroom. Districts need to have a coordinated design for linking and integrating isolated specific content centered activities together into a comprehensive plan (Birman et al., 2000; Darling-Hammond, 1998; Haycock, 1998; Joyce & Showers, 2002).

Birman et al. (2000) suggest that most professional development programs have some essential elements but lack others. They assert that districts simply do not have enough time or money to plan professional development well. They estimate that it costs an average of \$512 to give a teacher a high-quality experience, which is twice the amount districts usually spend.

Maximizing Professional Development with Technology

To support teachers with professional development within their busy schedules, to maximize resources and draw from local and non-local resources, districts should consider online professional development as an alternative to face-to-face professional development or to augment professional development. Online learning, done any time

anywhere, offers obvious advantages such as convenience, efficiency and autonomy, when compared to face-to-face learning. Learners may be even freer to learn actively, work at their own pace with the least performance pressure and review materials more often than with face-to-face classes (Bishop, 2006; Leh & Jobin, 2002). Online professional development also has the potential to be real-time, ongoing, collaborative, active, and content focused depending upon the design. If properly scheduled, teachers may have a learning experience, try out new practices in their classroom and then return to their peers with feedback, thoughts, and questions supported by real examples that reinforce their learning (Bishop, 2006).

There is currently a range of online professional development offerings serving a myriad of K-12 teachers. The research is heavily dominated by examples of higher education courses being offered online although that is certainly not the only type of online learning available. A study by the Sloan Consortium showed that 81% of higher education institutions offer at least one fully online or blended course (Allen & Seaman, 2003). There are courses that focus specifically on content areas such as science, courses that focus on skills and instructional practices, assessment, organizational culture, the school/community connection, reform and changing belief systems, and varieties of combinations of each aspect. According to Bishop (2006), some district and states partner with universities, associations, and foundations or districts contract outside commercial providers. There are also districts that purchase courseware management systems to create specially designed professional development.

While online professional development is increasingly available, relatively little is known about the range of types, effectiveness and best practices associated with the

professional development teachers are experiencing. There is little strong empirical evidence and few, if any, large-scale studies that lead to the kind of generativity that would effectively inform educational leaders sufficiently for policy and financial decision-making. Most of the research studies tend to be case studies of small numbers of convenience-sampled groups. For example, groups of K-12 teacher “students” engaged in professional development with a professor of higher education in an online course. Additionally, measuring the effectiveness of online teacher professional development, while enormously complex, is nearly completely absent from the literature.

Universities and community colleges have added online courses to their repertoire of offerings and many students are familiar with online learning environments as a result. Many K-12 districts, however, have been reluctant or unable to design online learning experiences to be a part of their district’s professional development offerings. With so much obviously available it is logical that educational leaders would not plan to design their own professional development, but instead take advantage of what is currently available. Districts have been reluctant to do that as well. There is an enormous volume of choices and yet very limited information about how to understand the choices.

Designers of conventional professional development, educational leaders, and policy makers who are considering online solutions as a new alternative would benefit from research findings that inform them about how teachers currently participate in online professional development that extends their learning and positively impacts their classrooms. In this portion of the review of literature, a synthesis is presented to better

understand what is currently known about online professional development and how it is currently being utilized.

Some online professional development courses are designed to teach technology skills in addition to skills that will advance typical classroom practices. Despite the advantages to online learning, not everyone embraces online learning opportunities. Individuals who lack confidence using the Internet resist online learning situation and participants without high quality equipment also resist online learning courses (Thompson & Lynch, 2003). Developing participants' familiarity with technology, comfort with the Internet, and exposure and use of websites, are primary or secondary goals for these courses. For the purposes of this review, online learning research focusing on technology education has been minimized. Instead, this discussion is focused primarily on online professional development designed to strengthen teacher effectiveness of practices without the dual objective of technology education.

Theoretical frameworks for the examination of online professional development are similar to the theoretical frameworks for face-to-face professional development with a focus on social learning theory and the concept of communities of practice (Franklin & Sessoms, 2005; Keller, Bonk, & Hew, 2005; Schlager & Fusco, 2003). Three themes emerge from the analysis using these frameworks: (a) interaction and collaboration, (b) content, and (c) design. These themes obviously overlap with the tenets of effective face-to-face professional development, however, the emphases of the research change when focusing on the online environment.

Interaction and collaboration

Palloff & Pratt (2007) suggest, “There are four basic features that must be present in order for community to form: people, purpose, policies, and computer systems” (p. 17). Moore and Barab (2002) developed an innovative example of an online community of practice called *The Inquiry Learning Forum* in which teachers engaged in an active learning environment with sustained support during a three-year project. The center of the learning environment was the classroom space that connected pre-service teachers to real classrooms with video and artifacts such as lesson plans, student work, and reflection journals. Even though the researchers approached the learning community website with a co-construction of knowledge approach, the researchers learned more about the importance of collaboration and interaction stating:

We had designed a technically solid site, but had not designed the social structures needed to support long-term engagement, interaction, and community building. The site was designed for usability, but not for "sociability" (Preece, 2000). Our focus during the last several months has shifted away from technical design to the design of spaces and structures to support the "sociability" of the Inquiry Learning Forum. Areas being addressed are more fully supporting workspaces, and expanding our attempts at face-to-face interactions. (p. 47)

In an effort to create communities in the online environment much has been written about ways to promote interaction and collaboration to develop a broader range of ideas and deepen understandings (Hur & Hara, 2007; Leh & Jobin, 2002; Levin, Waddoups, Levin, and Buell, 2001; Palloff & Pratt, 2007; Smith, 2005). Vygotsky (1978) defines collaboration as small, interdependent, and heterogeneous groups that co-construct knowledge. This co-construction of knowledge is facilitated by the provision of problem solving activities that allow participants to share classroom

authority and develop mutual agreement (Smith, 2005). In their review of the literature, Hur and Hara (2007) raised concerns about sparse community sustainability in the online environment and suggest that the opportunity to self-organize learners must be imbedded in order to have sustainability. Learning management systems such as Blackboard, WebCT, and Moodle can be used in combination with Web editing tools and databases created with Microsoft Access (Recesso, 2002). These systems either promote synchronous or asynchronous discussions with specifically pre-designed format and content. A key factor in promoting student engagement is communication with teachers outside of the classroom (Kennedy, 2000). Online chat, conferencing, forums, and even email are currently used tools to promote that dialogue. Keeping synchronous online discussions engaging requires a specific technique monitored by professors and facilitators. To keep all learners engaged and out of the periphery of the learning, professors' poll students, they solicit comments based on the polled responses and they offer options and choices in order to mitigate the increased potential distractions inherent in distance learning (Delaney & Leonard, 2002).

Asynchronous communication is advantageous because there is a lack of need to coordinate schedules to converse. Researchers found that when they compared online programs with face-to-face courses the asynchronous posting of ideas proved to be helpful to participants and facilitated the sharing of a broad range of ideas (Moore & Barab, 2002). Participants even responded more favorably about student interaction than the students involved in the face-to-face class because in the online environment the conversations were controlled by prompts and discussion responses, and participants stayed more focused on class topics (Harlen and Doubler, 2004). In addition, students

who appear quiet in the classroom are often found to become active participants in the online format.

In one study, asynchronous discussions benefited students with strong in-born thinking styles (as measured by the Myers-Briggs Thinking Indicator) in which more time to prepare thought is an advantage for them. They also determined that some students find it difficult to speak in large class settings either because there are so many people contributing ideas, they are shy or they are English learners (Brown & Green, 2003; DeLacey & Leonard, 2002). Using the framework of Jungian theory, Lin, Cranton and Bridglall (2005) determined the benefits and drawbacks of asynchronous dialogue for different types of learners. Participants were described as introverted or extraverted with four functions of living (thinking, feeling, intuition, and sensing) and educators tend to be personality type *extravert/intuition* (Cormier, 2003) even though personality type *extravert/sensing* is more frequent in the general population (Myers & Myers, 1995). Introverted learners found the additional thinking and reflection time of value before they respond. Extraverted learners appreciate seeing others perspectives satisfying in the online environment and less available in face-to-face settings.

Smith (2005) cautions that learners face communication, technical and socio-cultural challenges in collaborative groups. The absence of nonverbal cues and communication spontaneity can be a challenge particularly since there is potential to slow decision-making and consensus building. It is also a challenge for students who are not linguistically oriented (Leh & Jobin, 2002). Males tend to have more self-efficacy than females and when they have greater subject matter expertise are dominant in collaborative groups (Smith, 2005; Watson, 2006). Facilitators should also monitor

participation rates of minority students to guard against reinforcement of the dominant ideology (Smith, 2005).

Researchers point out that facilitation of the online class by the teacher is an important component and that teacher interaction and adequate and timely feedback is essential for learner satisfaction (Levin et al., 2001; Palloff & Pratt, 2007; Tobin, 1998). Palloff and Pratt (2007) recommend that facilitators create a distinctive gathering place for the group and establish clear norms and code of conduct. They recommend defining the purpose of the online community, establishing and promoting leadership of the total group and subgroups, and allowing for a range of member roles. Based on a literature review conducted by their student (Davidson, 2006) it is important for successful facilitators to do the following activities:

1. Create a learning community that is intellectually exciting and challenging.
2. Encourage learners to perform to the best of their abilities in all aspects.
3. Consistently use process-oriented instructional methods and keep the learning community centered.
4. Demonstrate effective use of group dynamics and dialogue techniques.
5. Use a variety of learning activities and demonstrate instructional methods other than lecturing.
6. Stress the interrelatedness of the complete curriculum and the value.
7. Build knowledge workplace trends and perspectives related to the subject matter being taught
8. Establish objectives and [inspire] learners to achieve them.
9. Draw out creativity, innovativeness, and ideas in a collaborative manner.
10. Integrate curriculum designed to provide learners with a learning environment that is experientially based and in a learning style that is collaborative and supportive.
11. Evaluate learning outcomes.
12. Attend professional development workshops that will review learning theories and continually develop facilitator skills.

13. Allow members to resolve their own disputes. (p. 108)

Online courses are panned when learners do not receive adequate feedback, particularly from facilitators. It is also essential, for community sustainability, for moderators to help avoid people dominating the community, allowing all members to strengthen their sense of ownership in the group (Hur & Hara, 2007). Smith (2005) recommends, “Instructors need to facilitate the adaptive functions and minimize the destructive functions of the group individuation process” (p. 196). If instructors attempt to solve group conflict, there is potential to destroy the group dynamic. Instructors should be aware of the psychological implications of group composition as heterogeneous groups can increase innovation they have an increased likelihood of experiencing conflict.

A potential disadvantage of online learning is the lack of ability for instructors to model their practice in an online environment, although Moore and Barab (2002) are attempting to model through the use of videotape. Brown and Green (2003) point out that, in online environments, “Teachers have fewer opportunities to demonstrate what they have learned and cannot receive immediate, expert feedback from their instructor when they attempt to replicate the model” (p. 150). Systematic feedback will be an essential design component to consider for future online professional development courses.

There are several aspects of interaction and collaboration that are similarly discussed in the face-to-face professional development and the online professional development research (see Appendix A). Researchers also recommend strengthening online learning communities with face-to-face facilitated meetings to strengthen the

online experience (Bishop, 2006). There is agreement, and strong focus in both sets of literature, that all forms of professional development should be collaborative endeavors in which knowledge is co-constructed in a community of practice or professional learning community. Online professional development literature departs from traditional professional development with its emphasis on synchronous conversation and asynchronous conversation, which is unique to online learning.

Professional development literature focuses on social networks of individuals who typically work together. They may assemble into study groups, action research teams, or mentoring/coaching teams. The online literature shows that the form of who and how individuals come together is dependent upon the design of group activities, how journaling and reflection are shared, how modeling is constructed and how facilitation and feedback are constructed synchronously or asynchronously. Collaborative learning and reflective practice are two important ingredients necessary for transformative learning to occur (Palloff & Pratt, 2007).

Content

Another important feature of the face-to-face and the online learning environment is the actual content of the material presented. In the online professional development literature the quality (not quantity) of the content is important and essential to retain students in online courses (Kennedy, 2000). Retention is a critical issue that needs to be addressed relative to online learning formats. The statewide average for California Community College retention online education courses is only 54 percent compared to 62-67 percent in face-to-face courses (Nather, 2003). What are the

important design considerations for content that will capture and sustain participant interest? Researchers attempt to answer this question and find that some aspects overlap with the tenets of effective face-to-face professional development content and some are unique to online environments.

As with face-to-face learning, the material is best when it is challenging, relevant, and immediately applicable in daily work (Levin et al., 2001). The members of a highly sustained online community suggested that the group continued because the online environment was strictly for teachers, by teachers, with practical applications for classroom teaching (Hur & Hara, 2007). It is not only important to adopt a constructivist approach that engages learners in the active participation and co-construction of knowledge through the sharing of information and experiences relative to their practice, it is also important for the learning activities to transfer to classroom application (Darling-Hammond, 1997; Leh & Jobin, 2002; Mouza, Kaplan, & Espinet, 2000). The content of online learning must be designed with a focus on this transfer.

Using inquiry in the online environment to promote experiential and challenging learning-centered environments for participants has proven to be an effective way to structure content (Moore & Barab, 2002). The objectives for the learner must be clear and understandable and information in the online environment must be presented in a thoughtfully scaffolded manner so that understanding is deepened throughout the experience (Harlen & Doubler, 2004). Grounded in the theory that the online environment is a community of practice, the content must be presented so that knowledge is co-constructed with the individuals participating in the learning experience. When students generate their own data, work with peers and online

coaches, generate significant portions of the content, and participate in guided exploration, relevance and learning improve (DeLacey & Leonard, 2002). To deepen the learning experience online designers use materials such as video, artifacts, lesson plans, student work, and realia.

Although the online environment may seem rigid and structured because of its linear nature, course design must create flexibility in teaching and learning. The more content, material and discussions are flexible the better the online course (Forsyth, 2002). Inviting students to contribute to the design of the course, providing opportunities for students to evaluate the course, encouraging evaluative discussion, discussing points of view, relating coursework to current events, or making work related connections, help students feel more connected and engaged in learning online (Kennedy, 2000). Fostering flexibility in teaching and learning means that teachers need to choose the right technology for the task and think about teaching in a new way e.g., taping conferences and posting the audio online (Levin et al., 2001).

In summary, the literature suggests that high quality content is extremely important for both online and face-to-face environments. The face-to-face professional development literature includes much more fully developed recommendations for designing the content of professional development that improves curriculum, instruction, skills, and strategies. That body of literature also includes studies connecting professional development to achievement. The online professional development is much less developed. While content emerges as important, attention is focused on beginning stage or surface level considerations such as how to sequence the learning. Use of inquiry has emerged as a good online solution for engaging teachers in

high quality complex content, however, more varied mechanisms need to be developed to add to this single solution. The limitations of the online environment definitely influence the range of choices available to professional development designers. We now look specifically at the design elements unique to the online setting in contrast to face-to-face settings.

Design

To build an online community, researchers must focus on the design elements that frame learning experiences. They must consider the audience of eclectic individuals, with their myriad of learning styles, as structures are created to support online websites. They must also determine when activities will be structured for individuals, small, or large groups, and they must determine how the learning activities will support the configurations of participants. For example, whether designed for individuals or the group audience, online environments often include opportunities for journaling, which has been shown to deepen reflection and meta-cognition. Teachers seldom have the opportunity to participate in in-depth reflective discussions (Moore & Barab, 2002). Research has shown that certain kinds of online social contexts have effects on a variety of dimensions of reflective thinking and that participants develop greater reflection in their learning through online courses compared to teachers who met face-to-face (Harlen & Doubler, 2004; Makinster, Barab, Harwood, & Andersen, (2006). By designing the website to strongly support journaling and deep reflection, the online environment has the potential to be more highly effective.

Course designers must also consider the technology itself, which can be a support or hindrance to learning. Students taking online courses must have a minimum of technology experience and expertise and computer system requirements (Ho & Burniske, 2005; Leh & Jobin, 2002; Recesso, 2002). Tobin (1998) introduced the concept of *qualia* to describe the affective aspects that influence the online learner's satisfaction such as confidence, frustration, and general feelings about the online experience. These are directly related to the users' capacity to manage the hardware and software technology. High quality design will take these important elements into consideration when choosing software and designing the website.

In the 21st century, online professional development seems to be a stronger and stronger choice for adult learning, however, some disadvantages need to be considered during the design process. It has been said that a disadvantage of online learning is that remote learners aren't forced to be together in a real community (Brown & Green, 2003). Some researchers even contend that a long period of dependence on online communication has the potential to exacerbate difficulties among individuals who are already isolated (Kennedy, 2000). Researchers have also shown that assessment of students is difficult at a distance (Leh & Jobin, 2002) or even non-existent (Bishop, 2006). Online professional development offers pacing flexibility for learners to adapt their learning to their personal schedules, for example, participants may complete assignments asynchronously through electronic bulletin boards. Even highly motivated teachers may lose focus if there is no formal assessment or defined conclusion to the learning. If the objective of online professional development is to improve student learning the assessment of changes in teaching strategies and pedagogical change is

highly recommended (Bishop, 2006). Online professional development literature points to these areas of concern and it is suggested that understanding design models is of critical importance, however, the research is not rich with information or particular solutions. Further research is necessary to propose address these dilemmas.

While researchers are questioning whether face-to-face or online learning is better and under what circumstances, it is important to explore the circumstances that would make completely online learning or a combination of online and face-to-face most beneficial for high quality experiential learning, especially when the experiences are closely tied to a professional work environment (Hur and Hara, 2007; DeLacey & Leonard, 2002; Ho & Burniske, 2005; Kennedy, 2000). The evolving technology favors certain kinds of learners. If done well, models designed with an integrative approach, in which all learning style preferences are honored, may be of great benefit (Lin, et al., 2005).

Conclusions

This review of the literature shows that face-to-face professional development and online professional development have a great deal in common and, while they are quite different in style, they require and have some similar design elements that support adult learning. To be effective they both need to promote interaction and collaboration in support of the co-construction of knowledge in a professional learning community. Both types of professional development need to bring the right group members together to work actively to solve immediate real-life problems for the students they work with

each day. Additionally, the content of the courses must be designed to build knowledge of curriculum and using the tenets of the effective practices outlined by researchers.

CHAPTER 3: METHODS

Teachers are faced with increasing accountability and pressure for diverse student populations to perform at higher achievement levels. A review of the literature showed that professional development, whether face-to-face or online, increased teacher effectiveness and positively impacted student achievement.

Purpose of the Study and Research Questions

Online professional development is a relatively new field of study and there are opportunities proliferating the World Wide Web. Colleges are offering courses and certificate programs. Professional learning communities that include discussion forums are forming to support teachers participating in discussions about topics of interest. Teachers are part of lesson studies in which they have the ability to review lesson plans, student work and even classroom videos. Online professional development includes keynote presentations and speeches from renowned speakers such as differentiation specialist Carol Ann Tomlinson and David Warlick. This study focused on identifying the models of online professional development that teachers found effective, contributed to their learning, and changed how they taught.

Using a mixed methods research design, participants were invited to complete surveys and participate in interviews. The surveys identified the characteristics of online professional development experiences that successfully impacted classroom practice. A cross-sectional survey design was used to investigate: (a) characteristics of the professional development experience, (b) attributes of participants such as learning style, and (c) impact of the professional development. According to Cresswell (2005), cross-sectional survey design is an appropriate methodology because cross-sectional

survey design is used to investigate trends in attitudes, opinions, beliefs, practices, and experiences, and is used to gather information at a single point in time.

Additionally, three of the surveyed participants were interviewed to further investigate the online experience using multiple case study research. Case study research is preferred when examining contemporary events in which interviews with participants yield information (Cresswell, 2005). Case study research offers an opportunity for the researcher to collect multiple sources of different types of evidence with a methodology that requires triangulation of data. Case study research is beneficial when the context of the person's environment is important, and context was established as important when using the theoretical framework of communities of practice and situated learning theory.

Data was analyzed to identify common themes of the useful and applicable online professional learning. To examine online professional development more in-depth the following research questions guided the study:

1. How do K-12 school teachers participate in online professional development?
2. How do these teachers describe online professional development experiences that positively impact their learning?
3. In what ways do these experiences positively impact their effectiveness in the classroom?
4. In what ways did the online experiences strengthen participant technology skills?

This study was intended to have implications for educational leaders. Districts no longer need to think in traditional ways about how they will design and offer professional development, but instead should consider how to take advantage of the powerful opportunities that already exist just beyond teacher's fingertips. This study was intended to inform district professional development practices and inspire new ways of thinking about how to conduct professional development. By understanding the strengths of online learning districts may add professional development options or will be more able to incorporate online learning components to existing professional development.

General Research Design and Rationale

This research study focused on K-12 public and private school teachers and their perceptions of online professional development that positively impacted their teaching when the professional development content objectives were not focused on technology.

Pilot Study

In December 2008 twenty convenience-sample participants reviewed initially developed survey questions and offered feedback to increase clarity, reliability, and validity of the survey questions. During February and March 2009 a pilot study was conducted with 41 teacher participants to validate the survey as a tool for the study. Factor analysis was used to determine if questions needed to be added or eliminated from the survey to increase the stability of the survey instrument.

Participation

After the pilot survey analysis was concluded and adjustments were made to the survey, an electronic mail invitation was distributed to leaders from affiliates of the International Society for Technology in Education (ISTE) soliciting participation in the study. ISTE affiliates are typically state organizations that support teachers and administrators with technology information and education. A directory of the names of affiliate leaders was found on the ISTE website at <http://www.iste.org>. These leaders were likely to be aware of districts and participants who have participated in online professional development opportunities. ISTE has approximately 18,000 members and there were currently more than 80 affiliate organizations of ISTE representing over 100,000 education and technology professionals in the United States.

