AN INVESTIGATION OF ONLINE ENVIRONMENTS SUPPORTING FOLLOW-UP TO PROFESSIONAL DEVELOPMENT FOR TEXAS SCHOOL LIBRARIANS

A Dissertation

by

MARY ELIZABETH GREEN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2005

Major Subject: Educational Psychology

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Approved by:

Chair of Committee,	Lauren D. Cifuentes
Committee Members,	John Denton
	Susan Pederson
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ABSTRACT

An Investigation of Online Environments Supporting Follow-up to Professional Development for Texas School Librarians. (December 2005)

Mary Elizabeth Green, B.S., The University of Texas at Austin;

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Chair of Advisory Committee: Dr. Lauren D. Cifuentes

At the beginning of the 2004-2005 school year, school librarians participated in a face-to-face workshop during in-service training. The workshop dealt with the process of creating a TAKS Support Plan, a plan for the library to remediate deficiencies on the TAKS at their school. At the conclusion of the workshop, school librarians were given the opportunity to participate in an eight-week online follow-up course that supported implementation of in-service themes.

The purpose of this study was to examine the effects of online follow-up and collaboration on participant attitudes, quality of course product, and course completion in an online professional development course for librarians in 12 Texas school districts. This study used a posttest-only control group experimental design with self-selected participants. School librarians were stratified by level of service and socioeconomic school status and were randomly assigned to one of three environments. Two experimental environments were used: (a) Collaborative Follow-up and (b) Noncollaborative Follow-up and a control environment, Noncollaborative/No Follow-

up. The experimental environments were given additional information and support in an online course to aid the creation of their TAKS Support Plan.

Results indicate that the professional development program that included online collaboration and follow-up produced more positive attitudes towards the professional development program than the professional development program with no collaboration or follow-up. Attitudes towards the online professional development experience from the two experimental environments were mildly positive with no significant difference across groups. Attitudes towards the professional development experience in the control environment were significantly less positive than the experimental environments. Logistic regression revealed that the likelihood of completion could be predicted by membership in professional development environment. The likelihood of completion by participants in the Collaborative Follow-up environment was significantly greater than participants in the Noncollaborative Follow-up and Noncollaborative/No Follow-up environments. No difference was found in completion rates between the other two environments. Credential proved to effect TAKS Support Plan completion. Master's degree holders in the Noncollaborative Follow-up environment and master's and bachelor's degree holders in the Noncollaborative/No Follow-up environment were less likely to complete than these levels in the Collaborative Follow-up environment.

DEDICATION

When confronted with an obstacle or a difficulty, many people reflect on a favorite poem or song or quote. With my long roots in children's literature, I found the classic story of *The Little Engine That Could* by Watty Piper to be a source of strength. In this story, the Little Blue Engine is able to complete a seemingly impossible task by looking beyond her obvious weaknesses and believing in her abilities. Over and over, she repeats, "I think I can. I think I can. I think I can." Unlike the Little Blue Engine, however, I had a host of people who stood by my side and reminded me constantly, "We think you can. We think you can. We think you can." It is to these people that this work is dedicated:

- To my husband who listened patiently every night as I recounted the tales of each day's work. His enthusiasm was unflagging and his support never wavered.
- To my daughter who is the sunshine of my life. With her frequent calls and messages of support, I knew I could not fail. You are my second-best roommate.
- To my son whose life defines the word courage. This work was largely written during his tour of service in Iraq. In the few telephone calls that we had during that time period, he would tell me, "You can do it, Mom."
- To my parents who define the words "lifelong learners." At every stage of their lives they believed in becoming better educated and have pursued learning.

- To Tiffani, who listened as I recounted every difficulty and invented nail colors to identify with each step of this process.
- To Sue who insisted that I get “Lost” and forget all my problems.
- To Helen who epitomizes professionalism and offered a shoulder to cry on and a fountain of professional wisdom.

ACKNOWLEDGEMENTS

You raise me up, so I can stand on mountains;
You raise me up, to walk on stormy seas;
I am strong, when I am on your shoulders;
You raise me up.…To more than I can be.
Performed by Josh Groban, *You Raise Me Up*

I would like to express my deep appreciation and gratitude to those special people who supported and assisted me in completing my dissertation. If I had listened to the skeptics who scoffed at this project, I would have remained bound by their limitations. Instead, many special people allowed me to share my vision with them and encouraged its fruition through their suggestions, guidance, participation, and encouragement.

First, I would like to acknowledge the insight and wisdom provided by my committee. A special thanks to Dr. Lauren D. Cifuentes for sharing from the depths of her knowledge, providing firm guidance, and retaining her good humor in the face of every adversity. Her attention to detail and the continual pursuit of excellence in my writing was extraordinary. Her efforts in my behalf went far beyond the scope of duties of a chair and are more aptly described by the word friend. Dr. Susan Pedersen provided valuable guidance as I took my first steps in the doctoral program. Her knowledge of research proved to be extremely valuable. Few people have the depth of knowledge in professional development as Dr. Stephanie Knight. Drawing on her experience, she reigned in my idealism while supporting my dreams. Those students who have been able to include Dr. John Denton on their committee can attest to his vast

knowledge of public education and his passion to make school a place where all students can be successful.

Next, I would like to thank all the school librarians who supported or participated in this study. It was an awe-inspiring journey to travel with them as they created their TAKS Support Plans. Through their writings, I felt like an invisible observer in each school. I shared with them their hunger to make their library a remarkable place for students that ventured far beyond the boundaries of the ordinary. Our state is truly blessed to have these fine men and women working on behalf of our students. I would also like to thank the library directors who supported this project and gave me access to these wonderful people. I also owe a debt of thanks to Mary Lankford and JoAnne Moore for reviewing the course and providing suggestions. Finally, I would like to thank Christine McNew at the Texas State Library and Archives Commission for providing the continuing education credits.

The Information Technology Services staff including Rhonda Blackburn at Texas A&M were most gracious in making WebCT Vista available to my student librarians. They shared my enthusiasm and worked with me to make my dream a reality.

With the help of these special people, I was truly able to stand on mountains and walk on stormy seas and to be more than I ever thought I could be.

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CHAPTER I

INTRODUCTION

> Technology is the wild card. I don't know what it is going to do, but its influence on us is going to be profound. (Levine, as cited in Chiron, 2001)

Throughout much of the history of American education, teachers have been challenged to provide instruction that meets the diverse needs and abilities of their students. To meet this challenge, professional development of school faculty has been a central component in nearly every proposal to bring about needed change (Guskey, 1986). Teacher expertise and performance have been found by some researchers to be the single most important determinants of student success (Darling-Hammond & Ball, 1998; Marzano, 2003; Sanders & Rivers, 1996). Furthermore, Wenglinsky (2002) found teacher professional development to be the critical factor in the improvement of teacher performance and, ultimately, student learning.

Simply stated, professional development is defined as "those processes and activities designed to enhance the professional knowledge, skills and attitudes of educators so that they might, in turn, improve the learning of students" (Guskey, 2000, p. 16). Further, Sparks and Hirsch (1997) assert that professional development is "a means to an end rather than an end in itself; it helps educators close the gap between current practices and the practices needed to achieve the desired outcomes" (p. 24). Loucks-Horsley et al. (1987) suggest that successful professional development is a process, not an event. Many approaches have been applied to professional

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The style for this dissertation follows that of *The Journal of Educational Research*.

development including teacher institutes, reading circles, classroom observation/ demonstration, workshops, independent study, teacher rap sessions, curriculum development work sessions, peer observations, action research, teacher centers, and self-assessment (Jones & Lowe, 1990; Neil, 1986).

Statement of the Problem

Regardless of the approach taken, professional development has frequently failed to deliver its promise of improvement in student outcomes (Guskey, 1986). Failure, according to Brown and Moffett (1999), can be traced to faulty models for professional development that "rarely include what works best in effecting, supporting and sustaining change" (p. 71). Although many approaches to professional development have evolved over time, the most used approach to professional development has left teachers as passive participants in sit-and-get lectures or one-shot workshops exposing those teachers to new ideas with little likelihood of changing teacher practice (Guskey, 1995; Joyce & Showers, 1995; Wood & Thompson, 1993). This has burdened professional development with characterizations such as Fullan and Stiegelbauer's (1991) assertion that "nothing has promised so much and been so frustratingly wasteful as the thousands of workshops and conferences that led to no significant change in practice when the teachers returned to their classrooms (p. 315).

Viewed from the perspective of instructional design, it is not surprising that professional development has failed to yield the desired results. Typified by the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) instructional design model, the practice of instructional design ensures that individual components of

instruction are all consciously addressed and interwoven into a cohesive plan (Smith & Ragan, 1999). Effective instructional design for professional development grounds decision-making on a thorough understanding of the needs and skills of the learner, the demands of the content, and the context for instruction. The results of this analysis are used to create delivery systems matched to assessed needs that support sustainable change in teacher practice.

Flaws in the Traditional Approach to Professional Development

The traditional approach to professional development is undermined by several flaws in instructional design. The traditional approach is characterized by the workshop model, also known as the one-shot presentation or drive-by professional development, which fails to provide continuing support for change in practice (Corcoran, 1995; Fullan & Stiegelbauer, 1991; Goldenberg & Gallimore, 1991; Lieberman, 1995). Trainers using the traditional approach treat teacher learning and improvement as an individual responsibility with few opportunities for collaboratively building knowledge (Smylie & Conyers, 1991). Traditional approaches to professional development focus on content and rarely support reflection. Trainers consider faithful replication of techniques learned in in-service programs to be the successful outcome of their professional development training and disregard teachers' differing prior knowledge and experience. Finally, the choice of content in the traditional model is guided by fads and quick fixes rather than determined by assessments of student needs (Goldenberg & Gallimore, 1991; Sheal, 1999).

Foremost among the flaws is the failure of the traditional approach to address the need for continuing support in the implementation of in-service themes and content. While teachers are left with handouts and notes at the end of a workshop, there is typically little follow-up support to ensure that they implement new programs properly or that their concerns are adequately addressed. If follow-up is neglected, only 5% to 10% of participants will implement new strategies (Joyce & Showers, 1988).

Second, traditional approaches to professional development emphasize private, individual activity and are rooted in the belief that the individual teacher is responsible for the problems of education (Shroyer, 1990). This approach is informed by the deficit model, where administrators perceive deficits in each teacher's knowledge that must be corrected. Teacher learning and improvement, thus, become an individual responsibility (Mitchell & Sackney, 2001). Teacher interactions in professional development workshops tend to be "brief and casual" with few "active, ongoing exchanges of ideas and practices" (Goodlad, 1984, p. 187). As Darling Hammond and McLaughlin (1995) noted:

> Almost everything about school is oriented toward going it alone professionally . . . .The traditional school organization separates staff members from one another and from the external environment. Inside school, teachers are inclined to think in terms of "my classroom," "my subject," or "my kids." Few schools are structured to allow teachers to think in terms of shared problems or broader organizational goals. (p. 601)

Yet another flaw is found in the time constraints of traditional workshops, combined with transmissive modes of delivery, limiting opportunities for teachers to engage in reflection. Reflective practice, characterized as carefully examining one's

own and others' practices in order to strengthen the quality and the effectiveness of their work, is associated with changes in teacher practice and improvements in student learning (Sparks & Loucks-Horsley, 1989). John Dewey (1938) acknowledged the necessity for reflection and differentiated between routine action and reflective action in teachers. Reflection enables teachers to act in a deliberate and intentional fashion rather than in a blind and impulsive manner.

Traditional professional development is also flawed by the failure to respond to individual differences in teacher-learners. Rarely in the traditional model of professional development are the unique differences in teacher knowledge, learning styles, and experience addressed. Teacher learning, in the traditional model, is perceived as an outside-in rather than an inside-out process. Smylie and Conyers (1991) rejected the business approach to education where quality and quantity of inputs by teachers are expected to result in effective teaching and desired outputs so that student learning will occur. In such an approach, teachers are viewed as technicians who can transfer a defined version of effective practice directly to the classroom. External experts present new methods and strategies through direct instruction focused on the objective of teachers learning to replicate the new program (Lambert, 1989). These experts deliver one-size-fits-all presentations, unaware of individual school's teachers, students, and culture, and differing levels of expertise and knowledge by the faculty (Robb, 2000).

Finally, trainers' selection of content in the traditional professional development approach remains problematic. While the content of traditional professional

development has generally focused on student learning, the choice of topics for professional development has been guided by fads, quick-fix solutions, or administrator preferences (Fullan & Stiegelbauer, 1991; Pink, 1989). External expert knowledge is valued over teacher knowledge (Gersten, Vaughn, Deshler, & Schiller, 1997). The most critical design flaw in the choice of professional development content, however, is the failure by trainers to align professional development content with needs determined through an analysis of student data.

New Approaches

New approaches to professional development framed on fundamentally different structures and assumptions are emerging to address inadequacies of the traditional approaches. Drawing from the fields of adult learning and cognitive psychology, these models create new opportunities for teacher learning through learner-centered, knowledge-centered, assessment-centered, and community-centered environments (Bransford, Brown, & Cocking, 2000). Learner-centered environments address the unique strengths, interests, and needs of teacher-learners, recognizing that teachers have unique ways of constructing knowledge that are "based on heredity and prior experiences, as well as special characteristics such as interests, talents, and intellectual or physical skills" (McCombs & Lauer, 2002, para. 9). Newer models also center on knowledge-based environments within which pedagogical content knowledge is examined. Rather than transmissive presentations, newer models integrate outside knowledge from speakers, research, and conferences and encourage reflective examination of teacher practice (Loucks-Horsley, Love, Stiles, Mundry, & Hewson,

2003). Assessment-centered strategies focus the choice of professional development content not simply on administrative or teachers' preferences, but on what students need to learn determined through multiple measures of student performance. Trainers design development programs with the objective of improving student outcomes (Speck & Knipe, 2001). Finally, community-centered environments refute the norms of isolation and individual practice inherent in the traditional model of professional development, replacing them with norms of collaboration where teachers share experiences and discourse within a community of practice (Lave & Wenger, 1991).

New models of professional development do not simply happen but are the result of careful application of instructional design principles. Instructional designers apply instructional and learning theories to develop strategies for building learners' capacities to learn and change. Effective designs within the newer models extend opportunities for teacher learning through follow-up to professional development in collaborative learning environments. Content aligns with needs determined through analysis of student data. Numerous opportunities are provided for reflection and individualization.

Online Professional Development

The widespread presence in schools of new technologies enables the delivery of professional development in online environments. Through information and communication technologies, online professional development programs provide three unique attributes to support learning including (a) flexible access to professional development coursework and other learners, (b) electronic access to a variety of

multimedia-based materials, and (c) the opportunities for the learning and teaching that they afford (Naidu, 2003).

Judicious design and integration of tools in course management systems provide the means to support effective designs in professional development. Follow-up is enabled through coursework embedded in course management system software that is distributed over time. Collaborative learning is enabled through discourse tools (e.g., threaded discussions, email, chat), disciplinary tools (e.g., graphs of data, pictures, simulations) as well as knowledge-representation tools (e.g., concept maps, databases, spreadsheets, multimedia publishing) that afford collaborative work within a community of practice (Jonassen, 2000; Suthers, 2001). Reflection can be fostered through computer-mediated communication technologies in both synchronous and asynchronous modes. Professional development needs driven by student data may require access to a wide variety of content in multiple formats. These needs may include access to content information, demonstrations of techniques, or examinations of data. The flexibility of many course management software programs allows for presentation of a wide variety of content in multiple formats. As the courseware matures and Internet bandwidth increases, this capacity should increase.

Previous studies have investigated various aspects of online professional development. The effective components of an online professional development environment were the focus of research done by Levin, Waddoups, Levin, and Buell (2001) and Passig (2001). The former study found five dimensions necessary for an effective online learning environment for teacher professional development: (a) relevant

and challenging assignments, (b) coordinated learning environments, (c) adequate and timely feedback from instructors, (d) rich environments for student-to-student interactions, and (e) flexibility in teaching and learning. Passig (2001) investigated comments made by teachers regarding their recommendations for future development of online professional development and organized these recommendations within a framework of psychological, professional, sociological, and socio-cognitive needs.

Stephens and Hartmann (2002) investigated the effectiveness of online discussion forums in an online professional development program. The objective of their program, "Teaching Mathematics with Technology," was to enable 11 mathematics teachers to reflect on and discuss the affordances of technology in helping students learn mathematics in online threaded discussions. While teachers in this study felt that email and the Internet were effective methods of communication about teaching, a majority of teachers expressed reservations about their ability to communicate effectively online. They indicated that they felt that discussions were awkward and difficult to keep going. The majority of these teachers also cited time as a constraint to further involvement.

O'Connor and Ertmer (2003) investigated using online mentors to sustain face-to-face professional development. The study examined online teacher mentors' perceptions and opinions of their roles and responsibilities in the online environment. They found that mentors felt that greater support from networked resources was needed to sustain and grow results after the initiative.

In summary, traditional professional development is flawed in at least five ways. It lacks continuing support for change, it fails to provide for collaboration, it does not give opportunities for reflection, it ignores teacher differences, and it is not determined by assessment of student needs. Drawing from constructivism and adult learning theory, new models create environments that support learning and empower educators to reach their true potential. These elements include (a) sustaining learning over time with follow-up support and programs, (b) encouraging collaborative partnerships, (c) providing opportunities for reflection (d) supporting learners at a variety of knowledge and experience levels, and (e) using student data when making decisions about content.

Purpose of the Study

The purpose of this study was to examine the effects of online follow-up and collaboration on participant attitudes, quality of course product, and course completion when added to face-to-face professional development for librarians in 12 Texas school districts. To meet this goal, the researcher proposed to test a professional development model that combined face-to-face and online activity in order to address the flaws found in traditional professional development. Follow-up was facilitated through six course modules extending in-service themes. New modules were opened weekly using the selective release tool in WebCT Vista. Collaboration was facilitated through discussions over course themes and discussions of colleagues' TAKS Support Plans. The researcher tailored the content of the course to the needs of individual school librarians and/or the needs of their schools by finding additional resources to support the creation of the Plan, feedback on the TAKS Support Plan assignments, and emails.

All of these activities encouraged reflective practice. As school librarians participated in the course, they accessed course readings and materials, participated in discussions with colleagues, and prepared TAKS Support Plans. This process encouraged a prolonged examination of current mental models and schematas informing current practice.

Significance of the Study

Numerous companies such as Connected University™, Lightspan™, and Riverdeep™, as well as major universities, such as Azusa Pacific University, Pepperdine University, and Walden University, provide professional development courses for K-12 teachers (Cannings, 2003). Although online professional development has mushroomed commercially, there are a dearth of studies that investigate online professional development and particularly the effect and impact of Collaborative Follow-up in online environments.

This study attempted to identify online professional development environments that were conducive to teacher learning and acted as a catalyst for teacher change. Careful study is needed to determine whether online follow-up and collaboration can truly enable teacher change. Recommendations from this study will contribute to the future design considerations of online professional development and will be of interest to educational leaders, courseware developers, and professional development trainers.

Research Questions

This study addressed the effectiveness of online follow-up to a face-to-face workshop for school librarians in Texas. The following research questions guided this study:

1. a. Is there a significant difference between online professional development environments including Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up in participants' attitudes towards the professional development program?

   b. Is there an interaction effect between professional development environments and school librarian credentials on participants' attitudes toward the professional development program?

   c. How satisfied are participants who have experienced Collaborative Follow-up with their collaborative experience in online professional development?

   d. (1) What are the attitudes of participants who have experienced Collaborative Follow-up and Noncollaborative Follow-up with their online follow-up experience in online professional development?

   (2) Is there a significant difference between their attitudes?

   (3) What are the participants' perceptions of the impact and quality of their online follow-up experience?

2. a. Is there a significant difference between online professional development environments in the quality of the TAKS Support Plan prepared by participants?

   b. Is there an interaction effect between professional development environments and school librarian credentials on the quality of TAKS Support Plan?

3. a. Does the likelihood of course completion by school librarians differ among the professional development environments including Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up?

   b. Is the effect of professional development environment on course completion moderated by school librarian credential?

Definitions

Course Completion: Completion of all parts of the TAKS Support Plan.

Collaboration: Participation in online discussions with peers, viewing and discussing others' TAKS Support Plans, and the option to use chat and email with peers.

Quality of Plan: Ratings of library TAKS Support Plans on a rubric developed by the researcher and validated by Texas school library leadership. TAKS Support Plans were assessed by six raters who had extensive experience in education either as school librarians and/or as teachers.

Socioeconomic Status of Schools: The percentage of students receiving free-and reduced-price lunches at each school. This information is available on the Texas Education Agency PEIMS data website.

TAKS Support Plan: A six-part plan written by the participating school librarians detailing their strategy for supporting student weaknesses identified on the Texas Assessment of Knowledge and Skills at their school. The plan included sections on:

- Background of the school

- Plan for collaborating within the school in preparing the plan
- TEKS selected as weaknesses
- Library plan for addressing weaknesses
- Evaluating resources
- Communicating the plan

Assumptions

Three assumptions underlie this study. First, the researcher assumed that randomization eliminated the effect of any unique differences within subjects. It is possible that confounding variables could be found within subjects but that they would be controlled through randomization. Second, the researcher assumes that participants will be truthful and honest in completing evaluations and participating in interviews. Understanding participants' perceptions of their experience depends on their frank responses. Finally, while research has established that students in online distance learning conditions have achievement patterns similar to face-to-face students, the researcher assumes that online professional development can be as effective as face-to-face strategies for sustained involvement in professional development.

CHAPTER II

LITERATURE REVIEW

The focus of this chapter is a review of the theory and research related to this study. First, I provide the theoretical perspective from which I conducted this research. Second, is an overview of the theory and research related to follow-up. Third, is an overview of the theory and research related to collaborative learning. The fourth section addresses the emerging field of online professional development. The last section addresses the literature about the relationship between teacher advanced degree and student achievement.

Theoretical Perspective

Constructivist learning theory forms a framework for the design of this research. Constructivists propose that each learner is capable of constructing knowledge through a process of discovery and problem solving. According to Adams and Burns (1999), constructivism is characterized by the following principles: (a) learners bring their personal prior knowledge and experiences to the learning situation; (b) learning is internally controlled and mediated; (c) tools, resources, experiences, and contexts help in the construction of knowledge in multiple ways; (d) learning occurs through a process of accommodation and assimilation when old mental models are challenged to create new ones; (e) learning is an active and reflective process; and (f) social interaction provides multiple perspectives to create knowledge. Instruction within this framework seeks to foster learning by designing environments conducive to the collective construction of knowledge (Gagnon & Collay, 2001).

Within constructivism, three major theoretical perspectives provide a rationale for follow-up and collaboration during professional development, including the socio-constructivist, the socio-cultural, and the shared-cognition perspectives (Dillenbourg, Baker, Blaye, & O'Malley, 1994). The social-constructive approach draws from Piaget's work and focuses on the development of the individual through interaction. The social-cultural approach draws from Vygotsky's work and focuses on the relationship between social environment and cognitive development. The shared-cognition approach focuses on the physical and social environment. These theories are grounded in cognitive development approaches to learning and emphasize the importance of social interaction in the learning process (Kusnick, 1997).

Socio-Constructivist Theory

Borrowing from Piaget's framework of conflict and centration, the Genevan school investigated the role of interaction in the individual's cognitive development (Dillenbourg et al., 1994). This approach, termed socio-constructivist, is grounded in the belief that "through interacting with others, coordinating his/her approaches to reality with those of others, that the individual masters new approaches" (Doise, 1990, p. 46). Individual development becomes a "spiral of causality; a given level of individual development allows participation in certain social interactions that produce new individual states which, in turn, make possible more sophisticated social interaction, and so on" (Dillenbourg et al., 1994). Interactions between the collaborators are more valued than the collaborative actions themselves. The underlying assumption of this model, however, is that the value of social interaction

lies in creating disequilibria that pushes the individual to go beyond the current state of knowledge and create new knowledge frameworks.

Socio-Cultural Theory

In contrast to the focus on peer interactions in the socio-constructivist approach, the socio-cultural approach centers on Vygotsky's assertions that human intelligence originates in the society or culture and that cognitive development is facilitated through interaction with others of a higher ability level in the zone of proximal development (Feldon, 2003). Whereas the socio-constructivist approach makes a distinction between the individual cognitive activities and the environment, the socio-cultural approach views the individual as an integral part of the social environment (Kleine Staarman, De Laat, & Van der Meijden, 2002). Knowledge construction is not simply a process that takes place in the mind of the learner, but as an interpersonal and intrapersonal process mediated by cultural tools and artifacts (Hakkarainen, Järvelä, Lonka, Lipponen, & Lehtinen, 1996). Through engagement in collaborative activities, the individual is able to master something they could not do before (Lipponen, 2001).

Shared-Cognition Theory

Shared-cognition theory is conceptually aligned with theories of situated cognition and communities of practice and has origins in sociology and anthropology (Dillenbourg et al., 1994). Unlike the socio-cognitivist and socio-cultural theories, however, shared-cognition theory stresses the environment in which learning takes place (Leister & Koubek, 2001). Further, while the environment is perceived as both the physical and social context, the unit of analysis in shared-cognition theory is the social

context that enables collaboration (Kumar, 1996). Learning becomes "a reculturative process that helps students become members of knowledge communities whose common property is different from the common property of the knowledge communities they already belong to" (Bruffee, 1993, p. 3). At the outset, learners begin their passage at the periphery of this community and advance toward the center as they become more active and engaged within the culture. They move from being a newcomer or novice toward assuming the role of expert or old-timer. Situated learning is usually not directly taught but is unintentional, occurring through active participation in collaboration with other people (Lave & Wenger, 1991).

Constructivist Professional Development

There is growing consensus that effective professional development is grounded in constructivist theories (Sparks & Hirsch, 1997). Constructivist professional development views the educator as actively engaged in the learning process (Kusnick, 1997). Constructivist professional development recognizes that educators filter new information through the lens of existing knowledge and beliefs. Constructivist methods enable teachers to "apply current understandings, note relevant elements in new learning experiences, judge the consistency of prior and emerging knowledge, and based on that judgment, they can modify knowledge" (Hoover, 1996, para. 4).

Two constructs are central to this paradigm. First, teacher learning is a process distributed over time, not a single event. Constructivists contend that significant change is only achieved in a gradual process (Bainer & Wright, 2000). As Halpern (1998) asserts,

> Beliefs that have been constructed over many years and the habits of mind that developed along with them will take multiple learning experiences, distributed over time and settings, before they will be successfully replaced with new ways of thinking and knowing about the world. (p. 454).

Second, teacher learning is facilitated through collaborative learning environments. Through collaboration, teachers explore multiple perspectives on concepts or issues. Framing teacher learning in collaborative environments empowers teachers to "reflect on their own interpretations, construct alternative meanings and expand their perspective" (Fung, 2000, p. 156)

Follow-Up

Traditional professional development is exemplified by the Three-Step Fable (James, Hord, & Pratt, 1988):

1. Give teachers the box of paraphernalia and printed materials,
2. Provide a half-day orientation, and
3. Bid them God speed and good luck! (p. 63).

Such professional development holds that teacher learning takes place at a series of workshops where outside presenters transmit knowledge to teachers (Lieberman, 1995). Initial enthusiasm for content presented in the workshop may be reassuring to organizers, but has relatively little influence on teacher learning (Showers, Joyce, & Bennett, 1987). The ultimate goal for teacher professional development is teacher learning that promotes changes in the teachers' knowledge, understanding, behaviors, skills, values, and beliefs (Hord, 1994). Without continuing assistance and support, variously referred to as *follow-up*, *sustained involvement*, or *follow-through*, the

traditional model of professional development overrates the teacher's capacity for change (Fullan & Stiegelbauer, 1991).

Researchers such as Joyce and Showers (1988) and Garet, Porter, Desimone, Birman, and Yoon (2001) have addressed the issue of follow-up following face-to-face professional development. Joyce and Showers (1988) found that successful professional development programs contained five elements that contributed to the successful transfer of professional development content to the classroom including (a) teachers are introduced to new theory by direct instruction, (b) teachers observe modeling of the strategy, (c) teachers practice the strategy, (d) teachers receive feedback from peers, and (e) teachers are then supported with follow-up coaching. However, they also found that most schools only practice the first four components, neglecting follow-up.

Sustained involvement in professional development programs is a factor contributing to teacher content knowledge and teacher satisfaction. Garet et al. (2001) conducted a survey of a national probability sample of teachers in the Eisenhower program and found that sustained involvement over time in professional development activities had an impact on teacher knowledge and skills as reported by teachers. Sustained involvement provided sufficient time for "in-depth discussion of content, student conceptions and misconceptions and pedagogical strategies" and they "allow teachers to try out new practices in the classroom and obtain feedback on their teaching" (Garet et al., 2001, p. 921).

Rationale

Beeby (1980) summarizes the rationale for follow-up in professional development saying: "Without continuing encouragement and support [upon completion of workshops and courses], the average teacher has a remarkable capacity for reverting back to old practices under a new name" (p. 466). Support over time provides teachers the ability to "deepen their understanding, analyze student work, and develop new approaches to instruction, but such time, must be purposefully structured" (Guskey, 2003, p. 11). To understand how continuing support facilitates the teacher change process, it is necessary to examine the underlying structures and processes that enable transfer of content, concepts, and skills and facilitate changes in attitudes from professional development experiences.