An electronic mail message sent to 45 ISTE affiliate leaders (representing 27 states) contained an informational message introducing and providing the rationale for the study (see Appendix B). The electronic mail message included a request to forward it to current US K-12 public school teachers who have participated in online professional development and link to the survey instrument via SurveyMonkey.com. ISTE affiliate leaders indicated that they would forward the survey to their constituents in the following states: Arizona, California, Florida, Kentucky, Michigan, Nevada, New Jersey, New Mexico, New York, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Wisconsin. As a result of the contact with ISTE affiliate organizations, a project manager for the Office of Elementary and Secondary Education in Pennsylvania also received the request to distribute the survey and it was agreed that the survey would be sent to the teachers in that constituent group. These sample populations were

surveyed because it was assumed that teachers who were members of these organizations would have access to the Internet and may have participated in an online professional development experience. Criteria for participation in the survey was having experience in online professional development that the teacher felt positively impacted their teaching.

Participants who were contacted via electronic mail from ISTE affiliate leaders also received an informational message introducing and providing rationale for the study (see Appendix C). ISTE affiliate leaders agreed to send out the survey on two occasions to the entire group since the leader would not have knowledge about who may have already participated in the survey. The survey was open to respondents for five weeks from April 24, 2009 through May 29, 2009. Once participants were directed to the SurveyMonkey.com Internet website, a description of the survey was provided with an informed consent for participation (see Appendix D). The survey was voluntary and participants remained anonymous unless they volunteered to participate in a follow-up interview. To take part in an interview, participants provided contact information in order to schedule and conduct the interview by phone.

Qualitative Sample Participants

According to Cresswell (2005), purposeful sampling is when individuals are intentionally selected to learn about a central phenomenon because the participants are “information rich.” In this study confirming and disconfirming sampling, a form of purposeful sampling, was used because participants were able to tell the stories of their experiences with professional development models of interest.

At the conclusion of the survey 567 participants answered at least some of the questions, however, 328 responses were determined to be complete enough for analysis to answer the research questions. Respondents who entered contact information had given permission to be contacted to schedule an in depth interview about their online experience. An analysis of the 195 unique weblinks submitted by participants was conducted to determine three models of professional development for more in depth study through interviews with participants in the pool of those giving permission. Since online professional development provided by colleges and universities dominated the literature of online professional development, it was determined that focusing on non-collegiate classes in more depth would contribute to gaps in the literature. Therefore, survey respondents were excluded from consideration for an interview if they referenced a college or university course as the focus for their responses. Respondents who indicated that they had participated in a school district created course, school district recommended professional development, online tutorial, or other professional development offering were considered for interview and three unique cases were selected that represented models for professional development meeting the criteria.

Using the URL information provided by participants, the website(s) were reviewed to learn more about the online professional development. Website document analysis included a review of the mission statement, description of the purpose of the professional development, basic organization of the professional development and identification of the sponsor of the professional development.

As indicated, respondents who indicated that they participated in a district recommended course that was also a college or university course were excluded.

Respondents who participated in a college or university professional development experience but incorrectly identified their professional development experience as non-collegiate were also excluded. It turned out that some respondents who indicated that their professional development experience was content focused actually participated in an online professional development experience that was more focused or equally focused on technology. Those respondents were excluded as well as were the respondents who did not leave their contact information for a follow-up interview.

The eMBEDDED LEARNING professional development was of interest for a case study because 60 participants indicated their participation in that professional development experience. A respondent who participated in eMBEDDED LEARNING and disclosed contact information was randomly chosen and contacted for a case study and that individual participated in the study. To identify two more respondents, the rest of the eMBEDDED LEARNING participants were excluded which meant there were only four respondents still included in the data set. All four were contacted for interviews, however, only two agreed to participate in a one-to-one telephone interview and those interviews were arranged to learn more about their online professional development experience.

Measures/Instrumentation

The first part of the survey was developed to collect eleven types of participant demographic information about models of professional development experienced, technology proficiency, gender, age, number of years of teaching, school type, subjects, and grade-levels currently teaching. During the opening week of the survey a request

was made by one of the ISTE affiliate leaders to geographically track responses. Fifteen of the survey respondents did not have the opportunity to indicate what state they were from, however, all of the rest of the survey participants were presented with the opportunity (see Appendix E).

The second part of the survey included check box sections in which participants checked statements that applied to them or the professional development experience being described e.g., characteristics of the professional development, technology proficiency before and after the professional development, and motivation for participation in the online learning experience. Seven types of this information were collected.

The second part of the survey also included seven fill-in-the blank and seven open-ended questions and statements. Fill-in-the-blank items required short answers, such as, identification of the number of hours per week required for the professional development experience. Open-ended responses required more depth and length, e.g., how the professional development impacted/changed the participants teaching in the classroom.

The second part of the survey also included 13 statements for participants to rank on a Likert scale from one through five indicating: *always, often, sometimes, or rarely, never*. This section of the survey also included 14 statements for participants to rank on a Likert scale from one through five indicating: *improved greatly, improved, improved somewhat, improved rarely, or stayed the same*.

The check-box, fill-in-the-blank, open-ended, and Likert scaled questions were mixed throughout section two to increase participant interest in continuing the survey.

Participants indicated information about the characteristics of the professional development experience being described, participant attributes and the impact of the professional development on teaching. Professional development characteristics included questions about: type, tools, facilitator, how long spent, pacing, content, assessment of learning, and features of the professional development impacting teaching. Participant attributes included: when participating, motivation for participating, alignment with learning style, and technical support needs. Impact of the professional development included how the professional development changed the participant's teaching, the impact of the learning on others and the impact on the participant's skill in the use of technology (see Appendix F).

After survey responses were collected and data initially analyzed, seven interview questions were developed (see Appendix G). Interview questions were asked to extend the survey questions and to provide evidence for rich case study descriptions. Interview questions were also required to better understand incomplete or contradictory statistical survey results and to validate trends. Questions were structured in accordance with best practice recommendations from methodology experts and researchers (Cresswell, 2005; Kvale, 1996).

Data Analysis

At the conclusion of the window for participation 567 teachers filled out at least one question of the survey and there were 328 complete (or nearly completed) surveys in the database. Survey responses were uploaded into the Statistical Package for the Social Sciences (SPSS) for analysis. Survey responses were subjected to a series of statistical tests recommended by Pallant (2005). To provide a description of the sample,

a series analysis resulting in descriptive statistics was performed. A factor analysis was computed to ensure the validity of the responses. The survey data were analyzed using correlations a series of t-tests to compare pairs, and one-way between-groups analysis of variance (ANOVA) with posthoc tests computed to examine if there were statistically significant relationships between the independent and dependent variables.

Next, all open-ended responses were loaded into either Excel spreadsheets or Word documents for analysis. The open-ended responses were coded using a constant comparative analysis method (Merriam, 1998).

The three interviews were recorded and transcribed into Microsoft Word documents using coding that did not include pauses, repetitions, or nonsensical fill words. Interview transcriptions were coded using best practices recommendations according to Yin (2003) and Miles and Huberman (1994). The interview data were also coded using constant comparative method recommended by Merriam (1998). Case study descriptions were written with fictitious names to protect the identities of the participants.

Summary of Methods

The focus of this study was to identify the models of online professional development that teachers found effective, contributed to their learning, and changed how they taught. In order to examine these phenomena teachers were contacted via electronic mail and invited to complete an online survey and 567 responded of which 328 completed the survey with enough information for analysis. The survey was divided into two sections. The first section was collected demographic information

about participants and was designed to gather information such as gender, age, location, number of years of teaching, school type, subjects, and grade-levels currently teaching. The second section solicited information about the characteristics of the professional development experience being described, participant attributes and the impact of the professional development on teaching. Additionally, three teachers were interviewed to gather more information about their online professional development experience. The following chapter will present the results of the data analysis.

CHAPTER 4: RESULTS

The purpose of this study was to identify the models of online professional development that teachers found effective, contributed to their learning, and changed how they taught. In order to examine these phenomena, teachers were asked to complete a survey about their experience with a particularly influential online professional development opportunity. Additionally, three teachers were interviewed about the professional development opportunity that they described in the survey. The reporting of the results of this study will begin with the presentation of the quantitative findings from the survey results, followed by the qualitative findings from the survey, then the qualitative findings from the interviews prior to the final summary of the findings.

Quantitative Data Results and Analysis

The quantitative portion of the study was designed to answer the following research questions:

1. How do K-12 school teachers participate in online professional development?
2. How do these teachers describe online professional development experiences that positively impact their learning?
3. In what ways do these experiences positively impact their effectiveness in the classroom?
4. In what ways did the online experiences strengthen participant technology skills?

To answer these questions a survey was sent to a purposeful sample of teachers across the nation. The survey included 11 demographic (see Appendix E) and 22 questions or statements (see Appendix F) about the online professional development experience that the participant chose to describe.

Factor Analysis

Within the survey there were 13 Likert scaled statements and 14 Likert scaled improvement questions statements in the survey. The 27 items were subjected to Principal Components Analysis (PCA) using SPSS Version 17 as recommended by Pallant (2005). Prior to performing the PCA, the data was assessed for suitability for factor analysis. The correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was .939 exceeding the recommended value of .6 (Pallant, 2005). The Barlett's Test of Sphericity reached statistical significance ($p=.000$) as it is recommended to be .05 or smaller (Pallant, 2005). These statistical tests supported that factor analysis was appropriate.

PCA revealed the presence of four components with eigenvalues exceeding 1. The first factor explained 46% of variance in teacher responses. The second factor explained 11% of the variance in teacher responses. The third factor explained 7% and the fourth factor explained 4% of the variance in teacher responses (see Appendix H). To aid in the interpretation of the four components, a Varimax rotation was performed.

Descriptive Statistics

To gain a complete understanding of the participant sample a series of descriptive analyses were performed using the demographic variables collected from the

11 survey questions. Frequencies were obtained to study the characteristics of each variable in the study sample (see Appendix I). The sample population surveyed between April 24, 2009 and May 29, 2009 included 567 respondents of which 328 completed the survey thoroughly enough for analysis. The 328 participants were from fifteen states. Forty-three percent were from Pennsylvania, 25% from California, 8% from Florida, 6% from Wisconsin, 4% from Arizona, 3% from Tennessee, 2% from Michigan, 2% from Kentucky and less than 2% each from Nevada, Ohio, New Mexico, Oregon, New Jersey, New York, and South Dakota. Six percent of the population either did not have the opportunity or failed to disclose what state they were from.

Teachers were given the opportunity to indicate how many online courses they have taken and what type of online professional development experiences they have participated in. The average of the survey population was eight online professional development experiences. Seventy-four percent had taken an online college or university course, 50% had participated in an online tutorial that provided professional growth for teaching, 44% had participated in a school district recommended professional development experience, 26% had participated in a school district created course, and 37% indicated that they participated in some other online professional development offering (not recommended by district staff) such as Cross-cultural Language and Academic Development (CLAD) or Structured English Immersion (SEI) credential classes, Classrooms for the Future training, Department of Education created courses, Promethean board training, grant funded training, or Webinar.

Seventy-one percent (232) of the individuals in the survey population were females, 28% (92) were males and 1% (4) did not indicate their gender. The majority of the participants (36%) were over 51 years of age, 24% were between 41 and 50 years old, 24% were between 31 and 40 years old, 16% were between 21 and 30 years old, and one person (.3%) was under 20 years of age. Less than 1% failed to indicate their age. The majority of participants were relatively experienced teachers. The average number of years of teaching experience for the survey population was 15 years. Nine percent taught more than 30 years, 22% taught between 20 and 29 years, 36% taught between 10 and 19 years, 23% taught between five and nine years, and 10% have taught between one and four years. One person (.3%) failed to indicate their years of teaching experience.

The study was predominantly a study of public school teachers (94%). The majority of the participants in the study were high school teachers (57%) followed by elementary school teachers (24%) and then middle school or junior high school teachers (13%). Three percent indicated that they work in a K-12 setting, 2% indicated that they work in a middle school and high school setting, and 1% indicated that they worked in an elementary/middle school. One percent failed to disclose the type of school they worked in.

Forty percent of the participants indicated that they work in a suburban setting, 37% rural, and 20% urban. The other 3% were working completely online, in juvenile court schools, on reservations, or in mixed settings.

The teachers in the survey population indicated that they taught a variety of relatively evenly distributed subject areas. The largest number of teachers taught multiple subjects (18%), followed by English/language arts (15%), science (14%), technology (12%), mathematics (11%), special education (8%), history/social studies (8%), library/media (4%), music (2%), physical education/health (1%), art and foreign language (less than 1%).

To gain a complete understanding of the online professional development experience being described a series of descriptive analyses were performed using the variables collected from eight survey questions related to the participant's professional development experience. Frequencies were obtained to study the characteristics of each variable (see Appendix J).

Most of the professional development experiences described were college or university courses (52%) followed by school district recommended professional development experiences (16%), online tutorials (12%), and "other" online professional development offerings (12%). Few participated in school district created courses (5%) and state created courses (2%).

To better understand the non-collegiate offerings the *school district recommended* professional development experiences were analyzed by reviewing the names and the associated websites disclosed in the survey. Of the 52 (16%) school district recommended courses 35 were state sponsored professional development (32 were the Classrooms of the Future Pennsylvania Department of Education, two were the California Technology Assistance Project (CTAP) and one other). Another six were

indicated to be school district sponsored, however, not a single one of the six indicated a website address for verification. Another four teachers indicated a school district recommendation to a commercial site (e.g., PD-360 at <http://www.schoolimprovement.com>). Two teachers indicated that they participated in a county sponsored professional development experience, two indicated the district recommended a college or university professional development experience, one indicated a district/university collaborative that would most likely be characterized as a powerful district sponsored offering (<http://www.tlc.milwaukee.k12.wi.us>). Two teachers did not indicate enough information to determine what the district had recommended.

Online tutorials were described by 40 (12%) of the participants. Twenty-two of the participants accessed professional development tutorials from commercial websites. Six of the tutorials were offered by a State Department of Education such as Florida's Sunlink. Five of the participants did not give enough information to determine who sponsored the professional development. Three teachers participated in tutorials that were offered by professional organizations and two teachers participated in tutorials offered by a County Office of Education. One tutorial was a project funded by the National Science Foundation and one tutorial was created at a university.

Thirty-six (11%) of the participants indicated that the general category "*Online professional development offering*" best described their online professional development experience. Sixteen of the participants indicated their participation in a professional development experience offered by the State Department of Education. Eight used commercial websites to access their professional development. Seven

participants did not indicate enough information to categorize their online learning experience. Three participated in college or university offered professional development. One person indicated participation in an online professional development experience that was offered by the County Office of Education and one person indicated the professional development was offered by the online Public Broadcasting System website.

Only 16 (5%) teacher participants indicated that the professional development experience they described was *created by their school district*. Eight participants indicated that their online professional development experience was created by the district, however, further investigation showed that they were actually *not* created by the district (one was a County School Boards Association website, three were commercial websites, and four were sponsored by the Pennsylvania Department of Education). Three of the participants indicated that the online professional development focused on using learning management tools used by the district e.g., Moodle and ANGEL. Three participants did not give enough information to determine the content of the professional development. One of the participants indicated that they learned to use software to set up grades and one teacher indicated that she participated in a Health and Safety module that was required for the district.

Of the five “*other*” professional development experiences that participants indicated did not fit into any of the categories above, two participated in professional development sponsored by the Pennsylvania Department of Education, and three participated in commercially offered websites (e.g., National Institute for Automotive Service Excellence and Apple®).

Viewed another way, 49% (63) of the non-collegiate professional development experiences described by the participants were created by a State Department of Education. Most were sponsored by the Pennsylvania Department of Education and included the Classrooms for the Future content. 31% (40) of the non-collegiate professional development experiences were offered on commercial websites.

Seventy-two percent of the participants indicated that they had a completely online experience and 22% participated in an opportunity that was mostly online. The majority indicated that they participated in the course completely at home (54%) rather than at work. Most of the participants indicated that they participated in the online experience because they were self-motivated to learn more about a particular topic (30%) and self-motivated to experience online learning (9%). Participants indicated that the online professional development opportunity was required for a degree program (21%) or an option for a degree program (7%). The online professional development was required by the district for 19% of the participants, chosen from a range of district options by 5% of the participants, required by the state for a credential for 5% of the participants, and required for a grant for 3% of the participants. Very few indicated that the experience was motivated by colleagues or friends or specifically for a pay raise (although a degree program may lead to a pay raise).

The total number of hours that participants estimated that they spent in their online experience ranged significantly with 0-19 hours (17%), 20-39 (24%), 40-49 (18%), 60-79% (10%), 80-99% (2%), and 100 or more (22%). Participants indicated that they spent an average of 163 hours in their online professional development

experience. The number of hours per week participants estimated they spent in their online experience was 0-4 hours (38%), 5-8 hours (30%), 9-12 hours (16%), and 13+ hours (12%). Participants estimated that they had spent an average of eight hours per week.

Participants were asked to rate their technology proficiency before and after the online experience (beginner, intermediate, proficient). The majority indicated that they did not improve a proficiency band (79%), while 18% indicated they moved up one level, and 2% indicated they grew by two levels.

When participants were asked which was most valuable to their learning/teaching most of the participants indicated that *self-paced learning* was most valuable (57%), followed by *interaction with others* (25%), followed by *the facilitator* of the online professional development experience (16%).

To gain a more complete understanding of who participated in the online experience with the respondent and what tools were available for use, a series of descriptive analyses were performed using the variables collected from two additional survey questions. Frequencies were obtained to study the characteristics of each variable. Tables 4.1 and 4.2 show the frequencies of these variables.

The majority of the participants indicated that they had a facilitator during the professional development. Sixty-two percent indicated that they participated with online learners they had never known before. Twenty-five percent participated with people from their district and another 25% indicated they participated with people from their school. Thirteen percent indicated they participated with learners from their grade-level

team. Fourteen percent indicated they participated with people they had only met online (during the online experience). Eleven percent indicated that they did not participate with anyone else.

Table 4.1: Frequency of Who Participated in the Online Professional Development Experience with the Survey Respondent

Independent variable	Frequency	Percent
Facilitator	217	66.2
Online learners I had not known before	203	61.9
Online learners from my district	81	24.7
Online learners from my school	79	24.1
Online learners from my grade-level team	41	12.5
Online learners I had met in class	45	13.7
No one else	34	10.4

Participants were asked to indicate the types of tools that they used in the online professional development experience they described. Most included online documents (90%), website links (84%), threaded discussions (83%), an assignment submission/feedback location (80%), video (69%), quizzes and/or surveys (65%), and email (62%). Relatively fewer indicated that online chat was a part of the experience (36%).

Table 4.2: Frequency of Tools Used in the Online Professional Development Experience

Independent variable	Frequency	Percent
Videos	226	68.9
Website links	276	84.1
Online documents	294	89.6
Threaded discussions (i.e. chat, blog, discussion board)	273	83.2
Email	204	62.2
Chat	116	35.4
Assignment submission/feedback location	261	79.6
Quizzes and/or surveys	212	64.6

Twenty-seven frequency and improvement questions were subjected to a series of tests to assess the normality of the distribution of scores. Participant mean scores fell within a range of 1.0 and 5.0 (see Table 4.3 and Table 4.4). The mean score of frequency of need of technical support was an average of 4.0 (rarely). All other means were below 2.84 (between always, often, and sometimes).

Table 4.3: Descriptive Statistics for Survey Frequency Statements

Question	N	Mean	Std. Deviation
Frequency the pacing was self-directed	326	1.86	0.96
Frequency assessment of my learning occurred	322	2.06	1.09
Frequency I learned from educational research and/or scholars	326	2.06	1.10
Frequency there was a positive impact on my classroom	322	2.10	1.12
Frequency I have or will recommend this course to others	321	2.11	1.33
Frequency a facilitator was available	325	2.13	1.12
Frequency technical support was available	322	2.14	1.22
Frequency I learned from practitioners	324	2.18	1.16
Frequency I created or modified lessons for my classroom	324	2.21	1.20
Frequency I felt I was a part of an online community	325	2.42	1.25
Frequency the online community supported my learning	324	2.47	1.27
Frequency I interacted with a facilitator	324	2.84	1.10
Frequency I needed and used technical support	323	4.00	1.15

Note. Values are the mean of reported scores on a 5-point scale (1 = *always*, 2 = *often*, 3 = *sometimes*, 4 = *rarely*, 5 = *never*).

Table 4.4: Descriptive Statistics for Survey Improvement Statements

	N	Mean	Std. Deviation
Improved my range of instructional strategies	318	2.24	1.13
Improved my skills as a teacher	319	2.35	1.10
Improved my ability to make learning more relevant in the classroom	319	2.38	1.16
Improved quality of my curriculum	320	2.45	1.22
Improved my knowledge of the availability of electronic resources	317	2.53	1.33
Improved my belief that I am more successful in meeting the needs of students	321	2.55	1.25
Improved my used of problem-solving and critical thinking in classroom	319	2.56	1.28
Improved my ability to use technology in the classroom	316	2.61	1.38
Improved my application of computer-related activities in instruction	318	2.61	1.38
Improved knowledge of my subject area	320	2.73	1.47
Improved my ability to assess student learning	319	2.74	1.28
Improved my technology skills	321	2.80	1.44
Improved my use of collaboration in the classroom	317	2.80	1.34
Improved my belief that students will be successful	319	2.98	1.45

Note. Values are the mean of reported scores on a 5-point scale (1 = *improved greatly*, 2 = *improved*, 3 = *improved somewhat*, 4 = *improved rarely*, 5 = *stayed the same*).

Teachers indicated on the average they *improved* or *somewhat improved* in every area as a result of their online professional development experience.

Research Question 1

A series of simple bivariate correlations, t-tests, and analysis of variance (ANOVA) were computed to identify the presence of statistically significant relationships between the dependent and independent variables in the study to answer the research question, “How do K-12 public school teachers participate in online professional development?” Of interest was whether there were statistically significant differences between age groups, genders, school levels, participation with and without school team members, ways participants were motivated, and tools used in the professional development experience.

Age. A one-way between-groups analysis of variance was computed to examine whether statistically significant differences existed between age groups. Tests were run between 21-30 year old, 31-40 year old, 41-50 year old, and 51 and above age groups. Results were used to determine the presence of significant differences between perceived levels of impact on technology skill improvement, curriculum and instruction, or interaction in the online community (See Table 4.5).

There was a small statistically significant difference between 31-40 year old teachers and 41-50 year old teachers for mean *technology improvement* in which the older group perceived a greater impact in their technology improvement. There was also a small statistically significant difference between 31-40 year old teachers and 41-50 year old teachers for mean *curriculum and instruction improvement* in which older teachers perceived a greater positive impact in curriculum and instruction. There were no other statistically significant results among age groups.

Table 4.5: Comparison Means for Impact of Online Professional Development

		Tech. Imp. Mean	Curriculum and Instruction Mean	Frequency of Interaction Mean
Age	21-30 years			
	31-40 years	2.95	2.82	
	41-50 years	2.40	2.18	
	50+ years			
School level	Elementary	2.24	2.06	
	Middle			2.02
	High School	2.82	2.73	2.42
Gender	Female			2.26
	Male			2.54
Participation	With team		2.81	
	Not with team		2.35	
Motivation	Self-motivated	2.31	2.11	
	Not self-motivated	2.86	2.71	
Online tools	Weblinks		2.40	2.26
	No weblinks		2.87	2.76
	Online documents	2.69		
	No online documents	2.15		
	Threaded discussion			2.21
	No threaded discussion			3.00
	Email		2.35	2.09
	No email		2.68	2.76
	Online chat	2.39		2.09
	No online chat	2.79		2.47
	Assignment feedback and submission			2.21
	No assignment feedback and submission			2.85

Note. All of the above values indicate significant differences between groups at the $p < .05$ level

Guidelines (proposed by Cohen, 1988) to interpret effect size statistics as an indication of the magnitude of the differences between groups:

.01= small effects, .06 = moderate effects, .14=large effects

Gender. An independent-samples t-test analysis was computed to compare the

means between females and males for technology improvement, curriculum and

instruction improvement, and frequency of interaction in the online community. There

were no statistically significant differences between females and males for *technology improvement* or *curriculum and instruction improvement*. There were, however, statistically significant differences between females and males for *frequency of interaction with community* (See Table 4.5), in which females interacted more frequently than males, although the magnitude of the differences in the means was small (Cohen, 1988).

Although there were no statistically significant differences between males and females when comparing the means for technology improvement and curriculum and instruction improvement, there were differences when analyzing the strength of correlation between variables. The analysis of the relationship between perceived *technology improvement* and *curriculum and instruction improvement* revealed a large statistically significant correlation between the two variables for males and a large statistically significant correlation between the same two variables for females (see Table 4.6) with high levels of perceived technology improvement associated with positive impact of curriculum and instruction. To determine whether the correlations for the two groups were significantly different, r values were converted into z scores, and values were used to calculate z_{obs} . There was a statistically significant difference in the strength of the correlation between technology improvement and curriculum and instruction improvement for males and females at 2.337.

Table 4.6: Correlation Matrix by Demographic Factor Gender

Gender		1	2	3
Female	1. Technology	--		
	2. Curriculum and Instruction	.668	--	
	3. Frequency of Interaction	.254	.416	--
Male	1. Technology	--		
	2. Curriculum and Instruction	.804	--	
	3. Frequency of Interaction	.494	.562	--

*all correlations statistically significant at .01

After realizing that there are statistical differences between females and males for *frequency of interaction with community*, in which females interacted more frequently than males, further investigation revealed a medium statistically significant correlation between *technology improvement* and the *frequency of interaction* for males and a small statistically significant correlation between the same two variables for females with high levels of perceived technology improvement associated with frequency of interaction with the online community or facilitator (See Table 4.6). To determine whether the correlations for the two groups were significantly different, r values were converted into z scores, and values were used to calculate z_{obs} . There was a statistically significant difference in the strength of the correlation between technology improvement and curriculum and instruction improvement for males and females at 2.182.

Further investigation of the *frequency of interaction* differences between males and females required analysis of the relationship between perceived *curriculum and*

instruction improvement and the *frequency of interaction* which revealed a large statistically significant correlation between the two variables for males and a medium statistically significant correlation between the same two variables for females with high levels of perceived curriculum and instruction improvement associated with positive impact of curriculum and instruction (See Table 4.6). To determine whether the correlations for the two groups were significantly different, r values were converted into z scores, and values were used to calculate z_{obs} . There was not a statistically significant difference in the strength of the correlation between technology improvement and curriculum and instruction improvement for males and females at 1.13.

School type. A one-way between-groups analysis of variance was computed to explore the impact of school type on technology improvement, curriculum and instruction improvement, and frequency of interaction. Participants were divided into three groups according to school level taught: elementary school teachers, middle school teachers, and high school teachers. There was a small statistically significant difference between elementary school teachers and high school teachers for mean *technology improvement* with high levels of perceived technology associated with lower level of school (i.e., grade-level). There was a medium statistically significant difference between elementary school teachers and high school teachers for mean *curriculum and instruction improvement* with high levels of perceived curriculum and instruction improvement associated with lower level of school (i.e., grade-level). There was a small statistically significant difference between middle school teachers and high school teachers for mean *frequency of interaction* with high levels of perceived interaction associated with the lower level of school (i.e. grade-level). There were no

other statistically significant results between groups.

To further confirm that elementary school teachers perceived a greater impact in technology in comparison to their high school counterparts, bivariate correlations were computed to identify the presence of statistically significant relationships between perceived *technology improvement* and the *school level*, which revealed that there was a small statistically significant negative correlation between the two variables [$r=-.187$, $n=300$, $p<.001$] with high levels of perceived technology improvement associated with lower level of school (i.e., grade-level).

Additionally, the analysis of the relationship between perceived *curriculum and instruction* improvement and the *school level* also revealed that there was a small statistically significant negative correlation between the two variables [$r=-.284$, $n=307$, $p<.000$] with high levels of perceived curriculum and instruction improvement associated with lower levels of school (i.e., grade-level).

The analysis of the relationship between perceived *frequency of interaction* and *school level*, however, did not reveal a statistically significant correlation.

To further answer the first research question, “How do K-12 teachers participate in online professional development?” survey participants answered three questions about who influenced their participation with in the online professional development experience they described (a) How did you locate this professional development opportunity or how might someone else locate this opportunity? (b) Who participated with you in this online experience? and (c) In what way(s) did the online experience impact your colleagues, friends, or other? Specify who was impacted, how, and why PLUS how many individuals were impacted and to what degree.

Of the 328 participants who responded, 38%, the largest percentage of participants, said they located the professional development through the school district, county office of education, union or state (e.g., to participate in a credentialing opportunity). Ninety-six participants (30%) located the professional development through a college or university. Fifty-two participants (16%) found their professional development opportunity by looking on the Internet. Twenty-four participants (7%) discovered the professional development from an advertisement or indicated that they read about it somewhere. Twenty-three participants (7%) indicated that they learned about the professional development from a colleague and 5 participants (1%) indicate that they learned about the opportunity from a professional organization or workshop.

Teachers were asked to identify whom they participated with and were given the opportunity to identify more than one group. Table 4.7 shows the frequency and percent indicated for each group.

Table 4.7: Percent of Individuals Who Participated in the Online Professional Development Experience with the Survey Respondent

Who Survey Respondent Participated With	Frequency	Percent
Facilitator	217	66%
Online learners I had not know before	203	62%
Online learners from my district	81	25%
Online learners from my school	79	24%
Online learners from my school grade-level or team	41	13%
Online learners I had met in a class	45	14%
No one else	34	10%
Total	328	

Teams. An independent-samples t-test analysis was computed to identify the presence of statistically significant relationships between the group of teachers who participated with someone from their grade-level/department team or the school and group of teachers who did not. There were statistically significant differences in *curriculum and instruction improvement* means between these two groups (See Table 4.5), however, the magnitude of the differences in the means was small $\eta^2 = .035$ (Cohen, 1988). There were no statistically significant differences between these groups for *technology improvement* or *frequency of interaction*.

Motivation. An independent-samples t-test analysis was computed to identify the presence of statistically significant relationships between the groups of teachers who said they were self-motivated to participate in the online professional development (to

learn more about a particular topic or to experience online learning) and those who were *not* self-motivated to participate in the online professional development experience (e.g., required course). There were statistically significant differences in *technology improvement* means between these two groups (See Table 4.5), however, the magnitude of the differences in the means was small $\eta^2 = .05$ (Cohen, 1988). There were also statistically significant differences in perceived *improvement in curriculum and instruction* means between these two groups (See Table 4.5), and, in this case, the magnitude of the differences in the means was large $\eta^2 = .10$ (Cohen, 1988). There were no statistically significant differences in *frequency of interaction means* between these groups.

Teachers were asked to indicate in what way(s) the online experience impacted their colleagues, friends, or others. The open-ended responses were coded using a constant comparative analysis method (Merriam, 1998). Of 328 total participants 132 (40%) did not respond to this question. Of those who did respond, the majority (29% of the total participants) indicated that they shared what they learned with other teachers, for example, with department or grade-level colleagues. Nine percent (29) indicated that they shared their learning with a broad audience such as at a staff meeting or through their work in an assigned leadership role such as literacy facilitator or technology coordinator.

A theme that emerged from the responses of these two groups indicated that teachers who shared with others felt comfortable sharing because they had participated together in the professional development experience. One participant, for example, said, "Several of us took the course together and we now have each other to use as

resources.” Another participant indicated, “There were 30 of us in the course. We were all impacted mostly by learning from each other. We learned about new assessment models/strategies. We learned how to make learning more engaging for students. We learned how to use more technologies to impact student learning.”

In addition to the 40% of participants who did not respond to this question, 14% indicated that colleagues or friends were not impacted or they didn't know the impact on others. A prevailing theme to these responses indicated that when teachers participated in professional development on their own, they discovered that other teachers were not interested in their learning or they were not comfortable sharing their learning because they felt other people would not relate to their learning experience. One teacher indicated, “It impacted me, I share my thoughts with colleagues, but often it falls on deaf ears.” Four percent indicated that their *students* were positively impacted, although that response was not specifically being solicited in the survey question. Three percent indicated that their learning had minimal or little impact on others. Some indicated that the most they may have done was recommend the class to another person. Another 3% shared that they didn't enjoy the professional development experience and that the substance of their discussions with colleagues, friends and others centered on sharing frustration about the experience.

Research Question 2

To answer the research question about how teachers describe online professional development experiences that positively impact their learning, a survey question asked participants, “What tools were used in the online professional development

experience?” Participants indicated if video, website links, online documents, quizzes and/or surveys, threaded discussions, email, chat, and/or assignment submission/feedback locations were used during the professional development experience.

A series of independent-samples t-tests were computed to compare the *curriculum and instruction improvement*, *technology improvement*, and the *frequency of interaction with online community* means for each of the tools.

There was a statistically significant difference in *curriculum and instruction improvement* mean scores for participants who used weblinks in their professional development and those who did not. The magnitude of the difference in the means was small (eta squared = 0.021). There was also a statistically significant difference between groups of participants who used email in their professional development and those who did not. Again, the magnitude of the difference in the means was small (eta squared = 0.021).

There was a statistically significant difference in *technology improvement* mean scores for participants who used online documents in their professional development and those who did not. The magnitude of the difference in the means was small (eta squared = 0.02). There was also a statistically significant difference between groups of participants who used online chat in their professional development and those who did not. Again, the magnitude of the difference in the means was small (eta squared = 0.02).

There was a statistically significant difference in *frequency of interaction with online community* means scores for participants who used weblinks in their professional development and those who did not. The magnitude of the difference in the means was

small ($\eta^2 = 0.031$). There was also a statistically significant difference between groups of participants who used threaded discussions in their professional development and those who did not and this time the magnitude of the difference in the means was moderate ($\eta^2 = 0.08$). For groups of participants who used email in their professional development there was a statistically significant difference between the groups who used it and those who did not and the magnitude of the difference in the means was moderate ($\eta^2 = 0.12$). For groups of participants who used chat in their professional development, there was a statistically significant difference between the groups who used it and those who did not and the magnitude of the difference in the means was moderate ($\eta^2 = 0.05$). Lastly, for the groups of participants who used assignment submission/feedback locations in their professional development, there was a statistically significant difference between the groups who used them and those who did not and the magnitude of the difference in the means was moderate ($\eta^2 = 0.06$).

To describe professional development experiences that positively impact teacher learning, participants were to think about *one* online professional development experience that most aligned with their learning style. They were asked to complete the survey if technology was merely the vehicle for the learning and asked to discontinue the survey if they were only able to describe an online experience in which the objectives were to improve personal technology knowledge and /or skills. However, when participants answered the question, “What was the title or content of the course?” it was difficult for participants to separate the technology content and processes from their online experience. Technology content represents 16% of the responses and

technology curriculum integration/online learning represented 7% of the responses. It is important to note, however, that 53% (178 of 328) of the responses included technology oriented content, materials, or resources, that were mentioned in addition to the primary content for example, *Shakespeare Using the Internet*, *Using the Measures of Academic Progress* (a completely online assessment tool), *Reading in the World-Wide-Web*, *Designing Virtual Field Trips*, *21st Century Learning* (7% of the responses), and *Classrooms of the Future* (see Appendix K).

In this population 10% of the respondents learned Instructional Strategies/Curriculum Development and 4% learned about Administration or Leadership. Specific content areas included English/Language Arts (8%), History/Social Studies (1%), Mathematics (5%), and Science (5%).

Participants in the survey were asked to list all Web addresses (URLs) for the professional development experience and 195 of the URLs were unique. Some respondents indicated the same URL such as 24 participants used <http://www.embeddedlearning.com>, 12 participants used <http://www.embeddedlearningacademy.com> (which is the same training as <http://www.embeddedlearning.com>), eight used <http://www.learningaccount.net> (which is also the same training as <http://www.embeddedlearning.com>), five used <http://www.ideal.azed.gov>, four used <http://www.moodle.org>, four used <http://www.wikispaces.com>, four used <http://www.tappedin.org>, three used <http://www.atomiclearning.com>, and three used <http://www.wilkes.edu> (see Appendix L).

Participants were asked to respond to an open-ended question in the survey

(Question 8), “How was this experience aligned with your learning style? In other words, what did you like about the experience?” Of the 328 respondents, 295 answered the question. Table 4.8 shows the themes of responses made by participants. In many cases respondents indicated that multiple learning style characteristics were supported during the online experience. Thirty-one percent (90) of the respondents indicated that the unique ability for online courses to be self-paced and flexible in pace supports learning. For example, one participant said, “It was largely self-paced though there were some deadlines. I have a very busy schedule and like to work when motivated so this was a good fit for me.” Others appreciated the ability to “go back if I needed to” to review the content, and work ahead when the content was familiar.

Twenty-five percent (75) of the respondents indicated that the convenience of the online professional development experience supported their learning style because they could participate in the course according to their personal schedules and they enjoyed the convenience of being at home. One respondent indicated, “I loved that I could access the classroom texts, do library searches, as well as discuss with fellow classmates all after school hours and at my convenience.” Another indicated, “I could easily be at home or on vacation and still be able to participate in all the class discussions and submit my work.” And another stated, “I did not have to spend two hours driving time. I could do my work within the assigned time at my convenience.”

Nineteen percent (56) of the respondents indicated that the discussion and collaboration with colleagues during the online professional development experience was of high value. One participant said:

In an actual class, I would normally not be an enthusiastic participant in discussions. I'm not very outgoing. In the online course, asynchronous discussions were a major part of the grade, so I was forced to participate more than I normally would have. But it was much easier online with the greater degree of anonymity. I actually enjoyed the discussions and learned a great deal from them. Having time to compose written responses in the discussion also allowed for more time for reflection than is possible in a real time face-to-face classroom discussion.

Another 4% (13) respondents suggested that they too valued the opportunity for reflection because the collaboration was asynchronous and provided the time to be thoughtful and precise about contributions to a threaded discussion.

Eleven percent (33) of the respondents indicated that the content of the professional development experience was of high value. One participant said, "The content itself was wonderful and wholly enhanced my teaching." In addition to the 11% who saw the content as valuable, an additional eight percent (23) of the respondents specified that they appreciated the practical application of the content to the classroom stating, for example, "I liked that it was all online, had good subject content, and the required work had direct application."

Of the 11% (31) of the respondents who said they did not like the online experience (and gave a reason for not liking it), many indicated that they were lacking one or more of the characteristics that the other respondents found of value. For example, one participant did not experience the highly valued flexibility of online learning and said, "I didn't like it. It was too rushed." Another didn't have an experience that provided enough of the highly valued collaboration and interaction with colleagues indicating, "It was totally read and respond. There was no interaction other than a discussion board."

Five percent (14) of the respondents indicated that the way the content was organized primarily contributed to supporting their learning style. Participants expressed this in a variety of ways. Some addressed organization generally and/or gave specific examples, such as, “It was well organized. There were pictures, videos, and text which had quizzes included for reference and better understanding.” Others pointed out that online professional development allowed for self-monitoring the pace and need to either skip or review content. One individual said, “The ability to skip things I already knew. I am a self-directed learner so it worked well. I could skip the parts I already knew and spend more time on the things I did not know.” Another respondent said, “Self paced - I could go back anytime during the course.”

Five percent (14) of the respondents indicated that their learning style was supported because they are visual learners, for example, “I am a visual learner.”

Table 4.8: Ways Professional Development Experience Aligned to Participant Learning Styles

Ways experience aligned with participant learning style	# of responses	Percent
Pacing: self-paced, flexible, time to practice skill, self-motivating	90	31%
Convenience: schedule, at home	75	25%
Discussion and collaboration with colleagues	56	19%
Content knowledge	33	11%
Didn't like	31	11%
Practical application to classroom	23	8%
Organization of the content: flexible, able to differentiate	14	5%
Visual content: demonstration, virtual class visitation	14	5%
Opportunities for reflection	13	4%
Multimodal, multimedia (including video)	11	4%
Reading and writing were required (and are areas of strength for participants)	11	4%
Incorporation of technology (as a learning style)	8	3%
Liked class	8	3%

In a different yet similar question (Question 17), respondents were asked, “How was the professional development experience effective in supporting your LEARNING? (Please give examples if possible.)” Of the 328 respondents, 228 answered the question and Table 4.9 shows the types of responses made by participants. Eleven of 15 response categories were the same and percentages were similar (within 5%) in 7 of the 11 areas. In the 5 areas in which the content was duplicated, the percentages varied by more than

5%, for example, content (knowledge and expertise) was indicated by 28% of the respondents for Question 17 and only 11% in Question 8. Pacing was indicated as supporting to learning by 21% of the respondents in Question 17 and 31% of the respondents for Question 8. Twelve percent of the respondents indicated (in Question 17) that immediately accessible materials were supportive to participant learning even though only 3% indicated the same thing in Question 8. Lastly, 7% of the respondents indicated that support for their learning included the convenience of the online professional development while 25% indicated the convenience was supportive in Question 8.

Four new categories were coded as they were indicated in Question 17 and not identified in Question 8. When asked how the professional development supported participant learning, 7% (17) indicated the online learning environment itself, 4% (10) indicated improvement in use of instructional strategies and delivery methods, 3% (6) indicated new interest in being a life-long learner, and 2% (5) indicated confidence building and/or validated current practices. (See Table 4.9)

Table 4.9: Ways Professional Development Experience Supported Learning and Learning Style

	Support learning (Question 17)	Support learning style (Question 8)
Content: knowledge and expertise developed, choices in content	28%	11%
Pacing: self-paced, flexible, time to practice skill, self-motivating	21%	31%
Discussion and collaboration with colleagues	18%	19%
Materials were easy to access and immediately available	12%	3%
<i>Online learning environment itself (conducive to learning style)</i>	7%	
Multimodal, multimedia (including video)	7%	4%
Convenience: schedule, at home	7%	25%
Didn't like	7%	11%
Feedback provided	6%	1%
Practical application to classroom	5%	8%
<i>Improvement in use of instructional strategies and instructional delivery methods</i>	4%	
Don't recall, off topic, not sure	4%	<1%
<i>New interest in being a life-long learner</i>	3%	
<i>Confidence building and/or validated current practices</i>	2%	
Liked class	2%	3%

Research Question 3

To answer the research question about the ways online professional development experiences positively impact teacher effectiveness in the classroom, a survey question (Question 11) asked participants, “How did the online experience impact and/or change your teaching? e.g., modes of delivery, instructional practices, content, assessments, etc.” Of the 328 respondents, 298 answered the question. Table 4.10 shows the types of responses made by participants. Twenty-nine percent (87) indicated that technology integration was increased in the classroom. Twenty-eight percent (83) indicated they improved their use of instructional strategies and instructional delivery methods. One participant said, “The major change is that my classroom is less didactic and more constructivist. My instruction is less artificial and more authentic. I have incorporated more activities utilizing varied forms of technology.” Twenty-one percent (63) of the participants indicated that as a result of the online professional development experience they had new ideas to implement and/or the participant had a deeper understanding of the content. One participant indicated, “My content knowledge became much deeper and more mature, giving me a better perspective for teaching. The discussion with other teachers gave me ideas on how to integrate what I had learned into my curriculum. This was a content knowledge course not a pedagogy course.”

Eleven percent (34) of the participants indicated that the impact on their teaching was related to the way in which they now plan the curriculum. Participants indicated that as a result of the online professional development experience they refined existing lessons, made them more student centered, and created more focus on essential

learning targets. Eleven percent (32) respondents indicated that there was very little impact on their teaching or they did not respond to the question, for example, a respondent indicated, “Not at all. I could have taught the courses I was taking. They were theoretical in nature and not practically applicable in the classroom setting.” Nine percent (27) respondents indicated that their assessment practices were impacted as a result of the professional development experience. Oftentimes respondents indicated that they were going to make assessments more project-based and assessments more authentic and real-world. Six percent (18) participants said they have better materials and resources as a result of the professional development experience. Many respondents indicated, as a result of taking an online class, they had access to online resources that they did not know were available or they had access to them as a result of participation in the experience. It is important to note that as respondents answered this question they frequently indicated that the experience impacted or changed their teaching in multiple ways, for example, a teacher indicated, “I looked more closely at instructional practices, assessment, modes of delivery, and will be modifying.” When a respondent indicated impact in instructional practice, assessment, and instructional strategies, a response was coded in each of the three areas.