Supporting Teacher Change

Few teachers leave a professional development event convinced that a new program or innovation will work (Guskey, 1986). The process of implementing change can be very threatening – challenging teachers' accepted pedagogical beliefs and philosophies, requiring teachers to adopt and use new practices and exchanging familiar materials and resources with those that are foreign. One significant reason for failure of many professional development programs is the neglect of "phenomenology of change," the failure to view the meaning of change from the teacher's perspective (Fullan & Stiegelbauer, 1991). As teachers grapple with change, they must construct meanings of what it is that should change, how that change can best be accomplished, and the interaction between the two. Further, unless validation occurs in the classroom,

teachers' attitudes are unlikely to change (Guskey, 1986). Thus, changes in attitudes, beliefs, and understandings follow rather than precede changes in behavior from professional development (Guskey, 1986). Understanding how teachers actually experience change and providing time and support for teachers during the change process is essential to the implementation of change.

Providing Time for Professional Discourse

Although norms of isolation and individualism persist in American education, many professional development theorists situate professional development in social contexts (Ball & Cohen, 1999; Dorph, Stoldolsky, & Wohl, 2002; Manouchehri, 2002). The emphasis on social learning stems from the premise that innovation requires a shared meaning if it is to be adopted and assimilated into an organization (Marris, 1975). Fullan and Stiegelbauer (1991) discuss what they term the "primacy of personal contact" stating, "Teachers need to participate in skill-training workshops, but they also need to have one-to-one and group opportunities to receive and give help and more simply to converse about the meaning of change" (p. 132). Similarly, Little (1982) asserts that successful faculty engaged in discussions characterized as "frequent, continuous and increasingly concrete and precise talk about teaching practice building a shared language around the complexity of teaching" (p. 331). Facilitating these types of discussions beyond training events enables faculty to reflect on their beliefs and assumptions about issues related to practice and to develop a shared understanding within a context of collegial support.

Building a Shared Vision

Research has stressed the vital role of building teacher commitment in the successful implementation of an innovation. The Rand Change Agent Study (Berman & McLaughlin, 1977) found that even the best innovation could not succeed with inadequately trained or uncommitted teachers. Assuming that fundamental variables such as adequate training, resources, and funding have been addressed, several researchers have explored the relationship between a unifying vision and teacher commitment to change (Mosenthal, Lipson, & Torncello, 2004; Wagner, 1996).

Shared vision, "a widely shared sense of purpose or vision" (Boyd, 1992, para. 4) galvanizes teachers to work to realize those ideals. A vision is not mandated by school administration, but developed in a joint effort by stakeholders in the school community. Its power is defined by its sharedness, concreteness, and clarity (Fullan, 1993). Shared visions ensure that faculty efforts are coordinated, aimed towards the same goals, and generate a long view. Simply having a vision, however, is not sufficient to trigger school change. Shared visions must be clearly articulated and communicated and ingrained into the daily routine (Deal & Peterson, 1994). Visions can be extremely powerful, but require time and support for the demanding work of defining the vision, building commitment for the vision, and ingraining the vision in the day-to-day experience within the school.

Building Competence

Garmston (2003) maintains that successful transfer of professional development requires *unconscious competence*, integrating new skills into work habits, and re-culturing of the school environment. Developing unconscious competence requires moving teachers from unconscious incompetence (the person is not aware of the content, concept, or skill, or its relevance to their work situation) to conscious competence (I am integrating new patterns into my work but with conscious, sometimes mechanical efforts) to unconscious competence (the skill becomes so practiced that it becomes second nature to me). Integrating new skills into work habits requires that teachers transfer learning from professional development into their personal educational context. They must be able to modify content, concepts, and skills while retaining fidelity to the original innovation.

Creating New Roles and Structures

Lieberman (1995) stresses that educators must be given opportunities to "think about, try out and hone" new practices over time. She asserts that change is facilitated by long-term processes where educators:

- Build new roles (e.g., teacher leader, peer coach, teacher researcher),
- Create new structures (problem-solving groups, decision-making teams),
- Work on new tasks, (journal and proposal writing, learning about assessment, creating standards, analyzing or writing case studies of practice),
- Create a culture of inquiry, wherein professional learning is expected, sought after, and ongoing part of teaching and school life (p. 4).

Thus, professional development morphs from an event with a lifespan of one or two days to a process that becomes "an expectation for the teacher's role and an integral part of the culture of the school" (Lieberman, 1995, p. 5).

Forms of Follow-Up

A variety of approaches have been employed to provide follow-up to professional development. These can be broadly classified as support, content focused, observation (both formative and summative with feedback), pedagogy, curricular, and inquiry (see Table 1). The choice of a strategy to be implemented depends on evaluation of three factors: (a) evaluating the strengths and weaknesses of the follow-up strategies, (b) the teacher-learner's prior knowledge, and (c) the desired outcomes of the professional development (Component Three, 2003; Harwell, 2003). The most powerful professional development programs blend multiple follow-up strategies (Harwell, 2003).

Effects of Follow-Up

The research in professional development demonstrates the significance of continuing assistance and support. In 1987, Showers et al.'s meta-analysis compared the effect sizes of professional development with inclusion of differing combinations of the following components: instruction in theory, demonstration, practice, feedback, and coaching. Those professional development workshops that included all five components had an effect size of 1.68 for transfer of training to the classroom. Inclusion of only the first four yielded .39 for transfer of training to the classroom. Use of fewer components yielded negligible effect for transfer of training.

Table 1. Forms of Follow-up

Approach	Forms	Strengths	Weakness
Support	Coaching Collegial Support Groups Mentoring Co-teaching	Mentor gains the satisfaction of transferring knowledge and skills gained through years of experience; Much of this knowledge is intangible and not included in typical teacher preparation. Mentee benefits from receiving this knowledge (Teacher mentoring, 1986).	Without careful selection and/or training, mentors, may promote conventional norms and practices rather newer learner-centered strategies (Feiman-Nemser, 1996).
Content Focused	Immersion in the discipline Content study	Provides teachers with theoretical understandings of subject matter. (Darling-Hammond, 2000, Elmore, 2000)	Should not be separated from pedagogic knowledge and content standards.
Observations	Observations including audio and videotaping participants during teaching with feedback	"The observer gains professional experience observing the colleague, preparing the feedback and discussing common experiences. The one being observed benefits from another's point of view, gains new insights, receives helpful feedback" (Guskey, 2000, p. 24). Observation/assessment also helps break down the isolation of teaching and school administration by having colleagues work together on shared improvement goals. (Ackland, 1991)	Can be unreliable and subject to bias. Susceptible to good teacher/bad teacher syndrome. Relies on "observers skill, knowledge, and sensitivity to the teacher and the learning environment." (Schempp, 2003, p. 168)
Pedagogy	Demonstrations Lesson study	"Teachers engage in very detailed analyses of [content], of students' …thinking and skill, of teaching and learning. Although the process results in a well-crafted lesson, teachers work on analyzing students' responses and learn from and revise their own teaching practices. Their knowledge becomes a basis for further learning through the study of a lesson" (Kirkpatrick, Swafford, & Findell, 2001, p. 395).	Requires large amounts of time to prepare lesson. Focuses on how to teach rather than what to teach. American education's is focused on curriculum and standards. Emphasis on critical self reflection may be uncomfortable for American educators. Presumes a high level of collaboration, shared norms and values. (Lewis, 2001.

Table 1 (continued)

Approach	Forms	Strengths	Weakness
Curricular	Curriculum writing Curriculum implementation	Teachers need to be knowledgeable about curriculum and understand the processes by which curricula may be developed. (Print, 1993) Allows teachers to continuously evaluating curriculum to determine how it supports student success. (Speck & Knipe, 2001) Creates interdependence and cooperation among teachers. Teachers take ownership of teaching materials	Requires release time or paid time in the summer to train teachers in content and pedagogy Requires release time or paid time to write curriculum. Must be closely monitored to assure that copyright is not violated (H. Sullivan, (personal communication, August 26, 2005).
Inquiry	Examining student work Action Research Study Groups	"Teachers either define the research questions or contribute to their definition in a meaningful way. Therefore, they have ownership over the process and are committed to promoting changes in practice indicated by the findings (Loucks-Horsley et al., 2003, pp. 162-163).	Limitations include: Time for research distributed over long periods. Lack of rigor or investigator bias. Sustaining commitment Maintaining consistency with multiple/and/or inexperienced researchers Reducing participant turnover (Gibson, 2004).

Adapted from O'Sullivan (2002).

Joyce, Calhoun, and Hopkins (1999) found that inclusion of each of the professional development components resulted in increases in the percentages of teachers able to appropriately implement a new strategy, with follow-up making the most significant contribution. Only 10% of teachers were able to transfer a new strategy appropriately to the classroom if the design of the workshop included only theory. Adding demonstration to theory enabled 15% of teachers to appropriately transfer a new strategy. The inclusion of practice and feedback enabled 15-20% of teachers to transfer a new strategy, whereas, the inclusion of follow-up by coaching enabled 80-90% of teachers to appropriately transfer a new strategy to the classroom.

Collaborative Learning

Although many definitions have been suggested, there is no comprehensive and internationally accepted definition of collaborative learning. As Smith and MacGregor (1998) observe, "Collaborative learning describes the many educational approaches involving joint intellectual effort by students, or students and teachers together. Most collaborative learning activities focus on the student's exploration and application of the course material, not the teacher's presentation of it" (p. 10). According to Schrage (1991), collaboration occurs when "an experience is actively shared with the outcome being greater than that resulting from a non-shared experience" (p. 40). Kaye (1992), on the other hand, determines that: "Collaborative learning [is] the acquisition by individuals of knowledge, skills, or attitudes occurring as the result of group interaction, or put more tersely, individual learning as a result of group process" (p. 4) Thus, the term, collaborative learning, has become an umbrella for a variety of instructional practices that aim at achieving (a) work sharing, (b) using differing knowledge and expertise to improve quality and/or take account of varied viewpoints, and (c) building or consolidating a (learning) community (Hartley, 1999).

Assumptions About Learning in Collaborative Learning Environments

Although there are a variety of approaches to collaborative learning, a common set of assumptions and expectations identified by Smith and MacGregor (1998) defines the learning process:

1. Learning is an active, constructive process. To learn new information, ideas, or skills, students have to work actively with them in purposeful ways.

2. Learning depends on rich contexts....Instead of being distant observers of questions and answers, or problems and solutions, students become immediate practitioners.

3. Learners are diverse. Students bring multiple perspectives to the classroom – diverse backgrounds, learning styles, experiences, and aspirations; teachers can no longer assume a one-size-fits-all approach.

4. Learning is inherently social. In collaborative learning, there is the social stimulation of mutual engagement in a common endeavor. This mutual exploration, meaning-making, and feedback often leads to better understanding on the part of students, and to the creation of new understanding as well.

5. Learning has affective and subjective dimensions.…In collaborative learning situations, students generally experience a shift in their intellectual development as they learn to articulate their own point of view and listen to the views of others. (p. 586)

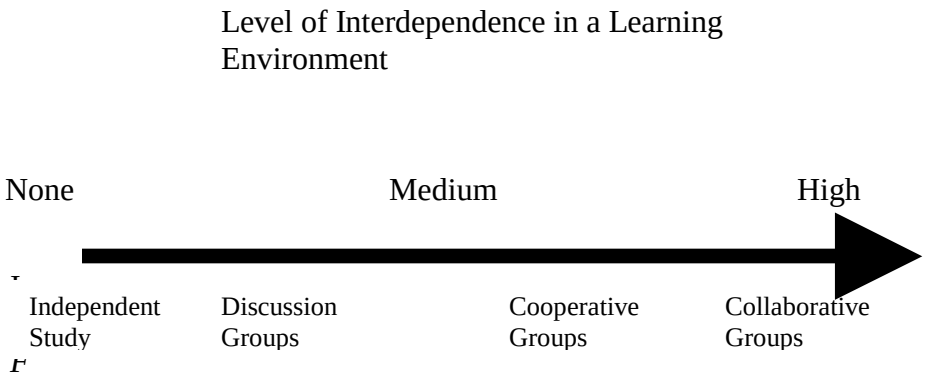
Thus, in a collaborative learning setting, learners have the opportunity to converse with peers, present and defend ideas, exchange diverse beliefs, question other conceptual frameworks, and are actively engaged in learning (National Institute for Science Education, 1997).

Elements of Collaborative Learning

Collaborative learning is based on the premise that knowledge is socially constructed through the interactions of students working in groups (Orange, 2002). Johnson, Johnson, and Smith (1991) characterize collaborative learning instructional designs as having five basic elements that are critical to the effective and productive effort of the group. These elements include positive interdependence, promotive interaction, individual accountability, social skills, and group processing.

Positive Interdependence

According to Johnson, Johnson, and Smith (1991), positive interdependence refers to group processing that results in participants striving for mutual benefit so that all members of the group benefit from the group's efforts. Positive interdependence promotes a sense of group cohesion and a heightened sense of belonging to the group (Jochems, van Merriënboer, & Koper, 2004). Interdependence can be fostered through instructional design (Graham & Misanchuk, 2003). Figure 1 shows the spectrum of activities across the spectrum of interdependence. Designs that focus on independent or self-study generate low levels of interdependence. Designs that include discussion groups or cooperative groups generate moderate levels of interdependence. Designs that include collaborative group work generate high levels of interdependence.



From Graham and Misanchuk (2003).

Figure 1. Different Levels of Interdependence in Learning Environments.

In an environment that fosters positive interdependence, group members are motivated to work for the progression of the group rather than competing for individual gains. (Nelson, 1999).

Promotive Interaction

Promotive interaction takes place when group members verbally promote each other's understanding through support, help, and encouragement (Johnson, Johnson, & Holubec, 1990). Typical activities within promotive interaction include "group members "explaining how to solve problems, discussing the nature of the concepts being learned, teaching one's knowledge to classmates, and connecting past with present learning" (Johnson & Johnson, 2004, p. 33). This type of interaction assures that every student has both an academic support systems committed to his/her learning and a personal support system committed to him/her as a person (Danforth & Smith, 2005).

Individual Accountability

To ensure that all group members participate, each member of the group must be held accountable for contributing to the group's efforts (Danforth & Smith, 2005). Holding all students accountable for contributing to the group promotes a sense of fairness and avoids situations where the group depends on one highly motivated member or the group is undermined by one unmotivated member (Nelson, 1999; Kellogg, 2005). Individual accountability can be established by creating positive interdependence and through setting requirements for individual accountability (Johnson & Johnson, 2004).

Teamwork Skills

Group tasks typically involve complex interactions to complete the group's work. Simply placing students in groups and telling them that they are a team will not assure that students will function as a team. For effective group functioning, group members must master appropriate social skills. These skills include: leadership, decision-making, trust-building, communication, and conflict-management (Johnson & Johnson, 2004). Teamwork skills must be taught as purposefully and precisely as content skills (Johnson & Johnson, 2004).

Group Processing

An oft-neglected component in collaborative learning is providing time for the group to process the effectiveness of their interactions. This involves groups' assessing what processes worked well and contributed to personal and academic goals as well as what processes were detrimental to the group (Gillies & Ashman, 2003). Group processing promotes greater personal and group processing skill than groups who do not take part in evaluating how the group functioned (Johnson, Johnson, Stanne, & Garibaldi, 1990).

Characteristics of Collaborative Learning Environments

There are four general characteristics of a collaborative learning environment: (a) shared knowledge among teachers and students, (b) shared authority among teachers and students, (c) teachers as mediators, and (d) heterogeneous groupings of students (Tinzman et al., 1990). The first two characteristics illustrate the changing relationship between teachers and students as the learning environment becomes a space of shared

knowledge and shared authority. The third highlights changing approaches in instruction, while the fourth addresses the composition of the collaborative classroom.

Effects of Collaborative Learning

The body of research literature on collaborative learning is substantial and is rapidly growing larger. Numerous studies have shown the powerful effects of collaborative learning on student achievement across diverse populations and disciplines at all educational levels. In a meta-analysis of 122 studies that compared the effectiveness of cooperation, cooperation with intergroup competition, interpersonal competition, and individualistic goal structures in promoting achievement and productivity, Johnson, Maruyama, Johnson, Nelson, and Skon (1981) found that cooperative goal structure was more effective in promoting student achievement and performance than both competitive and individualistic goal structures.

In addition to the academic benefits, researchers have found that collaborative learning also promotes a variety of affective gains, as well. Collaborative learning theorists acknowledge the intertwining of attitudes, feelings, self-esteem, and motivation in the learning process. Thus, researchers have found that collaborative learning also results in increased participation, improved attitudes, and increased achievement among students of lesser ability.

Participation

Too often, students sit silently in a class with little input. Repman and Logan (1996) suggest that students interacting with other students "increases their participation and enhances their motivation and learning" (p. 37). Manning and Riordan

(2000) found in a study of an online economics course that collaborative learning equalized participation by requiring input from students at each stage. Parent, Neufeld, and Gallupe (2002) found that participation increased in an exploratory study of a group support system as students became comfortable with the technology. However, Wolcott (1996) cautions that "students' reticence threatens spontaneity and lessens the amount and frequency of interaction: in turn, the lack of interaction can retard the development of rapport" (p. 24).

Attitudes

One of the most promising benefits of Collaborative Learning is in creating positive attitudes in students. Compared with traditional forms of instruction, numerous studies have found that collaboratively taught students tend to have more positive attitudes towards the subject matter (Johnson, Johnson, & Stanne, 2000; Springer, Stanne, & Donovan, 1999).

Another area of interest is student attitudes towards the collaborative process. Uribe, Klein, and Sullivan (2003) found little difference in attitudes between participants who worked alone online and participants who worked in a collaborative online environment in a problem-solving exercise. In this study, both groups were found to have generally positive attitudes toward their experience. However, the groups differed on items related to time necessary to complete the program. Collaborative online participants indicated that they felt that they did not have sufficient time to complete the program because communicating with their partner was time-consuming.

Persistence

Programs that incorporate collaborative learning can have a positive effect on students' persistence. As part of a learning community who are sharing common goals, students are motivated by their shared experience and encourage each other's efforts (Barab & Duffy, 2000). Further, students in collaboratively taught courses are more likely to complete assignments which, in turn, increase the likelihood of completing the course. (Panitz, 1999). Springer et al.'s (1999) meta analysis of collaborative learning studies in science, math, engineering, and technology at the college level found that student persistence was significantly higher in classes that used collaborative learning strategies reducing attrition by as much as 22%.

Novices

Collaborative learning enables learners of differing ability levels, especially below-average level learners, to be successful. Numerous studies have shown the powerful effects of collaborative learning on the performance of below-average students when combined with students of above average ability (Dembo & McAuliffe, 1987; Hooper & Hannafin, 1988; Webb & Sugrue, 1997). Theorists suggest several reasons for this effect. Below-average students benefit from peers' explanations in terms closer to their understanding (Schaffner et al., 1996). Below-average students may gain a broader perspective through the higher-level discussion in heterogeneous groups (Webb & Sugrue, 1997). Finally, for novices to a field, working with an expert allows insight into the cognitive processes used in solving a problem (Falchikov, 2001).

Challenges to Collaborative Learning

While there have been numerous successes with collaborative learning, the literature on collaborative learning has also identified a range of factors that present challenges to this instructional strategy. These factors include the increased time demanded for collaborative discussions, varying patterns of interaction, and varying qualities of responses. The presence of these factors can contribute to student dissatisfaction with the learning experience.

Increased Time Demands

Online courses benefit students by eliminating the time required for travel to and participation in face-to-face discussions. However, the time commitment for participation in asynchronous collaborative discussions in online courses may be greater than face-to-face courses. Online discussions require participants to post messages, read messages from other participants, and to respond to other participants' messages (LeJeune & Richardson, 1998). Students can become frustrated with the time required to read the messages and the responses to those messages throughout the discussion period (Land, 2002; Stacey, 2002). Students may associate the total freedom in space and time with total freedom in participation and underestimate the time required for participation (Delfino, Manca, Persico, & Sarti, 2004). To alleviate some of the frustration, some authors have suggested that students be made aware of the time requirements as they enter the course (Prendergast, 2003)

Frequency of Response

In a collaborative learning environment, learning advances through the active interaction among members sharing and constructing knowledge (Ayala, 2001). However, some researchers have found that the frequency of student responses in online discussions may not always reach desired levels of interaction leading to dissatisfaction. Hallett and Cummings' (1997) study of an educational psychology class found that students did not post messages beyond the required number and had a negative view towards participating in discussions. Heath's (1998) report of the interactivity of a social and political philosophy course where 15% of the grade depended on participating in discussions found that discussions also met with limited success and that students' varied patterns of participation had a negative impact on the class. As the semester progressed, declining numbers of messages were posted. Hess, Abt, and Serow's (1998) study of forestry students found that students felt less accountability towards an online class and frequently procrastinated in meeting course deadlines posting just before deadlines or in a few cases, not at all. Kreijns, Kirschner, and Jochems (2003) suggest two possible causes that may produce the lack of interactivity. First, they recommend that instructors not assume that interaction will take place. Instructor expectations that students will spontaneously interact in an online discussion space are not justified. Second, instructors frequently fail to recognize the social psychological dimensions of the online learning process. Online community is important to establishing feelings of cohesiveness and trust. If participants do not feel safe in the online environment, they will not take risks in interacting with others.

Quality of Response

If discussion comments made by students lack insight and depth or descend into casual conversation, the learning of the group suffers as well as satisfaction with the learning experience. Ideally, discussions should "allow students to interact with more capable peers, articulate and reach a more critical and informed understanding of the topic under consideration, elaborate on and challenge ideas, hear and incorporate multiple perspectives" (Muilenburg, & Berge, 2002, p. 101). However, students' comments can fail to justify claims, fail to link to course concepts, simply offer opinions, or tell stories unrelated to course concepts (Bonk, Wisher, & Lee, 2004). To move discussions towards the ideal, several authors recommend posting sample discussions, training students to back up claims, and modeling types of answers and arguments that might be expected (Bonk et al., 2004).

Promise of Online Professional Development

Online professional development is an emerging instructional delivery system that occurs at the intersection of two unique disciplines, distributed learning and professional development. Collaborative professional development models inclusive of follow-up sustain the capacity for educator learning through collective knowledge building and problem-solving. Distributed learning environments use information/ communication technologies to provide structures to support collaborative interactive learning in online communities across diverse geographic spaces. The interaction of these two disciplines provides a singularly different context for delivering professional development.

Distributed Learning

Distributed learning is defined as "educational activities orchestrated via information technology across classrooms, workplaces, homes, and community settings and based on a mixture of presentational and "constructivist" (guided inquiry, collaborative learning, mentoring) pedagogies" (Dede, 1996). This differs from distance education with its singular focus on instruction independent of time and place. Distributed learning builds on the "communicative potential of communication technology for designing and organizing collaborative learning communities among geographically dispersed students" (Sorenson & Fjuk, 1997). Course management systems such as WebCT facilitate collaborative processes such as participation, coordination, teacher intervention, and group interaction (Lin, 2005).

Distributed Learning Environments

Distributed learning environments require instructional spaces and tools that support the learner in collaboratively constructing meaning in online environments. Jonassen, Davidson, Collins, Campbell, & Haag's (1995) model of a distributed learning environment includes computer-mediated communication tools, computer-supported collaborative work tools, situated case-based learning pedagogies, and computer-based cognitive tools. The synergy of tools and pedagogy in distributed learning environments offers a collaborative, learner-centered setting that facilitates communication, reflection, and the co-creation of knowledge (Palloff & Pratt, 2001).

Computer-Mediated Communication Tools

Text-based computer-mediated communication (CMC) is facilitated through a suite of tools including electronic mail, discussion boards, chat, conferencing, whiteboards collaborative tools, and online databases. Asynchronous interactions are afforded through these tools allowing learners to choose the time and place of their involvement. According to Gibson (1995), the promise of these tools is that they create learning spaces that enable "connection to other learners and to resources within a potentially rich, discursive learning environment" (p. 8). Using these tools, students construct knowledge as they "explore issues, take positions, discuss those positions in an argumentative format, and reflect and re-evaluate their positions" (Jonassen et al., 1995).

Computer-Supported Collaborative Work

Computer-supported collaborative work tools "help groups structure work through group decision support systems, project management tools, electronic conferencing systems and shared editors" (Jonassen et al., 1995, p. 17). Dillenbourg and Schneider (1995) distinguish between cooperative work and collaborative work indicating that cooperative tasks are split among group members who work independently. Collaborative work, on the other hand, requires that learners work synchronously and interactively to solve a problem. This would indicate that discussion during task engagement is an important component of collaboration, since the cognitive benefits that are claimed for collaborative learning must be mediated by the verbal exchanges among learners (Pressley & McCormick, 1995). Curtis and Lawson (2001)

found in a study of the patterns of interactions of college students in a computer-mediated distance education course, that students made use of collaborative work tools for planning, contributing, seeking input, reflection/ monitoring, and social interaction. Technology tools that support collaboration help learners "construct a common understanding of the problem being solved and negotiate the most appropriate solution to that problem. Collaboration and negotiation are the hallmarks of constructivist learning. (Jonassen et al., 1995 p. 18).

Situated Case-Based Learning Environments

Technological environments should anchor instruction in real-world problems, events, or issues that may be appealing or meaningful to adult learners (Bostock, 1998). While these environments were once only available as CD-ROMS, there is a multiplicity of software solutions that allow instructors to present instruction. Lohr and Heng-Yu (2003), however, deplore environments whose only interactive features are multiple choice questions denouncing them as "products that do not actively involve or engage the learner's mind" (p. 214). Papanikolaou, Grigoriadou, Magoulas, and Kornilakis (2002) encourage environments that adapt the needs of individual learners through individualizing the sequencing of the curriculum, problem solving support, adapting presentations to the needs of learners, and supporting learners' orientation and navigation through adaptive navigation support. Ferguson and Wijekumar (2000) advocate the use of Spiro's Cognitive Flexibility theory with its use of a large number of small cases that interrelate course concepts. More recently, Dickey (2003) has investigated the utility of three-dimensional virtual worlds as a distance-learning

environment citing the ability of learners to explore and manipulate their space as well as communicate with other learners through chat features, thus sharing information and testing understandings.

Cognitive Tools for Knowledge Representation and Construction

Unlike face-to-face learning environments, online learning environments must utilize external representations of learning. Suthers, Hundhausen, and Girardeau (2003) propose three types of representations including discourse as in the chat and threaded discussions, disciplinary symbolic representations as in chemistry, and symbolic representations of theory. Other tools may include "databases, spreadsheets, semantic networks, expert systems, computer conferences, multimedia/hypermedia construction, computer program and microworld learning environments (Jonassen et al., 1995). Engagement with these tools requires students to organize, interpret, and synthesize their constructions of the content. This deep deliberation is critical to the process of knowledge construction. Products from these tools may be shared with colleagues to promote further knowledge representation through collegial evaluation.

Levels of Interaction

Many theorists assert that interaction is critical to learning and is an essential part of the distributed learning process (American Distance Education Consortium, 2003; Lamb & Smith, 2000; Perez-Prado & Thirunarayanan, 2002). Interaction is defined as "a learning-motivated engagement between student(s), instructor, content, or technology for the purposes of acquiring knowledge. This engagement often takes the form of an intrapersonal, interpersonal, and social dialogue, or human-machine

interface that spans theory and practice" (Hoyt, Jones, & Glenn, 2003). Summers (1991) maintains that teaching without interaction is simply "passing on knowledge as if it were dogmatic truth" (p. 14).

Moore (1989) suggests that there are at least three types of learner interaction in distributed learning environments: (a) learner-content interaction, (b) learner-instructor interaction, and (c) learner-learner interaction. To this, Hillman, Willis, and Gunawardena (1994) add learner-interface interaction. The most basic type of interaction, the learner-content interaction, is the interaction between the student and the subject matter. The content may be in a variety of formats such as text, video, audio, or computer software. The learner constructs knowledge by accommodating new information presented in the content with existing cognitive structures (Swain, 2002). Learner-instructor interaction is the interaction between the instructor and the student. This interaction provides the instructor with the opportunity to assist the student with the construction of new knowledge as well as to provide counsel, support, and encouragement (Moore & Kearsley, 1996). Learner-to-learner interaction emphasizes interaction between one student and another, one student and several others or a group of students (Thurmond & Wambach, 2004). Through interaction with their peers, students create a virtual learning community where they share ideas and discuss issues, promoting understanding of course content and stimulating critical thinking. The final type of interaction, learner-interface, refers to "how the learner uses the computer interface to access and participate in instruction and communicate with instructors and other learners. The computer interface includes the graphical user interface (GUI),

program instructions and help menus, and computer peripherals. Well-designed user interfaces are transparent to the student enabling a focus on learning rather than manipulating the system to access information and communication tools (Lohr, 2000).

Measures of Satisfaction in Distributed Learning Environments

As distributed learning becomes more universal, student satisfaction has been identified as a criterion to assess the quality of courses and programs. Greater student satisfaction is likely to produce higher learning, higher achievement, and successful program completion (Navarro & Shoemaker, 2000; Schwitzer, Ancis, & Brown, 2001). One factor of particular interest in measures of satisfaction is satisfaction with the technology.