Table 4.10: Ways Professional Development Experience Impacted/Changed Teaching

Ways experience impacted/changed teaching	# of responses	Percent
Increased technology integration	87	29%
Improvement in use of instructional strategies and instructional delivery methods	83	28%
General new ideas to implement/deepened understanding of content	63	21%
Improved curriculum	34	11%
Very little or no impact on teaching/didn't respond	32	11%
Assessment	27	9%
Better materials and resources	18	6%
How students learn, motivation, engagement	14	5%
Teacher learning enhanced, thinking reframed	11	4%
Response not on topic	11	4%
Meeting student needs	9	3%
Leadership/Administration/Organizational change	6	2%
Improved strategies for student/parent communication	5	2%
Reinforced what teacher already knew	3	1%

In a different yet similar question (Question 16), respondents were asked, “How was the professional development experience effective in supporting your TEACHING? (Please give examples if possible).” Of the 328 participants, 243 responded to this question. Nine of 14 response categories were the same and percentages were similar

(within 5%) in six areas. Three similar response categories, however, had significantly different response percentages. Improved curriculum was indicated by 19% of the respondents for the first question with only 11% in the second question. Improvement in use of instructional strategies and instructional delivery methods was indicated by 15% of the respondents for Question 11 with 28% for Question 16. Learning new ideas to implement was indicated to 13% of the respondents for the first question with 21% for the second question.

Five new categories were coded as they were indicated in Question 16 and not identified in Question 11. When asked how the professional development supported participant teaching, 11% (27) indicated collaboration with colleagues, 6% (15) indicated improved confidence in their teaching, 6% (14) indicated deepened content knowledge, 2% (5) indicated that the impact on teaching was generally “good”, and 1% (2) indicated that they experienced improved efficiency in their teaching. (See Table 4.11)

Table 4.11: Ways Professional Development Experience Supported and Impacted Teaching

	Ways Supported Teaching (Question 16)	Ways Impacted Teaching (Question 11)
Increased technology integration	24%	29%
Improved curriculum	19%	11%
Improvement in use of instructional strategies and instructional delivery methods	15%	28%
General new ideas to implement	13%	21%
<i>Collaboration with colleagues (feedback)</i>	11%	
Very little or no impact on teaching/didn't respond	12%	11%
Teacher learning enhanced, thinking reframed	8%	4%
<i>Confidence building</i>	6%	
Better materials and resources	6%	6%
How students learn, motivation, engagement	6%	5%
<i>Deepened content knowledge</i>	6%	
Assessment	4%	9%
<i>The impact on teaching was "good"</i>	2%	
<i>Improved efficiency</i>	1%	

Respondents were asked, “Describe how you use your learning in your classroom.” Of 328 participants 234 responded to this question. Increased technology

integration was indicated by 97 (41%) of the participants. Some respondents indicated that they would be developing or improving their own online courses. Many indicated that the frequency of use of technology was going to increase in their classroom as a result of the online professional development experience. Others indicated that they would be including more materials and resources from the Internet, integrating computer-based projects, introducing new software programs, and redesigning their websites to host newly added elements. Respondents also indicated that they would be using more Web 2.0 tools with students such as blogs, podcasts, wikis, and email.

Fifty-nine (25%) of the respondents indicated they would be using new instructional strategies as a result of their learning which will have a direct impact on classrooms. Some respondents indicated, as a result of the improved instructional strategies, they will be able to provide more differentiation in instruction and they will be more able to meet the unique needs of students. Additionally, some respondents indicated that the newly introduced instructional strategies would create opportunities for students have more hands-on activities and be more interactive.

Fifty-six (24%) of the respondents indicated they would be redesigning curriculum as a result of their online learning experience. Many indicated that units and lessons were shared by teachers and experts, and the new lessons, units, materials, and resources led to improvements in the curriculum. Respondents commented that units and lessons were more project-based, authentic, and used real-world applications. Some respondents indicated that the curriculum would be strengthened as a result of new learning about curriculum design and improved methods.

As a result of the online professional development experience 16 (7%) of the respondents indicated that assessment (and feedback) would be improved in the classroom, 16 (7%) indicated there would be no change (or they were unable to change because of the situation at the school), 14 (6%) indicated their general knowledge, ability to reflect and analyze practices impacted their learning which will result in change in the classroom, and 10 (4%) indicated that their learning will impact colleagues as they teach and collaborate with them. (See Table 4.12)

Table 4.12: Ways Professional Development Experience Impacted/Changed Learning

Ways experience impacted/changed learning	# of responses	Percent
Increased technology integration	97	41%
Improvement in use of instructional strategies and instructional delivery methods	59	25%
Improved curriculum	56	24%
Assessment and feedback mechanisms	16	7%
No change or unable to change	16	7%
General knowledge, reflection, analysis	14	6%
Will use to teach/collaborate with colleagues	10	4%
Previously answered	10	4%
Off topic, doesn't apply, N/A	7	3%
Will implement things learned	6	3%
Will implement with new certificate/credential	2	1%

Research question three investigated ways teachers experienced a positive impact in their classrooms and findings indicate that curriculum and instruction was positively impacted. A question that emerged was, “What might have contributed to the impact on curriculum and instruction?” The relationship between perceived *curriculum and instruction* and *frequency of interaction with the online community* revealed a medium statistically significant correlation between the two variables with high levels of perceived curriculum and instruction improvement associated with greater frequency of interaction with the online community (See Table 4.13).

Research question four (in the next section) investigates the impact of online professional development experiences on participant technology skill. Knowing that there was a positive impact on curriculum and instruction, a simple bivariate correlation was computed to identify the presence of statistically significant relationship between *curriculum and instruction improvement* and *technology improvement*.

The relationship between perceived curriculum and instruction and technology improvement perceived improvement was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. There was a strong correlation between the two variables with high levels of perceived impact on curriculum and instruction associated with high levels of perceived technology improvement.

Table 4.13: Correlation Matrix Technology Improvement, Curriculum and Instruction Improvement, and Frequency of Interaction

	1	2	3
1. Technology	--		
2. Curriculum and Instruction	.714	--	
3. Frequency of Interaction	.324	.463	--

*all correlations statistically significant at .01

Research Question 4

A series of simple bivariate correlations were computed to identify the presence of statistically significant relationships between the dependent and independent variables in the study to answer the research question, “In what ways did the online experiences strengthen participant technology skills?”

To investigate the connection between improved technology skill and the impact of online learning experiences, Pearson r correlation coefficients were computed to analyze the relationships between the *technology improvement* mean and (a) the number of online professional development participated in, (b) the hours spent in online professional development, and (c) the percentage of the time online (See Table 4.14). Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity.

Table 4.14: Correlation Matrix Technology Improvement

	Technology
Number of online pd experiences	-.179
Total hours required	-.162
Average hours per week required	-.124
Percent of online vs. face-to-face	-.160
Technology growth (before and after)	-.403

*all correlations statistically significant at .05

The analysis of the relationship between perceived technology improvement and the *number of online classes* an individual has taken revealed that there was a small negative statistically significant correlation between the two with high levels of perceived technology improvement associated with greater frequency of participation in online professional development classes.

The analysis of the relationship between perceived technology improvement and the *total hours required for the professional development experience* revealed that there was a small negative statistically significant correlation between the two with high levels of perceived technology improvement associated with a greater number of total hours required for the professional development experience described. Similarly, the analysis of the relationship between perceived technology improvement and the *average number of hours per week required for the professional development experience* revealed that there was a small negative statistically significant correlation between the two variables with high levels of perceived technology improvement associated with a greater number of average number of hours per week required for the professional

development experience described.

The analysis of the relationship between perceived technology improvement and the *percentage of the professional development experience that was online* revealed that there was a small negative statistically significant correlation between the two variables with high levels of perceived technology improvement associated with *less* intensity of interaction online.

The analysis of the relationship between perceived technology improvement and the perceived *technology growth* (comparing proficiency before and proficiency after the professional development) revealed that there was a medium negative statistically significant correlation between the two variables with high levels of perceived technology improvement associated with growth in one proficiency band or more (beginner, intermediate, proficient).

In an open-ended question respondents were asked, “In what ways did the online experience impact your technology skills and ability?” Of 328 participants 237 responded to this question. Ability and skill increases were indicated by 110 (46%) of the participants and another 11 (5%) indicated that their skills and ability increased significantly. Sixty (25%) indicated that their skill and ability did not increase as a result of the online professional development experience, however, 46 (19%) stated that this was because they began the online experience with already advanced skill and ability. Twenty-nine (12%) of the respondents indicated that their confidence or comfort with their technology skill/ability was increased as a result of their online experience and 22 (9%) indicated that their ability to integrate technology in the classroom increased. Eleven (5%) of the respondents indicated that after the online professional

development experience they were increasingly familiar with Web materials and resources, another 9 (4%) indicated that their knowledge and understanding were increased. Seven (3%) indicated that they had new ideas that improved their ability and skill and 6 (3%) indicated that they became instrumental in sharing their ability/skill with colleagues. Five (2%) of the responses were completely off topic and 4 (2%) of the respondents highlighted their increased ability or skill with computer hardware. (See Table 4.15)

Table 4.15: Ways Professional Development Experience Impacted Technology Skill and Ability

Impact on technology skill and ability	# of responses	Percent
Ability and skills increase	110	46%
None or N/A	60	25%
Already technologically competent or advanced	46	19%
Confidence or comfort	29	12%
Technology integration, design, and classroom application	22	9%
Familiarity with materials and resources	11	5%
Grew significantly in ability and skills	11	5%
Knowledge, awareness, understanding, interest	9	4%
New ideas	7	3%
Shared knowledge with colleagues	6	3%
Off topic	5	2%
Hardware	4	2%

Findings clearly indicate that participation in online professional development leads to a perceived positive impact on technology skill and ability. To investigate the relationship between perceived *technology improvement* and *frequency of interaction with the online community* revealed that there was a medium statistically significant correlation between the two variables with high levels of perceived technology improvement associated with greater frequency of interaction with the online community and/or facilitator (See Table 4.13).

Qualitative Data and Results and Analysis

At the conclusion of the survey 328 respondents had given thorough and complete enough information for analysis. Since college and university courses dominated the online professional development literature, the focus of the case studies remained on non-collegiate professional development. Additionally, respondents could only be contacted if they disclosed their contact information. Using the methods described in chapter 3, three respondents were interviewed to further investigate the online experience using multiple case study research. Case study research is beneficial when the context of the person's environment is important, and context was established as important when using the theoretical framework of communities of practice, situated learning theory, and social network theory.

Case Study 1: Classrooms for the Future Professional Development

In the study 60 participants indicated in survey responses that they accessed their professional development via a website linking the eMBEDDED LEARNING suite of professional development offerings. The eMBEDDED LEARNING websites provide access to the Pennsylvania Department of Education Classrooms for the Future (CFF) professional development.

Classrooms of the Future (CFF) is Pennsylvania Governor Edward G. Rendell's initiative to put a laptop computer on every high school English, math, science, and social studies desk and to provide teachers with a multimedia workstation and intensive training to enhance education. Governor Rendell's 2006-07 Budget provided \$20 million for the first year of Classrooms for the Future (CFF), which the Governor

successfully expanded to \$90 million in year two and \$45 million in year three. An additional \$6 million in state and federal resources were dedicated to training teachers and administrators in year one, another \$13 million in year two, and \$20 million in year three.

The Classrooms for the Future (CFF) initiative impacted over 540 Pennsylvania high schools with 12,000 teachers impacting 500,000 students. English, math, science, and social studies teachers used enhanced technology, Internet connected laptop computers (along with students), and other state-of-the art technology. One of the goals of the Classrooms for the Future (CFF) initiative is to offer students the opportunity to develop 21st century skills such as collaboration, problem solving, creativity and innovation, not just to bring technology into the hands of teachers.

The professional development offered to the teachers participating in the Classrooms for the Future (CFF) initiative included vendor-provided hands-on training to use the equipment and understand new instructional strategies, online blended study job-embedded courses for teachers (and administrators) and a half-time instructional coach to assist teachers with implementation of rigorous, relevant curriculum rather than a focus on technology.

Teresa, one of the participants in the survey participated in an interview to provide a detailed description of the on-line blended study group courses through the eMBEDDED LEARNING Academy. The course was a part of the *21st Century Teaching and Learning* series. Activities included online participation, readings, reflection, face-to-face discussion groups at the school site, action research, and action planning. Courses content included:

- Teaching in the 21st Century: The Need for Change
- Authentic Teaching and Learning in the (Math, English, Science, Social Studies) Classroom
- Differentiated Instruction in the (Math, English, Science, Social Studies) Classroom
- Inquiry-based Learning in the (Math, English, Science, Social Studies) Classroom
- Project-based Learning in the (Math, English, Science, Social Studies) Classroom

According to the Pennsylvania Department of Education website literature about the eMBEDDED LEARNING professional development:

Throughout the year teachers, administrators, coaches, and technology directors are invited to participate in free weekly webinars on topics of interest. In addition, the CFF community has a robust virtual community, which includes listservs for specific groups, a CFF coach, Moodle site, wikis, and other web 2.0 social networking sites. These ongoing opportunities create opportunities for teachers and coaches to collaborate, share ideas and extend learning beyond their individual schools (Pennsylvania Department of Education, 2009).

Teresa represented a typical participant in the study. She is female and a veteran (30 years experience) middle and high school teacher. She is 50+ years old and from a rural public school setting in Pennsylvania. Teresa teaches mathematics at both the middle school and the high school to eighth and tenth grade students. At the time of the survey she had participated in 10 online courses and considered her technology ability to be proficient both before and after the professional development experience. Teresa indicated that the professional development was mostly online (81% or more plus some

in person face-to-face) and she participated completely outside of the workday. Teresa reports that in total she spent 200 hours in the professional development experience at approximately six hours per week.

The Classrooms of the Future (CFF) online professional development included: videos, website links, online documents, threaded discussions (i.e., chat, blog, discussion board), email, chat, assignment submission/feedback locations, and quizzes and/or surveys. The professional development included a facilitator and Teresa participated with that facilitator in addition to teachers from her school, and teachers from her grade-level/team. Teresa indicated that the professional development was organized into nine lessons. She had been instructed that the lessons would take ten hours each, however, the first lesson took 18 hours and each of the lessons after that took approximately 24 hours each. Teresa indicated the younger teachers were more comfortable simply reading the material online and the veteran teachers took more time because they had to print off the information. They read about the model lessons and then implemented them in their classrooms.

Teresa indicated that interaction with others was most valuable to her learning/teaching, followed by the facilitator and then the self-paced aspect of the learning. When discussing the why interaction and collaboration with colleagues was so important she indicated:

There were twelve of us [teachers] that were in this grant together. We had already been team teaching since 1979 so we work well together and feed off each other. This just brought the curriculums together... you have to be able to sit down together and discuss what is working [with the students that are in the classes the teachers are teaching right now]... We found a real value in education. And we fed off of each other and you

need to get out of that “I” world that secondary education has and you need to have no administrators in the room and you need professional educators to be able to sit down and discuss things that are going on that are working for them and you learn from that and you take from that.

Teresa explained that during the professional development experience the facilitator would post a question or comment for the participants to respond to asynchronously, however, the opportunity to learn was leveraged to a higher level by the group interaction at the school site. She stated:

Sometimes online you would think of something and you would log it or post it to the board and then you’d put it out of your mind until you actually talked to someone [at the school] about it and then it became real. We had get together and those were required after every so many lessons or whatever where we had to get together and sit down and we talked about things we had learned and things we agreed with and things we disagreed with and that sort of thing.

Teresa described the cognitive dissonance that is created when learning something new and indicated that the support of her colleagues was an essential support to her learning:

We were the ones [referring to the veteran staff that seemed to struggle more with learning to implement the new technology] that dug in and we laughed about it and some days cried and some days I would go in someone’s room tearing my hair out going, “I don’t have the faintest idea what they are talking about it” and then we’d work together.

During the interview, Teresa went on to give a detailed explanation of what the English teacher told her about a student they shared who is facing a great deal of adversity in home life. Teresa asked, “How do I make Algebra relevant to her?” She went on to explain that these are the real-life challenges that students face and it makes a difference when teachers are able to work collaboratively so that they are aware and more able to be supportive to their students. She concluded:

So that is what the team is. And if we don't discuss what is going on with kids, you have to realize, the next time I look at that young girl in my math class I look at her differently and you don't get that if you stay in your room and you just do your job and then you leave at the end of the day. You have to have open discussions with people to understand what your students are going through.

Teresa indicated that the purpose of the professional development was, "To bring our students into the 21st century. To make sure that we had available to our students every bit of technology that was accessible and we had to be educated so that we could teach the students how to use it and how to work with it." She described the content of the professional development that allowed her to realize that the students today have different learning needs than the students she taught in the beginning of her career, particularly because the students today are "the natural citizens of technology" and she perceived herself as a technology "immigrant." According to Teresa, the content of the professional development included:

All types of learning, learning types, ways for differentiated instruction, it went into a lot about the fact of what type of learners we are in my generation compared to those kids that we are just starting to teach right now compared to those students we have in the classroom kids now. A lot of socio-economic a lot of gender equity stuff and different ways we could apply it.

Teresa described some of the professional development as focused on how to use a SMART Board, an interactive whiteboard developed by SMART Technologies. The SMART Board is a large whiteboard that uses touch technology to detect when a teacher or student touches the board and the touch functions as a computer keyboard or mouse. Typically a projector is used to display the computer's video output, which then acts as a huge touch-screen for the teacher or student. Teresa indicated that the

Classrooms for the Future (CFF) grant funded a SMART Board to be affixed in her mathematics classroom and using the SMART Board transformed her teaching practice.

Teresa stated that prior to having a SMART Board she used a chalkboard to show students how to solve simultaneous equations. Now that she has a SMART Board she (and the students) can graph an equation in yellow, graph another equation in blue, and at the point of intersection the yellow and blue colors will turn to green indicating the solution to the equation. Even further, students are able to suggest and then graph coordinate points on the SMART Board and they very visually show the location of the points and their relationship to the two equations. In addition to being a better tool for direct instruction, Teresa indicated that the SMART Board technology has:

Allowed me to create lesson plans that I am able to print off and hand out to my students. This gives us more time to discover mathematics. We are not wasting time copying notes from the board. Also, if a student is absent at the end of the class I just hit print and everything we have done in class is printed for the absent student. The students love going to the SMART Board to work and there a lot of great features that I have incorporated into my lessons.

Teresa indicated that the professional development lessons supported designing classroom lessons to use on the SMART Board in her classroom and, as a result of having the SMART Board in the middle of the central teaching wall of the classroom, she found it impossible to use it sporadically. Instead, she decided that it would be necessary to convert all of her lessons to SMART Board lessons so that all of her teaching would be done one way. Over time, the learning that she did in the online experience supplemented the work that she had done on her own.

Teresa spoke very highly of the online professional development experience and indicated that it has had a very positive impact in her classroom including increased

effectiveness of instructional strategies, increased use of technology with students, and modeling and demonstrating that this is what “life long learning is all about.”

Case Study 2: BrainX

In the study one participant who agreed to be interviewed indicated that she accessed a professional development experience that is typically used for school-age students via <http://www.brainx.com>. BrainX is an adaptive online learning system used to teach a variety of types of content either provided by BrainX or created by schools, publishers, corporations, and government agencies. The BrainX system was created using research from the fields of cognitive psychology, education and neuroscience in an effort to use what is known in these fields about learning to enhance long-term memory of content.

BrainX professional development consistently begins with pre-assessment to determine the learning needs of the participant then molds the course content to ensure that the necessary learning objectives have been mastered. The Digital Tutor (facilitator) determines how participants learn best and uses that information to support teaching the objectives in the shortest amount of time. The Digital Tutor also follows the learning and provides distributed practice designed to ensure that learning securely stores in the participants long-term memory. The Digital Tutor also provides motivational support and positive reinforcement.

BrainX is used in schools primarily to support struggling students, English learners, and students with special education needs. The student pre-assessments produce a report that give teachers an overview of which standards a student is

struggling with and which ones are difficult for the entire class. This allows teachers to re-teach commonly misunderstood information and specifically tailor lessons for individual students. The assessments allow each student to track their personal progress by identifying the standards they pass and date stamping when they have achieved mastery.

The content of BrainX includes six English/language arts courses and 10 mathematics courses. BrainX offers exit exam preparation, support for English Learners, an Academic Vocabulary and Writing Program, and Study Skills program. The Academic Vocabulary and Writing Program, for example, includes four different Academic Vocabulary courses. Each course covers 50 of the most commonly used words on high stakes exams and in textbooks. The writing component teaches students five types of writing: business letters, biographical narrative, expository composition, persuasive essays, and response to literature.

Each of the courses begins with a pre-assessment structured from the state standards and the courses are electronically adaptive to prevent students from having to review information they already know. Each section contains four learning activities: (a) Record What you Know, (b) Primary Learning Activities, (c) Study Session, and (d) Record What You Have Learned. To record what you know, an open-ended question activates prior knowledge, gets students ready to learn, allows for the monitoring of effort, and serves as a benchmark to compare future learning. After the Record What you Know section, students participate in the lessons and the Digital Tutor quizzes students on the material learned in the study sessions. According to the BrainX literature:

Study sessions are meant to be completed on several different days with nights of sleep in between, in order to ensure that the learned information is locked in long-term memory and each learner achieves true mastery of the content in the shortest amount of time. The questions that each student experiences in a study session and the number of days skipped between study sessions are optimized to fit the unique memory formation patterns of each student. This quizzing system is so unique that you have to experience it for yourself in order to fully grasp the power the system has to improve student performance (“BrainX,” 2009).

At the conclusion of the study sessions, participants return to the question presented in the Record What you Know portion of the online experience. Students should have more accurate and/or more complete answers after participating in the learning. Additionally, a post-test is given to evaluate overall mastery of the content and teachers determine if they are confident that the student is ready to move on to the next section.

A participant in the study, Louise, participated in a BrainX student tutorial Algebra course that provided professional growth for teaching. The course was offered at twice the speed students typically take by a Southern California County Office of Education to build participant mathematics content knowledge and earn a certificate (as an alternative to qualifying for a single-subject mathematics credential to teach in the state of California). Louise is a female veteran (18 years experience) high school teacher. She is 50+ years old and teaches in an incarcerated facility (juvenile hall) setting in California. Louise teaches English/language arts, history/social studies, and mathematics to ninth through twelfth grade students. At the time of the survey she had participated in two online courses and considered her technology ability to be intermediate both before and after the professional development experience, although she indicated that her technology skills improved as a result of the online professional

development experience and she indicated that it made her, “faster in her knowledge of how to take an online course.”

Louise indicated that the professional development was mostly online (81% or more plus some in person face-to-face) and she participated in 95% of the online professional development outside of the workday. Louise reports that she spent 40 total hours in the professional development experience at approximately ten hours per week.

The BrainX online professional development included: videos, website links, online documents, threaded discussions (i.e., chat, blog, discussion board), email, assignment submission/feedback locations, and quizzes and/or surveys. The professional development included an online facilitator and she participated face-to-face with three teachers from her school/grade-level/team and three other local teachers who met approximately every three weeks to share the lessons they had created.

Louise considered the self-paced learning of the professional development to be the most valuable to her learning/teaching, followed by the interaction with others, followed by the value of the facilitator. When discussing the pacing she indicated:

You can do it on your own pace so parts that were easier for me or more difficult for me...I could set up the pace I wanted to go along with. If there was an area, okay I'm going to come back to this, you know later, I could do that. Knowing that I couldn't finish that unit. There were a couple parts that I knew I had to go over in more detail. I liked that I was in control of that.

She expressed that if the facilitator did not respond with accuracy, expertise, or in a timely way Louise became dissatisfied with her lack of ability to proceed with the course. The benefits of a self-paced course were severely inhibited by her inability to move at the pace she had planned. Over time that became a great source of frustration.

Louise described that the interaction with others was of benefit when, “A couple of colleagues really supported me when I had some difficulties with some of the math concepts—they were more than willing to ‘tutor’ me and extend my learning experience.”

The content of the course was designed to review mathematics skills and ensure that participants have the minimal understanding of Algebra mathematics content to successfully teach an Algebra course. The BrainX Algebra course designed for the teachers took approximately a month to complete 12 chapters. There was an expectation that it would take students approximately three or four months to complete. Louise indicated that the first part of the class was review, then it got more difficult, and the course forced her to do math problems that she would generally stay away from because she was not confident in her abilities.

She also indicated that BrainX was extremely repetitive and cautioned that if she made inadvertent mistakes during the pre-assessment phase she became frustrated with herself and the professional development experience because of the repetitive work required to complete the portion of the course that she was actually *not* learning from. This turned out to be such a significant problem that teachers created strategies for outsmarting the technology and shared them with each other at school.

The content was not always easy, however, concentration of the professional development on building content knowledge often stretched Louise to, “Do some things that normally probably would have been over my head to teach. I did gain confidence from this course in teaching some things that I might not have felt comfortable teaching myself and that oh yeah I know how to do that myself.”

There were three assessment points within each chapter in which participants had to submit work to the facilitator. Open-ended questions were provided and the students had to submit answers. Participants were not allowed to move on in the course until the Digital Tutor (facilitator) approved the answers. Louise indicated:

You took a test at the beginning to see where your strengths and weaknesses were. It was probably two or three questions from each chapter. So the one would focus on exponents, and one would focus on positive and negative numbers, all the way up. After you took the test, lets say that you missed less than 80%, you had to take some of the problems again. Then you went in and they had some review questions for that particular exercise. And then it ended each unit would be more like a chapter that had a review question and then the facilitator would have to approve or disapprove before you could move on. And then you did a post-test after you went through all the lessons of that unit. And there were 12 units.

Writing about the mathematics and explaining her answers positively impacted her learning and was the most effective part for Louise. She indicated:

As frustrating as it was [because the facilitator did not provide timely feedback], when we had to write the part that he [the facilitator] had to look at...that was probably the best to assess whether [you understood the answer] because you had to re-explain why or how you got this particular answer... You can't guess on an answer like that. You have to know. It was probably a light bulb moment for me to see as an adult and the teacher being the student then to go, oh my gosh, if I didn't know how to explain this then I couldn't have done it.

At certain points during the online professional development teachers were required to create lesson plans for their classrooms and Louise thought this aspect was the most practical and effective aspect of the professional development. Additionally, she indicated that she was required to implement the lessons she created and that had a significant and positive impact on the classroom, her future teaching, and her learning.

Case Study 3: Facing History and Ourselves

In the study survey one participant indicated that she accessed her professional development experience via <http://www.facinghistory.org> that links to a website called Facing History and Ourselves. According to the home page, the purpose of the website is, “Helping classroom and communities worldwide link the past to moral choices today.” The website is designed for both teachers and students to learn from our human history to increasingly take responsibility for our world. Each year 1.8 million students participate in the global network of over 26,000 educators. In 2008, the website received more than 667,000 visits from people in 215 countries.

In addition to face-to-face seminars and workshops there are three online professional development seminars: Choices in Little Rock, Holocaust and Human Behavior, and Race and Membership. The content of the professional development is the exploration of the consequences of hatred. Learning goals for students are to recognize bigotry and indifference and also meet exemplars of courage and compassion in the face of injustice so that students can see the options they have when making personal choices that have impact on society.

Kayla, a participant in the study and a Holocaust educator, participated in the online seminar *Holocaust and Human Behavior*. She is a 21-30 year old female teacher with seven years of experience at a suburban high school where she teaches tenth through twelfth grade students. At the time of the survey she had participated in four online courses and considered her technology ability to be proficient both before and after the professional development experience, although she indicated that her

technology skills improved as a result of the online professional development experience.

Kayla indicated that the professional development was completely online and she participated in 60% of the online professional development outside of the workday and 40% during the workday. She reported that she spent 35 total hours in the professional development experience at approximately five hours per week.

Holocaust and Human Behavior was an eight-week professional development experience that provided an overview of the rise of the Nazis and the Holocaust. In a forced ranking, Kayla indicated that she considered the self-paced learning of the professional development to be the most valuable to her learning/teaching, followed by the value of the facilitator, followed by interaction with others. She appreciated the self-paced nature of the course more than the facilitator or the interaction in the online community because she was so burdened in her personal life with other time constraining responsibilities. She also appreciated the ability to work at her own pace within a specified time frame. She did not participate with teachers from her school/grade-level team.

Holocaust curriculum is typically organized chronologically or by theme. Kayla described the units organized thematically by “scenes” such as the camps, the focus on resistance, and then how it is organized chronologically within a certain scene.

The professional development was structured to include reading materials including primary source documents, viewing video, creating journal entries, and participating in facilitated discussion forums. The online experience also included presentations by leading Holocaust scholars and culminated with a live conversation

with a Holocaust survivor. Kayla described this unique and vivid experience as the component that contributed the most to creating a successful experience. She indicated that the survivor:

Was someone who was a Schindler Jew, so that was even more unique because there are not that many of them left any more. To get to interact with someone like that was really cool. We were each allowed to ask a specific question, but she came on and told her story, then we were allowed to ask a question each.

The purpose of the online professional development was to support teachers who teach about the Holocaust and genocide by teaching them to use the website resources as teaching tools for the classroom and to support use of increasingly varied instructional strategies. Kayla confirmed that the online experience impacted and/or changed her teaching by allowing her to explore additional ways of delivering content to her students. At the conclusion of the seminar teachers were given unit plans and lessons, transcripts of online conversations, plus they had access to resource collections, publications, classroom strategies, online modules, a lending library, idea exchange, and video clips for future use with students and was given support from a Facing History Program Associate.

Kayla indicated that she benefited from the process of evaluating how she was teaching the Holocaust more than learning about the Holocaust, however, she indicated that the professional development experience did allow her to expand her existing knowledge of the Holocaust. She said that the professional development was focused not on the content of the material but how to teach it, different approaches and materials to use, and instructional strategies for teaching the content. For example, since Kayla has a set of laptops for every student in her classroom she is able to construct class

activities that can be accessed via a wiki both at school and at home. The online professional development experience gave Kayla ideas for how to structure the online components that she uses with her students. She also indicated that one of the activities in the course required the development and use of an online module that she still uses in her classroom today.

Although the interactive opportunities of the experience were ranked behind the impact of the self-paced learning and the impact of the facilitator, Kayla indicated that participation in the forum and discussions and communication with class members and facilitators strengthened her curriculum and instructional practices. She said there were two facilitators and some people taking the class as repeat because they were in training to be facilitators. Kayla indicated that during the course they challenged her to be more reflective and deepen her thinking. For example, a facilitator posted a question and waited for students to post responses. “In this particular course, if you gave an answer the facilitator would come back and ask you, ‘Okay, why did you say this?’ ‘Or maybe you could think about it this way.’ The facilitators were very well trained.” This was unique from her perspective. She indicated, “I’ve taken online classes where the facilitator doesn’t really interact” and this was a substantively different experience.

When asked about the interaction with other teachers online, Kayla indicated that the other participants were valuable to her and that she met some people online that she continues to interact with in the Holocaust education community. She was grateful that the online professional development experience provided her with an opportunity to make the initial contacts that led to future relationships.

CHAPTER 5: SUMMARY AND DISCUSSION

This chapter restates the study research questions and reviews the methods used before summarizing the results and discussing the implications of those results. Study limitations are presented and recommendations for future studies are provided.

Statement of the Problem

Teacher effectiveness in the classroom is of concern and many reform efforts focus on teacher professional development to strengthen curriculum and pedagogy as a vehicle for improved student achievement. Increased advancement, expansion and use of technology has created opportunities for online professional development to play a more significant role, however, online professional development is currently underutilized in K-12 school districts. This study investigated successful models of online professional development and the results provide insight that will inform district decision-making at the local level.

Review of the Methodology

This study focused on identifying the models of online professional development that teachers found effective, contributed to their learning, and changed how they taught. Using a mixed methods research design, participants were invited to complete surveys and participate in interviews. The surveys identified the characteristics of online professional development experiences that successfully impacted classroom practice. A cross-sectional survey design was used to investigate: (a) characteristics of the professional development experience, (b) participant attributes, and (c) impact of the professional development. Additionally, three of the surveyed

participants were interviewed to further investigate the online experience using multiple case study research. The following research questions were used to guide this study:

1. How do K-12 school teachers participate in online professional development?
2. How do these teachers describe online professional development experiences that positively impact their learning?
3. In what ways do these experiences positively impact their effectiveness in the classroom?
4. In what ways did the online experiences strengthen participant technology skills?

Summary of the Results

Leaders from affiliates of ISTE (International Society for Technology in Education) invited teachers in fifteen states to participate in a study of positive experiences with online professional development. Responses from 328 teachers who participated in the online survey were analyzed to gain insight into the impact and outcomes from online professional development experiences.

Research Question 1: How do K-12 school teachers participate in online professional development?

Who are the teachers?

Descriptive analysis revealed that the survey population was surprisingly experienced with online professional development with the average individual having

taken eight online courses. While it was not surprising that the survey population of teachers would be dominated by females (72%), or that the population would be dominated by people in suburban and rural (77%) settings because of the convenience of the online situation, it was surprising that the majority of the participants were older with 36% over 51 years of age, and 24% between 41 and 50 years old and typically more experienced in the teaching profession.

Nearly a decade ago Marc Prensky (2001) suggested, “Today’s students – K through college – represent the first generations to grow up with the arrival and rapid dissemination of digital technology.” He referred to them as *Digital Natives* and contrasted the youth of that day to the older *Digital Immigrants*, those not born into the digital world. Prensky suggests, “The importance of the distinction is this: As *Digital Immigrants* learn – like all immigrants, some better than others – to adapt to their environment, they always retain, to some degree, their ‘accent,’ that is, their foot in the past.” He further suggests *Digital Immigrants* typically have very little appreciation for the new skills that the *Natives* acquired and perfected through years of interaction and practice.

If Prensky’s (2001) assertion is true, that older teachers are less interested or less able, it is surprising that 60% of the participants in the study are over 40 years old and participating in online professional development more than their younger counterparts. Additionally, the majority of the participants evaluated their professional development experience as positive and gave specific examples of how it positively impacted their classrooms. While participation in the survey was contingent on having a professional development experience that positively impacted the classroom, it is notable that the

detailed explanations in narrative responses confirmed a very high level of enthusiasm for the experience. Additionally, two of the three case study participants who were over 50 years old both indicated a high degree of enthusiasm for their online experience and the match to their learning style.

Looking more specifically at age groups, there was a small statistically significant difference between 31-40 year olds and 41-50 year olds for mean technology improvement and for impact on curriculum and instruction. The older age group perceived greater improvement in technology use and greater improved impact on curriculum and instruction, however, this trend did not hold for the participants in the group over 50 years old. There were no statistically significant differences in the way participants perceived frequency of interaction (either with the facilitator or the online community).

It was less surprising that most of the participants in a study about online learning teach high school (57%) as the literature suggests that online courses for high school classes are more prevalent than for middle or elementary classes and teachers are more likely familiar with the environment (Project Tomorrow, 2009).

While the survey was distributed in the same manner through organizations in fifteen states, it was surprising that the survey population was dominated by participants from Pennsylvania (43%). The 140 teachers taking the survey from Pennsylvania were contacted because they participated in the state's Classrooms for the Future program.

As discussed in the case study, Classrooms for the Future (CFF) is Pennsylvania Governor Edward Rendell's initiative to put a laptop computer on every high school English, math, science, and social studies desk and to provide teachers with a

multimedia workstation and intensive training to enhance education. A significant amount of state money was dedicated to train teachers and administrators on how to best harness the power of technology to enhance classroom discussions, lessons, and projects. Not all of the Pennsylvania participants, however, reflected upon their Classrooms for the Future experience. Some chose to answer the survey about a different experience as they answered the questions about the online learning experience that impacted their classroom.

The investigation of the characteristics of the teachers (e.g., differences between gender, age, and school-level groups) follows. Findings sometimes answer multiple research questions, such as, differences between males and females are shown in the context of the technology improvement that occurs while participating in online professional development.

What are the characteristics of the online professional development experiences?

The narrative responses to a variety of questions affirmed that participants generally appreciated the online delivery model of their professional development experience. When participants were asked about how the experience supported their learning some participants indicated specific features in the structure of the online professional development. For example, 12% said that the materials were easy to access and immediately available because of the delivery model, 7% said the online learning environment itself was conducive to their personal learning style, 7% indicated that the multimodal/multi-media (e.g., video) delivery model supported their learning.

There were two survey questions in the study that show what kind of online courses this experienced group of teachers participated in. The first question revealed

all of the types of online courses participants have experienced (in total) and the second question asked participants to indicate the one type of professional development that they would be describing in the rest of the survey.

The online professional development literature is dominated by discussion of online college and university courses and, in the first question, 74% of the participants indicated they have taken an online college or university course at some time. It was initially surprising to find that 50% of the participants indicated that they had participated in an online tutorial, 44% indicated that they had participated in a school district recommended course, and 26% indicated that they participated in a school district created course. These initial findings suggested that the use of online professional development has expanded beyond colleges and universities to school districts, which was promising because Birman et al. (2000) indicate that professional development goals and district/school goal coherence and alignment is important. As online professional development opportunities expand beyond college courses there is greater potential to create that coherence and alignment.

Analysis of the results for the second question, however, revealed a different conclusion. Participants were asked to select and describe the one online professional development experience that most aligned with their learning style and positively impacted their teaching or learning. They were instructed to consider that one experience and then refer to that experience throughout the rest of the survey. Fifty-two percent (174) described a college or university course, 16 % (52) described a school district recommended professional development experience, 12% (40) described an online tutorial, 11% (36) described an online professional development offering, 5%

(16) described a district created professional development experience, and 2% (5) described something “other” than above.

Considering the literature review was dominated by research associated with college and university developed online courses, and because the study was about K-12 public and private school teachers, more detailed analysis focused on the 47% of non-collegiate professional development that the teachers described.

Findings suggest that the primary sources for non-collegiate professional development are State Departments of Education and relatively large commercial websites. It appears to be likely that creating effective online professional development requires significant resources to create, organize, and distribute online learning opportunities. State Department of Education findings, however, should be cautiously considered. Because of the way the survey was distributed, through International Society for Technology Education (ISTE) affiliate organizations including the Classrooms for the Future (CFF) listserv, the sample population includes a relatively large percentage of participants in CFF, therefore a relatively large percentage of participants accessing their professional development from the Pennsylvania Department of Education.

The more thorough analysis and comprehensive findings that show Departments of Education and commercial websites dominating non-collegiate professional development offerings, contradict the initial findings from the first question and suggest that the use of online professional development has not expanded well beyond colleges and universities to school districts. Findings also suggest that districts are not primary sources for online professional development experiences, even though they play a role

in recommending them. There appears to be an opportunity for improving the frequency in which districts offer online professional development that can potentially be linked and aligned to district and school goals.

Further investigation into the characteristics of online professional development found that 73% of the online experiences described were completely online courses and the range of hours invested in the experience is wide with 17% from 0-19 hours and 22% more than 100 hours. An important attribute of effective professional development is long duration. Traditional face-to-face professional development workshops and conferences are criticized for being brief and sporadic, therefore ineffective. They do not have the positive impact that longer training has particularly when ongoing follow-up and continued learning over time are built into the professional development design (Birman et al., 2000; Haycock, 1998; Johnson, 2006; Moore & Barab, 2002). In the study, participants indicated that they spent an average of 163 hours in their online professional development experience and they estimated spending an average of eight hours per week. At this pace, the average professional development experience was 20 weeks long, which is plenty of time to create a continued learning experience with opportunities to learn, implement practices, and reflect on the application in the classroom.

The eMBEDDED LEARNING case study shows an example of Teresa's participation in a unit of study in which discussion of that content follows (both online and with colleagues) while implementing her learning in the classroom. The case specifically shows how Teresa's more than 200 hour learning experience included this

learning sequence repeatedly over many months with ongoing learning and built-in continued follow-up with a coach.

As with face-to-face learning, online professional development material is best when it is challenging, relevant and immediately applicable in daily work (Levin et al., 2001), it is also important for the learning activities to transfer to classroom application (Darling-Hammond, 1997; Leh & Jobin, 2002; Mouza, Kaplan, & Espinet, 2000). The online professional development experiences in the study included video (69%) as well as a variety of ways to interact and communicate such as threaded discussion (83%), email (62%) and chat (35%). The professional development experiences also included website links (84%) and online documents (90%) that were not just simply for reading and writing which teachers prefer. Most of the teachers in the study enthusiastically enjoyed their online experience and described their experiences as dynamic, active, and interesting, and found the material to be challenging, relevant, and applicable to their daily work.

The literature review did not uncover trends in the use of particular sites for online professional development. Instead it revealed an eclectic mix along with face-to-face classes that had been converted to online classes. It was hoped that this study would reveal trends in non-collegiate district affiliated online professional development. While the results of the study do show that teachers are participating in non-collegiate online professional development, the study did not show trends toward particular websites or activities. With 195 unique URLs reported, the most commonly used website was <http://www.embeddedlearning.com> and 60 participants (18%) reported

using that site (or another version of it e.g., embeddedlearningacademy.com). All of the other websites were used by less than 3% of the participants in the study. This finding suggests that it is still difficult to make recommendations to educational leaders regarding the best choices for high quality professional development.

How was the online professional development experience located and who participated together?

Groups of teachers from the grade-level, department, or school benefit from professional development activities in real-life contexts (Birman et al., Duncan, 2005; Glazer & Hannafin, 2006). Professional learning is a social enterprise and is improved when school teams work together to consider innovative practices in a common environment and for similar students with the same curriculum (Glazer & Hannafin, 2006). Study participants were engaged in their online professional development experience with online learners from their district (25%), school (24%), and even grade-level team (13%). Two of the three case study teachers participated in the online professional development with colleagues from their schools. They described the participation with others as a positive influence on their learning because interaction with colleagues deepened their reflection and thinking about the content, curriculum, and use of instructional strategies in the classroom.

Although most of the online professional development experiences are not offered by a district, the largest percentage (38%) of the participants located the online professional development through the school district, county office of education, union, or state (e.g., credentialing opportunity).

This is a significant finding for educational leaders to consider. District leaders should sequence adult learning toward intended results in ways that connect online and face-to-face learning with a coordinated design that links specific content to a comprehensive and coherent plan (Birman et al., 2000; Darling-Hammond, 1998; Haycock, 1998; Joyce & Showers, 2002). Since online professional development typically offers the added benefit of being longer in duration, with opportunities for concurrent job-imbedded practice (in classrooms), it is advisable for districts to clearly articulate district priorities and recommend online professional development that links and aligns to those priorities. Additionally, study findings show that online learning communities don't need to be thought of as mutually exclusive from face-to-face school and district learning communities. District leaders should not only recommend the content but also foster teams working together to learn the content simultaneously.

Research Question 2: How do teachers describe online professional development experiences that positively impact their learning?

One of the challenges in the study was interpreting data and summarizing findings because of the inextricable link between the overt and observable aspects of learning and how learning takes place covertly in the human mind. In the survey, even when asked about the impact of the experience on their learning, it was difficult for participants to discuss their learning without commenting on the unique *convenient* manner in which online learning was done. Twenty-five percent of the participants indicated that convenience was significant for supporting their learning style although “convenience” is not typically viewed as a learning style. From the narrative comments

it was inferred that the ability for individuals to be able to imbed learning into their hectic daily schedules and the ability to work at home at any time of day was perhaps what made it possible for individuals to participate in a learning activity at all.