Technology

While technology problems can cause distress in a traditional classroom, technology problems can doom a course dependent on technology as a delivery system and diminish student feelings of satisfaction. Technical problems may relate to technological difficulties with course delivery, difficulty in using course software, or with students' computer competencies. Messecar, Van Son, and O'Meara (2003) reported that technical difficulties in the delivery of the web-based component of a nursing statistics course resulted in overall lower mean ratings of satisfaction. The usability of the course management system also contributes to technology satisfaction. Online learners must be able to master the use of the system to be successful in the course (Belanger & Jordan, 2000). Chong's (1998) case study of computer conferencing

found that students' dissatisfaction related to their difficulty working with the course management system noting:

> Students disliked having to deal with a [system] whose functions were not very intuitive and rather clumsy compared to other microcomputer applications. Students were reluctant to learn commands for a software tool that they could not use on a PC, one that seemed to not have utility beyond the boundaries of a particular course. (p. 177)

Few studies have examined the relationship between students' computer competencies and course satisfaction; however, Slick's (2004) study of postsecondary students enrolled in community college found a significant relationship between technical skills and course satisfaction. Similarly, Gunawardena, Lowe, and Carabajal's (2000) study of eight process variables contributing to course satisfaction in a graduate level course also found student computer competency to be a significant factor.

Online Professional Development

EdTech Leaders Online (2000) defines online professional development as "using the Internet to provide activities, information, and interactions with mentors and colleagues that enable educators to improve their knowledge and professional practices." Creating powerful professional development programs in online contexts demands that designers incorporate best practice principles in professional development while taking advantage of the strengths of the online medium.

Online Professional Development Formats

Online professional development draws from a wide range of online delivery systems that vary across time orientations and interactivity and reflect a variety of pedagogies (Table 2).

Table 2. Interactivity of Online Professional Development Models

Teaching Approach	Communication Tools	Potential for Interactivity With Others	Time orientation
Broadcast lecture	Webcast Videoconference	Low - although occasionally time is provided for questions	Synchronous
Self paced independent study	Email	Low – interaction primarily with content	Asynchronous
College lecture course model	Webcast Videoconference Email Chat	Combines first two strategies. Occasionally chat is available with professor.	Synchronous and asynchronous
Tutorial	Email Chat	Active and ongoing interactions with instructor	Synchronous and Asynchronous
Learning community model	Email Chat Whiteboard Discussion Board Shared Publications	High -Interactions between students, between student and instructor	Synchronous and Asynchronous

Adapted from Kleiman (2004).

In a study of adult education teachers in three online professional development environments: independent, facilitated, and study group, Russell, Copeland, Corrigan, and Diaz (2003) found that effective design for online professional development included:

- Learner-center focus that supports teacher learning and links professional development to practice.
- Content that improves and deepens teacher content knowledge.
- Opportunities for teachers to become actively involved in the meaningful analysis of teaching and learning.
- Thorough grounding in the functionality of the system.
- Opportunities for communication and collaboration.

- Opportunities for teachers to investigate authentic issues that arise from their practice.

Communication and Collaboration

Online environments that facilitate communication and collaboration among learners enable "multiple and collaborative participation from widely dispersed teachers" (Schrum, 2001). Cifuentes, Murphy, Segur, and Kodali (1998) argue that collaborative learning and computer-mediated communication have a reciprocal relationship where collaborative learning is enabled by computer-mediated communication and computer-mediated communication requires collaborative learning. Using synchronous tools, such as chat or asynchronous tools such as email, discussion, whiteboard or shared publications, teachers can engage in professional discourse that enables a peer-mediated understanding of professional development content. Further, Cifuentes, Murphy, and Davis (1998) found that collaboration in networked communities can increase multicultural understanding. Sander, Stevenson, King, and Coates' (2002) investigation of online environments indicates that collaborative engagement of teachers requires environments that build communities of learners through high levels of interaction around authentic learning activities.

Benefits of Online Professional Development

Flexibility

Flexibility is an oft-touted reason for online professional development. Due to its largely asynchronous nature, teachers may choose the time and place of their involvement (Schrum, 2001). Teachers can connect with colleagues, complete

assignments, and request help from the instructor whenever and wherever they have access to the Internet. Flexible environments meet the needs of diverse learning styles and offer learners a measure of control over their learning environment.

Increased Participation

Online professional development also raises the potential for increased participation of learners who are reticent to speak up in face-to-face professional development. Mason (2000) found that middle school teachers in three different schools became actively engaged in an online learning community taking part in self-directed and self-initiated professional dialogue. Similarly, Ebenezer, Lugo, Beirnacka, and Puvirajah (2003) found that preservice teachers carried out reflective dialogues about innovative methods of teaching science.

Teacher Degree Status and Student Achievement

A growing body of research points out the importance of teacher quality as a predictor of student achievement. Numerous studies have attempted to determine the relationship between various teacher characteristics and student achievement. These studies have variously focused on teacher verbal and cognitive ability (Bowles & Levin, 1968; Coleman et al., 1966; Ehrenberg & Brewer, 1995; Hanuschek, 1971; Levin, 1976; Murnane & Phillips, 1981), experience (Hanuschek, 1970; Murnane, 1975; Murnane & Phillips, 1981), teacher coursework (Druva & Anderson, 1983; Evertson, Hawley, & Zlotnik, 1985; Ferguson & Womack, 1993; Monk & King, 1994) or teacher test scores (Ferguson, 1991). While these studies have helped to explain some of the variations in student achievement, their contradictory findings emphasize the need to

determine which characteristics are most likely to translate into effective classroom practice.

Several researchers, however, have considered the impact of advanced degree on student achievement. In 2003, the National Education Association (2003) reported that 56% of teachers in the United States had a master's degree or six-year diploma. Further, teachers have higher rates of attainment of an advanced degree than nonteachers (Goldhaber & Liu, 2003). Local education agencies reward teachers for advanced degrees with a considerable increase in their base pay (Goldhaber & Brewer, 1998). This pay differential ranges from 11% for a master's to 17% for a doctorate over what a teacher would earn with a bachelor's.

Two key findings emerge from the studies of the effects of teacher advanced degree on student achievement. At the secondary level, teacher advanced degrees in math or science are positively associated with student achievement in science and math, while advanced degrees in other areas report mixed results. At the elementary level, the research is mixed on the impact of advanced degree on student outcomes.

Goldhaber and Brewer's (1997) study at the secondary level reported positive relationships for teachers with advanced degrees in science or math at the secondary level on student outcomes in science or math but not for other subject areas. This study examined the results of the National Educational Longitudinal Study [NELS]: 88 follow-up data and found that students with teachers who had advanced degrees in mathematics scored higher than students whose teachers did not have advanced degrees or had advanced degrees in other subjects. A similar investigation was conducted on

NELS:88 data from student tests in English and history and found no significant relationship.

Johnson (2000), however, found that eighth grade students of teachers with advanced degrees in English or literature scored 2.7% higher on the 1998 NAEP than students whose teachers had an advanced degree in education. This study also found that eighth grade students whose teachers had an advanced degree in math or science, scored 3.4% higher than students whose teachers had an advanced degree in education.

The impact of advanced degree on elementary student outcomes is mixed. Johnson's (2000) study of the 1998 NAEP fourth grade data found that there was no difference between students whose teachers had a degree in math or English and students whose teachers had an advanced degree in education. Eberts and Stone (1984) found a negative relationship between a teacher's degree level and mathematic gains by fourth grade students. However, Ferguson and Ladd's (1996) study of school districts in Alabama found a positive relationship between the percentage of teachers who held advanced degrees and student achievement while controlling for other factors.

A series of studies conducted by the Keith Curry Lance (Lance & Rodney, 2000; Lance, Rodney, & Hamilton-Pennell, 2000a, 2000b, 2001) from the Library Research Service at the Colorado State Library examined the influence of librarians and library media programs on student achievement. School librarians in Colorado, Pennsylvania, Oregon, and Alaska were surveyed to determine whether certain elements and activities were included in their practice and the depth of the elements and the frequency of those activities. Survey items were regressed against student reading scores on state tests

while controlling for socioeconomic status of the school and various community attributes. Factors associated with the quality of the library media program and the leadership ability of the school librarian were found to be a predictor of positive student outcomes on student achievement measures. These factors included:

- Library is adequately staffed with a professionally-trained and credentialed school librarians, well stocked, and funded.
- Library staff are actively involved leaders in their school's teaching and learning enterprise.
- Library staff have collegial, collaborative relationships with classroom teachers.
- Library media program embraces networked information technology.

Although socioeconomic status explained approximately 60% of the variance, these measures accounted for 2-10% of the variance in student achievement in the various states.

Summary

Professional development is one of the most powerful strategies in bringing about the changes necessary to improve student learning (Bredeson, 2000; Darling-Hammond, 2000). As Darling-Hammond and Ball (1998) assert, "No other intervention can make the difference that a knowledgeable, skillful teacher can make in the learning process" (p. 8).

Supporting teacher change through follow-up in the implementation of in-service themes is a powerful force for improving student learning (Cohen & Hill, 1998).

Without follow-up, 90-95% of educators return to their classroom and go back to doing things they did before. Follow-up supports the process of educator change, enables educator discourse regarding change, aids the creation of a shared vision, allows educators to assume new roles, and builds unconscious competence. Follow-up can take a variety of formats and the most powerful forms of follow-up blend several formats.

Placing educators in collaborative learning environments for professional development is essential to generating powerful shared learning (Darling-Hammond, 1998). Collaboration frees teachers' minds to "do the kind of powerful, professional, critical thinking that moves [their teaching and their students] forward" (Pardini, 2004). Through collaborative professional development, educators construct the "culture and environment that maximizes individual knowledge development as well as knowledge sharing through collaborative work" (Ng, 2005, p. 155). Collaborative learning environments enable more participation, persistence, positive attitudes toward the content, and in some cases, greater student achievement. However, it is not without challenges, including greater time demands, lack of responses from participants, and responses that demonstrate only shallow understanding.

New technologies hold the promise of surmounting old problems. Providing professional development in distributed learning environments creates powerful new opportunities for teacher learning. Effective online professional development recognizes the various levels of interaction and draws on the tools and pedagogies of distributed learning to create online collaborative communities. This type of

professional development offers flexibility of time and space to participants as well as greater opportunities for involvement.

While a growing body of research demonstrates the importance of teacher quality as a predictor of student achievement, teacher advanced degree is shown to affect student achievement at the high school level only in science and math and at the middle school level in English. The results are mixed at the elementary level. Student achievement is aligned with a cluster of factors from the library media center, notably the amount of time spent by the librarian in leadership activities. Increasingly, educators must not define the end of their education as the completion of a degree. To meet the ever-changing demands of education, educators must be willing to continuously engage in learning and relearning what makes effective practice. Carefully designed professional development experiences that include follow-up in collaborative environments are more likely to create and sustain change in teacher practice.

CHAPTER III

METHODOLOGY

The purpose of this study was to examine the effects of online follow-up and collaboration on participant attitudes, quality of course product, and course completion when added to face-to-face professional development for librarians in 12 Texas school districts. Librarians participated in a face-to-face in-service in their home district. An eight-week online follow-up course supported implementation of in-service themes. School librarians were randomly assigned to receive one of three treatment environments: Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up.

Research Design

A mixed methods design was employed for this research study. Both quantitative and qualitative data were used in order to get a well-rounded account of the effects of differing online follow-up environments on Professional Development Evaluation ratings, TAKS Support Plan scores, and course completion.

Quantitative

A posttest-only control group experimental design with self-selected participants was used to determine the effects of the independent variables, online follow-up environment and credentials, on the dependent variables, course completion, TAKS Support Plan score, and professional development attitudinal score. Table 3 illustrates the design.

Table 3. Quantitative Research Design

c	R	X_1	$O_1O_2O_3$
Noncollaborative Follow-up	R	X_2	$O_1O_2O_3$
Noncollaborative/No Follow-up	R	X_3	$O_1O_2O_3$

R=Random
X_1= Collaborative Follow-up Treatment
X_2= Noncollaborative Follow-up Treatment
X_3= Noncollaborative/No Follow-up Treatment
O_1= Course Completion Score
O_2= TAKS Support Plan Score
O_3= Professional Development Program Evaluation Score

Variables

The following variables were used in the ANOVA analyses of this study (Table 4):

Table 4. Research Variables in ANOVA Analyses

Variable	Type	Range
Environment	Independent	Three environments: 1. Collaborative Follow-up 2. Noncollaborative Follow-up 3. Noncollaborative/No Follow-up
Credentials	Independent	Two levels of credentials were investigated 1. BS in Library Science, BS + Learning Resources Endorsement, BS + ExCET Testing in Learning Resources 2. Master's in Library Science
TAKS Support Plan score	Dependent	Range from 60-120 If a participant did not turn in a final product they were given a 0.
Professional Development Program Attitude Survey	Dependent	1-5

The following variables were used in the logistic regression analyses (Table 5):

Table 5. Research Variables in Logistic Regression Analyses

Variable	Type	Range
Environment	Predictor	Three environments: 1. Collaborative Follow-up 2. Noncollaborative Follow-up 3. Noncollaborative/No Follow-up
Credentials	Predictor	Two levels of credentials were investigated: 1. BS in Library Science, BS + Learning Resources Endorsement, BS + ExCET Testing in Learning Resources 2. Master's in Library Science
Course Completion	Criterion	1 Completed 0 Did not complete

The following variables were used in the *t*-test of attitudes toward online professional development between the Collaborative Follow-up environment and the Noncollaborative Follow-up environment (Table 6).

Table 6. Research Variables *t*-test Analyses

Variable	Type	Range
Environment	Independent	Two environments: 1. Collaborative Follow-up 2. Noncollaborative Follow-up
Online Professional Development Program Attitude Survey	Dependent	1-5

Qualitative Design

Understanding the dynamics of online professional development requires more exploring the effects of environment and/or credentials on specific outcomes. Deconstructing this phenomenon and reliving it through the perceptions of its participants allows the synergy of the underlying environment and the spirit and tenacity of the participants in uncharted country to emerge vividly. The qualitative portion of this study explored the perceptions of the participants in the two experimental environments regarding their experiences.

Participants

Participants were drawn from the population of school librarians in Aldine, Austin, Dallas, El Paso, Fort Bend, Fort Worth, Houston, Hurst-Euless-Bedford, Northside, Mesquite, Plano, and Round Rock. These districts represented several of the largest districts in Texas and their library services directors have been active in Texas Library Association. School librarians' experience ranged from school librarians in their first year of practice to school librarians with 30 plus years of service. School librarians' level of service ranged across elementary, middle, and high school representing the distribution in the field. School librarians' credentials were categorized in these levels: (a) not credentialed (not certified, obtaining certification), (b) bachelor's level degrees (bachelor's in Library Science, bachelor's plus Learning Resources Endorsement, bachelor's plus ExCET testing, and HISD certification), and (c) master's in Library Science.

All school librarians from Aldine, Austin, El Paso, Fort Bend, Fort Worth, Hurst-Euless-Bedford, Mesquite, Northside, Plano, and Round Rock took part in a mandatory three-hour workshop during in-service training at the beginning of the 2004/2005 school year. Librarians in 2 out of 12 districts, Dallas and Houston, took part in an optional in-service presentation outside of school hours. A total of 812 school librarians attended the workshop. Following the workshop, all school librarians were offered the opportunity to continue professional development through the online courses. Of the total attendees, 444 indicated an interest in continuing in the course. These librarians were stratified by level of service (elementary, middle, or high school) and socioeconomic status of the school and randomly assigned to environment using the SPSS randomization tool. The level of service represented in this group included 20% high school librarians, 19% middle school librarians, and 61% elementary school librarians.

Of the 444 who indicated an interest, 278 actually entered the course. The Collaborative Follow-up environment had 94 participants. The Noncollaborative Follow-up environment had 96 participants. The Noncollaborative/No Follow-up environment had 88 participants. Chi square was employed to determine if there were significant differences between the expected and observed characteristics of the school librarians who entered the course with regard to level of service and socioeconomic status. No significant difference was found for either characteristic with a χ^2 =1.192,*df* = 4,n=278, p=.879 for level of service and a χ^2 = 4.228, *df* = 4, n=278, p =.376 for socioeconomic status of the school.

Population Characteristics

The distribution of librarian's level of service was fairly similar between the three environments. The most striking difference between the groups was the lower percentage of elementary librarians in the Collaborative Follow-up environment. Of the 94 school librarians who participated in the Collaborative Follow-up environment, 55% were elementary librarians, 19% were middle school librarians, 24% were high school librarians, and 1% mixed level. Of the 96 school librarians who participated in the Noncollaborative Follow-up environment, 65% were elementary librarians, 16% were middle school librarians, 18% were high school librarians, and 2% were from mixed level schools. Of the 88 school librarians who participated in the Noncollaborative/No Follow-up environment, 60% were elementary librarians, 19% were middle school librarians, 18% were high school librarians, and 3% were mixed level.

Total experience in education was also fairly evenly distributed between the three environments. The most striking difference was the slightly increased number of school librarians with 30 plus years of experience in the Collaborative Follow-up environment. In the Collaborative Follow-up environment experience, 7% had from 0-5 years, 19% had 6-10 years, 16% had 11-15 years, 16% had 16-20 years, 12% had 21-25 years, 11% had 26-30 years, and 17% had 30 plus years. In the Noncollaborative Follow-up environment, 5% had from 0-5 years, 20% had 6-10 years, 19% had 11-15 years, 20% had 16-20 years, 18% had 21-25 years, 9% had 26-30 years, and 8% had 30 plus years. In the Noncollaborative/No Follow-up environment, 1% had from 0-5 years,

22% had 6-10 years, 22% had 11-15 years, 17% had 16-20 years, 11% had 21-25 years, 14% had 26-30 years, and 8% had 30 plus years.

Librarian education, type of credential, and year credential was obtained were also very similar among the three environments. In each of the three environments, at least 90% were currently certified. Similarly, the majority of librarians in each environment held a master's in Library Science ranging from 69% in the Collaborative Follow-up environment to 55% in the Noncollaborative/No Follow-up environment. The most striking difference in credentials was the low number of librarians holding the bachelor's plus ExCET testing in Learning Resources credential (2%) in the Collaborative Follow-up environment as opposed to the 12-13% of the librarians holding this credential in the other environments. Year credential was obtained was also remarkably similar with 45-55% of each environment having received their credential since 1996. Both males and females were represented in this study. However, females accounted for at least 96% of the participants in each environment.

Table 7 presents a summary of the characteristics based on the frequency counts of the participants' responses to the demographic data survey in each environment.

Table 7. Participant Characteristics by Environment

	Collaborative Follow-up	Non Collaborative Follow-up	Noncollaborative/ No Follow-up
Level of Service			
Elementary School	52	62	51
Middle School	18	15	16
High School	23	17	16
Mixed Level	1	2	5
Total	94	96	88
Years in Education			
0-5	7	5	1
6-10	18	19	22
11-15	15	18	18
16-20	15	19	14
21-25	11	17	11
26-30	10	9	12
31+	16	8	7
Total	92	95	85
Certification Status			
Certified	86	90	81
Obtaining certification	8	6	6
Not certified			1
Total	94	96	88
Type of Certification			
BS in Library Science	2	1	3
BS + Learning Resources	17	22	14
Endorsement	2	12	14
BS + ExCET	65	56	50
MLS	1		
HISD certification			1
Not certified	7	5	6
Obtaining certification			
Total	94	96	88
Year Certification Obtained			
1965-1970	3	3	1
1971-1975	10	4	2
1976-1980	8	6	9
1981-1985	7	5	5
1986-1990	6	8	8
1991-1995	10	16	22
1996-2000	15	19	31
2001-present	27	29	8
Obtaining certification	6	6	1
Not certified			1
Total	93	96	88
Overall Educational Attainment			
Bachelor's	4	6	4
BS +	9	15	18
Master's	42	48	43
Master's +	36	26	21
PhD	1	1	
Total	92	96	86
Gender			
Females	90	93	85
Male	4	3	3
Total	94	96	88

Instrumentation

All surveys employed in this study were developed by the researcher. Cronbach's (1951) alpha coefficients were computed to assess the reliability of each survey. Cronbach's alpha coefficient is an assessment of internal consistency based on interitem correlations. Nunnally (1978), suggests an alpha coefficient of .70 as an acceptable reliability coefficient. However, Nunnally also states:

> In the early stages of research on predictor tests or hypothesized measures of a construct, one saves time and energy by working with instruments that have only modest reliability for which purposes reliabilities of .60 or .50 will suffice. (p. 226)

A review of the alpha coefficients for this study shows a range of .62 to .92.

1. Demographic data were collected from course participants as they entered the course through an online survey. Data on credentials, length of service and gender were collected from participants. The survey was on the first page of the course and triggered access to the remainder of the course (see Appendix A).

2. Course completion was measured by completion of all parts of the TAKS Support Plan. Participants who completed course requirements were rated 1 and participants who did not complete the course were rated a 0.

3. Quality of TAKS Support Plan was measured through ratings of the Library TAKS Support Plans using a rubric developed by the researcher. The rubric assessed TAKS Support Plans through four dimensions: (a) collaboration, (b) potential for impact, (c) feasibility, and (d) clarity. Collaboration assessed the extent to which the participant collaborated with administrators and teachers in the school to generate a

TAKS Support Plan. Potential for impact assessed the extent to which the plan could possibly impact student outcomes on the TAKS. Feasibility assessed the extent to which it was possible to implement the TAKS Support Plan. Clarity assessed the extent to which the plan was clearly expressed. The rubric was reviewed for content validity by content experts from Texas Library Association and Texas State Library and Archives Commission. Each domain could receive a minimum of 15 points and a maximum of 30 points resulting in overall scores ranging from 60-120 (see Appendix B). A coefficient alpha was generated to determine the relationship between individual rubric domains and the rubric as a whole. The coefficient for the total rubric was .92.

Plans were scored by six raters who had extensive experience in education either as school librarians and/or as teachers. Raters were trained with extensive definitions and information on each construct. Each rater was given three sample plans of varying quality to grade. Raters graded each of the sample plans independently. Afterwards, raters discussed their ratings. Scores were subjected to Pearson correlation after each round. After attaining an agreement rating of .90, raters were given five plans to grade independently. Some rater drift was observed after these plans were graded. Adjustments were made to the rubric and raters were retrained. After again attaining a .90, raters were given five sample plans to grade independently. After successfully grading these plans independently, participants were given the remainder to grade.

Each TAKS Support Plan was scored by two raters. If scores varied by 10 or more points, another rater scored the plan. Scores that were less than 10 points apart were averaged. All plans were scored blindly. Names and descriptive information was

removed and each plan was assigned a number. Bradley-Johnson and Lesiak (1989) suggest that interrater reliability ratings of .80 or above are acceptable. Overall, this study attained .82.

4. Attitudes towards the Professional Development Program (see Appendix C), an instrument developed by the researcher, measured course satisfaction in five categories drawn from Guskey's (2000) professional development evaluation model: (a) participant reactions, (b) participant learning, (c) participant's use of new skills, (d) organizational culture, and (e) student outcomes. The items related to "participant reactions" are intended to assess whether participants felt that the program was well organized, that time was well spent, and that learning activities were useful. The items related to "participant learning" are intended to assess how well the participants felt they had learned the concepts, ideas, and/or pedagogies included in the professional development program. The items related to "participants' use of new Skills" are intended to assess the extent to which participants were implementing new the concepts, ideas, and/or pedagogies in the professional development program in their educational situation. This survey depended on participants' self report on the implementation items. The items related to "organizational culture" assesses the participants' perception of support by their school for their plan. The items related to "student outcomes" measures the extent to which librarians believe that their TAKS Support Plan will impact student performance on the TAKS. The survey included 15 items regarding participation in the overall professional development program. This survey uses a 5-point Likert scale to indicate the degree to which they agree or disagree

with the item. Higher scores correspond with a positive response. Mean survey responses ranged from 1-5. In reporting scores, mean ratings of 1.0-2. 0 were classified as very negative, 2.01.-2.99 were classified as mildly negative, 3.0 were classified as neutral, 3.01-4.0 were classified as mildly positive, and 4.01 to 5.0 were classified as very positive. Descriptive statistics were reported for each of the five categories of the survey and by item.

A coefficient alpha was generated to determine the relationship between individual test items and the test as a whole. The coefficient for the total test was .92.

5. Attitudes toward the collaborative experience were measured through a 10-item survey, Attitudes Towards the Collaborative Experience Survey, developed by the researcher, and given to participants in the Collaborative Follow-up environment (see Appendix D). These items assess participation in discussions, chat, email, viewing, and commenting on other's TAKS Support Plans, and receiving comments from peers about their own TAKS Support Plan. This survey uses a 5-point Likert scale to indicate the degree to which they agree or disagree with the item. Higher scores correspond with a positive response. Mean survey responses ranged from 1 to 5. In reporting scores, mean ratings of 1.0-2.0 were classified as very negative, 2.01.-2.99 were classified as mildly negative, 3.0 were classified as neutral, 3.01-4.0 were classified as mildly positive, and 4.01 to 5.0 were classified as very positive.

A coefficient alpha was generated to determine the relationship between individual test items and the test as a whole. The coefficient for the total Attitudes Towards the Collaborative Experience Survey was .62.

6. Attitudes toward the online professional development environment were addressed through a 10-item Attitudes Towards the Online Follow-up Experience Survey developed by the researcher and given to the Collaborative Follow-up and Noncollaborative Follow-up environments (see Appendix E). These items addressed ease of use of WebCT Vista for professional development, attitudes toward online professional development content and materials, and comfort with online professional development. This survey uses a 5-point Likert scale to indicate the degree to which they agree or disagree with the item. Higher scores correspond with a positive response. Mean survey responses range from 1 to 5. In reporting scores, mean ratings of 1.0-2. 0 were classified as very negative, 2.01.-2.99 were classified as mildly negative, 3.0 were classified as neutral, 3.01-4.0 were classified as mildly positive, and 4.01 to 5.0 were classified as very positive.

A coefficient alpha was generated to determine the relationship between individual test items and the test as a whole. The coefficient for the total Attitudes Towards the Online Experience Survey was .87.

Procedures

All participating school librarians took part in a mandatory three-hour workshop during in-service training at the beginning of the 2004-2005 school year in their district given by the Library Services Director or his/her designee. The presenter was trained by the researcher during the summer and used an agenda and a PowerPoint presentation developed by the researcher.

Face-to-Face Workshop Content

Content for the face-to-face workshop included:

1. An overview of the new Texas school library standards adopted by the Texas State Library and Archives Commission.
2. The importance and relevance of evidence-based practice to school librarians.
3. The six components of a TAKS Support Plan and the content of each component.
4. How to read the TAKS Summary Report of Student Performance to obtain data about school weaknesses.
5. Resources to support construction of a TAKS Support Plan.

At the end of the workshop, the school librarian was able to:

1. Discuss the attributes of evidence-based practice.
2. Determine how evidence-based practice is reflected in the Texas Standards for School Libraries.
3. Generate the components of a Library TAKS Support Plan.
4. Analyze a sample TAKS Test Report Summary Performance for weaknesses.
5. List possible resources for creating a Library TAKS Support Plan.

Treatment Environments

Three treatment environments were tested in this study. Two experimental environments were used: (a) Collaborative Follow-up, (b) Noncollaborative Follow-up

and (c) a control environment, Noncollaborative/No Follow-up. Table 8 illustrates the design of these environments.

Table 8. Instructional Design of Treatment Environments

	Collaborative Follow-up	Noncollaborative Follow-up	Noncollaborative/ No Follow-up
Participate in initial workshop	✓	✓	✓
Logon to WebCT Vista	✓	✓	✓
Upload TAKS Support Plan through WebCT Vista	✓	✓	✓
Cueing messages	✓	✓	
Follow-up		Readings Weekly module questions completed independently and submitted to instructor through Assignment tool Email to course instructor	
Collaborative Follow-up	Readings Online discussion of weekly module questions with peers Email to peers or course instructor View and discuss peers' TAKS Support Plans Online Chat with peers		

The courses for the two experimental environments each had six modules. Content for the modules drew from the *2004 School Library Programs: Standards and Guidelines for Texas* adopted by the Texas State Library and Archives Commission on March 19, 2004 and *We Boost Achievement! Evidence-Based Practice for School Library Media Specialists* by David Loertscher and Ross Todd (2003), readings from various journals, and PowerPoints about module themes prepared by the researcher.

Modules were released weekly using the selective release feature of WebCT Vista at midnight on Sunday night. Each module was designed to require an average of one hour per week in online time. The Noncollaborative/No Follow-up environment received only administrative messages.

Collaborative Follow-up Environment

After the face-to-face workshop, school librarians randomly assigned to this environment were enrolled in the Collaborative Follow-up environment on WebCT Vista using Texas A&M's server. School librarians were divided into online discussion groups with no more than 15 school librarians in a group. The instructional design of this environment provided follow-up through:

- Access to readings from professional journals and relevant websites.
- Collaboration through weekly discussions with peers, private discussions through email and chat, and viewing and discussing peers' TAKS Support Plans.
- Opportunities for reflection through online interactions with peers and instructor and selective release of course materials over time.
- Individual feedback from instructor.
- Examination of student TAKS data from participant's school.
- TAKS Support Plans sections submitted weekly through the WebCT Vista assignment tool.
- Weekly cueing messages in the form of announcements and messages.