Learning is also significantly impacted my motivational factors, not only involved in the teaching, but in the learner (Ahl, 2006). In this study it was encouraging to learn that the motivation to participate in the professional development was primarily to learn more about a particular topic (30%) and to experience online learning (8%) as opposed to being required by the employee's district or to obtain a degree. In fact, 16% of the participants located the professional development by looking on the Internet and 7% located the professional development through an advertisement to find something to participate in simply because it was of high interest.

Design and Pacing

When asked which was the most valuable to learning, 57% of the participants indicated that the self-paced nature of the professional development was most important (compared to interaction with others and use of a facilitator). Additionally, when asked how the professional development experience aligned with the participant's learning style, the majority (31%) indicated that the self-paced style of the learning created the most support. Participants indicated that the flexibility to slow down and speed up the learning improved their learning. They indicated the need for the time and opportunity to re-read material, think and process information, and practice skills. Participants also appreciated the ability to quickly review or skip material that was familiar. The ability to differentiate the pace of the learning was described by participants as highly

motivating. Equally, when online learning experiences were panned it was often because the learning was too fast or too slow and frustrating for the participant. Additionally, while interaction with the facilitator was not always considered overtly valuable, the lack of interaction when needed, expressed by one of the case study participants, indicates the importance of the availability of the facilitator when necessary to keep the student's desired pace.

Between four and six percent of the respondents discussed that online professional development provides a unique benefit because of the opportunity for deeper analysis and reflection when the pace of the learning was controlled by the learner. This is not surprising because research has shown that certain kinds of online social contexts have effects on a variety of dimensions of reflective thinking and that participants develop greater reflection in their learning through online courses compared to teachers who met face-to-face (Harlen & Doubler, 2004; Makinster, Barab, Harwood, & Andersen, (2006). This is an important and unique attribute of online learning because research shows that teachers seldom have the opportunity to participate in in-depth reflective discussions (Moore & Barab, 2002).

Each of the case study interview participants discussed pacing as an important aspect of what they appreciated about their learning experience. Teresa described times when she was having difficulty understanding the material and because she could slow the pace of her learning, and even go ask a teacher down the hall for assistance, she was more successful at learning the content by the time the group met on-site to discuss it. Louise described the self-pacing as most valuable to her teaching/learning because she could control her ability to repeat information. Louise also highlighted how important it

was that the self-pacing was not interrupted by the facilitator. In her experience, the facilitator had to approve sections before she could move on and it was frustrating when the facilitator was unavailable to make the approvals in a timely manner. In the third case study, Kayla also ranked the self-pacing as most valuable to her teaching/learning because she was so burdened in her personal life with other time constraining responsibilities and she appreciated the ability to work at her own pace within a specified time frame.

Study findings suggest that designers of online learning have known that self-pacing is an important characteristic to make a part of the online experience. Respondents indicated that the average frequency that the pacing was self-directed for all online experiences in the study was between *always* and *often* which was one of the reasons the online experience of the participants in this study were so favorable about their experiences. While self-pacing is frequently offered in online professional development experiences, it is an important selection criterion before educational leaders recommend particular courses. It is also important to consider the role of the facilitator and their ability to influence on the self-pacing.

Theoretical Frameworks

As discussed in the review of the literature, the theoretical framework most commonly used in the professional development literature is Lave and Wenger's (1991) theory asserting that learning takes place in a *community of practice*. People being participants in an activity together generate shared meaning through social participation from that activity. Communities of practice are defined as self-organizing, evolving,

entities that have their own emergent organizational structure and norms of behavior (Lave & Wenger, 1991; Schlager & Fusco, 2003).

In this study a modification to this theoretical framework is being asserted. The theoretical framework implies that learning occurs in a single community of practice and the online community is a “virtual” community of practice that is simultaneously experienced in addition to the face-to-face community of practice. Study findings showed, however, that online learning communities don’t need to be considered mutually exclusive from face-to-face school or district communities. Twenty-five percent of the study participants had intersecting communities of practice in which members of the online community also included members of their school, district, and/or team community members.

Using an additional social capital theoretical framework proved to be useful in the study analysis to consider the meaning of varied levels of intensity of interaction, reflection, and participation that explain the social and meaning-making aspects of adult learning. Social networks are groups of individuals joined together, in effect, as communities of practice, that have a particular identity, engage in purposeful tasks or practices, and make meaning from their shared experiences, therefore, building social capital. Scott (1991) describes individuals in networks in relation to each other. Participants are “central” when they have or give or receive more information and knowledge than other participants. This notion of *volume* contrasts with the *frequency* of interactions between members referred to as density. Teachers, therefore, are stronger in the community of practice when they experience more interaction and communication. Participants in the study described the social networks they participated

in (both the online and school communities), and the impact of the volume and frequency of their interactions with members in each community.

Collaboration and Interaction

To create an online community of practice, establish a social network, and build social capital, vehicles for interaction such as threaded discussion, chat, or email must exist. Study findings show that the frequency of the opportunity for the existence of this second community of practice online is high. The majority of the respondents addressed the ways in which community was created. Eighty-three percent agreed that threaded discussions were an interactive component of the professional development in which they participated, 62% used email, and 35% used chat.

Threaded discussions and chat play an important role in increasing the amount of interaction participants experience. In the study there was a moderate statistically significant difference in *frequency of interaction with online community* mean scores for participants who used threaded discussions in their professional development and those who did not. Threaded discussions were associated with greater frequency of interaction. The same was true for chat. There was a moderate statistically significant difference in *frequency of interaction with online community* mean scores for participants who used chat in their professional development and those who did not with opportunity to chat associated with greater frequency of interaction. In summary, these vehicles for interaction were frequently available and participants capitalize on the opportunity to use them.

Additionally, when the opportunity does not exist to participate in an online community of practice, teachers are frustrated and tend to not like the experience. For example, one participant indicated when reflecting on the impact of the online experience on colleagues, “I was frustrated because we could not get onto blogs and web-based communities the COURSE ENCOURAGED!”

This study confirmed the importance of interaction in a variety of ways. When asked which was the most valuable to learning 25% of the participants indicated that interaction with others was most important (compared to the self-paced nature and use of a facilitator). In a forced ranking about frequency, participants mostly stated they “often” felt a part of an online community, and “often” felt part of an online community that supported their learning. They even more frequently indicated that they learned from educational research and/or scholars and practitioners. The premise of Brown, Collins, and Duguid’s (1989) theory of *situated cognition* and Lave and Wenger’s (1991) *situated learning theory* is that engagement and active participation are viewed as inseparable for learning in physical and social settings. According to situated learning theorists, knowledge is “situated” in real contexts, and interactions between individuals in the context lead to development of meaning and understanding.

Joyce and Showers (2002) suggest that an essential element of professional development that will significantly affect student achievement requires, “A community of professionals coming together who study together, put into practice what they are learning, and share the results” (p. 4). In narrative responses teachers frequently commented on the importance of learning from other teachers (even more than from the supposed expert facilitator). In the interview with Louise, she indicated that a couple of

colleagues supported her when she had difficulty with the mathematics content and they were more than willing to extend her learning experience.

Teachers perceived other teachers as experts because they were doing the same kind of daily work and they sought their expertise as tried and therefore true. When discussing the impact and/or change in teaching, one participant explained it this way:

Instructional practices. Was able to brainstorm and develop ideas and have them reviewed by teachers of the same subject for confirmation or rejection of idea and meeting expressed needs. This was useful as I am the only teacher of my subject in my district and I never get conferences approved to collaborate with others in my subject area.

Kayla, one of the interviewees, explained that there aren't many teachers who teach about the Holocaust specifically and in-depth the way she does. She found interaction with other same subject area teachers to be beneficial and was grateful to have made lasting friendships with her online colleagues. She also indicated that participation in the forum and discussions and communication with class members and facilitators strengthened her curriculum and instructional practices.

Another survey participant indicated, "I was able to share ideas with other teachers around the world who shared the same learning needs that I had. We all had the same compassion for learning more ideas to help our students." And another indicated, "Hearing from other teachers gave me ideas of what works. I've gotten great ideas and introduction to new technologies and how they are being used in classrooms around the country."

Case Study 1 participant, Teresa, explained that interaction and collaboration with the online community through threaded discussion posts and discussions were beneficial, however, interaction with her face-to-face/online team took her learning to a

higher level. She indicated that discussion at the school site made the curriculum stronger and, in particular, more responsive to the needs of the students in their school. The academic content conversation even promoted conversations about students, their histories and their individual needs.

In a general question about how the professional development experience supported participant teaching (not learning) 11% (27) were compelled to address the importance of collaboration with colleagues. In a different question, 19% (56) of the respondents indicated that the discussion and collaboration with colleagues during the online professional development experience was of high value. One participant said:

In an actual class I would normally not be an enthusiastic participant in discussions. I'm not very outgoing. In the online course, asynchronous discussions were a major part of the grade, so I was forced to participate more than I normally would have. But it was much easier online with the greater degree of anonymity. I actually enjoyed the discussions and learned a great deal from them. Having time to compose written responses in the discussion also allowed for more time for reflection than is possible in a real time face-to-face classroom discussion.

The study showed that social interaction also had an important role in improving learning and its' consequent application to the classroom. The analysis of the relationship between the frequency of interaction with the online community and/or facilitator and the impact on curriculum and instruction revealed a medium (.463) statistically significant correlation between the two variables. High levels of interaction were associated with higher levels of improvement on curriculum and instruction. Likewise, the analysis of the relationship between the frequency of interaction with the online community and/or facilitator and the impact on improved use of technology also revealed a medium (.324) statistically significant correlation between the two variables.

High levels of interaction were associated with higher levels of improved technology improvement.

Study findings also show that the online learning experiences influence face-to-face communities and there are important implications for educational leaders. Teachers were asked to indicate way(s) the online experience impacted their colleagues, friends, or others. Of those who responded, most (29% of the total participants) indicated that they shared what they learned with other teachers, for example, with department or grade-level colleagues. Nine percent indicated that they shared their learning with a broad audience such as at a staff meeting or through their work in an assigned leadership role.

Researchers suggest that professional development activities should be structured for collaborative learning, for example, through study groups, coaching, internships, action research, committees, teacher networks, or mentoring situations (Birman et al., 2000; Conway, Hibbard, Albert, & Hourigan, 2005; Glazer & Hannafin, 2006; Johnson, 2006; Joyce & Showers, 2002). A theme that emerged from participant responses was that teachers who shared with others felt comfortable to share because they had participated together in the professional development experience. One participant, for example, said, "Several of us took the course together and we now have each other to use as resources." Another participant indicated, "There were 30 of us in the course. We were all impacted mostly by learning from each other. We learned about new assessment models/strategies. We learned how to make learning more engaging for students. We learned how to use more technologies to impact student learning." The two case study participants who did their online learning with their district or school

colleagues were not only comfortable in sharing what they learned, they were comfortable asking questions and co-constructing knowledge. Louise indicated that the sharing of lesson plans and units was particularly effective and Teresa indicated that having an opportunity to ask questions and analyze lessons (and their implementation) together was highly beneficial.

Another prevailing theme to these responses was that when teachers participate in professional development on their own, they discover that other teachers are not interested in their learning or they are not comfortable sharing their learning because they feel other people will not relate to their learning experience. One teacher indicated, “It impacted me, I share my thoughts with colleagues, but often it falls on deaf ears.”

District leaders are likely to be more aware of participation in face-to-face professional development than online professional development. It is recommended that districts create mechanisms to find out what kind of online learning teachers are experiencing. It is also recommended that they create systems for fostering teams to participate together and routinely share what people are learning. Achievement is improved when teachers work in professional learning communities in which collaboration is a central feature (Dufour & Eaker, 1998; Schmoker, 1999).

How do teachers NOT describe online professional development experiences that positively impact their learning?

While it is interesting to summarize the findings about what participants describe as positively impacting their learning, it is also important to consider what is missing from those descriptions, in this case, mention of the facilitator of the

professional development. Only 66% of the participants in the study indicated that there was a facilitator available during their professional development experience. On the average, the frequency the facilitator was available was “often” yet the average participant interacted with the facilitator only “sometimes.” In a forced ranking regarding what was most valuable to participant learning/teaching, only 16% of the respondents indicated that the facilitator of the professional development was more valuable than community interaction or the self-paced format of the professional development.

When asked two related questions, “How was the experience aligned with your learning style?” and “How was the professional development experience effective in supporting your learning?” there was very little mention of the facilitator. When mentioned, the role of the facilitator was usually in combination with comments about interacting with other online learners such as, “The facilitator and other teachers taking this course provided a lot of good ideas and feedback on how to incorporate technology into lessons and how to make the student learning more authentic” or, “While a facilitator may be necessary to explain some concepts and clarify if needed, I learned much more from the interactions with my classmates.”

It was unexpected that the results of the survey implied that the professional development facilitator plays a relatively less essential role in participant learning. The survey provided a variety of opportunities to describe the role of the facilitator and rich descriptions of the value in the facilitator as an expert and support were expected, however, only 66% indicated there was a facilitator in their professional development experience.

Findings may suggest that learning is effective when the primary role of the

facilitator is simply setting up structures for learning and interaction between participants and that learning continues to be highly effective when the facilitator is non-existent or unobservable. However, an alternate interpretation of the findings may result in an alternate conclusion.

The role of the facilitator is typically to determine the goals and objectives for the professional development and to choose teaching methods that will most effectively and efficiently lead to the successful acquisition of the learning objectives for all students. They are typically responsible for choosing the content for the professional development, how it will be presented (e.g., reading or video), how the information will be assimilated and how the content will be monitored and modified based on the progress of the learners. The assimilation of the learning may occur through carefully crafted questions or reflection topics that are provoking, stimulating, controversial, and/or cause teachers to think differently about their thought patterns or practices. When discussion opportunities evoke meaningful responses and engage the learners it is likely that the interaction among participants is what is memorable and impactful and the important skilled facilitator becomes transparent to the learner. In the case study, *Facing History and Ourselves*, Kayla described a highly skilled facilitator who skillfully entered and exited conversations to effectively promote divergent thinking. She indicated that the facilitators were well trained, frequently present, and effectively interacted to push her learning further. She also indicated that there were facilitators in training during the professional development experience, which indicated to her that effective facilitation was something that required knowledge, skill, and practice.

When the facilitator is observable, their influence emerges as very important.

Louise indicated that in the BrainX professional development she became highly frustrated with the facilitator because the facilitator impeded her progress. The facilitator also lacked the expertise required to support her learning, which was a source of immense frustration to Louise.

Findings suggest that it is not simply structuring interaction that is important in the online professional development experience, but structuring interaction that deepens the individual's shared experience. It is perhaps the shared experience that is memorable and "practice changing" and it is the experience that cannot be replicated with teachers, who did not participate in the experience, through simple interaction.

Research Question 3: In what ways do online professional development experiences positively impact effectiveness in the classroom?

The study of professional development is important because of the implications that teacher practice will be improved and achievement will be better for children. Joyce and Showers (2002) suggest, "Only content dealing with curriculum and instruction or the overall social climate of the schools is likely to *considerably* improve student learning" (p. 11). Other researchers agree on the curriculum focus, however, suggest that professional development goals should focus specifically on improving and expanding teacher's content knowledge in their subject area (Birman et al., 2000; Conway et al., 2005; Haycock, 1998, Hirsh, 2005).

Curriculum and Instruction

Study findings show that online professional development has a positive impact on the content of the curriculum and strengthening of instructional strategies. All three of the case study participants discussed the positive impact on their classrooms with specific examples. In the first case study, Teresa described the changes she made in her curriculum, and the instructional strategy differences that resulted from consistent use of a SMART Board. She indicated that the professional development led her to fundamentally change the mode of instructional delivery of “all of her lessons” from traditional direct instruction with only a chalkboard for visual support, to multi-media demonstrations including opportunities for student interaction. She indicated that her instructional strategies are stronger now because she integrates technology and provides greater support for her digital native students. Additionally, she indicated that her curriculum was strengthened to meet the needs of a diverse student population.

In the second case study, Louise indicated that the curriculum she teaches was enhanced by the professional development experience because she added more rigorous student experiences and material to the curriculum. She indicated that the quality of the curriculum and strengthening of instructional strategies resulted when her homework assignments included creating (and sharing) lessons.

In the third case study, Kayla indicated that the online professional development strengthened her personal understanding of the content, improved the curriculum, expanded her use of varied instructional strategies and increased her ability to integrate technology. She obtained lessons, units and other resources to use with her class. She also indicated that she learned new ways to deliver the content, such as, she is now

using a wiki with her class that allows her to deliver the content in a more meaningful way creating more engagement and active participation with the integration of technology.

When survey participants were asked how the online professional development experience impacted their *learning* 25% indicated improvement in the use of instructional strategies and instructional delivery methods. Another 24% indicated improved curriculum and 7% indicated their classroom assessment and feedback mechanisms were improved (an important component of curriculum and instruction). In responses for two related survey questions, when asked how the online professional development experience impacted *teaching*, 28% and 15% indicated improved use of instructional strategies and instructional delivery methods. Nineteen percent and 11% indicated improved curriculum, and, similarly, another 21% and 13% indicated they had new ideas to implement (which would most likely impact curriculum and instruction). The rest of the responses were closely related to curriculum instruction: teacher learning enhanced, thinking reframed, better materials and resources, how students learn, motivation, engagement, and assessment. The only two responses that didn't directly impact curriculum and instruction were teacher confidence building (and an argument could be made that there would be a positive impact on curriculum and instruction) and improved efficiency (it is not known whether this is simply teacher planning efficiency or efficiency in the classroom).

Most teacher participants indicated that their range of instructional strategies, their skills as a teacher, the quality of their curriculum, and their ability to make learning more relevant in the classroom "improved" as a result of the professional

development experience. Most teacher participants indicated their belief that they are more successful in meeting the needs of students, and use of collaboration, problem-solving and critical thinking in the classroom “improved somewhat” as a result of the professional development experience. Additionally, respondents indicated that they “often” thought there was a positive impact on their classrooms and “often” created or modified lessons for their classroom as a result of the professional development experience.

To better understand the impact on curriculum and instruction, a one-way between-groups analysis of variance was computed to explore the impact of school type (elementary, middle and high school) on curriculum and instruction improvement. There was a medium statistically significant difference between elementary school teachers and high school teachers with elementary school teachers rating the impact of the professional development higher than high school teachers.

Changing curricular and instructional practices requires thought and motivation. As stated earlier, there were 128 (39%) participants in the study who indicated that they were motivated to participate in the professional development experience simply to learn something new. An independent-samples t-test analysis was computed to compare the *perceived improvement in curriculum and instruction* means for teachers who said they were self-motivated to participate in the online professional development to those who were not. There was a large statistically significant difference in scores for teachers who were self-motivated and teachers *not* self-motivated. Teachers who were self-motivated responded that curriculum and instruction improved “often” whereas teachers who were not self-motivated responded that curriculum and instruction improved

“sometimes.”

Content Knowledge

Haycock (1998) suggests that professional development should strengthen content knowledge and teaching skill (the shared strengths of effective teachers) in order to improve curricular and instructional practices. The average respondent said knowledge of their subject area “improved somewhat.” In two similar survey questions that addressed how the professional development experience supported learning, responses indicated that 28% and 11% of participants indicated that content knowledge and expertise were impacted most significantly. In a more unrelated question, when teachers were asked to describe the impact on their *teaching*, 6% responded that deepened content knowledge impacted their teaching most significantly.

Two of the case study interviewees addressed the emphasis of their professional development experience on building their content expertise. Louise indicated that concentration of the professional development on her mathematics content knowledge often stretched her to do things that would have been “over her head” to teach. She indicated that the online professional development built her confidence and ability as a result of the focus on content. Kayla indicated that the online learning experience allowed her to expand her existing knowledge of the Holocaust thus enabling her to teach with better command of the content.

Technology Integration

The last significant finding, that addresses the positive impacts from taking online professional development on the effectiveness in the classroom, relates to

technology. The purpose of this study was to investigate online professional development in which technology was merely the vehicle for the adult learning. In fact, respondents were asked to discontinue the survey if they were only able to describe an online experience in which the objectives were to improve their personal technology knowledge and/or skills. The study showed that the use of technology as a delivery model for professional development results in two positive outcomes (whether they are purposeful or unintended consequences).

First, when asked about how the online experience impacted participant *learning*, 41% indicated increased technology integration. In two related questions about impact on *teaching*, 24% and 29% of the respondents indicated it increased the amount of classroom technology integration (the largest percentage single coded response). Participants also indicated that they “improved” or “somewhat improved” in their ability to use technology in the classroom and application of computer-related activities in instruction. Two of the case study interviewees, Teresa and Kayla, indicated that increased technology was a significant impact on their classrooms. Teresa experienced significant impact because she is now teaching with the SMART Board. Kayla indicated that she has increased technology integration because she is using the class wiki with more frequency and using some of the strategies that she experienced in her online professional development experience.

Second, when asked about how the online experience impacted participant *learning*, participants indicated that personal technology skills improved in a variety of ways, which are investigated in the final research question.

Research Question 4: In what ways do online professional development experiences strengthen technology skills?

As discussed, the participants in the study can generally be viewed as proficient users of technology. The average participant has had eight online professional development experiences. The average frequency in which technical support was available was “often.” The average frequency in which respondents “needed and used technical support” was “rarely.” Yet participants indicated that they “improved” or “somewhat improved” in their technology skill and knowledge of the availability of electronic-resources. And, when asked about the impact of the professional development experience on technological expertise, 46% described an increase in skill or ability. Each of the case study participants indicated that they began their online learning experience as proficient users, however, indicated that they grew in their technology ability as a result of the experience. Teresa indicated that her personal technology expertise grew greatly as a result of her online experience and use of the SMART Board in her classroom. She is now more skilled at using the actual device and the multi-media resources associated with using it. Louise indicated that her technology skill improved and she indicated that her ability to participate in online courses efficiently and effectively has improved.