A full course outline is available in Appendix F.

In a typical week, a school librarian in this environment might log on and take part in the following activities online:

- Check for announcements.
- Read the objectives for the week.
- Read feedback from instructor on previous week's TAKS Plan section submission.
- Read the journal articles and PowerPoints chosen to extend understanding and support writing weekly TAKS Support Plan assignment.
- Read email.
- Read and participate in the weekly discussion.
- Participate in a chat.

Noncollaborative Follow-up Environment

After the face-to-face workshop, the school librarians randomly assigned to this environment were enrolled in the Noncollaborative Follow-up environment on WebCT Vista using Texas A&M's server. Follow-up in this environment consisted of access to readings from professional journals and relevant websites and opportunities for reflection by independently preparing a response to the same discussion question as the Collaborative Follow-up environment. The instructional design of this environment provided follow-up through:

- Access to readings from professional journals and relevant websites.
- Individual feedback from the instructor.
- Opportunities for reflection through journal assignments and selective release of course materials over time.
- Examination of student TAKS data from participant's school.

A full course outline is available in Appendix G.

In a typical week, a school librarian in this environment might log on and take part in the following online activities:

- Check for course announcements.
- Read the objectives for the week.
- Read feedback from instructor on previous week's TAKS Plan section submission.
- Read the journal articles and PowerPoints chosen to extend understanding and support writing weekly TAKS Support Plan assignment.
- Read weekly cueing messages in the form of announcements and messages.

There was no collaboration in this environment as all WebCT Vista communication tools were blocked.

Noncollaborative/No Follow-up Environment

After the face-to-face workshop, the school librarians randomly assigned to this environment were enrolled in the Noncollaborative/No Follow-up environment on WebCT Vista using Texas A&M's server. There was no follow-up in this environment nor was there any collaboration as all WebCT Vista communication tools were blocked. The WebCT Vista screen in this environment had the following message: "Welcome to TAMU. Thank you for participating in the study. Please upload your TAKS Support Plan no later than November 1, 2004. School librarians were given a link to instructions to using the assignment tool to enable upload of their TAKS Support Plan whenever the participant deemed it completed. A full course outline is available in Appendix H.

TAKS Support Plan

In each environment, school librarians were asked to create a TAKS Support Plan consisting of six components: (a) overview of the school, (b) collaboration plan, (c) TEKS selected for remediation, (d) planning for student achievement, (e) evaluating resources, and (f) communication plan. Within the overview of the school section, school librarians were asked to describe the strengths and weaknesses of their school, the environment of the library collection, and the openness of the faculty to collaboration. The Collaboration Plan specified the faculty within the school that would support the librarian in obtaining information regarding the weakness on the TAKS and in implementing the Plan. The TEKS selected section described the TEKS or TAKS objectives selected for improvement at the campus and why they were chosen. In the Planning for Student Success section, the librarian discussed the various activities,

programs or strategies that would be implemented to remediate student weaknesses on the TAKS. Evaluating resources required that the librarian consider what resources would be needed to implement the plan and what strategies would be undertaken in order to obtain needed resources. Finally, Communicating the Plan described the process by which the librarian would inform the school community of the plan.

Data Collection

Demographic data were collected from participants as they entered the course via the WebCT survey tool. Course completion data were collected based on the completion of TAKS Support Plan. Attitudes towards the Professional Development Program response, Online Experience responses and Collaborative Experience responses were collected through a survey tool in WebCT at the beginning of the sixth week of the course. At the beginning of the seventh week, library directors were asked to send out follow-up reminders to participants to complete course surveys. After two additional weeks, paper and pencil surveys were sent to participants with a self-addressed stamped envelope. Overall, 70% of participants returned the surveys. TAKS Support Plans were collected by the researcher through the assignment tool in WebCT.

Missing Data

Once the data were collected, it was inspected to determine what data might be missing and for any patterns in the missing data. Although the demographic data survey triggered entry into the professional development environment, some participants chose not to respond to questions either because he/she interpreted the question as an invasion of privacy or might have encountered difficulties with the WebCT survey tool. Of the

278 cases who entered the study, 5 participants provided only partial answers to the demographic data questions. After the eight-week long treatment, 77 of the initial 278 participants did not complete the after-course surveys and were eliminated from analysis. This left 203 participants in the Attitudes Towards Professional Development Program analysis.

Data Analysis

The following section presents the data analysis by research question.

Research Question 1

a. Is there a significant difference between online professional development environments including Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up in participants' attitudes towards the professional development program?

To answer the question, an analysis of variance (ANOVA) was conducted to determine the effects of professional development environments on attitudes towards the professional development experience. In this analysis, the dependent variable was mean scores from the Professional Development Program Attitudinal Survey, and the independent variable was the professional development online environment. Post hoc comparisons were completed through Tukey HSD to identify statistical differences between the professional development environments.

b. Is there an interaction effect between professional development environments and school librarian credentials on participants' attitudes toward the professional development program?

The question was addressed through factorial analysis of variance (ANOVA) using librarian credential (2 levels) x online professional development environment (3 levels) as the independent variables and mean scores from the Professional Development Program Attitudinal Survey as the dependent variable.

c. How satisfied are participants who have experienced Collaborative Follow-up with their collaborative experience in online professional development?

The question was addressed through descriptive statistics drawn from item responses to the Collaborative Professional Development Survey directed specifically to the Collaborative Follow-up environment (see Appendix D). Items were analyzed separately and as a whole.

d. (1) What are the attitudes of participants who have experienced Collaborative Follow-up and Noncollaborative Follow-up with their online follow-up experience in online professional development?

The question is addressed through descriptive statistics drawn from the item responses to the Attitudes Towards the Online Follow-up Experience Survey (Appendix E) directed specifically to the Collaborative Follow-up and Noncollaborative Follow-up environments. Items were analyzed separately and as a whole for each environment.

(2) The question, Is there a significant difference between their attitudes? was addressed through a *t*-test of the means of the online course survey for each environment.

(3) Qualitative analysis was used to answer the question: What are the participants' perceptions of the impact and quality of their online follow-up experience?

Sample Selection and Setting

Participants in the interviews were drawn from the pool of participants in the Collaborative Follow-up and Noncollaborative Follow-up environments using purposive sampling techniques. A high school, middle school, and an elementary librarian from each of the 12 participating school districts was identified for an interview. An attempt was also made to balance the interviews between participants who finished the online course and participants who had not finished the online course. Invitations to participate in interviews were emailed to each identified participant. If a participant agreed to participate in an interview, a time was scheduled for a phone conversation. Nine interviews were conducted overall including four elementary librarians, three middle school librarians, and two high school librarians representing seven districts. The interview participants also represented seven participants from the Collaborative Follow-up environment and two from the Noncollaborative Follow-up environment and one non-completer.

Data Collection

Interviews were the primary source of data for this part of the study. After obtaining consent from the interviewees, the semistructured interviews (Merriam, 2001, p. 74) were conducted by the researcher with one interviewee. The interviews were taped and lasted approximately 45 minutes. The interviews included 12 open-ended

questions (Appendix I) about their online professional development experience, their opinions of the professional development program, and their perceptions of the impact of their participation. While the questions gave structure to the interview, other areas were probed as they developed.

Data Analysis

Interview data were analyzed using a demonstration version of ATLAS.ti, a software application that uses a code and retrieve approach designed for the manipulation and analysis of textual, graphical, audio, and video data. Using the constant comparative method (Glaser & Strauss, 1967), each interview was transcribed and analyzed to draw data into codes leading to categories or themes. Through the transcription process, several themes began to emerge in the data. Interviews were then imported into ATLAS.ti. Codes were assigned manually through the "Open Coding" or through the "Code by List" procedure. Theoretical networks were generated from these emerging categories and themes allowing the researcher to create a working hypothesis allowing the researcher to create a theoretical model.

Internal Validity

To validate the information obtained and to assure validity, the data were subjected to multiple checks. Several strategies were employed to achieve triangulation (Mathison, 1988). First, interviewees represented a wide spectrum of school level, years of service as a librarian, and school district. Peer review (Merriam, 2001, p. 204) was another strategy used to achieve validity. As theories, emerged from the data at various times during the research, they were posed to peers for their perspectives and analysis.

Research Question 2

a. Is there a significant difference between online professional development environments in the quality of the TAKS Support Plan prepared by participants?

To answer the question, an analysis of variance (ANOVA) was conducted to determine the effects of online professional development environments on the quality of the TAKS Support Plan. In this analysis, the dependent variable was scores from the TAKS Support Plan and the independent variable was the professional development online environment.

b. Is there an interaction effect between professional development environments and school librarian credentials on the quality of TAKS Support Plan?

To answer the question, factorial analysis of variance (ANOVA) was conducted using librarian credential (2 levels) x online professional development environment (3 levels) as the independent variables and scores from the TAKS Support Plan as the dependent variable.

Research Question 3

a. Does the likelihood of course completion by school librarians differ among the professional development environments including Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up?

To answer the question, logistic regression analysis was employed to estimate the probability of course completion as a function of the professional development

environment. The dependent variable, course completion, was binomial with 1 indicating that the participant completed requirements for the course and 0 indicating that the participant failed to complete course requirements. The predictor variable was online environment. There were two phases to this analysis. In the first phase, Noncollaborative/No Follow-up was the referent group, while in the second phase, Collaborative Follow-up, was the referent group.

b. Is the effect of professional development environment on course completion moderated by school librarian credential?

To answer the question, binary logistic regression was conducted to examine credential as a moderator of the relationship between professional development environment and course completion. The dependent variable, course completion, was binomial with 1 indicating that the participant completed requirements for the course and 0 indicating that the participant failed to complete course requirements. Four dummy variables were constructed: bachelor's level degree by Noncollaborative Follow-up, master's level degree by Noncollaborative Follow-up, bachelor's level degree by Noncollaborative/No Follow-up, master's level degree by Noncollaborative/No Follow-up with the referent groups being bachelor's level degree by Collaborative Follow-up and master's level degree by Collaborative Follow-up.

CHAPTER IV

RESULTS

This study investigated the effects of online environments that provide follow-up to face-to-face professional development for librarians in 12 school districts. Librarians participated in a face-to-face in-service. An eight-week online course supported implementation of in-service themes and was divided three ways: Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up.

This chapter presents the results of the data analysis within the framework of the research questions. The first section presents the number of interactions by the two experimental environments. This data was obtained from the Tool Usage Report from WebCT Vista.

The second section examines the results of the attitudinal questions. This includes the effects of the three professional development environments on attitudes towards the Professional Development Program. This analysis has two phases. The first phase considers the responses of all participants by environment and the second considers the responses of participants by credential in each environment. Next, this section examines the satisfaction of the participants in the Collaborative Follow-up environment with their collaborative experience through descriptive statistics. Finally, the last part of this section examines the attitudes of the Collaborative Follow-up and Noncollaborative Follow-up environments towards their online experience, both quantitatively and qualitatively methods. Survey responses were examined through

descriptive statistics for each group. Then, a *t*-test was performed to determine if differences on the mean of all survey items was significant. Interviews were also conducted with a sample of participants from each of the two treatment groups to characterize participants' perceptions of their experiences.

The second section reports the results of the second research question that examined the effects of the three professional development environments on the TAKS Support Plan scores. This analysis has two phases. The first phase considers the responses of all participants and the second segments participants by school librarian credential.

The third section investigates whether the likelihood of course completion differs by professional development environment. This analysis has two phases. The first phase considers completion of all participants and the second segments participants by school librarian credential.

Frequency of Interaction in Experimental Environments

A Tool Usage Summary report was generated in WebCT Vista to determine the type and extent of interactions in each of the two experimental environments. Announcements show the number of times students consulted the announcements posted by the instructor. Feedback from the instructor was given after each assignment was turned in. Assignments show the number of times feedback was give to students. Chat provided an opportunity for synchronous discussions between participants. Discussions represent the total number of times the discussion tool was used to post or

read messages in all discussions. Email represents the number of times the email tool was used to send or read emails.

The two experimental environments did not differ much in their amount of interaction through announcements and assignments. However, the Collaborative Follow-up participants interacted in chat 53 times, discussions 2005 times, and email 614 times. The Noncollaborative group had zero interactions through chat and discussion. Their email interactions were only with the instructor and totaled approximately 280.

Table 9 shows the frequencies of the interactions in the Collaborative Follow-up environment.

Table 9. Frequencies of Interactions Between Instructor and Participants and Participants and Participants in Collaborative Environment

Announcements	Assignments	Chat	Discussion	Email
360	2,253	53	2005	614

Table 10 shows the frequencies of interaction between instructor and participants in the Noncollaborative Follow-up environment. Announcements show the number of times students consulted the announcements posted by the instructor. Feedback from the instructor was given after each assignment was turned in. Assignments show the number of times feedback was given to students. The email tool

was blocked in this environment and emails were directed to the instructor's private account.

Table 10. Frequencies of Interactions Between Instructor and Participants in the Noncollaborative Environment

Announcements	Assignments	Email
362	2,188	280

Research Question 1a

Is there a significant difference between online professional development environments including Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up in participants' attitudes towards the professional development program?

The Attitudes Towards the Professional Development Program Survey provided the data for analysis for this research question. Tables 11-25 present the means, standard deviations, frequencies, and percents of the participants' responses by survey item. Survey results are presented in separate sections for each of the five domains in the survey including: (a) participant's reactions, (b) participant's learning, (c) participant's use of new skills, (d) organizational culture, and (e) student outcomes.

Participant Reactions

In this group of survey questions, the Collaborative Follow-up participants responded very positively, the Noncollaborative Follow-up participants responded fairly

positively, and the Noncollaborative/No Follow-up group was slightly positive to slightly negative. The average for the overall participant reactions survey items for the Collaborative Follow-up environment was 3.99, for the Noncollaborative Follow-up environment was 3.88, and the Noncollaborative/No Follow-up environment was 3.51.

In general, the school librarians felt that the goals of the program were clearly expressed (see Table 11 and Figure 2). Eighty-three percent of the Collaborative Follow-up participants strongly agreed or agreed with 7% disagreeing or disagreeing strongly. Similarly, 84% of the Noncollaborative Follow-up group strongly agreed or agreed, while 7% disagree or disagree strongly. However, only 67% of the Noncollaborative/ No Follow-up group agreed strongly or agreed, while 23% disagreed or disagreed strongly.

Table 11. Means, Standard Deviations, Frequencies, and Percents for Goals and Objectives Survey Item

Statement: Goals and objectives of the professional development program were clear.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	4.03	.95	22	31	38	53	7	10	2	3	3	4
Noncollaborative Follow-up	4.01	.94	20	29	39	56	6	9	2	3	3	4
Noncollaborative/ No Follow-up	3.57	1.09	10	16	31	51	6	10	12	20	2	3

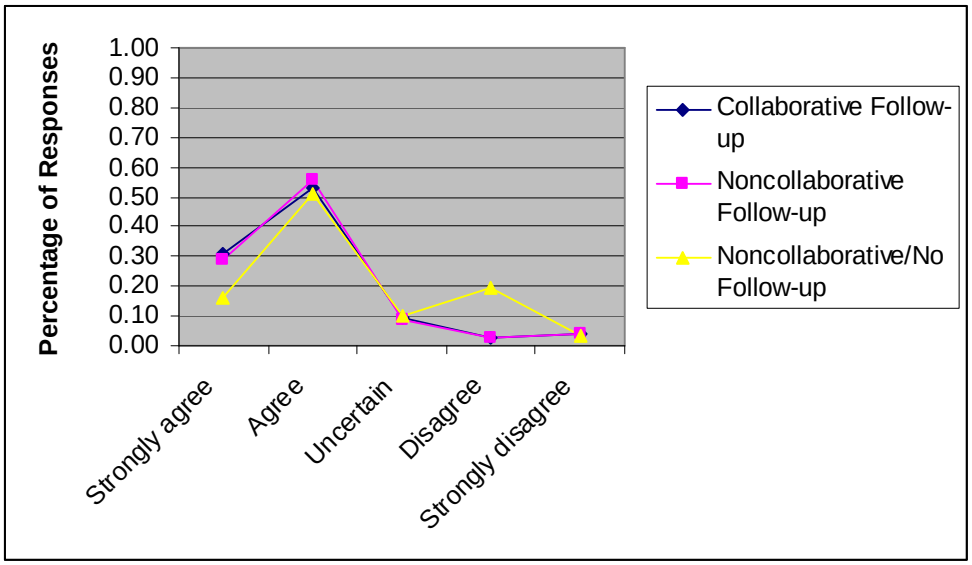


Figure 2. Goals and Objectives Were Clear.

School librarians also indicated that they felt that the content was relevant and consistent with objectives (see Table 12 and Figure 3). Eighty-five percent of the Collaborative Follow-up environment strongly agreed or agreed, while 4% disagreed or strongly disagreed. Eighty-nine percent of Noncollaborative Follow-up environment strongly agreed or agreed, while 3% disagreed or strongly disagreed. Similarly, 75% of the Noncollaborative/No Follow-up environment also strongly agreed or agreed, while 13% disagreed.

Table 12. Means, Standard Deviations, Frequencies, and Percents for Relevancy of Content Survey Item

Statement: The professional development program content was relevant and consistent with overall objectives.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	4.15	.78	25	35	36	50	8	11	3	4	0	0
Noncollaborative Follow-up	4.17	.70	22	31	40	57	6	9	2	3	0	0
Noncollaborative/ No Follow-up	3.79	.99	12	20	34	56	7	11	6	10	2	3

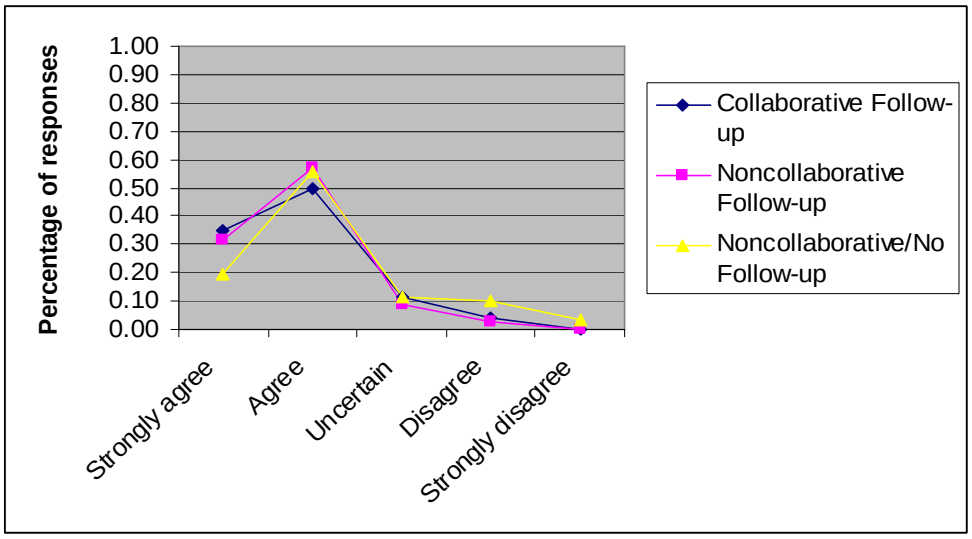


Figure 3. Content Was Relevant and Consistent With Overall Objectives.

Most of the school librarians agreed that the program was well organized (see Table 13 and Figure 4). Seventy-three percent of the Collaborative Follow-up participants strongly agreed or agreed, while 17% disagreed. Seventy-six percent of the Noncollaborative Follow-up environment strongly agreed or agreed. However, only 52% of the Noncollaborative/No Follow-up participants strongly agreed or agreed, while 25% disagreed or disagreed strongly.

Table 13. Means, Standard Deviations, Frequencies, and Percents for Professional Development Survey Item

Statement: The professional development program was well organized.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.92	1.14	27	38	25	35	7	10	10	14	2	3
Noncollaborative Follow-up	3.97	.93	22	31	31	44	10	14	7	10	0	0
Noncollaborative/No Follow-up	3.31	1.09	6	10	26	43	14	23	11	18	4	7

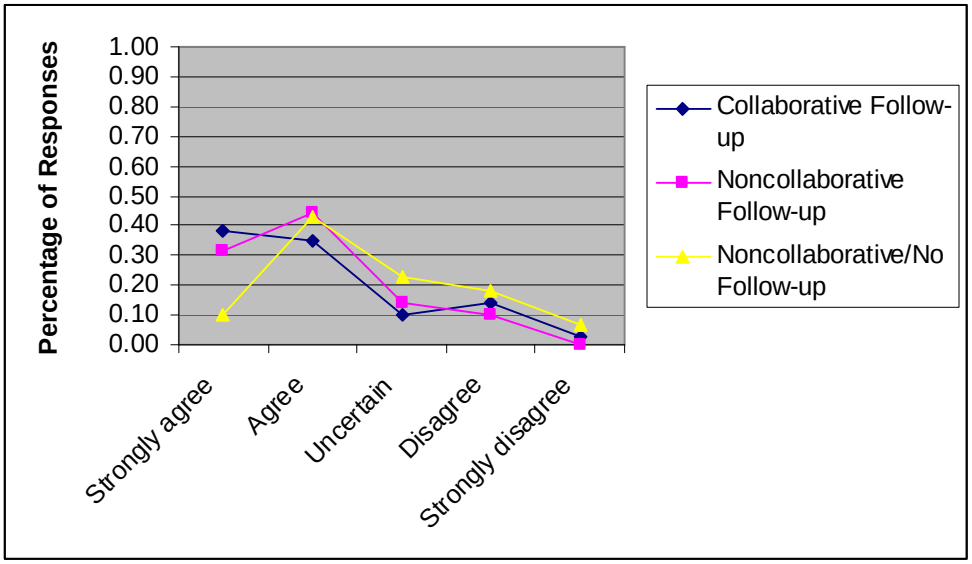


Figure 4. Professional Development Program Was Well Organized.

In each environment, a majority of the school librarians felt that the time required for professional development was appropriate (see Table 14 and Figure 5). Sixty-six percent of the Collaborative Follow-up environment strongly agreed or disagreed, while 15% disagreed or strongly disagreed. Similarly, 67% of the Noncollaborative Follow-up participants strongly agreed or agreed, while 19% disagreed or strongly disagreed. Fifty-seven percent of the Noncollaborative/No Follow-up participants strongly agreed or agreed, while 20% disagreed or strongly disagreed.

Table 14. Means, Standard Deviations, Frequencies, and Percents for Time Required Survey Item

Statement: The time required for the professional development was appropriate.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.65	1.00	12	17	35	49	13	18	9	13	2	3
Noncollaborative Follow-up	3.62	1.04	12	17	34	49	10	14	11	16	2	3
Noncollaborative/ No Follow-up	3.44	.99	6	10	29	48	14	23	10	16	2	3

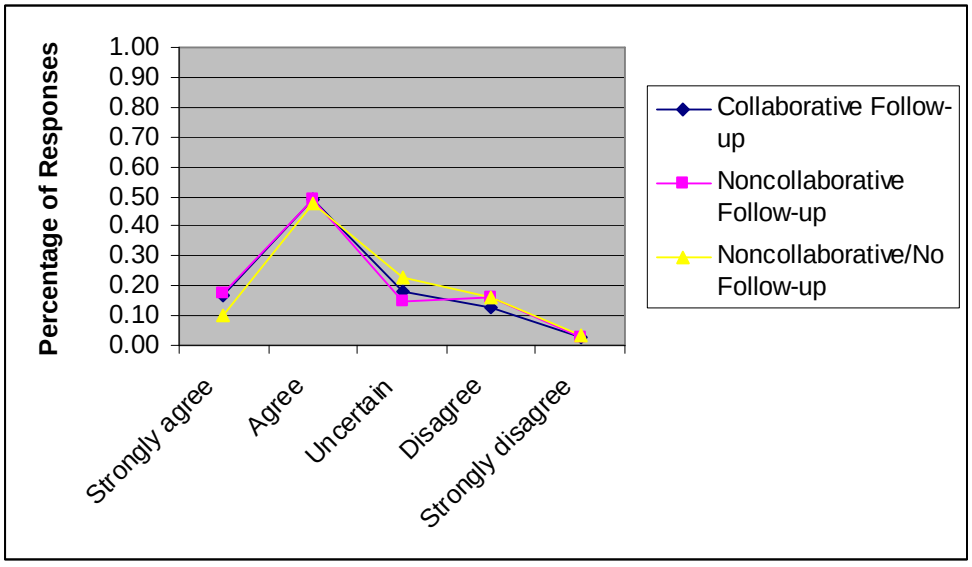


Figure 5. The Time Required for the Professional Development Was Appropriate.

The environments split over whether setting their own time for professional development was effective (see Table 15 and Figure 6). Eighty-five percent of the Collaborative Follow-up environment agreed or strongly agreed with the statement. Likewise, 69% of the Noncollaborative Follow-up environment agreed or strongly agreed, while 21% disagreed or strongly disagreed. However, only 49% of

Noncollaborative/No Follow-up environment agreed or strongly agreed, while 33% disagreed or strongly disagreed.

Table 15. Means, Standard Deviations, Frequencies, and Percents for Setting My Own Schedule Survey Item

Statement: Setting my own schedule for involvement in professional development worked well for me.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	4.21	.92	32	44	29	40	6	8	4	6	1	1
Noncollaborative Follow-up	3.80	1.23	26	37	22	31	7	10	12	17	3	4
Noncollaborative/ No Follow-up	3.31	1.41	17	28	13	21	11	18	12	20	8	13

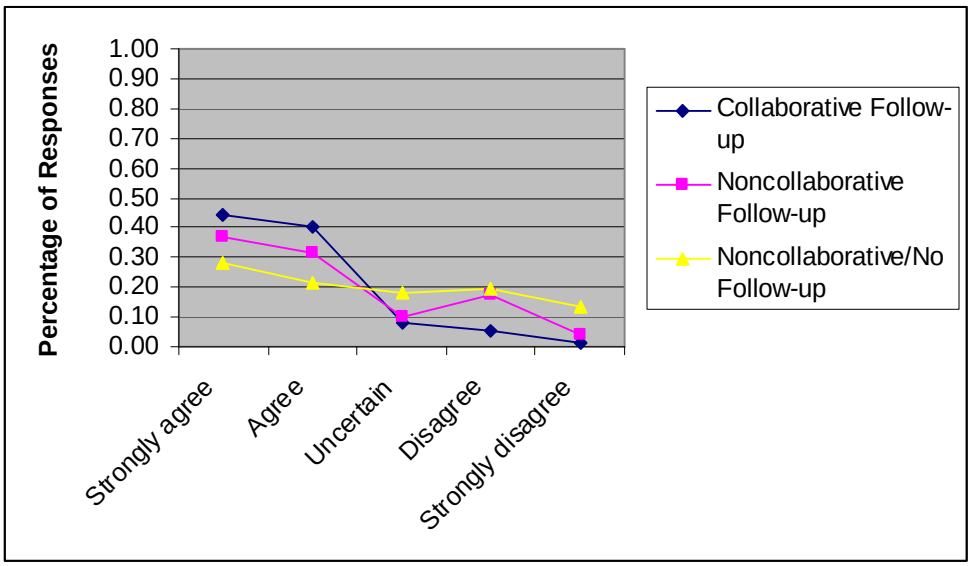


Figure 6. Setting My Own Schedule for Involvement in Professional Development Worked Well for Me.

All the participants supported the statement that the TAKS Support Plan was appropriate in length and format (see Table 16 and Figure 7). Seventy-five percent of the Collaborative Follow-up environment agreed or strongly agreed, while 14%

disagreed or strongly disagreed. Sixty-seven percent of the Noncollaborative Follow-up participants also agreed or strongly agreed, while 13% disagreed. Sixty-six percent of Noncollaborative/No Follow-up participants agreed or strongly agreed, while 20% disagreed or strongly disagreed.

Table 16. Means, Standard Deviations, Frequencies, and Percents for TAKS Support Plan Length

Statement: The TAKS support plan was appropriate in length and format.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.89	.98	20	28	33	46	8	11	10	14	0	0
Noncollaborative Follow-up	3.67	.91	10	14	37	53	14	20	8	11	1	1
Noncollaborative/ No Follow-up	3.57	1.09	10	16	30	49	9	15	9	15	3	5

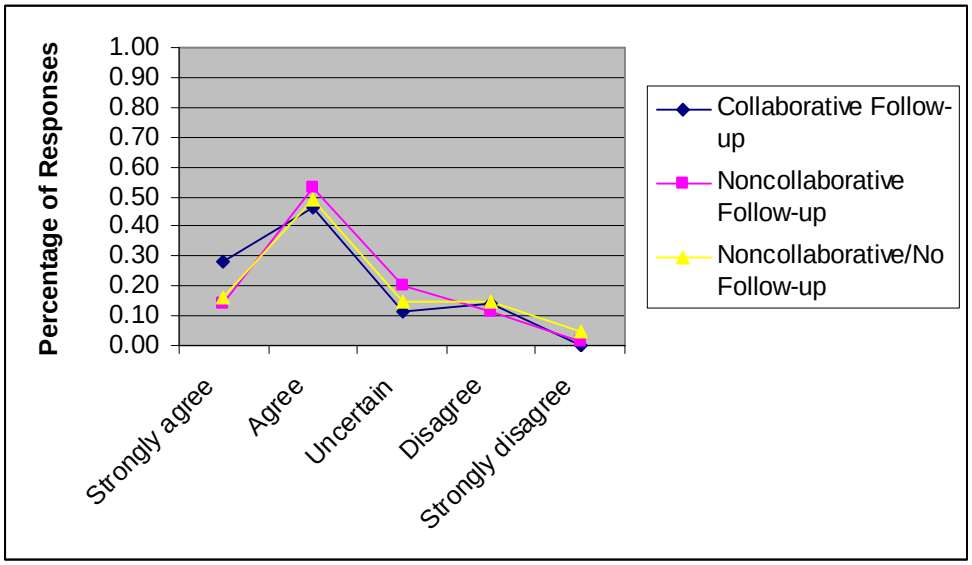


Figure 7. The TAKS Support Plan Was Appropriate in Length and Format.