The analysis of the relationship between perceived technology improvement and perceived technology growth (comparing proficiency before and proficiency after the professional development) revealed a medium statistically significant correlation with high levels of perceived technology improvement associated with growth in one proficiency band or more (beginner, intermediate, proficient).

Several logical yet notable findings address the relationship between technology improvement and the number of online courses and time spent. There was a small statistically significant correlation between the two variables that represented technology improvement and the number of online courses taken by respondents with high levels of perceived technology improvement associated with greater frequency of participation in online professional development classes. There was also a small statistically significant correlation between the two variables that represented technology improvement and the total hours required for the professional development experience with high levels of perceived technology improvement associated with a greater number of total hours required for the professional development experience described. The same was true for the average number of hours per week required for the professional development experience.

In conclusion, the study set out to investigate how K-12 public school teachers participate in online professional development, how they describe online professional development experiences that positively impact their learning, what ways these experiences positively impact their effectiveness in the classroom, and in what ways the online experiences strengthen participant technology skills. It is clear that to be effective online professional development experiences need to provide self-pacing of the content and promote interaction and collaboration to support the co-construction of knowledge in a professional learning community focused on the immediate work of classroom teachers. Additionally, the content of the courses must be designed to build knowledge of content, curriculum, and instructional practices. By participating in

effective online professional development it is likely that participant technology skills and transfer to the classroom will also result.

Limitations of the Study

This study was intended to identify trends in the online professional development experiences of K-12 public and private school teachers across the nation who participated in a professional development experience that positively impacted their teaching, learning, and/or classroom. The study breaks new ground in the pilot study and use of a new survey instrument in which statistical tests, including factor analysis, have been conducted.

Online professional development for K-12 teachers is an emerging field and this study represents an initial step in understanding teacher participation by casting a wide net (teachers in 15 states) to gain breadth of teacher perspectives. This study intentionally sought out teachers who had successful experiences with online professional development to determine what would be recommended for future replication. Since ISTE affiliate leaders sent the survey to their constituent groups and it is assumed that members of the groups may have forwarded the survey to other teachers, it is impossible to know the exact size of the sample population. It is, therefore, impossible to know the response rate i.e., percentage of surveys that participants returned to the researcher. Results from the survey, therefore, must be generalized with caution.

Caution should be taken when generalizing results to teachers from other states or countries and teachers in higher education. Similarly, because the interview sample

of three individuals is very small, the findings from the case studies should be viewed as supplementary information to the survey.

The study is also limited because the participants are not representative of all teachers. Leaders from affiliates of ISTE (International Society for Technology in Education) invited teachers to take the survey using the Internet by emailing to their membership lists. It can be assumed that teachers with Internet access do not represent all teachers. Further, it can be assumed that all teachers are not represented by members of technology-focused organizations (with participation in an average of eight online professional development experiences).

The study is also limited because teachers were only invited to participate in the study if they participated in an online professional development experience that positively impacted their teaching or learning. Although some participants indicated that they experienced some challenges and frustrations, it is assumed that most of the participants who did not have a positive impact in their teaching or learning exited the survey. Additionally, the teachers participating in the survey are relatively proficient users of technology (with the average respondent having participated in eight online professional development experiences). It is possible that more proficient users of technology have better software and hardware and may have accessed higher caliber professional development. Therefore, findings cannot be generalized to the population of all teachers or all online learning experiences.

Suggestions for Future Research

The literature review for this study informs the educational community about professional development yet it reveals significant areas for future research. While

large-scale empirical studies with strong methodology have been conducted to determine the effectiveness of face-to-face professional development, equally rigorous studies have not been done in the field of K-12 online professional development.

This study surveyed teachers typically strong in technology proficiency and study findings are not generalizable to all teachers. Further studies are needed that include teachers with a range of technology ability to confirm whether study findings will generalize to the broader population of all teachers. Instead of identifying research participants through ISTE (International Society for Technology in Education) affiliates, a random sample of teachers in a geographic region may elicit more information about how many teachers are participating in online professional development and whether a more typical teacher finds online professional development to be as valuable as this technologically proficient group. More research needs to be done with representative sampling and quantitative analysis to complement the many convenience-sampled qualitative studies evidenced in the literature review.

It was hoped that one of the outcomes of the study would be to identify the top ten to twenty online professional development opportunities that are widely used in addition to being of high value. Instead, 195 unique URLs were indicated by participants and only one website was used by more than four study participants. One suggestion is to conduct a larger study in which more teachers are surveyed so that trends are more able to surface.

More studies need to be conducted to more thoroughly understand online learning beyond college and university courses to better understand what is available, high quality, and matched to teacher need. Study findings suggest minimal

opportunities for teachers to participate in online professional development offered by school districts. A suggestion for future research is to confirm that finding by studying a sample population of school districts to learn more about what they offer and how online professional development is aligned to school district goals.

Finally, more research needs to be done to show the effect of online professional development on adult learning and student achievement.

Recommendations and Conclusions

The purpose of this study was to identify models of online professional development that teachers found effective, contributed to their learning, and changed how they taught. The study showed that participants highly value online professional development because of the convenience and the ability to self-pace and differentiate their learning. Teachers appreciate the ability to quickly review information that is familiar and slow the pace when encountering new and unfamiliar material. Online professional development has the unique potential to foster reflection, deep thought, and analysis. It is easily structured to support teachers over longer periods of time and it is best when imbedded in teacher practice.

Teachers appreciate the potential to interact with an online professional learning community and the study documented that most online professional development experiences are structured to facilitate this interaction. Teachers thrive on the interaction and sharing of ideas between colleagues in job-alike situations. They benefit from the interaction with the online professional learning community and seem to benefit even more when they participate online with people from their face-to-face professional learning community. The majority of participants found that online professional

development helped them improve their knowledge of curriculum content and the range of instructional strategies used in the classroom. It gave them more ideas for ways to improve their classrooms to meet the needs of diverse student population, and helped validate effective practices that were already firmly in place. Additionally, a byproduct of online professional development is increased skill and ability with the use of technology that leads to increased integration of technology in classrooms.

This study has implications for policy makers and district leaders. Teachers find online professional development to be valuable, uniquely accessible and available, and convenient. They indicate that there are many benefits such as improved curriculum, instruction, technology integration, and technology proficiency. Teachers and district leaders should consider online professional development to be a strong viable option to improve teacher practice.

Decades of face-to-face professional development literature exists to inform educational leaders about how to construct adult learning yet teachers continue to suffer through professional development experiences condescendingly referred to as “sit and get” or “spray and pray.” Coherent professional development involves systematically sequencing adult learning toward intended results and standards of practice. Activities should ideally connect from one to the next over a period of time with opportunities to apply new learning in the classroom. Districts need to have a coordinated design for linking and integrating isolated specific content centered activities together into a comprehensive plan (Birman et al., 2000; Darling-Hammond, 1998; Haycock, 1998; Joyce & Showers, 2002). District leaders must embrace exchanging the poor habits of the past for sound research-based adult learning practices. Providing online learning

opportunities may be a vehicle to break the cycle of poor professional development practices, it will, however, be important not to replicate poor practices in the online format.

When considering offering or recommending online professional development, district leaders would be wise to consider making clear and specific recommendations regarding teacher learning objectives (linked with district goals and objectives) and find aligned online professional development opportunities that already exist rather than trying to create them on their own. Two of the best resources appear to be State Departments of Education and commercial professional development resources. Additionally, school districts would be wise to work with their neighboring school districts to build consortiums that provide online professional development, particularly as financial resources are in short supply.

Even if educational leaders have goals to improve teacher technology skills and/or technology integration in the classrooms, they should consider offering online professional development opportunities that have a subject area focus since facility with the use of technology will improve naturally as a byproduct of the experience. Additionally, when recommending professional development district leaders should consider online learning experiences that maximize interaction of teachers with common teaching assignments.

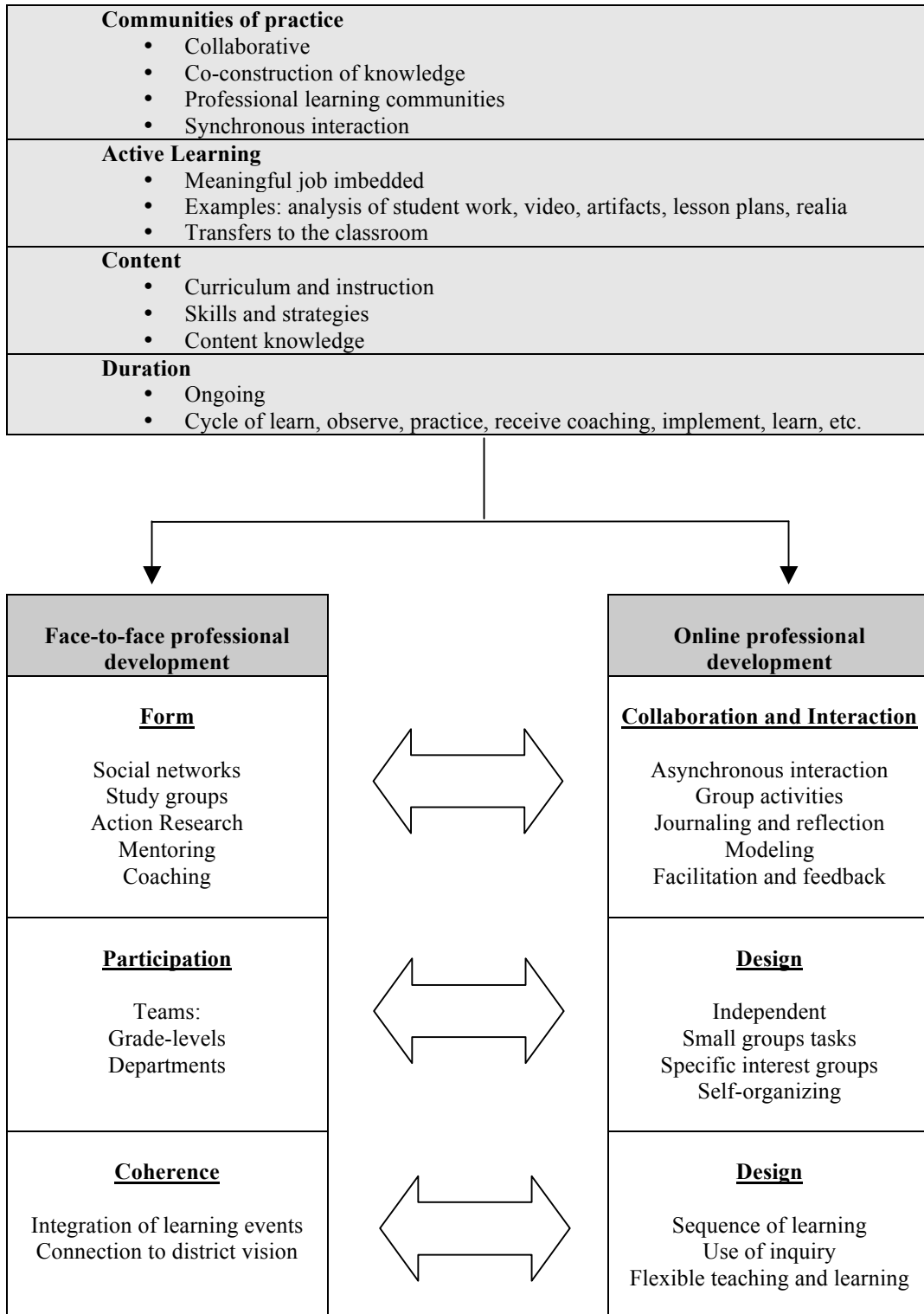
District leaders should also strongly consider ways to encourage people to participate in online professional development in teams, particularly those who work together in daily teaching and/or planning teams. It will be important organizationally to support teachers who are continuing their learning and to create ways to overcome the

obstacle that one participant highlighted, “It impacted me, I share my thoughts with colleagues, but often it falls on deaf ears.” By recommending specific online learning experiences and encouraging teachers to participate together in their learning, districts will be well served by the effective online professional development offerings that are available.

To truly understand the online learning environment it must be experienced. Educational leaders such as Board members, union leaders, superintendents, directors, and principals play an integral role in influencing district decision-making about professional development. It appears that online learning is something that cannot be completely understood without experiencing it first-hand. In order to be well-informed and strong decision-makers it is highly recommended that educational leaders participate in an online learning experience.

APPENDIX A

Effective Professional Development Design Characteristics



APPENDIX B

Electronic Mail to ISTE Affiliate Leaders

Dear Affiliate Organization Leader,

My name is Katie McNamara and I am a researcher graduate student at California State University San Marcos and am conducting a study of perceptions based on experiences from participating in online professional development. As an assistant superintendent of a California school district, I know how important this emerging model is for schools.

The study objectives are to determine how teachers participate in online professional development and how these experiences positively impact teacher learning and effectiveness in the classroom.

Participants in the study must be K-12 public or private school teachers who have participated in an online professional development experience that positively impacted his/her teaching. Additionally, the online professional development must have targeted a content area as opposed to learning to use technology.

Participants will be invited to complete the anonymous survey expected to take approximately 20-30 minutes to complete. Risks associated with participation are the time it takes to complete the survey. The survey will be open for four weeks beginning mid-January 2009. After surveys have been collected, three volunteers will be selected to participate in an interview to learn more about the model for their successful online experience and information will be requested from the professional development organization or sponsor to clarify elements of the model.

This study has been approved by the Cal State San Marcos Institutional Review Board (IRB). If you have questions about the study, you may direct those to the researcher, Katie McNamara at (858)229-9249 or kmcnamara@sbsd.k12.ca.us. You may also contact the researcher's advisor/professor, Dr. Katherine Hayden at 760 750- 8545.

Would your affiliate be willing to send an introduction and link to the survey to your membership or select teachers appropriate for this research study? Please let me know if your organization is willing to participate. If you agree, an email will be sent that provides information and a link to the survey for you to forward to potential participants.

Looking forward to hearing from you,

APPENDIX C

Electronic Mail to Survey Participants

Dear Teacher,

Katie McNamara, a researcher graduate student at California State University San Marcos is conducting a study of perceptions based on experiences from participating in online professional development. As an assistant superintendent of a local school district, she knows how important this emerging model is for schools.

The study objectives are to determine how teachers participate in online professional development and how these experiences positively impact teacher learning and effectiveness in the classroom.

You are being asked to complete an electronic survey on Survey Monkey if:

1. You are a K-12 public or private school teacher
2. You have participated in an online professional development experience that positively impacted your teaching
3. The online professional development targeting a content area as opposed to learning to use technology

This voluntary and anonymous survey will take approximately 20-30 minutes to complete. You may answer as many or as few questions as you choose. Your input would be greatly appreciated during January or February. The research would be valuable to educators all over the world.

If you are willing to participate in the survey please click on the following link:

http://www.surveymonkey.com/s.aspx?sm=3o9PnLdGoxsGk3IEFvkhtg_3d_3d

This study has been approved by the Cal State San Marcos Institutional Review Board (IRB). If you have questions about the study, you may direct those to the researcher, Katie McNamara at (858)229-9249 or kmcnamara@sbsd.k12.ca.us. You may also contact the researcher's advisor/professor, Dr. Katherine Hayden at 760 750- 8545.

THANK YOU for your participation!

APPENDIX D

Consent to Participate in Research

Invitation to Participate

Katie McNamara, a researcher graduate student at California State University San Marcos is conducting a study of perceptions based on experiences from participating in online professional development. You are invited to participate in the study because leaders in affiliate organizations of the International Society for Technology in Education (ISTE) were asked to send this survey to appropriate participants.

Purpose

The study objectives are to determine how teachers participate in online professional development and how these experiences positively impact teacher learning and effectiveness in the classroom.

Description of Procedures

You are being asked to complete an electronic survey on Survey Monkey if:

1. You are a K-12 public or private school teacher,
2. You have participated in an online professional development experience that positively impacted your teaching,
3. The online professional development content objectives were NOT mostly technology objectives.

The survey will take approximately 20-30 minutes to complete. The survey is completely voluntary. At the end of the survey you will be asked if you would like to provide an email contact address if you would consider being interviewed over the telephone to share about a specific online professional development program or experience.

Risks and Inconveniences

There are minimal risks attached to this study. There is minimal risk to have physical or psychological responses with strong emotional and/or negative reactions to research questions because research questions are limited to positive online professional development experiences that have been rewarding. Online surveys have the potential to be difficult to navigate, however, to participate in the study it is assumed that you participated in an online learning experience and that may have prepared you to successfully take an online survey. Additionally, there is the risk of loss of time in taking the survey, however, you can stop at any time without any consequence to you.

Benefits

Your participation will benefit future teachers and administrators as study findings will identify professional development experiences that have a positive impact on teachers and classrooms. The results of the survey will be published in a dissertation and an electronic copy of the final dissertation may be requested at katielmcnamara@gmail.com

Confidentiality

Your survey responses are given anonymously. No names, addresses, phone numbers or email addresses are required, however, you may disclose an email address should you decide at the end of the survey that you are willing to be interviewed over the telephone. Once the survey response time of four weeks has passed, the survey will be closed. Responses are password protected on the Survey Monkey website and only the researcher and her advisor/professor has access to the data. Access to the website does not allow a person the ability to track participants.

Voluntary Participation

Although participation in the survey is entirely voluntary, I would truly appreciate the time involved in filling out the survey. If you agree to the study, but later change your mind, you may withdraw at any time. There will be no consequence of any kind if you decide you do not want to participate.

Questions

If you have questions about the study I will be happy to answer them now. If you have any questions now or in the future you may direct those to the researcher, Katie McNamara at (858)229-9249 or katielmcnamara@gmail.com. You may also contact the researcher's advisor/professor, Dr. Katherine Hayden at (760) 750- 8545 or khayden@csusm.edu. This study has been approved by the Cal State San Marcos Institutional Review Board (IRB). Questions about your rights as a research participant should be directed to the IRB at (760) 750-4029 or irb@csusm.edu.

If you agree to participate, please click the next button to give your consent and access the survey.

NEXT

APPENDIX E

Participant Demographic Survey

The following questions provide some insight into your background in order to better understand your responses. Please indicate your answer by typing in the text box or choosing one of the responses shown.

1. I have participated in the following ONLINE professional development experiences (mark all that apply):

- College or university course
 - School district created course
 - School district recommended professional development experience
 - Online tutorials that provided professional growth for my teaching
 - Online professional development offering (not recommended specifically by district staff)
 - None (please discontinue the survey)
- Other (please specify): _____

2. How many online professional development experiences have you participated in? (Indicate the number in the box)

3. Please indicate your gender:

- Female
 - Male
- Other (please specify): _____

4. Please indicate your age range:

- 20 years or younger
- 21-30 years old
- 31-40 years old
- 41-50 years old
- 51 or older

5. How many years have you been teaching? (Indicate the number in the box)

6. The school level you teach is best described as:

- Elementary school
 - Middle school or junior high school
 - High school
- Other (please specify): _____

7. The school where I teach is best described as: Private school Public school

Other (please specify): _____

8. The school where I teach is best described as: Urban Suburban Rural

Other (please specify): _____

9. Please indicate the subject(s) you currently teach: Multiple Subjects, e.g., Elementary School Special Education Art English/Social Studies Mathematics Music Science Performing Arts/Theatre Physical Education Technology

Other (please specify): _____

10. Please indicate the grade level(s) you teach: Kindergarten 1st Grade 2nd Grade 3rd Grade 4th Grade 5th Grade 6th Grade 7th Grade 8th Grade 9th Grade 10th Grade 11th Grade 12th Grade

Other (please specify): _____

APPENDIX F

Professional Development Survey

Think about **ONE** online professional development experience that most aligned with your learning style and **positively impacted your teaching or your learning** as you answer ALL of the following questions. Complete this survey if technology was merely the vehicle for your learning. Discontinue the survey if you are only able to describe an online experience in which the objectives were to improve your personal technology knowledge and/or skills.

1. You have chosen the ONE online professional development experience that most positively impacted your teaching or learning. Which of the following describes it best:

- College or university course
 - School district created course
 - School district recommended professional development experience
 - Online tutorials that provided professional growth for my teaching
 - Online professional development offering (not recommended specifically by district staff)
 - None (please discontinue the survey)
- Other (please specify): _____

2. Continuing to describe this same professional development experience:

The experience is best described as:

- Completely online
 - Mostly online (81% or more plus some in person face-to-face)
 - Some online (30-80% online, plus face-to-face)
- Other (please specify): _____

3. When did you participate in the online experience? Please fill in the percentage of each (should add to 100%).

- During work time
- Outside of the work day
- Other

4. What best describes your motivation to participate in the online experience:

- I was self-motivated to learn more about a particular topic.
 I was self-motivated to experience online learning.
 It was required for a degree program.
 It was required by my school district.
 I chose this from a range of options offered by my school district.
 My colleagues/friends motivated me to participate.

Other (please specify): _____

5. What was the title or content of the course?

6. How did you locate this professional development opportunity or how might someone else locate this opportunity?

7. List all Web addresses (URLs) for the professional development experience that apply e.g., www.Tappedin.org. This might be a link to a tool, support site used in the course, or site with professional development experience description.

URL: _____

URL: _____

URL: _____

Other (please list): _____

8. How was this experience aligned with your learning style? In other words, what did you like about the experience?

9. Consider the entire professional development experience. If you have not finished the experience, please anticipate how long you think you will have spent.

How many TOTAL hours of your time did the experience require?

10. How many hours per week did you spend?

Average number of hours per week

11. How did the online experience impact and/or change your teaching? e.g., modes of delivery, instructional practices, content, assessments, etc.