The environments also split on the statement that working with their faculty to create the plan worked well for them (see Table 17 and Figure 8). Seventy-nine percent

of Collaborative Follow-up participants agreed or strongly agreed, while only 3% disagreed. Similarly, 70% of the Noncollaborative Follow-up environment agreed or strongly agreed, while 4% disagreed or strongly disagreed. However, only 54% of the Noncollaborative/No Follow-up participants agreed or strongly agreed, while 10% disagreed or disagreed strongly.

Table 17. Means, Standard Deviations, Frequencies, and Percents for Working With Faculty Survey Item

Statement: Working with other faculty at my school helped create a more meaningful plan.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	4.06	.82	22	31	35	49	13	18	1	1	1	1
Noncollaborative Follow-up	3.93	.89	20	29	29	41	18	26	2	3	1	1
Noncollaborative/ No Follow-up	3.54	.98	9	15	24	39	22	36	3	5	3	5

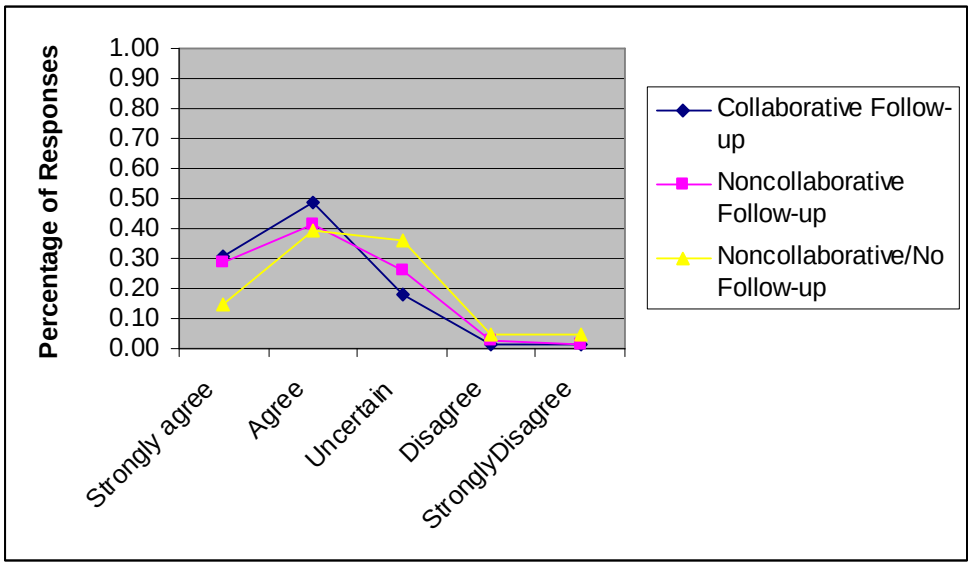


Figure 8. Working With Other Faculty at My School Helped Create a More Meaningful Plan.

Participant Learning

Participant learning measures participants' perceptions of their learning. In this group of survey questions, the Collaborative Follow-up participants responded very positively, the Noncollaborative Follow-up participants responded fairly positively, and the response from Noncollaborative/No Follow-up participants was slightly negative. The average for the participant learning survey items for the Collaborative Follow-up environment was 3.86, for the Noncollaborative Follow-up environment was 3.66, and the Noncollaborative/No Follow-up environment was. 3.16.

School librarians in the Collaborative Follow-up and Noncollaborative Follow-up environments believed that the professional development program helped them better understand evidence-based practice for school libraries (see Table 18 and Figure 9). Seventy-three percent of the Collaborative Follow-up environment agreed or strongly agreed, while 13% disagreed. Likewise, 63% of the Noncollaborative Follow-up school librarians, while 14% disagreed or strongly disagreed. However, only 46% of the Noncollaborative/No Follow-up participants felt that they had understood evidence-based practice.

Table 18. Means, Standard Deviations, Frequencies, and Percents for Professional Development Helped Developed Understanding of Evidence-Based Practice

Statement: The professional development program helped me develop a greater understanding of evidence-based practice for school libraries.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.79	.98	15	21	37	52	10	14	7	10	2	3
Noncollaborative Follow-up	3.66	.98	13	19	31	44	16	23	9	13	1	1
Noncollaborative/ No Follow-up	3.20	1.15	7	11	21	34	15	25	13	21	5	8

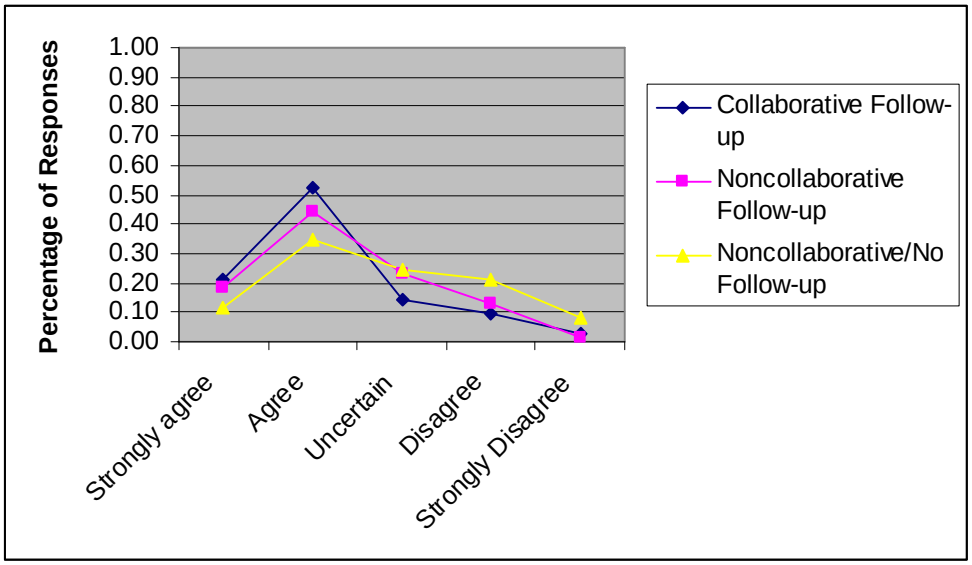


Figure 9. The Professional Development Program Helped Me Develop a Greater Understanding of Evidence-Based Practice for School Libraries.

School librarians in the Collaborative Follow-up and Noncollaborative Follow-up environments felt that the program enabled them to integrate evidence-based practice into their situation (see Table 19 and Figure 10). Seventy percent of the Collaborative Follow-up environment agreed or strongly agreed that they were able to integrate evidence-based practice, while 8% disagreed. Sixty-one percent of the

Noncollaborative Follow-up environment agreed or strongly agreed that they were able to integrate evidence-based practice into their situation, while 13% disagreed or strongly disagreed. However, only 43% of the Noncollaborative/No Follow-up environment felt that they were able to integrate evidence-based practice into their situation and 26% disagreed or strongly disagreed.

Table 19. Means, Standard Deviations, Frequencies, and Percents for Professional Development Program Helped Integrate Evidence-Based Practice Into Situation

Statement: The professional development activities helped me integrate evidence-based practice into my situation.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.87	.89	18	25	32	45	15	21	6	8	0	0
Noncollaborative Follow-up	3.64	.95	12	17	31	44	18	26	8	12	1	1
Noncollaborative/ No Follow-up	3.23	1.16	9	15	17	28	19	31	11	18	5	8

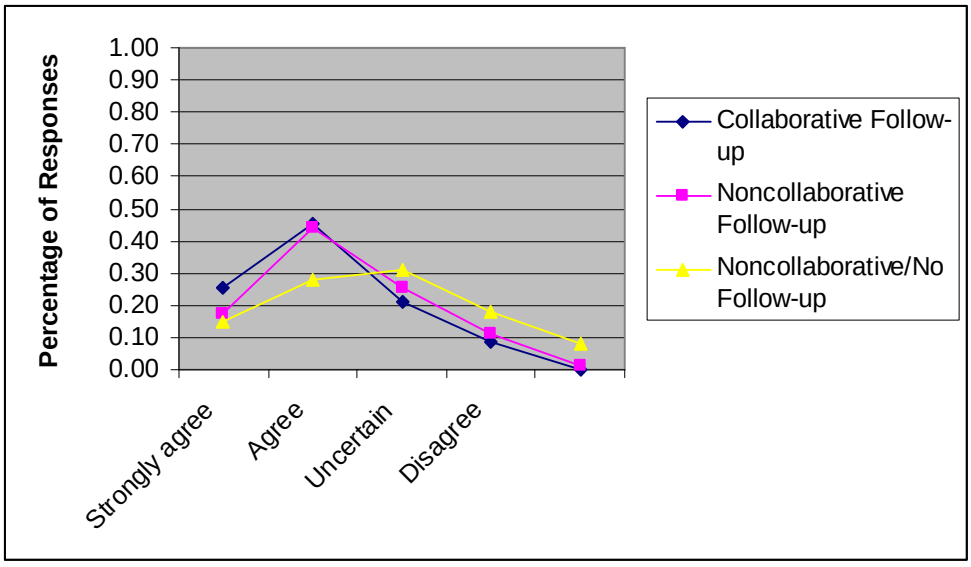


Figure 10. The Professional Development Activities Helped Me Integrate Evidence-Based Practice Into My Situation.

Most of the school librarians in the Collaborative Follow-up and Noncollaborative Follow-up environments reported that they had the knowledge and skills to create a TAKS Support Plan (see Table 20 and Figure 11). Seventy-four percent of the Collaborative Follow-up agreed or strongly agreed that they had the knowledge and skills to create a TAKS Support Plan, while 11% disagreed or strongly disagreed. Sixty-seven percent of the Noncollaborative Follow-up environment agreed or strongly agreed that they also had the knowledge and skills to create a TAKS Support Plan, while 13% disagreed or strongly disagreed. However, only 38% of the Noncollaborative/No Follow-up environment agreed or strongly agreed that they had the knowledge and skills to create a TAKS Support Plan, and 39% disagreed or strongly disagreed that they had the requisite knowledge and skills.

Table 20. Means, Standard Deviations, Frequencies, and Percents for Professional Development Program Helped Acquire Knowledge and Skills to Create a TAKS Support Plan

Statement: The professional development program helped me acquire the intended knowledge and skills to create a TAKS Support Plan.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.82	.97	16	22	37	51	11	15	6	8	2	3
Noncollaborative Follow-up	3.70	.94	12	17	35	50	14	20	8	11	1	1
Noncollaborative/ No Follow-up	3.03	1.20	8	13	15	25	14	23	19	31	5	8

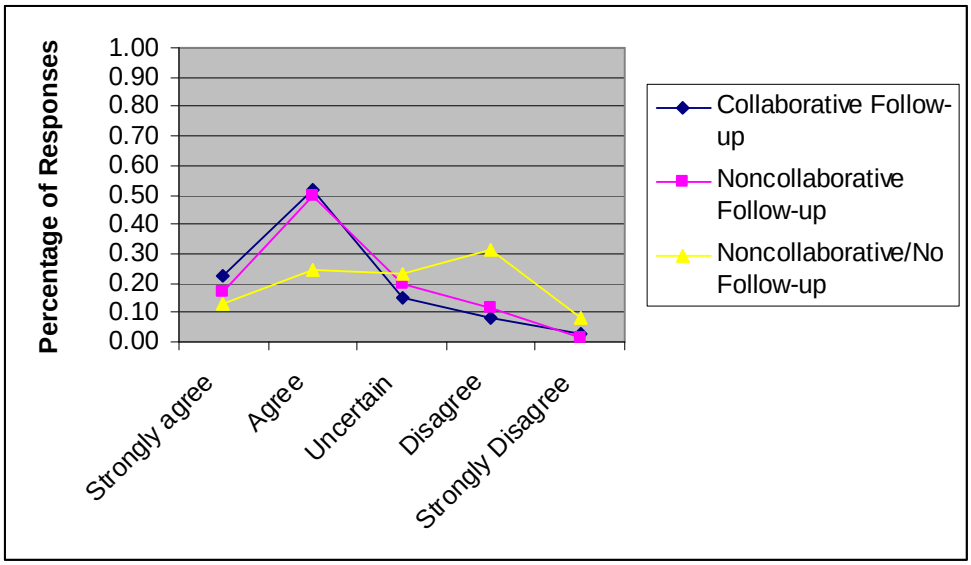


Figure 11. The Professional Development Program Helped Me Acquire the Intended Knowledge and Skills to Create a TAKS Support Plan.

A majority of the Collaborative Follow-up and Noncollaborative Follow-up environments indicated that they felt that the professional development program enhanced their contributions to their school community (see Table 21 and Figure 12). Seventy-five percent of the Collaborative Follow-up environment agreed or strongly agreed that the program enhanced their contributions to their school community, while 6% disagreed or strongly disagreed. Likewise, 60% of the Noncollaborative Follow-up environment agreed or strongly agreed that the professional development program had enhanced their contributions to their school community, while 14% disagreed or disagreed strongly. However, only 42% of the Noncollaborative/No Follow-up environment agreed or strongly agreed that the professional development program enhanced their contributions to their school community and 31% disagreed.

Table 21. Means, Standard Deviations, Frequencies, and Percents for Professional Development Program Enhanced Contributions to School Community

Statement: The professional development program enhanced my contributions to the school community.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.96	.89	20	28	33	46	14	20	3	4	1	1
Noncollaborative Follow-up	3.64	.99	14	20	28	40	18	26	9	13	1	1
Noncollaborative/ No Follow-up	3.20	1.17	9	15	16	27	16	27	14	24	4	7

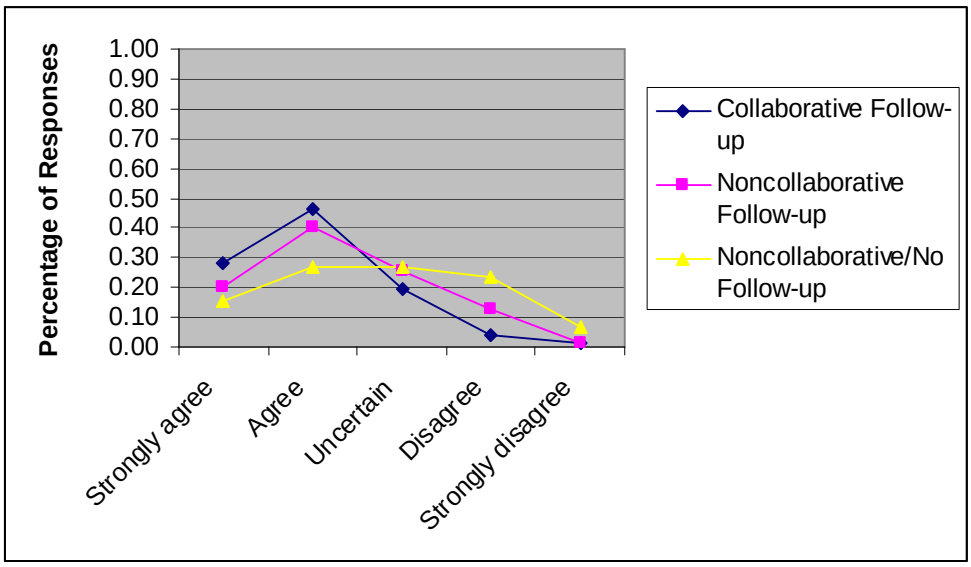


Figure 12. The Professional Development Program Enhanced My Contributions to the School Community.

Participant's Use of New Skills

Participant's use of new skills measured the potential for the participant to use skills learned in the professional development program. The majority of the Collaborative Follow-up and Noncollaborative Follow-up indicated that they would be using their new skills and communicating their new skills to their school community.

The overall average for participant's use of new skills by the Collaborative Follow-up environment was 3.99, by Noncollaborative Follow-up participants was 3.74, and by the Noncollaborative/No Follow-up environment was 3.25.

Most of the Collaborative Follow-up and Noncollaborative Follow-up environment indicated that they would put the plan they developed into practice in the current school year (see Table 22 and Figure 13). Seventy-nine percent of the Collaborative Follow-up environment agreed or strongly agreed that they would put their plan into use, while 8% disagreed or strongly disagreed. Seventy percent of the Noncollaborative Follow-up environment agreed or strongly agreed that they would put their plan into use, while 6% disagreed or strongly disagreed. However, fewer than half of the Noncollaborative/No Follow-up environment agreed or strongly agreed that they would put their plan into use and 26% strongly disagreed or disagreed.

Table 22. Means, Standard Deviations, Frequencies, and Percents for Putting TAKS Support Plan Into Use This Year Survey Item

Statement: I will put the TAKS Support Plan I developed into use this school year to support achievement in my school.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	4.01	.93	23	32	33	46	9	13	5	7	1	1
Noncollaborative Follow-up	3.89	.89	18	26	31	44	17	24	3	4	1	1
Noncollaborative/ No Follow-up	3.31	1.19	10	16	20	33	15	25	11	18	5	8

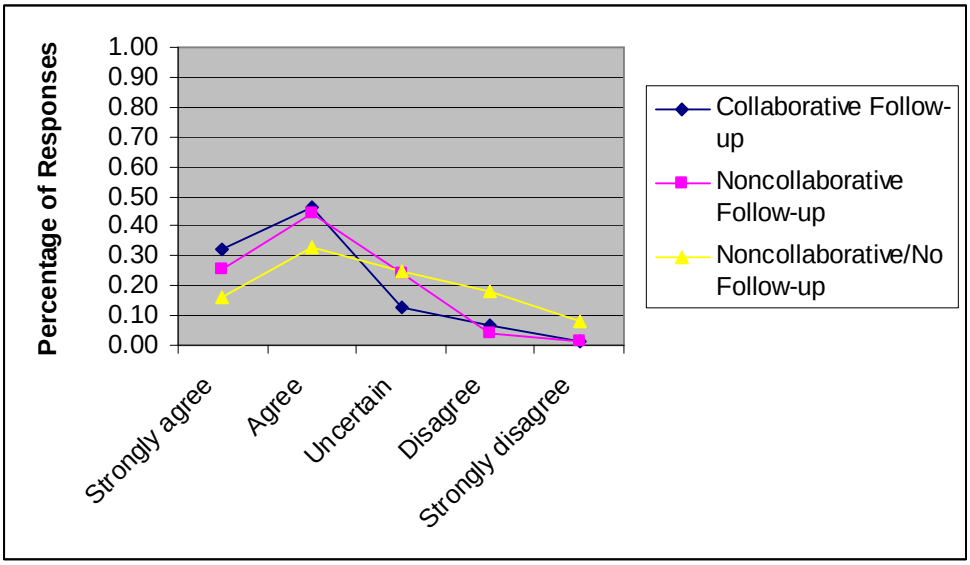


Figure 13. I Will Put the TAKS Support Plan I Developed Into Use This School Year to Support Achievement in My School.

Most of the participants in the Collaborative Follow-up and Noncollaborative Follow-up environments also indicated that they would share their TAKS plans with stakeholders in their school community (see Table 23 and Figure 14). Seventy-nine percent of the Collaborative Follow-up environment agreed or agreed strongly that they would share their plans with their school community, while 6% disagreed or disagreed strongly. Fifty-four percent of the Noncollaborative Follow-up environment agreed or strongly agreed that they would share their plans with their school community, while 11% disagreed. However, fewer than half, 44%, agreed or strongly agreed that they would share their plans with their school community in the Noncollaborative/No Follow-up environment and 30% disagreed or strongly disagreed.

Table 23. Means, Standard Deviations, Frequencies, and Percents for Communicating the Plan to the School Community Survey Item

Statement: I will communicate the TAKS Support Plan to the various community stakeholders in my school community.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.96	.84	17	24	39	55	11	15	3	4	1	1
Noncollaborative Follow-up	3.59	.94	12	17	26	37	24	34	7	10	1	1
Noncollaborative/ No Follow-up	3.18	1.15	7	11	20	33	16	26	13	21	5	8

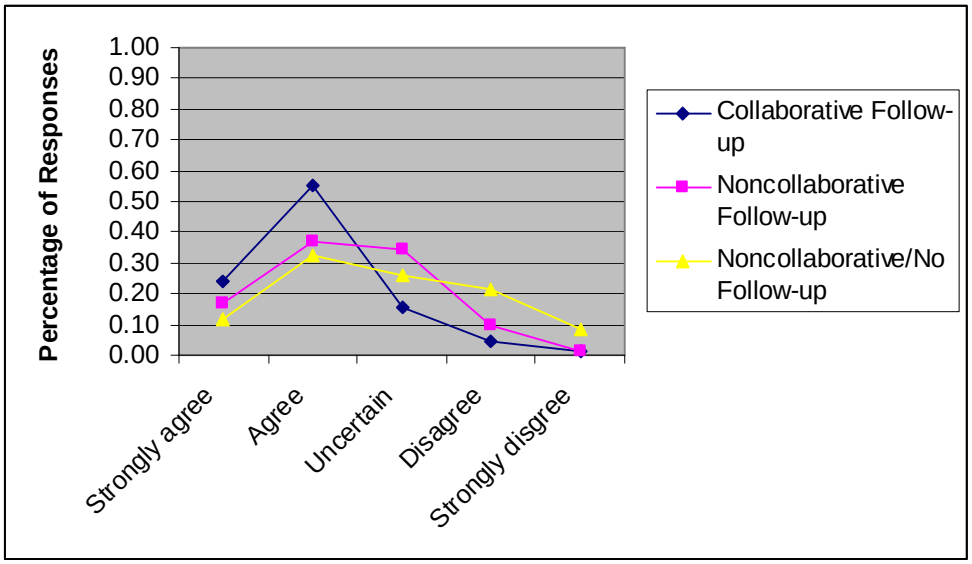


Figure 14. I Will Communicate the TAKS Support Plan to the Various Community Stakeholders in My School Community.

Organizational Culture

The organizational culture item measured the perceived receptiveness of the school community to the TAKS Support Plan (see Table 24 and Figure 15). A majority of participants in all three environments stated that their schools supported their creating a TAKS Support Plan. Seventy-seven percent of the Collaborative Follow-up

environment agreed or strongly agreed that their schools supported their creating a plan, while only 10% disagreed. Sixty-three percent of the Noncollaborative Follow-up environment agreed that their schools supported their creating a TAKS Support Plan with only 11% disagreeing or strongly disagreeing. Sixty-five percent of the Noncollaborative/No Follow-up environment agreed that their schools supported their creating a TAKS Support Plan with only 13% disagreeing or strongly disagreeing.

Table 24. Means, Standard Deviations, Frequencies, and Percents for Organizational Culture Survey Item

Statement: Creating a TAKS Support Plan was supported by my community.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.99	.92	22	31	33	46	9	13	7	10	0	0
Noncollaborative Follow-up	3.63	.89	9	13	35	50	18	26	7	10	1	1
Noncollaborative/ No Follow-up	3.58	.98	7	12	32	53	13	22	5	8	3	5

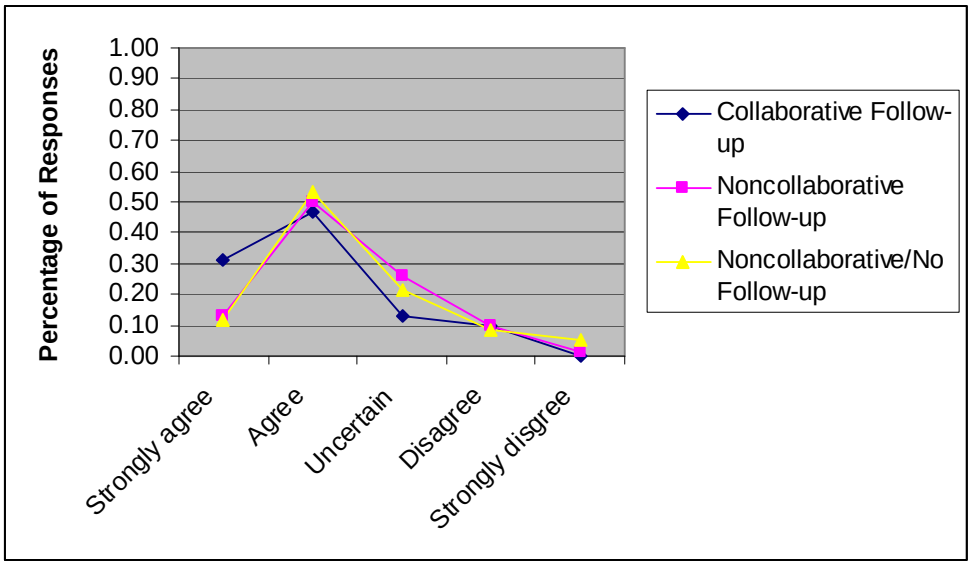


Figure 15. Creating a TAKS Support Plan Was Supported by My Community.

Student Outcomes

One of the primary aims of professional development is improving student outcomes. Since the goal of the TAKS Support Plan created by the participants was to improve student outcomes on the TAKS that were given several months after the conclusion of the study, participants were asked their opinion on whether they thought their learning could produce an effect on the TAKS. The two experimental groups agreed that their learning could impact student performance on the TAKS in the spring. Sixty-six percent of the Collaborative Follow-up environment agreed that their learning would impact student performance on the TAKS, while only 6% disagreed. Sixty percent of the Noncollaborative Follow-up environment agreed or strongly agreed that their learning would impact student performance on the TAKS, while 6% disagreed. However, only 38% of the Noncollaborative/No Follow-up environment thought that their learning would impact student performance on the TAKS and 25% disagreed or strongly disagreed (see Table 25 and Figure 16).

Table 25. Means, Standard Deviations, Frequencies, and Percents for Whether School Librarian Learning Is Likely to Increase Student Performance Survey Item

Statement: I believe that my learning is likely to increase student performance.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.79	.81	13	18	34	48	20	28	4	6	0	0
Noncollaborative Follow-up	3.70	.91	13	19	29	41	24	34	2	3	2	3
Noncollaborative/ No Follow-up	3.16	1.05	6	10	17	28	23	38	11	18	4	7

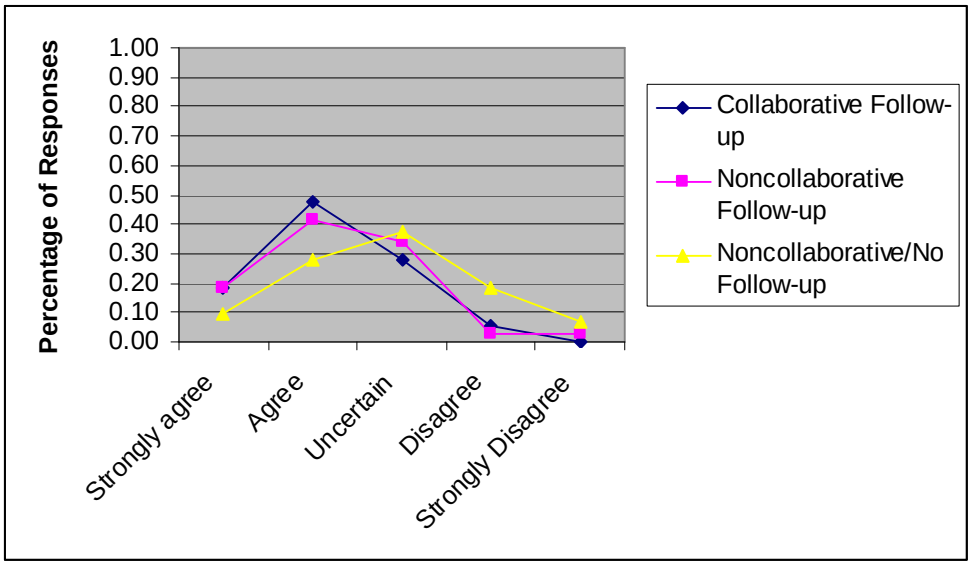


Figure 16. I Believe That My Learning Is Likely to Increase Student Performance.

Means and standard deviations for the attitudinal survey items are reported overall and by professional development environment in Table 26.

Table 26. Mean and Standard Deviations for Attitudinal Survey Items Overall and by Environment

Overall		Collaborative Follow-up		Noncollaborative Follow-up		Noncollaborative/ No Follow-up	
Mean	SD	Mean	SD	Mean	SD	Mean	SD
3.71	.77	3.94	.68	3.77	.68	3.36	.84

One-way analysis of variance (ANOVA) was conducted with type of professional development environment (Collaborative Follow-up, Noncollaborative Follow-up and Noncollaborative/No Follow-up) as the independent variable and mean scores from the Attitudes Towards the Professional Development Program Survey as the dependent variable.

A statistically significant difference was found among the three types of professional development environment on attitudes towards the professional development program, $F(2,203) = 10.098$, $p = .000$ (see Table 27).

Table 27. Results of the ANOVA on Attitudes Towards the Professional Development Program

Source	*df*	*SS*	*MS*	*F*	*p*
Attitudes					
Between groups	2	1.199	.599	10.098	.001
Within groups	201	11.932	.059		
Total	203	13.131			

Post hoc Tukey HSD Tests indicated that the attitudes of the Collaborative Follow-up participants differed significantly from the Noncollaborative/No Follow-up, ($p < .001$). Likewise, a significant difference was found between the attitudes of the Noncollaborative Follow-up and the Noncollaborative/No Follow-up ($p < .007$).

Research Question 1b

Is there an interaction effect between professional development environments and school librarian credentials on participants' attitudes toward the professional development program?

School librarians' attitudes towards professional development varied across level of credential (see Table 28). Master's level school librarians rated their experience highest in the Collaborative Follow-up environment followed by bachelor's level degrees. Bachelor's level school librarians rated their experience highest in the Noncollaborative Follow-up environment followed by master's level school librarians.

Master's level school librarians rated their experience highest in the Noncollaborative/ No Follow-up environment followed by bachelor's level degrees. Table 28 shows the number of subjects, the mean, and standard deviation of attitudes for each cell.

Table 28. Means, Standard Deviation, and *n* for Attitudes Towards Professional Development Program as a Function of Professional Development Environment and School Librarian Credential

	Bachelor Level Degrees			Master's in Library Science		
Attitudes	*n*	M	SD	*n*	M	SD
Collaborative Follow-up	18	3.87	.50	49	3.96	.73
Noncollaborative Follow-up	27	3.90	.68	40	3.64	.66
Noncollaborative/ No Follow-up	21	3.32	.77	37	3.38	.90
Total	66	3.70	.71	126	3.67	.79

Attitude scores from the Professional Development Program Survey were subjected to a two-way analysis of variance having three levels of environment (Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up) and two levels of school librarian credential (bachelor's level degrees, master's in Library Science). This analysis included only bachelor's and master's level participants due to the small number of participants who were not credentialed. Bachelor's level participants included school librarians with a Bachelor of Science in Library Science, bachelor's plus Learning Resource Endorsement, bachelor's plus ExCET certification in Learning Resources, and Houston ISD certification. Master's level included all participants who had master's level degrees.

The two-way analysis of variance indicated that the interaction of professional development environment and credential did not significantly affect attitudes towards the professional development program F (4,171) = 1.240, p = .292 (see Table 29).

Table 29. Two-Way Analysis of Variance for Attitudes Towards Professional Development Program as a Function of Professional Development Environment and School Librarian Credential

Source	*df*	*MS*	*F*	*p*
Attitudes				
Environment	2	4.444	8.178	.000
Credential	1	.069	.127	.722
Environment*Credential	2	.674	1.240	.292
Error	171	.543		

Research Question 1c

How satisfied were participants who have experienced Collaborative Follow-up with their online collaborative experience in online professional development?

Both participants who completed the course as well as participants who were not able to complete the course were surveyed. The means, standard deviations, frequencies, and percents can be found in Table 30.

Table 30. Means, Standard Deviations, Frequencies, and Percents of Collaborative Survey Items

			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
1. Discussions were an effective means of communication with colleagues within the course.	3.34	1.20	9	13	25	36	18	26	14	20	3	4
2. Discussions with colleagues helped me to develop new understandings of course concepts.	2.90	1.10	1	1	23	33	21	30	15	22	9	13
3. I felt comfortable participating in discussions with colleagues.	3.67	1.04	12	17	34	49	13	19	9	13	1	1
4. Discussion topics were relevant and useful.	3.7	.94	9	13	38	56	9	13	8	12	0	0
5. I saw myself as an active participant in a discussion group.	2.8	1.17	6	9	15	22	13	19	29	42	6	9
6. Email was an effective means of communication with colleagues within the course.	3.47	1.11	10	15	25	37	21	31	11	16	1	1
7. Chat was an effective means of communication with colleagues within the course.	2.77	.90	2	3	9	13	34	49	21	30	4	6
8. Viewing other colleagues' TAKS Support Plans helped me to create a better plan.	3.64	.94	10	14	32	46	23	33	4	6	1	1
9. Comments from others on my TAKS Support Plan helped me to create a better plan.	3.26	1.03	7	10	21	30	26	38	13	19	2	3
10. Interaction opportunities with other students provided a useful learning experience.	3.40	1.07	8	12	29	42	15	22	16	23	1	1

Overall, participants' responses from the Collaborative Follow-up participants were mildly positive. Since each participant in this environment was working independently on a plan for their school, opportunities for collaboration were relegated to collaborative knowledge building though discussions, viewing each others' TAKS Support Plans and other forms of communication. Nearly half of the participants found the discussions an effective form of communication within the course. Forty-nine percent strongly agreed or agreed, while 25% disagreed or strongly disagreed. Participants split over whether the discussions helped them develop new understandings of course content. Thirty-five percent strongly agreed or agreed that discussions helped them understand course content and 35% disagreed or strongly disagreed. Participants indicated that they felt comfortable in participating in the discussions. Sixty-seven percent strongly agreed or agreed that they felt comfortable, while 14% disagreed or strongly disagreed. Participants also believed that discussion topics were useful and relevant. Sixty-nine percent strongly agreed or agreed, while 12% disagreed or strongly disagreed. However, participants were not as positive about their participation in the discussions. Thirty percent strongly agreed or agreed that they were active participants, while 51% disagreed or strongly disagreed. Participants did find email an effective means of communication with colleagues. Fifty-one percent strongly agreed or agreed, while 18% disagreed or strongly disagreed. However, participants did not find the chat tool to be an effective form of communication. Only 16% strongly agreed or agreed, while 30% disagreed or strongly disagreed. Each week, participants "published" their plans in WEBCT Vista, and the survey found that participants valued the opportunity to

view their colleagues' plans and felt that this strengthened their plans. Sixty percent strongly agreed or agreed, while 7% disagreed or strongly disagreed. However, they did not feel that comments made by others about their plans helped strengthen their plan. Forty-one percent strongly agreed that other's comments were helpful, while 22% disagreed. Interaction with others was a valuable part of their learning experience, with 54% strongly agreeing or agreeing, while 25% disagreed or strongly disagreed.

Highest ranked items in this survey included:

- Discussion topics were relevant and useful – 3.70 SD .94.
- I felt comfortable participating in discussions with colleagues – 3.67 SD 1.04.
- Viewing other colleagues' TAKS Support Plans helped me to create a better plan – 3.64 SD .94.

Lowest ranked items in this survey included:

- Chat was an effective means of communication with colleagues within the course – 2.77 SD .90.
- I saw myself as an active participant in a discussion group – 2.80 SD 1.17.
- Discussions with colleagues helped me to develop new understandings of course concepts – 2.90 SD 1.10.

Research Question 1d(1)

What are the attitudes of participants who have experienced Collaborative Follow-up and Noncollaborative Follow-up with their online follow-up experience in online professional development?

To answer this question, participants in the Collaborative Follow-up and Noncollaborative Follow-up were surveyed about their perceptions of their online experience using the Attitudes Towards the Online Follow-up Survey. This survey had 10 Likert scale questions. Answers were analyzed using frequencies and percentages. Overall, responses from both the Collaborative Follow-up environment and the Noncollaborative environment to these questions were mildly positive.

Almost all participants in these two environments felt that the online environment was a good environment to learn this content (see Table 31 and Figure 17). Seventy-two percent of the Collaborative Follow-up environment either strongly agreed or agreed, while 3% strongly disagreed. A majority of participants in the Noncollaborative Follow-up environment also felt that the online environment was a good environment for them to learn this content. Fifty-seven percent either strongly agreed or agreed, while 24% strongly disagreed.

Table 31. Means, Standard Deviations, Frequencies, and Percentages for Online Professional Development Was a Good Environment to Learn This Content

Statement: The online professional development format was a good environment for me to learn this content.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.75	1.04	16	22	36	50	8	11	10	14	2	3
Noncollaborative Follow-up	3.49	1.19	15	21	25	36	13	19	13	19	6	4

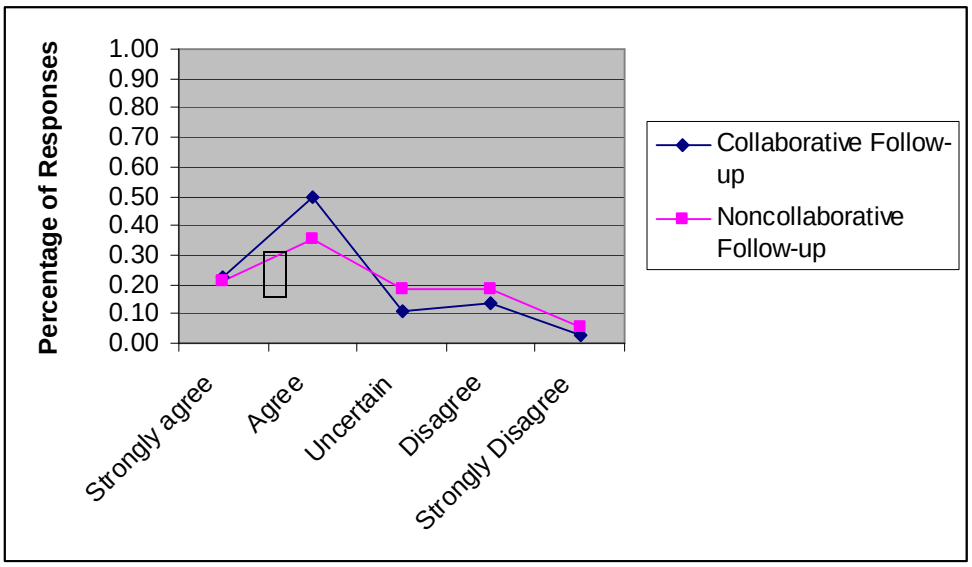


Figure 17. Online Professional Development Was a Good Environment to Learn This Content.

Almost all participants stated that the content provided useful information (see Table 32 and Figure 18). Seventy-eight percent of the Collaborative Follow-up environment strongly agreed or agreed, while 10% disagreed or strongly disagreed. Similarly, 73% of the Noncollaborative Follow-up environment also strongly agreed or agreed, while 8% disagreed or strongly disagreed.

Table 32. Means, Standard Deviations, Frequencies, and Percentages for Online Professional Development Provided Useful Information Survey Item

Statement: The online professional development content provided useful information.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.97	.90	21	29	35	49	9	13	7	10	0	0
Noncollaborative Follow-up	3.87	.96	18	25	34	48	13	18	4	6	2	3

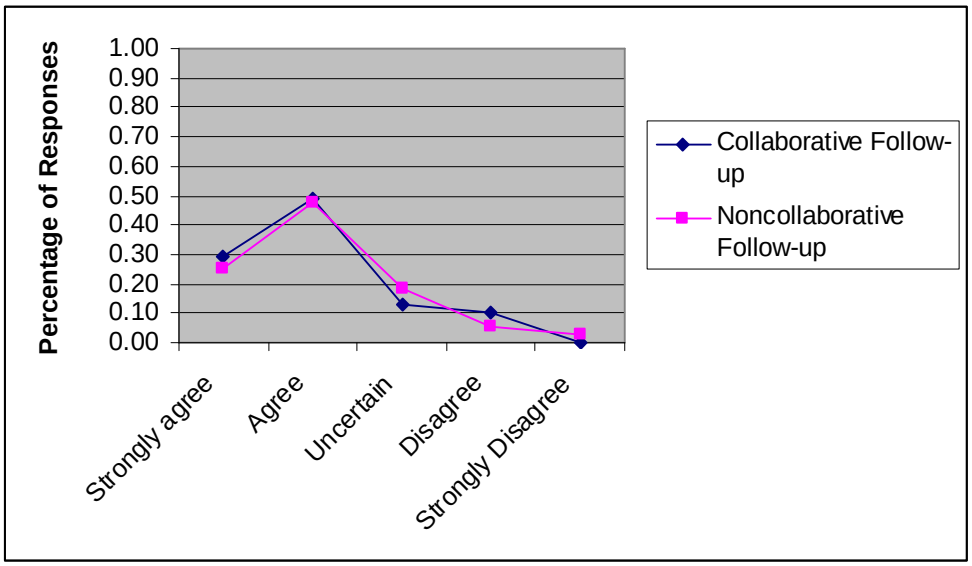


Figure 18. Online Professional Development Provided Useful Information.

Almost all participants reported that the articles, websites, and PowerPoint presentations were an effective medium for learning content (see Table 33 and Figure 19). Seventy-six percent of the Collaborative Follow-up environment strongly agreed or agreed, while 9% disagreed or strongly disagreed. Likewise, Sixty-nine percent of the Noncollaborative Follow-up strongly agreed or agreed, while 17% disagreed or strongly disagreed.

Table 33. Means, Standard Deviations, Frequencies, and Percentages for Professional Development Readings Were an Effective Learning Medium Survey Item

Statement: The online professional development readings (articles, websites, and PowerPoint presentations) were an effective learning medium for me.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*F*	%	*f*	%
Collaborative Follow-up	3.92	.93	19	26	36	50	10	14	6	8	1	1
Noncollaborative Follow-up	3.76	1.09	19	27	30	42	10	14	10	14	2	3

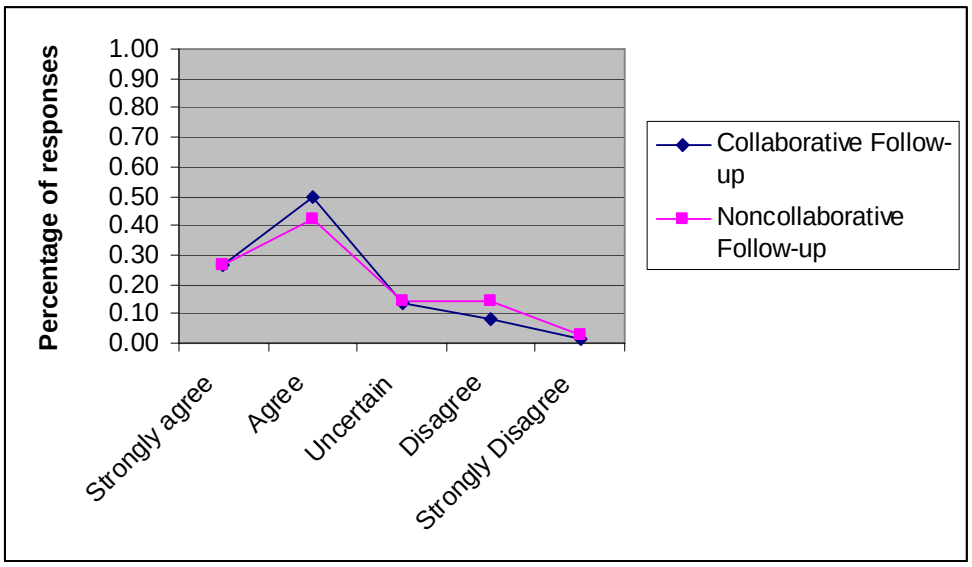


Figure 19. Professional Development Readings Were an Effective Learning Medium.

The environments split over whether they felt that they learned as much in the online format as they had learned in other professional development environments (see Table 34 and Figure 20). Sixty-seven percent of the Collaborative Follow-up environment strongly agreed or agreed, while 17% disagreed or strongly disagreed. Participants in the Noncollaborative Follow-up environment did not feel that they

learned as much in the online format as they would have in a face-to-format. Only 49% strongly agreed or agreed, while 32% disagreed or strongly disagreed.

Table 34. Means, Standard Deviations, Frequencies, and Percentages for I Feel I Learned as Much From This Online Professional Course as From Traditional Professional Development

Statement: I feel I learned at least as much from this online professional development course as I have learned in other professional development opportunities that were in a traditional format.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.76	1.14	22	31	26	36	12	17	9	13	3	4
Noncollaborative Follow-up	3.38	1.26	18	25	17	24	13	18	20	28	3	4

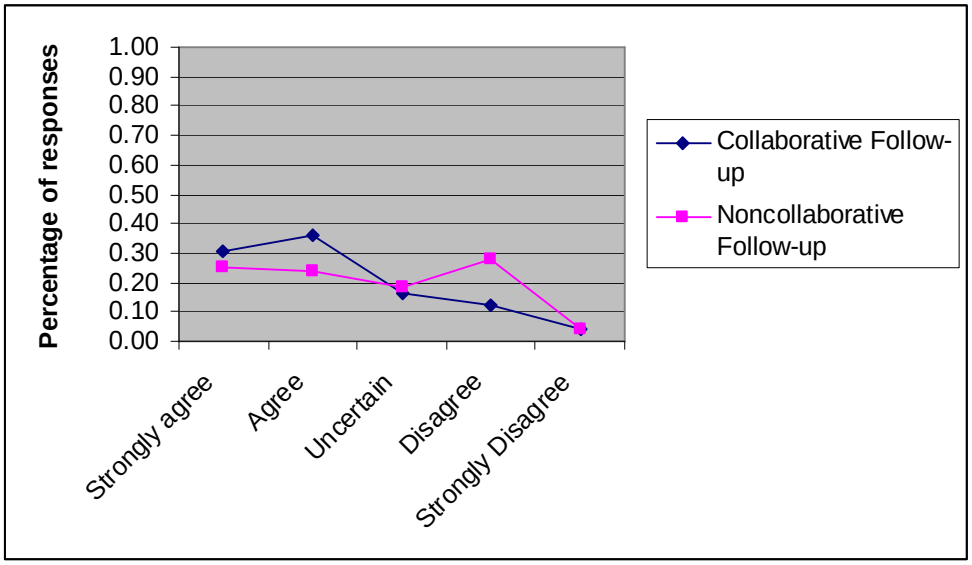


Figure 20. I Feel I Learned as Much From This Online Professional Course as From Traditional Professional Development.

A majority also agreed that they looked forward to participating in the course (see Table 35 and Figure 21). Sixty-two percent of the Collaborative Follow-up

environment agreed or strongly agreed, while 21% disagreed or strongly disagreed. Fifty-five percent of Noncollaborative Follow-up environment strongly agreed or agreed, while 21% disagreed or strongly disagreed.

Table 35. Means, Standard Deviations, Frequencies, and Percentages for I Looked Forward to Participating in the Online Professional Development Survey Item

Statement: I looked forward to participating in the online professional development.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.60	1.15	17	24	27	38	13	18	12	17	3	4
Noncollaborative Follow-up	3.54	1.12	16	23	23	32	17	24	13	18	2	3

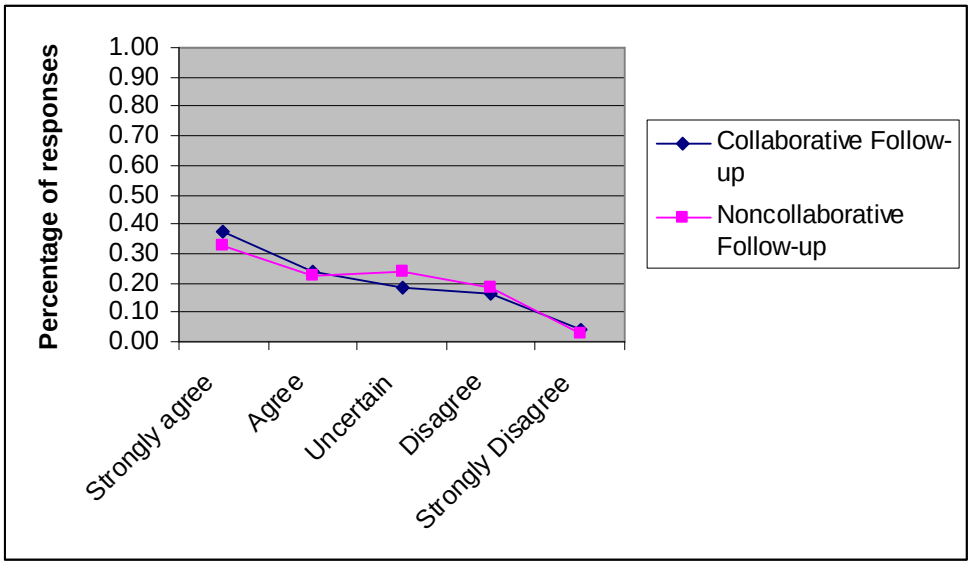


Figure 21. I Looked Forward to Participating in the Online Professional Development.

Participants felt comfortable using WebCT Vista for professional development (see Table 36 and Figure 22). Seventy-five percent of the Collaborative Follow-up environment strongly agreed or agreed, while 14% disagreed or strongly disagreed.

Sixty-five percent of the Noncollaborative Follow-up strongly agreed or agreed, while 18% disagreed or strongly disagreed.

Table 36. Means, Standard Deviations, Frequencies, and Percentages for I Felt Comfortable Using WebCT Vista for Online Professional Development Survey Item

Statement: I felt comfortable using WebCT Vista for online professional development.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.85	1.23	22	31	31	44	8	11	5	7	5	7
Noncollaborative Follow-up	3.70	1.15	20	28	26	37	12	17	10	14	3	4

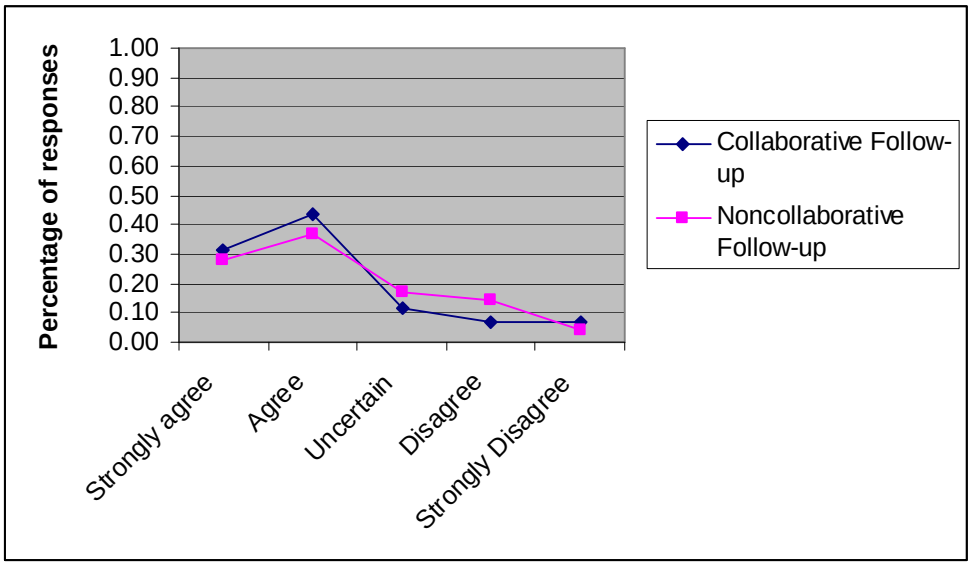


Figure 22. I Felt Comfortable Using WebCT Vista for Online Professional Development.

Collaborative Follow-up participants felt slightly more comfortable in navigating through WebCT (see Table 37 and Figure 23). Sixty-eight percent of the Collaborative Follow-up participants indicated that they agreed or strongly agreed,

while only 22% disagreed or strongly disagreed with this statement. Fifty-six percent of the Noncollaborative Follow-up participants strongly agreed or agreed with this statement, while 33% disagreed or disagreed strongly.

Table 37. Means, Standard Deviations, Frequencies, and Percentages for I Was Able to Easily Navigate Through WebCT Vista for Online Professional Development Survey Item

Statement: I was able to easily navigate through WebCT Vista for online professional development			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.60	1.18	15	21	34	47	7	10	11	15	5	7
Noncollaborative Follow-up	3.51	1.32	21	33	18	30	8	30	22	26	1	1

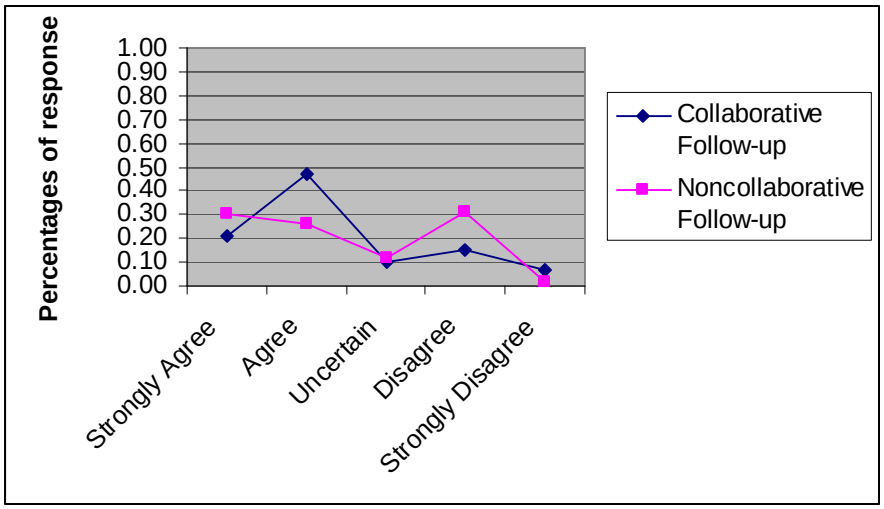


Figure 23. I Was Able to Easily Navigate Through WebCT Vista for Online Professional Development.

Similarly, most participants felt that they could easily use WebCT tools (see Table 38 and Figure 24). Sixty-eight percent of the Collaborative Follow-up strongly

agreed, while 21% disagreed or strongly disagreed. The Noncollaborative Follow-up was not quite as positive about their skill with WebCT Vista tools. Not quite half of the participants in this environment felt that they could easily use WebCT tools, with 49% strongly agreeing, while 28% disagreed or strongly disagreed.

Table 38. Means, Standard Deviations, Frequencies, and Percentages for WebCT Vista Tools Were Easy to Use

Statement: WebCT Vista tools were easy to use.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.60	1.12	13	18	36	50	8	11	11	15	4	6
Noncollaborative Follow-up	3.41	1.14	15	21	20	28	16	23	19	27	1	1

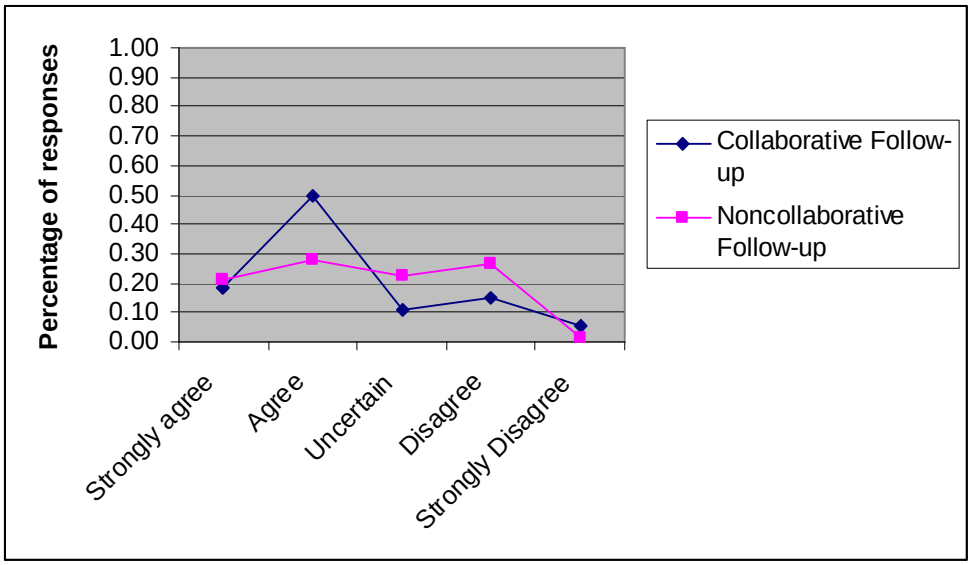


Figure 24. WebCT Vista Tools Were Easy to Use.

A majority of participants felt that they had adequate technical support (see Table 39 and Figure 25). Fifty-three percent of the Collaborative Follow-up

environment strongly agreed or agreed, while 5% disagreed or strongly disagreed. A majority of participants in the Noncollaborative Follow-up environment also felt that they had adequate technical support. Fifty-four percent strongly agreed or agreed, while 11% disagreed.