12. Please indicate which of the following best described your technology proficiency:

	Beginner (I have basic skills using technology)	Intermediate (I frequently use the Internet and feel proficient in at least two software programs)	Proficient (I use the Internet extensively and am proficient in more than two software programs)
BEFORE the online professional development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AFTER the online professional development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please comment if necessary to explain ranking: _____

13. Who participated with you in this online experience? Check all that apply.

- Facilitator
- Online learners I had not known before
- Online learners from by district
- Online learners from the school
- Online learners from my school grade-level team
- Online learners I had met in a class
- No one else
- Other

Other (please specify): _____

14. Which was the most valuable to your learning/teaching?

	Most valuable	Second most valuable	Least valuable
Facilitator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interaction with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self-paced learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please comment if necessary to explain ranking: _____

15. What tools were used in the online professional development experience? (Mark all that apply)

- Video
 Website links
 Online documents
 Threaded discussions (i.e., chat, blog, discussion board)
 Email
 Chat
 Assignment submission/feedback location
 Quizzes and/or surveys

Other (please specify): _____

16. How was the professional development experience effective in supporting your TEACHING? (Please give examples if possible).

17. How was the professional development experience effective in supporting your LEARNING? (Please give examples if possible).

18. During the professional development experience...

	Always	Often	Sometimes	Rarely	Never
A facilitator was available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I interacted with a facilitator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt I was a part of an online community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The online community supported my learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical support was available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I needed and used technical support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assessment of my learning occurred	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was a positive impact on my classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The pacing was self directed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have or will recommend this course to others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learned from educational research and/or scholars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learned from practitioners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I created or modified lessons for my classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. As a result of this professional development experience...

	Improved greatly	Improved	Improved somewhat	Improved rarely	Stayed the same
Knowledge of my subject area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality of my curriculum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My skills as a teacher	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My range of instructional strategies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My use of problem solving and critical thinking in the classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My technology skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My use of collaboration in the classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My ability to assess student learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My ability to more effectively use technology in the classroom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My belief that students will be successful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My belief that I am more successful in meeting the needs of students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My knowledge of the availability of electronic resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My application of technology in planning for instruction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Describe how you apply your learning in your classroom.

21. In what way(s) did the online experience impact your colleagues, friends, or others? Specifically who was impacted, how, and why PLUS how many individuals were impacted and to what degree?

22. In what way(s) did the online experience impact your own technology skills the ability?

After surveys have been collected for four weeks, interviewees will be selected from volunteers from this survey who provide their contact information, so that the researcher may learn more about three models of online experiences: one based on a facilitator role, one based on interaction with an online community, and one based on a self-paced, independent learning mode.

Please provide your email address if you would be willing to participate in a 40-minute follow-up interview to more fully explain the professional development experience that you described in the survey. If you are willing to be interviewed your answers will be confidential and you may discontinue the interview at any time. You will be asked if the interview can be audio recorded to allow the researcher to study your responses. All identities will remain confidential and names will not be disclosed in the written dissertation.

Thank you for your time in completing this survey. The results will be published in a dissertation and a copy of the final dissertation may be requested by email at: katielmcnamara@gmail.com. Click Done to submit your responses.

APPENDIX G

Participant Interview Questions

1. What was the name of the online professional development experience that you participated in? Was there a particular website associated with it? Who sponsored the professional development opportunity?
2. From your unique perspective, tell me who you think the professional development was designed for and for what purpose?
3. Describe the site: how it was organized, how it was sequenced
4. What was the content of the course?
5. In the survey there was a question that forced you to rank what was most valuable to your learning: the facilitator, the interaction with others or the self-paced learning. You ranked:
 - a. Facilitator as most valuable to your learning/teaching
 - i. What was unique about the facilitator that made that person so important?
 - ii. Do you think that is typical or unique to your particular experience?
 - iii. In thinking about what was valuable to your learning, why did you rank the interaction with others after the facilitator?
 - iv. Why did you rank the self-paced learning after the facilitator?
 - b. Interaction with others as most valuable to your learning/teaching
 - i. What was unique about the interaction with others that made it so important?
 - ii. Do you think that is typical or unique to your particular experience?
 - iii. In thinking about what was valuable to your learning, why did you rank the facilitator after interaction with others?
 - iv. Why did you rank the self-paced learning after interaction?
 - c. Self-paced learning as most valuable to your learning/teaching
 - i. What was unique about the self-paced learning that made it so important?
 - ii. Do you think that is typical or unique to your particular experience?
 - iii. In thinking about what was valuable to your learning, why did you rank the facilitator after self-paced learning?
 - iv. Why did you rank the interaction with others after self-paced learning?
6. Describe a part of the course design and/or course activities that contributed to your successful experience.
7. Describe ways you implemented your learning in your current teaching situation.

APPENDIX H

Principal Component Analysis

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.414	45.979	45.979	12.414	45.979	45.979
2	2.887	10.692	56.672	2.887	10.692	56.672
3	1.788	6.624	63.295	1.788	6.624	63.295
4	1.096	4.059	67.355	1.096	4.059	67.355
5	0.954	3.535	70.889			
6	0.884	3.275	74.164			
7	0.709	2.628	76.792			
8	0.665	2.461	79.253			
9	0.628	2.324	81.577			
10	0.580	2.149	83.726			
11	0.513	1.900	85.626			
12	0.478	1.770	87.396			
13	0.404	1.498	88.894			
14	0.358	1.327	90.221			
15	0.333	1.234	91.455			
16	0.294	1.087	92.542			
17	0.278	1.028	93.571			
18	0.254	0.940	94.510			
19	0.239	0.883	95.394			
20	0.234	0.866	96.259			
21	0.195	0.721	96.981			
22	0.172	0.637	97.618			
23	0.159	0.590	98.207			
24	0.150	0.556	98.764			
25	0.132	0.487	99.251			
26	0.105	0.390	99.641			
27	0.097	0.359	100.000			

Extraction Method: Principal Component Analysis.

APPENDIX I

Demographic Frequencies of Study Sample

Independent variable		Frequency	Percent
Gender:	Female	232	70.7
	Male	92	28
	Total	324	98.8
Age:	<20	1	0.3
	21-30	48	14.6
	31-40	79	24.1
	41-50	80	24.4
	50+	117	35.7
	Total	325	99.1
Number of years of teaching experience:	1-4 years	34	10.4
	5-9 years	74	22.6
	10-19 years	117	35.7
	20-29 years	73	22.3
	30+ years	29	8.8
	Total	327	99.7
School level taught:	Elementary School	78	23.8
	Middle School/ Jr. High School	43	13.1
	High School	186	56.7
	Elem. School and Middle School	4	1.2
	Middle and High School	5	1.5
	K-12	9	2.7
	Total	325	99.1
	Type of school:	Private	14
Public		308	93.9
Total		322	98.2

Demographic Frequencies of Study Sample, Continued

Independent variable		Frequency	Percent
Type of school location:	Urban	67	20.4
	Suburban	131	39.9
	Rural	122	37.2
	Online	2	0.6
	Juvenile Court Schools	1	0.3
	Reservation	1	0.3
	Mixed	4	1.2
	Total	328	100
	Subject area teaching:	Multiple Subjects	59
Special Ed		25	7.6
Art		3	0.9
English/Language Arts		50	15.2
History/Social Studies		26	7.9
Math		35	10.7
Music		5	1.5
Science		46	14
PE/Heath		4	1.2
Technology		39	11.9
Library/Media		13	4
Foreign Language		2	0.6
Science/Technology		2	0.6
Core		3	0.9
Math/Technology		1	0.3
Math/Science		3	0.9
Other		11	3.4
Total		327	99.7

Demographic Frequencies of Study Sample, Continued

Independent variable		Frequency	Percent
Grade-level teaching:	K-2nd	26	7.9
	3-6th	43	13.1
	7/8 or 6/7/8	37	11.3
	9-12th	187	57
	K-6	16	4.9
	K-8	3	0.9
	K-12	6	1.8
	Other/Adults	8	2.4
	Total	326	99.4
State teacher from:	California	81	24.7
	Pennsylvania	140	42.7
	Michigan	7	2.1
	Nevada	1	0.3
	Ohio	2	0.6
	Florida	26	7.9
	Tennessee	9	2.7
	Wisconsin	19	5.8
	Arizona	12	3.7
	New Mexico	1	0.3
	Kentucky	6	1.8
	Oregon	1	0.3
	New Jersey	2	0.6
	New York	2	0.6
	South Dakota	1	0.3
	Total	310	94.5

APPENDIX J

Survey Response Frequencies

Independent variable		Frequency	Percent	
Professional development type being described:	Valid	College or university course	171	52.1
		School district created course	16	4.9
		School district recommended professional development experience	52	15.9
		Online tutorial that provided professional growth for my teaching	40	12.2
		Online professional development offering	40	12.2
		State created course	7	2.1
		Total	326	99.4
	Missing	System	2	0.6
Total		328	100.0	
Percent of online vs. face to face:	Valid	Completely online	238	72.6
		Mostly online (81%+)	73	22.3
		Some online (30%-80%)	17	5.2
	Total		328	100.0
Percent of time spent on professional development at home vs. work:	Valid	100% at home	176	53.7
		95% home 5% work	12	3.7
		90% home 10% work	21	6.4
		80% home 20% work	32	9.8
		75%home 25% work	20	6.1
		60% home 40% work	6	1.8
		50% home 50% work	20	6.1
		25% home 75% work	14	4.3
		10% home 90% work	5	1.5
		100% work	18	5.5
	Total		324	98.8
Missing	System	4	1.2	
Total		328	100.0	

Frequencies of Study Sample, Continued

Independent variable		Frequency	Percent	
Motivation to participate in professional development:	Valid	Self-motivated to learn more about a particular topic	99	30.2
		Self-motivated to experience online learning	29	8.8
		It was required for a degree program	68	20.7
		It was an option degree program	23	7.0
		It was required by district	61	18.6
		I chose this from a range of options offered by my school district	15	4.6
		My colleagues/friends motivated me to participate	5	1.5
		To receive a pay raise	2	0.6
		Required for a grant	8	2.4
		Required for credential	17	5.2
		Total	327	99.7
		Missing	System	1
	Total		328	100.0
Total hours required for professional development:	Valid	0-19 hours	56	17.1
		20-39 hours	78	23.8
		40-59 hours	59	18.0
		60-79 hours	33	10.1
		80-99 hours	8	2.4
		100+ hours	73	22.3
		Total	307	93.6
	Missing	System	21	6.4
Total		328	100.0	
Average hours per week required for professional development average:	Valid	0-4 hours	125	38.1
		5-8 hours	97	29.6
		9-12 hours	51	15.5
		13-16 hours	18	5.5
		17-20 hours	10	3.0
		21+ hours	10	3.0
		Total	311	94.8
	Missing	System	17	5.2
Total		328	100.0	

Frequencies of Study Sample, Continued

Independent variable			Frequency	Percent
Technology growth before and after:	Valid	No growth	259	79.0
		Growth of one proficiency level	60	18.3
		Growth of two proficiency levels	5	1.5
		Total	324	98.8
	Missing	System	4	1.2
	Total		328	100.0
Which was the most valuable to your learning/teaching?	Valid	Facilitator	51	15.5
		Interaction with others	83	25.3
		Self-paced learning	187	57.0
		All three were equally important	6	1.8
		Total	327	99.7
	Missing	System	1	0.3
Total		328	100.0	

APPENDIX K

Titles of Online Classes

21 Century Teaching and Learning (25)

Administration/Leadership (13)

Differentiated Supervision for Teachers
Education Specialist
Instructional Coaching (3)
Teacher Leadership Inclusive Instruction
Teaching Credential Courses

Authentic Teaching (8)

In the 21st Century (4/5 above)
Social Studies

Classrooms for the Future (39)

Classrooms for the Future and Promethean Board training
Classrooms for the Future for Language Arts (2)
Classrooms For the Future--using technology in the classroom (2)
Classrooms for the Future: Teaching Authentically in the 21st Century (2)
Embedded Learning (3)

English/Language Arts (27)

Literature: teaching and choosing (3)
Comprehension Strategies (2)
Developing Writers: A Workshop for High School Teachers
Foundations of Language and Cognition
Reading/Literacy (15)
Writing and language development
Supervision and Teaching of Language Arts
Teaching Shakespeare Using the Internet
Vocabulary Strategies

English Language Development (10)

Cross-cultural, Language, and Academic Development (5)
Structured English Immersion (3)
Diversity and English language learners

History/Social Studies(4)

Holocaust and Human Behavior
Social Science benchmarks and California State Standards.

*Titles of Online Classes, Continued***Instructional Strategies/Curriculum/Management (32)**

Power Strategies for teaching, Principles and Practices of online Teaching
 Active Teaching Strategies and Classroom Management
 Blended Teaching and Learning
 Critical Thinking
 Curriculum and Instruction (3)
 Curriculum and Leadership with emphasis in technology
 Curriculum Design and Assessment
 Curriculum Mapping
 Curriculum of Learning Theory
 Differentiated Instruction
 Education (2)
 Education and technology
 Gifted Education (3)
 Instructional Design
 Interpretation of student reports from our MAP testing program
 Odyssey software program (for intervention)
 Instructional strategies
 Pennsylvania Academic Standards
 Planning effective assessment
 Project Based Learning (3)
 Teaching as Inquiry
 Teaching Critical Thinking Skills in the Classroom
 Teaching methodology
 Thinkfinity (online lesson plans and educational resources)
 Brain research: anatomy and operations

Library/Media (8)

UW-LaCrosse Learning Community Program <http://www.uwlax.edu/mepd/lc/>
 Virtual Libraries
 Virtual Americana

Mathematics (17)

Teaching Authentic Mathematics in the 21st Century
 Calculus & Mathematica
 Essential Questions and the Big Ideas in Mathematics
 Fastt Math
 Geometer's Sketchpad and Applications
 Historical and Cultural Significance of Math
 Incorporation of Technology in the mathematics classroom
 INSPIRE teaching AP Statistics
 Math Standards and Technology
 Mathematics Education
 Professional Development Resources Online for Mathematics (PD-ROM)(2)

Titles of Online Classes, Continued

Teaching Authentic Mathematics in the 21st Century (3)

Teaching Geometry using Geometer's Sketchpad

Teaching Math Using Technology

Science (18)

Biology 101

Geosciences for teachers (2)

Health and Nutrition (4)

Inquiry in Science Education

Matter and Interactions for Secondary Teachers

Modern Molecular Genetics

Pedagogy in physics education

Science Education Research Design

Science instruction and integration of writing strategies.

Science-A Hand's On Approach

Teaching Authentic Content: Science (4)

Special Education (10)

Mainstreaming Special Education children in the general education classroom

Assistive technology

Students with emotional needs in the classroom

Technology (53)

Adobe Photoshop (3)

ANGEL software

Atomic Learning

Blackboard use

Graphic Organizers and Web-based Learning

Human/Computer Interface

iSuite tutorials e.g., iLife, iWork, iMovie (4)

Promethean Activstudio Skills, Apple Professional Development (4)

Internet as a Research Tool 21st Century Learning

Moodle (3)

MS Word, MS Excel, Powerpoint (4)

Safeguarding the Wired Schoolhouse

Setting up Grade Pro

SmartBoard Training

Sun Link - Learning to utilize the State Database

Teaching Through Learning Channels

Tech4Learning Training Sessions

Technology in the 21st century

Technology Coaching

Technology Tools for Teachers

ActionScripts in Web design

Titles of Online Classes, Continued

Using California Technology Assistance Project (CTAP)

Using e-PALs in schools

Using GPS/GIS to improve curriculum

Using technology in mathematics

Utilizing Technology with Gifted Learners

Web 2.0 Tools (3)

Web-authoring with Dreamweaver

Wiki Educator, Moodle, and other online tools as a part of Nellie Deutsch's weekly Wiziq classes

Technology Curriculum Integration/Online learning (25)

Applying Advanced Technology to Support Standards Based Instruction (2)

Designing Virtual Field Trips

Distance Learning: Theory and Practice (3)

E learning for educators (2)

Educational Technology degree program

Evaluating on line resources (2)

Florida Virtual School training

Integrating Technology into the Classroom (11)

Intel Teach Essentials (2)

Don't remember (4)**There were multiple classes (9)****Miscellaneous (34)**

Outdoor Education

Accounting

Advanced Automotive understanding CAN systems

Art

Assessment and Evaluation

Astrobiology

BRAINX and pd-rom

Course Development

Datastreme Atmosphere

Datawise

Demystifying quantum mechanics

Finance

FLaRE

Law course (2)

Career & Technical Education

Computer Science AP

Museum Box

Open Response (2)

Titles of Online Classes, Continued

PASC1 course

PD 360

Philosophy and ethics course

Physical Education in Elementary Education (2)

Religious Studies

Research Methods (2)

Research using the Internet

Safe School

Successful teaching for the acceptance of responsibility (STAR)

Suicide prevention for students

Superintendent Letter of Eligibility

Training to use a new Learning Management System

APPENDIX L

Professional Development Website URLs

21stcenturyskills.org
4.ncsu.edu/~rwchabay/mi
abolition.e2bn.org
academics.uww.edu/libmedia/uwsslec
admin.na3.acrobat.com/_a769301336/marylynne
adobe.com/training
ametsoc.org/amsedu/dstreme/4
amu.apus.edu
andrews.edu
aol.com
apple.com/iwork/tutorials/#pages
applelearning.com
apu.edu
ascd.org
ase.com
asset.asu.edu
atomiclearning.com
authorpoint.com
authorstream.com
bb.nefec.org
bhsu.edu
blackboard course; various sites used
blackboard.polk-fl.net/webapps/portal/frameset.jsp
blendedschools.net/
brainx.com
cabrillo.edu
cal.org
calstateteach.edu
casenex.com
cast.org
cff.org
chemlife.umd.edu/grad/mlfsc/620.htm
childrensbooks.about.com
chiron.valdosta.edu/whuitt/col/affsys/humed.html
classroom20.org
clrn.org
cms.psu.edu
cnets.iste.org
coastlines.ws

Unique Professional Development Website URLs, Continued

coe.sdsu.edu
csun.edu/~webteach
csusm.webct6.org
ctap3.org
cte.org
cue.org
d21.sdbor.edu
davidwarlick.com/wiki/pmwiki.php/Main/RedefiningLiteracyForThe21stCentury
del.ic.ous
dim-dim.com
discoveryeducation.com
discoverystarnetwork.com
docs.google.com
drexel.edu
ecampus.phoenix.edu
ed.gov
edc.blackboard.com
education.asu.edu
education.pitt.edu
edzone.sccoe.org
einstruction.com
illuminate.com
emmeddedlearningacademy.com
emsc.nysed.gov
epals.com
ericdigests.org
eponline.com
eval.org
facing.org
fresno.edu/cpd/online
fullerton.edu
gcu.edu
georgetowncollege.edu
globalclassroom.us/moodle/catalog/teacherscollege/?category=39
greece.k12.ny.us/instruction/ELA/6-12/Reading
ideal.azed.gov
iEARN.org
ies.ed.gov
imacs.org
imovie08adventures.blogspot.com
infed.org/biblio/learning-humanistic.htm
inspiration.com
intel.org

Unique Professional Development Website URLs, Continued

IQ-ity.com
IRCC.edu
iste.org
iteslj.org/Articles/Bell-Reading.html
k12.phys.virginia.edu/home.html
keypress.com
kids.yahoo.com
kn.pacbell.com
krauseinnovationcenter.org
kyoto-su.ac.jp/~trobb/sussrobb.html
kyvs.org/webapps/portal/frameset.jsp
learner.org/index.html
learningacademy.com/pde
learningaccount.net/MyAccount/login.cfm
lhup.net
lib.muohio.edu
litandlearn.lpb.org/strategies.html
literacymatters.org
lynda.com
macprovideo.com/tutorial/keynote09101
mlearnport.org
montana.edu
moodle.pcsb.org
msgeoscience.edu
mtl.math.uiuc.edu
museumbox.e2bn.org/creator/
mypima.pima.edu
mywilkes.wilkes.edu/cp/home/loginf
nap.edu
nau.edu
ncela.gwu.edu
ncrel.org
ning.com
nmsu.edu
norleb.k12.pa.us
nova.edu
nu.edu
nwea.org
onlinelearning.net
owl.english.purdue.edu/owl
pa.professionaleducation.org
pbsteacherline.org
pbworks.com

Unique Professional Development Website URLs, Continued

pd-rom
pd.owensboro.kyschools.us
PD360
pde.state.pa.us
pdrom.coursepath.org
phoenix.edu
photoshouser.com
pima.edu
plsweb.com
poets.org
pointloma.edu/Biology/Biology_Graduate_Program/BiologyGraduateProgram/Program_Information.htm
polk-fl.net
power-ed.com
principals.org/s_nassp?sec.asp?CID=886&DID=47262
prometheanplanet.com
qwizdom.com
reading.org/pdf/1036.pdf
readingonline.org
readingonline.org
readwritethink.org
recipes4success
reta.org
riosalado.edu/Pages/default.aspx
rmu.edu
rrps.net
safeschool.com
sandiegonline
science-approach.com
science-house.org/teacher/course.html
secure.uwlax.edu/d21
ship.edu/~cgboeree/snygg&combs.html
sites.google.com/a/pvlearners.net/imovie-08-adventures-hybrid
sjrcc.edu
skype.com
starfsfolk.khi.is/solrunb/vygotsky.htm
surveymonkey.com
tappedin.org
teachertube.com
teachstaracademy.lacoe.edu
tech4learning.com
tei.gwu.edu
teqjournal.org

Unique Professional Development Website URLs, Continued

tesol.org
thejournal.com/articles/14141
thinkfinity.org
tigernet.dwu.edu/ics
tlc.milwaukee.k12.wi.us
tomsnyder.com
twitter.com
uclaextension.edu/r/Default.aspx
unk.edu
uscranton.com
usd.edu
usf.edu
ustream.tv
uwlax.edu/mepd/lc
uwm.edu
uwstout.edu/soe/profdev/elearning.shtml
vista.nau.edu/webct/entryPageIns.dowebct
vpython.org
waldenu.edu
webinars.nmsu.edu
wemtaonline.org
wested.org
wikispaces.com
wilkes.mywilkes.com
wiziq.com
wlkes.edu
wordpress.com
worldcampus.psu.edu/MasterinTeacherLeadership.shtml

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http://www.edportal.ed.state.pa.us/portal/server.pt/community/classrooms_for_the_future/475/about_cff/202788

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