Table 39. Means, Standard Deviations, Frequencies, and Percentages for Technical Support Was Available When I Needed It Survey Item

Statement: Technical support was available when I needed it.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.61	.86	11	16	26	37	29	41	3	4	1	1
Noncollaborative Follow-up	3.58	.89	11	15	27	38	25	35	8	11	0	0

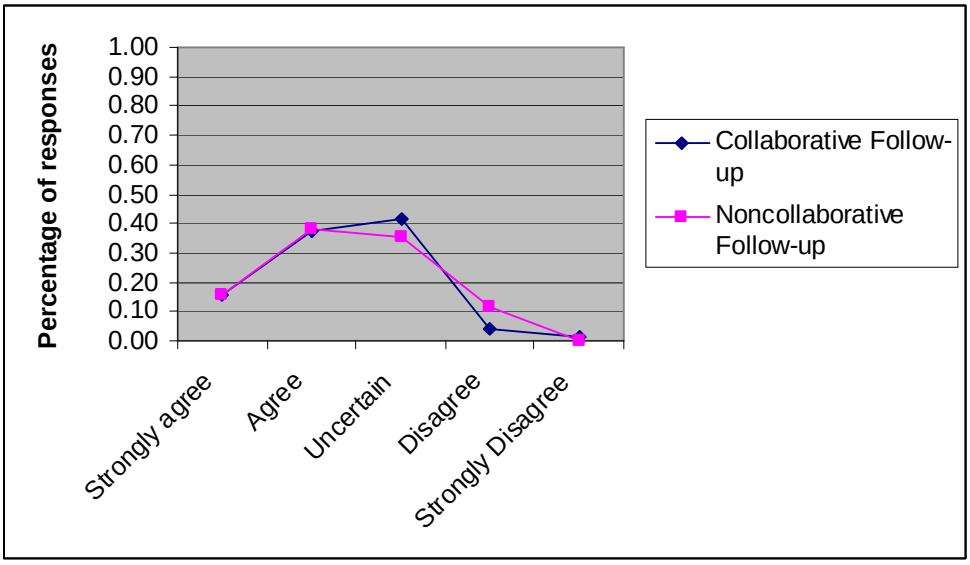


Figure 25. Technical Support Was Available When I Needed It.

A majority of participants reported that they would participate in another online professional development course (see Table 40 and Figure 26). Sixty-eight percent of

the Collaborative Follow-up environment strongly agreed or agreed, while 18% disagreed. The participants in the Noncollaborative Follow-up environment were not quite as strong in their support of this statement with 56% strongly agreeing or agreeing that they would participate in another online professional development course, while 14% disagreed or strongly disagreed

Table 40. Means, Standard Deviations, Frequencies, and Percentages for I Would Participate in Another Online Professional Development Course Survey Item

Statement: I would participate in another online professional development course.			Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	Mean	SD	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	3.72	1.21	19	27	29	41	10	14	10	14	3	4
Noncollaborative Follow-up	3.50	1.06	15	21	25	35	21	30	7	10	3	4

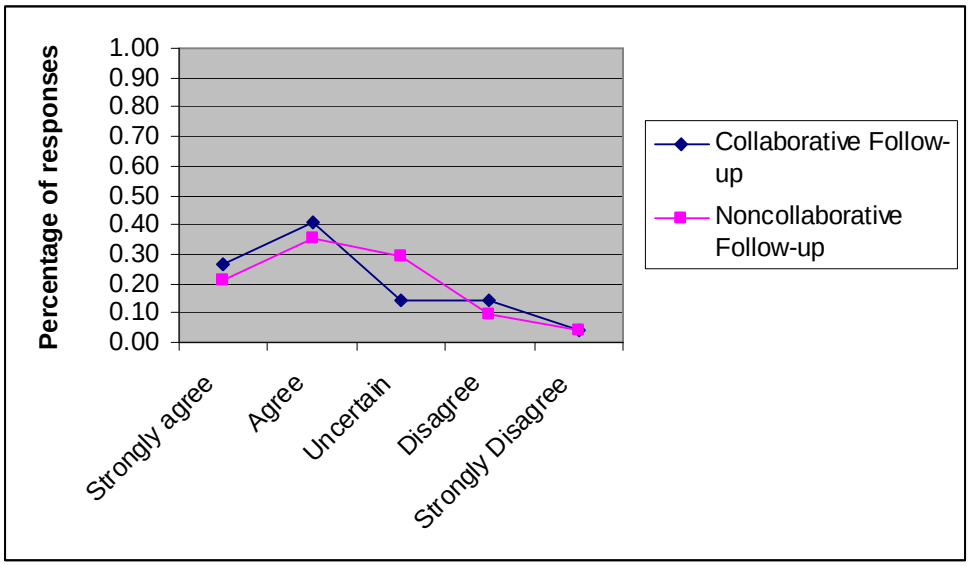


Figure 26. I Would Participate in Another Online Professional Development Course.

Research Question 1d(2)

Is there a significant difference between their experiences?

Table 41 shows that there was no significant difference between the Collaborative Follow-up and Noncollaborative Follow-up on their satisfaction with their online experience (p = .288).

Table 41. Results From *t*-test of Online Experience Survey Means

Variable	*M*	*SD*	*t*	*df*	*p*
Online Experience Survey			1.066	141	.288
Collaborative Follow-up	3.73	.84			
Noncollaborative Follow-up	3.58	.85			

Research Question 1d(3)

What are the participant's perceptions of the impact and quality of their online follow-up experience?

Open coding of the qualitative data reveals six categories. Descriptions of each category and subcategory are outlined in Table 42.

Table 42. Categories and Subcategories That Emerged From Qualitative Open Coding

Category	Subcategory	Description
Building Competence	Present efforts to support the TAKS preparation Need to find new ways to support TAKS preparation	Factors that created the demand for this professional development
Professional knowledge	Differing experiential knowledge Differing knowledge of the Library's relationship to the TAKS	The range of knowledge that supports professional development
Flexibility	Time Place	The types of flexibility that created an environment that
Interaction	With Colleagues With Instructor With Content With technology	Opportunities for interaction with the various elements of the course.
Reflection	Reflective thinking Discussions with others	Process through which educators make meaning of their experiences and integrate new beliefs into existing cognitive structures
Change	Librarian change Principal change	

Building Competence

It is innately human to feel a need to be competent in interacting with the continuum of environments that constitute reality for each of us. Competence is affirmed "largely through the cues we perceive in the environment that tell us we have been successful in achieving our aims" (Northwest Regional Educational Laboratory, 2001, p. 22). Educators' feelings of competence are shaped through interactions with administrators, colleagues students, parents, and other members of the school community.

Many of the librarians in this study felt that they were competently handling their responsibilities as librarian and contributing to TAKS preparation for their students. Indeed, during the first assignment, the course assignment asked them to share

what they were currently doing to support the student achievement on the TAKS at their school. Many librarians submitted long list of activities, programs, and strategies that they had undertaken to support the TAKS. For example:

> The first one is scheduling regular check out/library time for sixth grade language arts teachers and encouraging seventh and eighth grade LA teachers to set up bi-weekly times. This is aimed at getting our students to read. I also offer teachers a variety of different ways to assess reading besides writing summaries and taking AR tests. As I am short of assistance, I will teach the teachers how to check out to their classes so that I can provide instruction to classes. The schedule also allows five days every two weeks for research related sign ups. I am running both Bluebonnet and Lone Star reading programs along with a local sixth grade program sponsored by Ray Mickens, a local football player. Through these regularly scheduled times, I teach the students how to use the online catalog, how to locate books via Dewey, how to choose books per their interests, and incorporate booktalks, read alouds, and storytelling activities. The math leader, literacy leader and myself are in the process of organizing weekly Family Reading and Math Nights. I am also forming a Library Advisory Committee to help guide the library programming. I require teachers wanting to research to meet with me prior to their coming to the library so that I can explain the Big 6, give them handouts, and offer integrated information skills instruction. Database use, copyright info, plagiarism, website evaluation are incorporated into these sessions. I also determined that our students have a need for topic focusing, notetaking, and summarizing activities and am working with teachers to provide instruction in these areas. I have subscribed to professional journals in all department areas for teachers. I have also requested in-service times to teach teachers how to use our databases and how to guide research.

In spite of these efforts, many of the librarians felt that the TAKS testing environment that permeates public schools in Texas was redefining what it meant to be competent. Many echoed the thoughts of this librarian who used a language metaphor to describe the estrangement between the library and the school:

> I wish, however, that I could encourage more teachers to use the library and its resources for research or enhancement of their own lessons or just a small amount of collaboration. I took this course hoping to learn more about their language – I call it TAKS-TEKS (and not being native Texan and getting my certification ‘up north in Minne-soh-ta, it’s a language I’ve just learned in the

> past few years) – in an attempt to woo them into collaborating with me. If I can combine TAKS-TEKS and Librarian-ese (that's our language), maybe we can all speak the same language.

Finally, one librarian shared:

> I think they see us as keepers of things…I think they see us as helpful and going all out…I don't think they see me in a teaching light.…an instructional light.

Professional Knowledge

Knowles, Holton, and Swanson (1998) found that adult learners' prior experience and knowledge provided a rich resource for learning. Learners "rely on their cognitive structures, their needs, beliefs and prior knowledge to transform new information into new knowledge" (Harapnuik, 1998, para. 17). The librarians in this study brought varying levels of professional knowledge about librarianship to this professional development experience. This knowledge was tempered by varying years of working experience in the field and by varying types of background knowledge.

The librarians in this study had a wide range of experience:

> Actually this is my second year working as a librarian, my second year out of library school.

> This is my 14th year as a [redacted] ISD Librarian and my 4th year at [redacted] High School (I was librarian for 6 years at [redacted] Elementary and for 4 years at [redacted] Middle School).

> I am retired and job share with another retired librarian.

They also had varying degrees of knowledge of the library's relationship to student achievement. Some felt that they had substantial knowledge:

> I had been working with our district coordinator trying to get TAKS and TEKS pulled together with the library. It wasn't foreign to me.

> I had a pretty good perception of the effects of the library program on student achievement.

Others felt that this was an area where that knowledge base needed developing:

> I'm hoping for ideas to better prepare students for TAKS and getting students to discover that the library is a good source of information for anything.

> I was immediately interested in this course when [redacted] said that it would help us learn to incorporate the library with the curriculum. As in the corporate world, education is becoming more and more focused on accountability, goals, and documentation of achievement. From this course, I hope to find ways to impact student achievement, fluency, and self-esteem. Thank you for offering this course!

Flexibility

Many of the participating librarians cited the flexibility of the online program as a factor facilitating their participation. For some, it was the flexibility of the course to choose the time and place of their involvement.

> To do it whenever I wanted to. To do it wherever I wanted to. I could have done it at school, but it was easier for me to think and sit and do it at home.

> I think if it had been, "We are going to meet every week at 3:30 and we are all going to sit down and do this," I don't know that I could have done it because my life is so jumbled up with so many different tasks and wearing so many different hats. I don't think I could have done that. With it being flexible, it met my needs.

> It could be done at home. I didn't have to go somewhere to somewhere to learn. It wasn't like Tuesday night at 9:00 at night I was in the parking lot looking for my car after I had been to an in-service.

For others, it was the flexibility of the content to meet their needs at their school. As this librarian shared:

> It was suited to a lot of different people's needs and it allowed you to be able to do….It allowed you to customize the course to yourself, basically. Everybody

> could apply it. I didn't really see anything about the course that I didn't like or didn't fit my needs.

Interaction

The interactive components of the course were some of the most valued aspects of the course. Interaction included interaction with other learners, interaction with the instructor, interaction with the content, and interaction with the technology.

Social interaction among students was a highly rated component. As this librarian shares:

> I really enjoyed hearing what other people had to say. The discussion part – what other people think is enjoyable to me. I wouldn't say that that is the most important, but that is very interesting because that is like a conversation. When you respond to them and when they respond back, that is like a conversation. That's the most fun for me.

Another librarian found that the broad representation of librarians from around the state was powerful:

> It is a neat, neat thing to hear what people from other parts of the state have to say. It is just fantastic. That was the main thing – to get ideas from different areas rather than just talking to librarians within my area. Getting different viewpoints.

Getting viewpoints from librarians at different grade levels was also seen as a strength. As one high school librarian reported:

> Sometimes something the elementary librarians said would sound corny, but I think I can make it work. I am dealing with big "kids." Sometimes things that sound corny, but fun will work if you make a few tiny changes.

Although participants in each of the collaborative sections were divided into 10 sections with 15 students in each section, students did not enter in equal numbers leaving some sections with as few as four active participants. This combined with

differing times of participation limited interaction with colleagues. Those active participants in these sections expressed disappointment that they did not have greater opportunities for interaction:

> I would have loved to have more interaction. I would go to make a comment on the discussion and there wouldn't be anything to comment on.

The quality of the discussion became an issue for another librarian who felt that librarians needed more training in how to participate in a discussion:

> Sometimes I felt like we were talking at each other as opposed to interacting where we had to solve a problem or read something and then give our portion of a task come back and report.

Librarians from the Noncollaborative Follow-up environment expressed regret that they did not have opportunities for interaction:

> I wanted to see what other people had to say about it. I was hoping that there would be more discussion because I like to pick other people's brains for the information they can give me.

Participants also reported that they found feedback from the instructor very meaningful:

> I just loved your comments. I was always wanting to go the computer every day to see if you had written anything. Cause I wanted to see. I wanted feedback, I wanted to know how I was doing.

Participants also found the readings to be thought-provoking:

> I think the readings were good. I thought all that background material was excellent. The having to sit down and think through it for myself was a good thing to do. It took me to places I probably wouldn't have gone on my own in the normal course of events.

Anther librarian reported that the readings inspired her to go out and seek information from other resources:

> And reading some of the other texts that we have, we have some professional books on information technology and collaboration that I was looking through and seeing if I could find something that would help me.

Reflection

Central to the professional development process is the ability of the program to promote reflection. Reflection enables educators to examine their beliefs, assumptions, and practice in the light of new information. Many librarians reported that they were making connections with the course content at times when they were not on the computer:

One librarian shared that she found meaning through reflecting on the discussions:

> I would be doing something and think "Oh, so and so said this or was in a situation similar to this and said such and such. Now, how does that fit this situation? Or could I use something like this.

Another librarian found connections in working with her students:

> Plus, when you look at the lessons that you are working with kids at the time, you're like "Maybe I could stretch this for them and we could do this." So, yeah, it wasn't just at the point of sitting at the computer and working on it.

One high school participant in the collaborative environment began sharing and discussing content with her lead librarian who was not in the study:

> So then I would say things to her and tell her things I was reading and she wanted to see the discussions, so I would print out everything for her. She' d read it.

One participant shared that she was even discussing course content with the teachers in her building:

> I found myself talking with my colleagues at school, especially the ones that agreed to work with me. To talk about the next thing we were talking about in the class. Cause, what I did was, I went through and printed out all the different modules so I would know what was going to be next. Then I talked about it with my colleagues.

Changing Attitudes

Through their participation in the course, the librarians began to take ownership of working with the school on the identified weaknesses at their campus. As one librarian shared:

> Quite honestly, I had never paid any attention to what the weaknesses might be. I had just done what was library related. I knew that I was supporting the TEKS and TAKS objectives, but I was doing it from my own point of view as far as what I wanted them to learn in the library. I had never really paid that much attention to what the weaknesses were. Just going through the process made me realize more than ever that I could actually help instead of just doing library stuff. I could incorporate library stuff into what the teachers need to learn for their TAKS. I can truly help.

Some participants also reported that their participation in the course began reframing their principals' views of the library program. One middle school librarian reported:

> I think he felt the library was just there, but it wasn't really a part of it. The fact that now that some of the things we do are part of the school improvement plan has been a change for him.

An elementary school librarian shared:

> I think when he knew that I was designing a TAKS Support Plan, that he was excited. Particularly about science. He is very, very concerned because our science scores were so low last year. He really saw the importance of what I could do to help the classroom teachers in their goal. This has really been our school's goal this year. We have really focused on science. We have created a science lab here. He was able to see the contribution that I was able to make to that school-wide goal.

Theoretical Model

The results of the theoretical coding were placed in a diagram to explicate the relationship between and among the strands of findings (see Figure 27). In this model, the need to develop their competence in better supporting students preparing for the TAKS brought librarians to the course. The school librarians did not arrive as a blank slate, but brought with them their professional knowledge tempered by their years of experience and their background knowledge on the library's relationship to student achievement. The course interactive components, including interaction with colleagues, interaction with the instructor, interaction with the content, and interaction with the technology clearly connected with prior knowledge. This relationship was facilitated by the flexibility of the online course time and place of involvement and the flexibility of the course to individualize the course to meet the needs of the student. These aspects of the course promoted reflection on prior knowledge, assumptions and beliefs. The cumulative effect of this system of involvement was in changing attitudes.

Research Question 2a

Is there a significant difference between online professional development environments in the quality of the TAKS Support Plan prepared by participants?

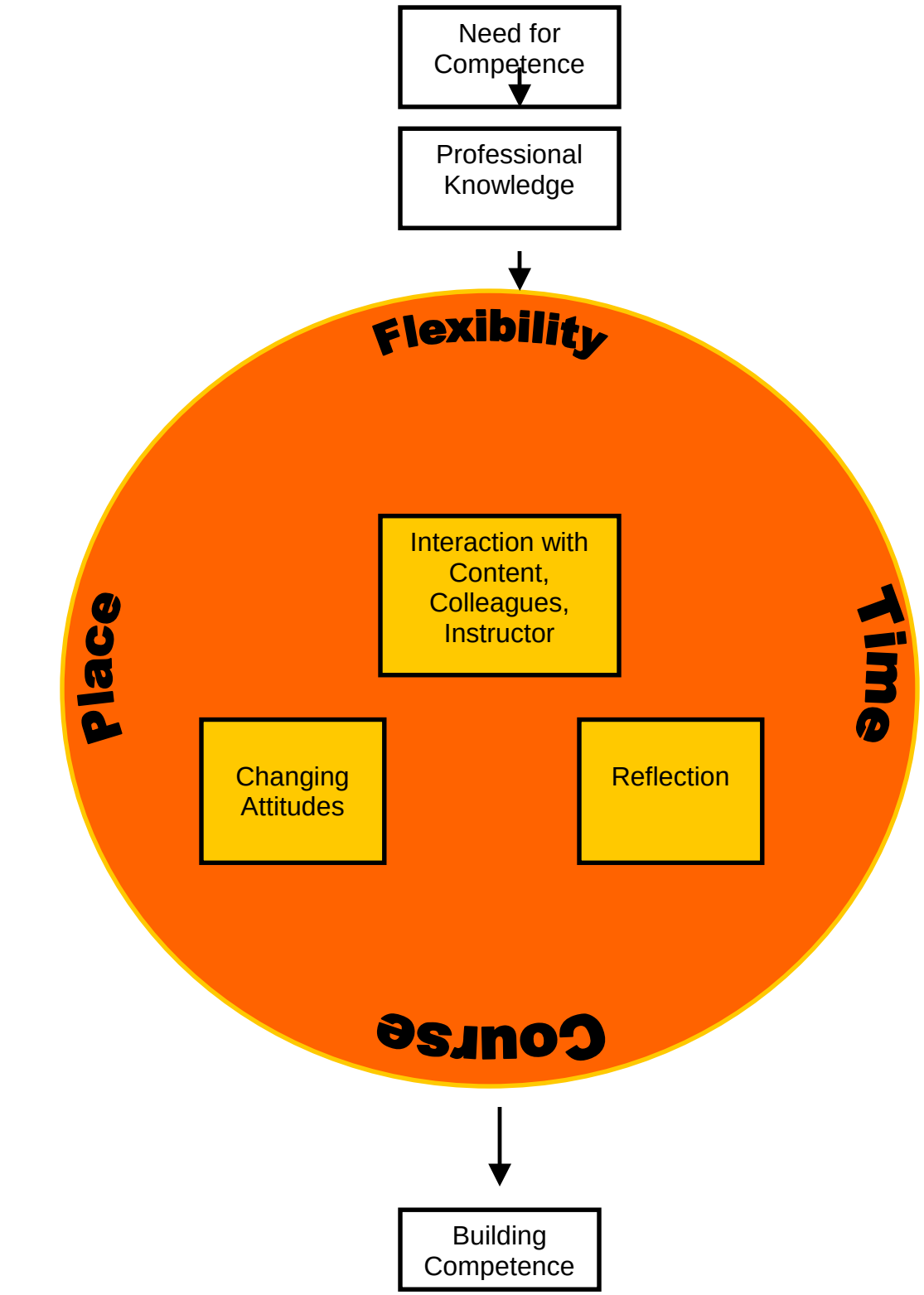


Figure 27. Theoretical Model of Qualitative Findings.

To answer this question, one-way analysis of variance (ANOVA) was conducted with type of online professional development environment (Collaborative Follow-up, Noncollaborative Follow-up, and No Follow-up/Noncollaborative) as the independent variable and TAKS Support Plan scores as the dependent variable. Means and standard deviations for the TAKS Support Plans are reported overall and by professional development environment in Table 43.

Table 43. Means and Standard Deviations for the TAKS Support Plans Reported Overall and by Professional Development Environment

Overall		Collaborative Follow-up		Noncollaborative Follow-up		Noncollaborative/ No Follow-up	
Mean	SD	Mean	SD	Mean	SD	Mean	SD
98	11.12	99.36	10.71	95.67	11.72.	99.14	10.77

No significant differences were found between the three environments on TAKS Support Plan scores, F (2.120) =1.478, p = .232. Results from this analysis are found in Table 44.

Table 44. Results of ANOVA for TAKS Support Plan Scores

Source	*df*	*SS*	*MS*	*F*	*p*
TAKS scores					
Between groups	2	362.699	181.349	1.478	.232
Within groups	120	14727.531	122.729		
Total	122	15090.229			

Research Question 2b

Is there an interaction effect between professional development environment and school librarian credentials on the quality of TAKS Support Plan?

TAKS Support Plan scores were subjected to a two-way analysis of variance having three levels of environment (Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up) and two levels of school librarian credential (bachelor's level degrees, master's in Library Science). This analysis included only bachelor's and master's level participants due to the small number of participants who were not credentialed. Bachelor's level participants included school librarians with a Bachelor of Science in Library Science, bachelor's plus Learning Resource Endorsement, bachelor's plus ExCET certification in Learning Resources, and Houston ISD certification. Master's level included all participants who had master's level degrees.

Table 45 shows the number of subjects, the mean, and standard deviation of attitudes for each cell. The two-way analysis of variance indicated that the effects of professional development environment and credential did not significantly affect scores on the TAKS Support Plans F (2,113) = .382, p. =.858 (see Table 46).

Table 45. Means, Standard Deviation, and *n* for TAKS Support Plans as a Function of Professional Development Environment and School Librarian Credential

	Bachelor Level Degrees			Master's in Library Science		
TAKS Support Plan Scores	*n*	M	SD	*n*	M	SD
Collaborative Follow-up	14	99.96	10.42	37	98.97	11.77
Noncollaborative Follow-up	18	98.06	12.54	21	97.41	10.87
Noncollaborative/ No Follow-up	7	99.57	12.38	18	98.50	10.36
Total	39	98.03	11.77	77	98.12	11.06

Table 46. Two-Way Analysis of Variance for Attitudes on the TAKS Support Plan Score as a Function of Professional Development Environment and School Librarian Credential

Source	*df*	*MS*	*F*	*p*
TAKS Support Plan				
Environment	1	77.069	.591	.555
Credential	2	2.129	.016	.899
Environment*Credential	2	14.315	.110	.896
Error	112	130.352		

Scores on the TAKS Support Plans varied across credentials at each level. School librarians with bachelor's level degrees scored highest in the Collaborative Follow-up environment with a mean score of 99.96, followed by master's level librarians, 98.97. Librarians with bachelor's level degrees also led the Noncollaborative Follow-up environment with a mean score of 98.06, followed by master's level school librarians, 97.41. Librarians with bachelor's level degrees also led the Noncollaborative/No Follow-up environment with a mean score of 99.57, followed by master's level school librarians, 98.5.

Research Question 3a

Does the likelihood of course completion by school librarians differ among the professional development environments including Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up?

Table 47 shows the frequencies and percentages of course completion by environment.

Table 47. Frequencies and Percentages of Completion by Environment

Conditions	Collaborative Follow-up		Noncollaborative Follow-up		Noncollaborative/ No Follow-up	
	f	%	*f*	%	*F*	%
Completion rates	55	59	41	43	26	30

Binary logistic regression was used to estimate the likelihood of course completion by membership in professional development environment. Differences in course completion were significantly predicted: $\chi^2 = 14.474$, $df = 2$, $p < .001$. Table 46 presents the odds ratio. Membership in the Collaborative Follow-up environment was significantly associated with greater likelihood of course completion when Noncollaborative/No Follow-up participants were the referent group (OR 3.186) (see Table 48).

Table 48. Logistic Regression Predicting Course Completion

Variable	*β*	*SE*	*Odds Ratio*	*p*
Collaborative Follow-up	1.159	.312	3.186	.000
Noncollaborative Follow-up	.569	.308	1.766	.065
Constant	-.815	.231	.433	.000

Referent: Group for calculating Odds Ratio was Noncollaborative/No Follow-up.

A second logistical regression was conducted with the Collaborative Follow-up environment as the referent group to assess whether there was a difference between the Collaborative Follow-up and the Noncollaborative Follow-up environments in predicting the likelihood of course completion. Participants in the Collaborative

Follow-up environments were significantly more likely to complete than participants in the Noncollaborative Follow-up environment, with an odds ratio of .544, $p < .05$.

Research Question 3b

Is the effect of professional development environment on course completion moderated by school librarian credential?

Binary logistic regression was conducted to examine credential as a moderator of the relationship between professional development environment and course completion. Descriptive results are presented in Table 49.

Table 49. Completion Rates by Professional Development Environment and Credential

Completion Rates	Bachelor's Level Degrees				Master's in Library Science			
	Complete		Noncomplete		Complete		NonComplete	
	n	*%*	*n*	%	*n*	%	*n*	%
Collaborative Follow-up	15	68	7	32	38	61	25	39
Noncollaborative Follow-up	20	54	17	46	20	37	34	63
Noncollaborative/ No Follow-up	7	23	24	77	19	38	31	62

Results from the logistic regression are presented in Table 50. This analysis included only bachelor's and master's level participants due to the small number of participants who were not credentialed. Bachelor's level participants included school librarians with a Bachelor of Science in Library Science, bachelor's plus Learning Resource Endorsement, bachelor's plus ExCET certification in Learning Resources, and Houston ISD certification. Master's level included all participants who had master's level degrees.

Table 50. Logistic Regression of Professional Development Environment by Credential Predicting Course Completion

Variable	*B*	*SE*	*Odds ratio*	*p*
Noncollaborative by bachelor's level degree	-.374	.400	.688	.551
Noncollaborative by master's level degree	-1.018	.358	.361	.004
Noncollaborative/No Follow-up by bachelor's level degrees	-1.768	.485	.171	.000
Noncollaborative/No Follow-up by master's level degree	.536	.373	.340	.004

Referent: Group for calculating odds ratio was Collaborative Follow-up.

Examination of the concurrent associations found a significant relationship between professional development environment by school librarian credential for master's level degrees in the Noncollaborative Follow-up environment and for both bachelor's and master's level degrees in the Noncollaborative/No Follow-up environment. Using the levels in the Collaborative Follow-up environment as referent, master's in the Noncollaborative Follow-up environment were 64% less likely to complete, master's in the Noncollaborative/No Follow-up environment were 66% less likely to complete, and bachelor's in the Noncollaborative/No Follow-up environment were 83% less likely to complete.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this study was to examine the effects of online follow-up and collaboration on participant attitudes, quality of course product, and course completion when added to face-to-face professional development for librarians in 12 Texas school districts. Librarians participated in a face-to-face in-service in their home district. An eight-week online follow-up course supported implementation of in-service themes. School librarians were randomly assigned to receive one of three treatment environments: Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up.

Discussion

This chapter presents a discussion of the findings regarding the effects of collaboration and follow-up in online professional development on attitudes towards the professional development program, attitudes towards collaborative learning, attitudes towards the online professional development experience, scores on TAKS Support Plans completion rates, whether school librarian credential was a significant moderator of these variables and qualitative findings highlighting reflection and individualization. Then, limitations, implications for practice, and recommendations for further research are addressed.

Attitudes Towards the Professional Development Program

The follow-up with or without collaboration provided by this research had a positive effect on attitudes towards the professional development program. Overall,

school librarians in all three environments rated their professional development experience as mildly positive. However, the school librarians who received follow-up training and support reported significantly more positive attitudes than those school librarians who did not receive follow-up training and support. The groups that experienced follow-up and/or collaboration had equally positive attitudes.

Difference Between Experimental Environments and Control Environment

School librarians whose environment included follow-up reported attitudes that were significantly more positive than the school librarians whose environment did not include follow-up. This finding supports previous theory and research that asserts that educators learn best when professional development learning is sustained over time through follow-up (Garet et al., 2001; Showers et al., 1987). Traditional professional development programs based on standalone workshops are not as well received by educators as professional development programs that include follow-up to support the ongoing process of educator change. Such follow-up enhances educators' feelings of competence (Guskey, 2000). Educators value professional development that enhances their effectiveness with students (Fullan & Stiegelbauer, 1991). Professional development programs that result in educators developing the knowledge and skills that improve student outcomes are rated favorably by educators (Guskey, 2000). Conversely, professional development programs that fail to develop the requisite knowledge and skills are viewed negatively and considered a waste of time (Lindstrom & Speck, 2004).

The environments that provided follow-up support over time offered school librarians an opportunity to deepen their understanding of evidence-based practice and to continue learning about the process of constructing a TAKS Support Plan. The discussions in the Collaborative Follow-up environment and the journals in the Noncollaborative Follow-up environment provided a format for reflection that allowed school librarians to step back from the routine, examine their beliefs about evidence-based practice, and consider new approaches to supporting their school. As TAKS weaknesses at the schools were identified, information was provided to school librarians to support the creation of their plan. Individual needs were addressed through feedback from the instructor and peers. Thus, participating in the online follow-up experience enhanced school librarians' feelings of competence leading to the more positive ratings. Through emails and phone calls, school librarians in the No Follow-up/Noncollaborative environment frequently shared that they felt that the task was too hard to complete on their own leading to their negative ratings of the professional development program.

Lack of Difference Between Two Experimental Environments

The inclusion of online collaborative learning in the instructional design of the Collaborative Follow-up-environment facilitated discussion and interaction. However, the time commitment of participating in a discussion was not always well received but looked on as an additional responsibility in an already crowded schedule. Unlike school librarians in the other environments, the lowest-rated item for the Collaborative Follow-up environment was "the professional development program took an appropriate

amount of time." The lower ratings on this survey item by the Collaborative Follow-up school librarians contributed to no significant difference in attitudes towards the professional development program.

Instructional designs that provide for collaborative learning afford participants rich and engaging opportunities through the interaction with and support of peers. However, collaborative learning in electronic environments can require significantly more time and effort than traditional learning environments (Kulp, 1999), and educators are "captives of clock and calendar" (National Education Commission on Time and Learning, 1994). Finding time for collaborative participation is problematic for educators.

These results are consistent with Uribe et al. (2003), where the researchers found little difference in attitudes between participants who worked alone online and participants who worked in a collaborative online environment in a problem-solving exercise. In this study, both environments were found to have generally positive attitudes toward their experience. However, the environments differed on items related to time necessary to complete the program. Collaborative online participants indicated that they felt that they did not have sufficient time to complete the program because communicating with their partner was time-consuming.

Attitudes Towards the Collaborative Experience

The purpose of this part of the study was to shed light on participant's attitudes towards their collaborative experience. The importance and relevance of interaction in the learning process has been stressed by many theorists (Vygtosky, 1978; Wenger,

1999). Rather than isolating the learner, collaborative learning is increasingly being recognized as a learning strategy that emphasizes the social nature of learning and where interaction occupies a central role in the learning process.

From the descriptive data collected, however, the school librarians in the Collaborative Follow-up environment reported only mildly positive attitudes towards the collaborative experience. Of the 10 items included in this survey, three items received negative ratings, while the others received mildly positive ratings. School librarians indicated dissatisfaction with (a) discussions helping to develop new understandings of course concepts, (b) perceptions of themselves as active participants in a discussion group, and (c) chat as an effective means of communication with colleagues. School librarians gave mildly positive ratings to (a) feelings of comfort in participating in discussions, (b) discussions relevance, (c) viewing others' TAKS Support Plans, and (d) reading comments on their Plans, from others as a means of support in creating their own.

Two possible explanations may explain these findings: (a) the frequency and quality of responses and (b) the use of discussion as the collaborative vehicle.

Frequency and Quality of Responses in Discussions

Previous research in online collaborative learning has revealed problems with the frequency of response and quality of responses in discussion. Hallett and Cummings (1997) and Heath's (1998) also found that the varied participation levels and quality of the messages had a negative impact on satisfaction. In this study, discussion responses were more closely associated with Bonk et al.'s (2004) litany of nonresponsive

comments than Muilenburg and Berge's (2002) vision of a thoughtful discussion. The sporadic and superficial nature of the discourse contributed to the dissatisfaction of participants who wanted to participate in meaningful discussions. Messages posted in this study met the requirement for the course for the school librarians in the Collaborative Follow-up environment, but few generated real discussions.

Use of Discussions as a Collaborative Vehicle

The instructional design of the Collaborative Follow-up environment did not promote high levels of interdependence. According to Graham and Misanchuk's (2003) interdependence theory, the use of discussions as the vehicle for collaboration in the instructional design of the Collaborative Follow-up experience could only enable medium levels of interdependence. Higher levels of interdependence balanced with time constraints could have yielded greater satisfaction with the Collaborative Follow-up experience.

Attitudes Towards the Online Experience

Overall, school librarians in the Collaborative Follow-up and Noncollaborative Follow-up environments gave their online experience a mildly positive rating with school librarians in the Collaborative Follow-up environment rating their experience slightly higher. However, a statistical analysis of the mean ratings on this survey did not find a significant difference in the attitudes towards the online experience.

Although school librarians work daily with complex circulation software systems, participants in the two online follow-up groups did not find the WebCT Vista system intuitive and easy to use. Previous research in online learning has found that

technology issues and interaction are critical factors affecting students' satisfaction with their online course. The findings in this research parallel Chong's (1998) study that found that students' dissatisfaction with course software led to lower ratings of course satisfaction. The school librarians in the Collaborative Follow-up environment not only had to learn how to use the content tools, and assignment tools but also a suite of communication tools including email, discussion tools, and chat tools to participate in the course. Survey items related to use of the WebCT tools and system received low ratings of satisfaction from the Collaborative Follow-up librarians.

Providing opportunities for interaction have been found to be key to student satisfaction in online courses in previous studies (Bolliger & Martindale, 2004; Swan, 2001). Thus, it could be expected that since the Collaborative Follow-up environment provided multiple opportunities for interaction, the responses to survey items such as, "I looked forward to participating in the online course" and "I would participate in another online professional development course," would receive higher ratings from participants than from participants in the Noncollaborative Follow-up environment. However, since many of the school librarians in the study indicated in their initial postings that they had not taken an online course before, their ratings may be consistent with Sung's (2003) findings that some educators find the lack of human contact and face-to-face interaction found in online professional development courses disconcerting.

TAKS Support Plan Scores

Follow-up and collaboration did not contribute to differences among the three environments in the quality of the TAKS Support Plans submitted by the school librarians. It was anticipated that the effects of follow-up and collaboration would impact the quality of the TAKS Support Plan. However, no significant difference was found among environments on TAKS Support Plan scores. It appears that participants in the two follow-up environments, despite six weeks of instruction, were not able to construct plans that were significantly better than the participants in the No-Follow-up environment. Nor were the participants who received follow-up and collaboration able to construct plans that were significantly better than the participants who only received follow-up.

A host of background factors may explain the lack of difference. In doing research in multiple schools, it is difficult to account for differences in culture and context. The study did not account for the differences in context at the various participant schools. Some participating schools may have been more successful at identifying practices that are likely to encourage success for their students, while others may have continued to employ approaches that have not promoted success. Plans from the school librarians in all environments most likely reflect their school context. Further, several librarians reported that their school had analyzed results of the TAKS, chosen an area for special focus, and had provided additional professional development for their faculty on that focus area. This local professional development may have increased the differences in the level of expertise between school librarians. Finally,

some school librarians had participated in other professional development programs on their own and applied that knowledge to their TAKS Support Plan.

There is also a question whether the plans submitted by the Noncollaborative/ No Follow-up participants were representative of the environment. The number of participants submitting plans in the Noncollaborative/No Follow-up environment was relatively small, 26 or 30% of the total whereas the Collaborative Follow-up environment submitted 55 or 59%. This small sample may not be representative of all participants.

Completion

Follow-up and collaboration were the factors that encouraged course completion. School librarians in the Collaborative Follow-up environment were 30% more likely to complete the course than the participants in the Noncollaborative/No Follow-up environment. Participants in the Noncollaborative Follow-up environment were 55% less likely to complete than the participants in the Collaborative Follow-up environment. There was no significant difference in the likelihood of completion between the participants in the Noncollaborative Follow-up environment and the participants in the Noncollaborative/No Follow-up environment.

The growth of distance education has greatly widened access to learning but has brought with it a new problem: high attrition rates. The completion rate in the Collaborative Follow-up environment, however, compares favorably to previous research in higher education and business. Perhaps, opportunities to collaborate compensate for the isolation in distance education environments. Moore and Kearsley

(1996) found attrition rates of 50% or better in online courses in institutes of higher education. Business organizations also depend on online courses, referred to as e-training, to provide training for employees, but have suffered attrition rates of 60% or higher (Thalheimer, 2003). However, completion rates of participants in all three environments were not as favorable as those found by Joyce and Showers who assert that through face-to-face follow-up, 90-95% of teachers will implement new strategies.

Completion rates in the professional development program were impacted by follow-up provided through the eight-week long course. In fact, one interviewee from the Collaborative Follow-up environment suggested that we send emails to all participants some months after finishing the professional development program surveying them as to the status of their plans and asking if they needed any further assistance. Essentially, she suggested that we should provide follow-up to the follow-up acknowledging the need for continuing learning and support. In order to sustain the learning that is begun at the initial workshop, teachers need ongoing support. Speck and Knipe (2001) observe that "new learning must be supported by modeling, coaching and problem solving components in order for new learning to be practiced, reflected on and integrated into regular use" (p. 15). Professional development without follow-up is not likely to lead to the desired changes in teacher practice.

In addition to follow-up, including opportunities for collaboration with other school librarians also contributed to differences in completion rates. Collaborative professional development breaks down the norms of isolation and establishes cultures

where educators connect and learn from and through each other. As Chrislip (2002) notes:

> Collaboration works because it engages stakeholders as peers using skillful means to facilitate dialogue, mutual learning, shared responsibility and action. By providing a powerful, transforming experience, it allows stakeholders to engage and act together as fellow human beings to address mutual concerns. (p. 1)

Follow-up environments founded on collaborative learning theories supported the formation of communities of practice (Lave & Wenger, 1991; Wenger, 1999). Through discourse regarding issues related to the development of a TAKS Support Plan, the school librarians in the Collaborative Follow-up environment were able to share knowledge and solutions, build competency and expertise, and thereby, learn through and from each other. Novices existed on multiple levels. Some school librarians were novice to the field of school librarianship. Others were novice to a level of service. Still others were novice to the field of distance learning. Supportive relationships with peers fostered mentoring by the "experts" in the community enabling growth.

Socioeconomic Status and Completion

A closer look at the completion data yielded additional insights with regard to the rate of completion by socioeconomic status. Socioeconomic status of the school for each librarian was collected from the Texas Education Agency website. Based on this data, librarians were divided into school socioeconomic status quartiles within each environment and percentages of completion were found for each quartile in each environment. Table 51 and Figure 28 show that completion was more evenly distributed across socioeconomic environments in the Collaborative Follow-up environment. In

both the Noncollaborative Follow-up and Noncollaborative/No Follow-up, completion rates were highest among participants in wealthy schools and lowest among participants in low wealth and impoverished schools.

Table 51. Percentages of Participants Who Completed by Environment and Socioeconomic Status

	High Wealth		Moderate		Low		Impoverished	
	f	%	*f*	%	*f*	%	*f*	%
Collaborative Follow-up	14	64	14	64	12	57	15	58
Noncollaborative Follow-up	16	67	12	55	7	44	8	26
Noncollaborative/ No Follow-up	7	39	7	33	6	23	7	30

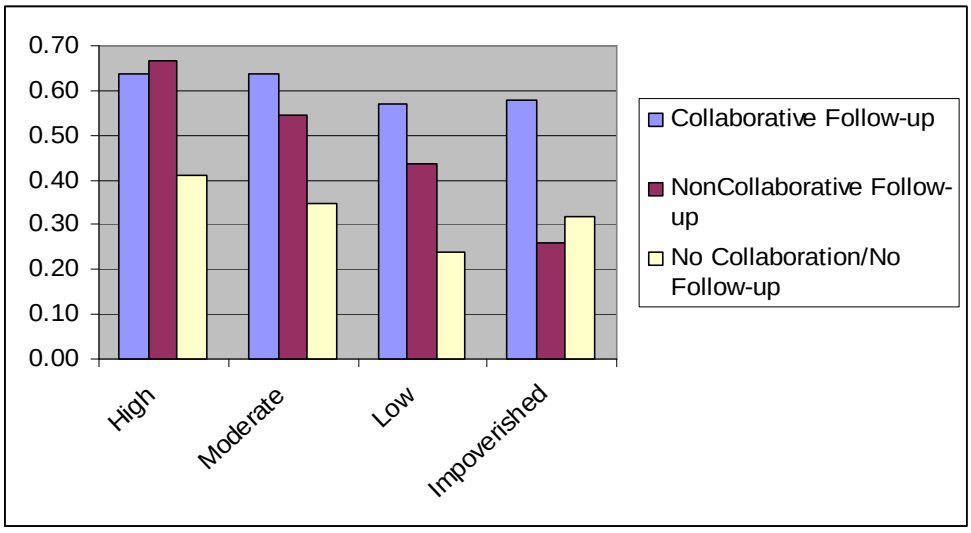


Figure 28. Percentages of Participants Who Completed by Environment and Socioeconomic Status.

Credential

Credential proved to be a significant moderator only in the analysis of completion. Anecdotal evidence from the library directors led the researcher to assume that the additional training and professionalism inherent in the master's degree participants would translate into greater satisfaction, higher scores on the TAKS Support Plan, and higher rates of completion. Previous research on the impact of advanced degree has suggested that the master's degree in the content area is a good predictor of student success on standardized tests at the high school level in math and science and on the English NAEP exam on the 8th grade. For school librarians, student success on standardized tests was associated with the leadership skills of the school librarian. However, none of these analyses was successful in predicting more than a small amount of the variance. Other predictors such as measures of teacher cognitive and verbal ability and/or teacher experience have been much stronger predictors of student success (Ferguson & Ladd, 1996; Greenwald, Hedges, & Laine, 1996; Kain & Singleton, 1996).

Lack of experience and placement in high poverty schools may explain the master's level school librarians' failure to complete the course in the Noncollaborative Follow-up and Noncollaborative/No Follow-up environments. In June 2002, the Texas State Board of Educator Certification adopted rules for the School Library Specialist certificate that made the master's level degree the required degree to enter the field. Many of the master's level participants in the study received their master's degree since 2000, while the school librarians with bachelor's degrees typically had experience

ranging over 25 years. Although, the master's degree is often associated with experience in the teaching field, for school librarians it has become the entry point in the field and may be associated, for the time being, with less experience. Further, many of the novice master's level school librarians were working in schools with high poverty rates (over 75% economically disadvantaged). High poverty schools have the greatest difficulty in attracting and retaining high quality teachers (Darling Hammond & Post, 2000). Students in high poverty schools are more likely to be taught by teachers with less than three years' experience than those in low poverty schools (Park, 2003). Teachers with less experience tend to be less effective than their experienced counterparts and experience a range of problems that more experienced teachers have mastered (Darling-Hammond, 1995). Master's level school librarians who failed to complete the course in the Noncollaborative Follow-up environment and Noncollaborative/No Follow-up environment were largely new to the field or working in high poverty schools or both. The support supplied by the Collaborative Follow-up environment proved to be essential in promoting the success of these participants.

Completion by bachelor's level school librarians in the Noncollaborative/No Follow-up environment was also significantly lower than school librarians in the Collaborative Follow-up environment. Bachelor's level school librarians, with experience of 25 years or more, were the seasoned veterans. Two factors may contribute to the failure to complete by the bachelor's level librarians in the Noncollaborative/No Follow-up environment: (a) resistance to change and (b) no formal leadership training in their initial training and induction into school librarianship. Huberman (1988) found

that seasoned teachers were not only resistant to change, but less likely to believe that it would work. Without follow-up training and support and the opportunities to collaborate with other school librarians in resolving issues, bachelor's level school librarians in the Noncollaborative/No Follow-up environment may have considered the TAKS Support Plan strategy yet another passing fad with little relevance to the library program. The requirements for the bachelor's level credential focused on the content knowledge for school librarians and not on leadership. Participation in leadership activities by school librarians has been associated with positive gains in student achievement. Creating a TAKS Support Plan required that the librarian assume a leadership role in the school.

Reflection and Individualization

Two points are worth noting in the findings from the qualitative research: (a) the capacity of this online professional development program to stimulate reflection and (b) to provide for individualization. Numerous researchers have asserted that professional development programs that include opportunities for reflection are more likely to trigger and sustain teacher change in practice. Further, responding to the varying needs of educators supports change in practice as it addresses the needs of educators at varying levels of experience, skills, perceived need, and content understanding.

In the qualitative interviews, school librarians discussed how they found themselves thinking about the course at times other than when they were on the computer. Whether it was considering a message posted to a discussion or connecting course concepts to practice, school librarians were engaging in reflection. This process

of examining assumptions underlying past practice in light of new information was critical to school librarians' changing attitudes.

Incorporating opportunities for reflection into professional development has been found by other researchers to be powerful strategy for generating teacher change. Freidus (1997) describes a case study of one graduate student/teacher whose teaching styles and beliefs reflected the training and socialization of the directed teaching strategies era. Through the process of creating a master's portfolio of meaningful objects and experiences that illustrated her understanding of teaching and learning, this student began to reflect on the conflict between her motivations for teaching and the constraining environment that shaped her practice.

Individualization also proved to be a meaningful element for the interviewees. Getting feedback from the instructor focused on helping them create a dynamic TAKS Support Plan proved to be an important strategy. Rather than developing a plan in isolation with little understanding of its potential, school librarians had personal guidance that celebrated the strong points in their plan and encouraged the weak points to become stronger. Further, as weaknesses in math and science were uncovered at the schools, specialized resources were incorporated in the course to meet these needs.

Several of the library directors asserted that most school librarians would choose to work on TAKS weaknesses in reading or language arts. However, when school librarians investigated the weaknesses at their campus, many found that their schools' TAKS weakness involved math or science. Since many school librarians are drawn to librarianship as an extension of their reading and language arts expertise, it became

paramount to scaffold these school librarians with both resources and advice in math and science. Responding to the individual needs of school librarians allowed them to pursue their personal learning goals in the context of their school.

In summary, this study supports the inclusion of opportunities for collaboration and follow-up in online follow-up to face-to-face professional development. School librarians whose environment included follow-up reported attitudes that were significantly more positive than the school librarians whose environment did not include follow-up. School librarians whose environment included collaboration reported mildly positive attitudes towards the collaborative experience. Follow-up and collaboration were the factors that encouraged course completion. However, no difference was found in the attitudes towards the online experience by school librarians who participated in online follow-up. Follow-up and collaboration did not contribute to differences among the three environments in the quality of the TAKS Support Plans submitted by the school librarians. Credential proved to be a significant moderator only in the analysis of completion. Completion rates in the environment that included follow-up and collaboration were more evenly distributed among school librarians' socioeconomic status of their schools than librarians in other environments. Reflection and individualization as reported by interviewees were important factors adding depth to the experience.

Limitations

Several factors may limit the contributions of this study. Positive changes in educator knowledge, attitudes, and skills are the product of sustained involvement with

professional development. However, no algorithm or heuristic has been established that determines what length of time is necessary for stimulating transformative change. The duration of the course, eight weeks, may be too short to create transformative change. The initial workshop was presented by the local library services director or designee, tempering the presentation with variance in knowledge, emphasis, intensity, and enthusiasm. Each of the school librarians will vary in experience and aptitude for online distance learning. Some of the school librarians have or are in the process of obtaining school librarian credentials online. These librarians will have greater experience and comfort with online distance learning, while other librarians will be complete novices. Many of the standard deviations of the survey item responses are above one on a five-point scale indicating a lack of consensus on the item. Trends, however, can be inferred from the percentages of agreement and disagreement. Additionally, self-reported surveys and interviews can be susceptible to self-report bias. Finally, the organizational cultures of various schools may limit the ability of school librarians to effect change.

Implications for Practice

Educators face a constant challenge to maintain their proficiency with effective teaching and learning practices. Daily, they must tackle new curriculums, pedagogies, technologies, and an increasingly diverse student body. Professional development becomes a critical component in enabling schools to meet these challenges. Yet, millions of dollars have been allocated for professional development with little to show for the money. Previous research demonstrates that professional development aligned with traditional methods will not yield the results that are needed to address the broader

problems that are facing schools in the United States today. This research demonstrates that professional development aligned with two research-based strategies, online follow-up and online collaboration, with online delivery support professional development completion.

Follow-up to professional development has long been acknowledged as a necessary component to professional development. Yet, few instructional designs for professional development include follow-up strategies. This research demonstrates the importance of including continuous feedback and coaching as school librarians created plans for the library program to support identified student weaknesses on the previous years' Texas Assessment of Knowledge and Skills. Sustained educator change is the ultimate goal of professional development. This goal is not easily accomplished in the one-shot workshop design. Professional development designers recognize that change is a long process supported through phases of learning, practicing, and reflection.

This research demonstrates that professional development is most effective when the instructional design for professional development includes opportunities for collaborative learning. Designers of collaborative professional development recognize that learning situated in social contexts "integrates content, context, community, and participation" (Stein, 1998, para. 5). Collaborative professional development not only acknowledges each educator-learner's diverse background, context, and experience but draws upon those factors to enrich the learning of all learners. Collaborative work among participants balanced with time considerations could foster the growth of interdependence and contribute to group cohesion. Collaborative professional

development, thus, enables educators to learn through and from each other. Powerful professional development for educators recognizes that reflection is important in creating and sustaining change. Educators must be given opportunities to think critically and to make meaning of their professional development experience. Rather than simply accept new strategies at face value, they must have time and opportunities to consider readings, discuss with colleagues, to journal, or to participate in mentoring relationships. This process allows educators to examine long-held beliefs that underlie practice and to gain insight into the assumptions that sustain these beliefs. Rethinking old attitudes and beliefs allows educators to become consciously aware of the how these existing networks of belief influence practice and how change may yield benefits to students and faculty. This process is not instantaneous and requires time beyond a single in-service event.

Individualizing professional development moves educator development beyond transmissive presentations that focus on simply replicating practice to programs that recognize that educators vary in a variety of ways and have different learning needs. Whether considering the different stages of an educator's career, prior knowledge, or differing discipline needs, professional development designers must consider how best to tailor professional development to the needs of the individual educator. This research demonstrates that providing feedback on TAKS Support Plans and providing resources that met the needs of participants were key elements.

Today, educators recognize that effective professional development must be tightly targeted to student needs. Many educators recognize that to promote success for

students, professional development must address those areas of difference between student performance and goals and standards for student learning. By analyzing these data sources, educators are learning where students need stronger support and educators need to refine their practice. Although student scores on standardized tests are the most frequent source of data, numerous other data sources are available such as AP test scores, graduation rates, end of course exams, etc.

Professional development providers remain considerably biased towards face-to-face professional development. However, there is increasing evidence that educators are logging on to learn. This research demonstrates that local education agencies can take advantage of the Internet and reach far greater numbers of educator-learners if they make learning less dependent on time and place. However, throwing learners into a new learning environment without support is not recommended. Educator-learners need support in learning how to interact with the online course management systems. Some professional development designers have even included a boot-camp type week at the beginning of the course to ensure proficiency. Professional development providers should also take advantage of community-building tools embedded in course management software and provide students with training in appropriate uses. Giving students access to the full suite of communication tools and encouraging thoughtful participation establishes norms of online communication and collaborative effort.

Questions for Further Research

Based on the results of this study, the following areas are recommended for future research:

- The most obvious area for research is to investigate how the TAKS Support Plans created by this cohort of school librarians impacted the schools in which they were created. What were the impacts on student learning? What were there impacts on school culture? What were the impacts on the perceived leadership ability of the school librarian?
- This cohort of school librarians worked on disparate content areas. Would a greater sense of community evolve if all participants were working on a common content area such as math or science?
- This model for professional development focused on the creation of the TAKS Support Plan over an eight-week timeframe. Would an extended timeframe that supported the implementation phase of the Plans create additional success?
- Participants in the Collaborative Follow-up environment were the most successful in completing the course. However, even this environment sustained losses. Could survival analysis statistical modeling techniques be applied to online professional development to learn what trigger points cause learners to drop out?
- Does the context and culture of the school effect of the school impact attitudes towards the professional development program, attitudes towards the collaborative experience, attitudes towards the online experience, the quality of the TAKS Support Plan, and completion rates?

- Does treatment environment including Collaborative Follow-up, Noncollaborative Follow-up, and Noncollaborative/No Follow-up contribute to differences in the ratings for the individual constructs in the Attitudes Towards Professional Development Survey including: (a) participant reactions, (b) participant learning, (c) participant's use of new skills, (d) organizational culture, and (e) student outcomes?

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APPENDIX A

DEMOGRAPHIC DATA SURVEY

DEMOGRAPHIC DATA SURVEY

Demographic and Professional Background Data	
Please indicate the level of your school	Elementary Middle High Mixed Level
Including this year, please indicate your cumulative years of service as a teacher and a school library media specialist	0-5 6-10 11-15 16-20 21-25 26-30 31+
Please indicate your school library media specialist certification status	Certified Not certified Obtaining certification
Please indicate your credentials as a school library media specialist	No certification Obtaining certification Bachelor's in Library Science Bachelor's + ExCET testing in School Library Bachelor's + certification MLS Post MLS
Please indicate your last educational degree	Bachelor's Bachelor's+ Master's Master+ PhD
Please indicate the range that includes the year that you received library certification	NA 1965-70 1971-75 1976-80 1981-85 1986-90 91-95 96-2000 2000-2004
Gender	M F

APPENDIX B

TAKS SUPPORT PLAN RUBRIC

TAKS SUPPORT PLAN RUBRIC

	Exceeds Expectation 30-25	Meets Expectations 24-20	Below Expectations 19-15	Score
Collaboration The degree to which the school library media specialists collaborated with other faculty members in creating the plan.	There is extensive evidence of collaborative planning in creating plan between the school library media specialist and other faculty members through formal and informal structures such as faculty committees, partnerships.	There is considerable evidence of collaborative planning in creating plan between the school library media specialist and other faculty members through inclusion of faculty members in	There is moderate evidence of collaborative planning in creating plan between the school library media specialist and other faculty members..	
Potential for Impact The degree to which the plan has the ability to influence student achievement on the TAKS	Clearly describes in detail the goals and objectives of the plan Clearly shows that plan will have a strong sustainable impact on student achievement through careful analysis student data. Remediation is through innovative programs, activities, and resources reflects high standards for student achievement.	Describes the goals and objectives of the plan Plan will have considerable sustainable impact on student achievement through analysis of student data. The connection between activities and potential impact on achievement is evident.	Includes a brief list of the goals and objectives of the plan Plan will have a moderate sustainable impact on student achievement. Focus is too vague or too general, lacks rigor or innovation. Unclear how sustainable the student impact will be.	
Feasibility The degree to which the plan can be successfully implemented	The plan strategies and the associated timeline and are both realistic and likely to be accomplished. Analysis of real and potential resources (Items/services/human resources) is reasonable. Faculty has or has the potential to acquire requisite skills to implement.	The plan strategies and the associated timeline have potential. The project may be successful if some revisions are made to the goals, the timeline or real or potential resources (Items/services/human resources) Faculty has the potential to acquire requisite skills to implement	The plan strategies, the associated timeline or the analysis or real and potential resources (Items/services/human resources) are unrealistic. The plan is unlikely to be successful. Faculty does not currently have skills to implement and no plan for acquiring skills has been presented.	
Clarity The degree to which the plan is thorough in defining issues, and expressing ideas	Ideas expressed clearly and concisely. Main elements of the plan are well thought-out, flows logically and level of detail given provides a thorough understanding of how this plan will be implemented	Ideas were clearly expressed. The main elements are identified and the level of detail given is sufficient to provide a complete outline of how this project will be implemented.	Ideas are not clearly stated. The plan is incomplete, does not flow logically. Main elements have been omitted or are weakly stated. The level of detail is not sufficient to provide a complete overview of how this plan will be implemented.	
Total Score:				
Comments:				

APPENDIX C

ATTITUDES TOWARD THE PROFESSIONAL DEVELOPMENT PROGRAM

ATTITUDES TOWARD THE PROFESSIONAL DEVELOPMENT PROGRAM

Course Evaluation					
Please indicate your response to the following items as **1 = Strongly disagree** **2= Disagree** **3= Undecided** **4 = Agree** **5 = Strongly Agree**					
1) Participant Reactions (Asked to all participants)					
1. Goals and objectives of the professional development program were clear	1	2	3	4	5
2. The professional development program content was relevant and consistent with overall objectives.	1	2	3	4	5
3. The professional development program was well organized.	1	2	3	4	5
4. The time required for professional development was appropriate	1	2	3	4	5
5. Setting my own schedule for involvement in professional development worked well for me.	1	2	3	4	5
6. The TAKS support plan was appropriate in length and format.	1	2	3	4	5
7. Working with other faculty at my school helped me create a more meaningful plan	1	2	3	4	5
Participant's Learning (Asked to all participants)					
8. The professional development program helped me develop a greater understanding of evidence-based practice for school libraries	1	2	3	4	5

9. The professional development activities helped me integrate evidence-based practice material into my situation	1	2	3	4	5
10. This professional development program helped me acquire the intended knowledge and skills to create a TAKS Support Plan.	1	2	3	4	5
11. The professional development program enhanced my contributions to the school community.	1	2	3	4	5
Participant Use of New Skills (Asked to all participants)					
12. I will put the TAKS Support Plan I developed into use this school year to support achievement in my school.	1	2	3	4	5
13. I will communicate the TAKS Support Plan to the various community stakeholders in my school community.	1	2	3	4	5
Organizational Culture (Asked to all participants)					
14. Creating a TAKS Support Plan was supported by my campus.	1	2	3	4	5
Outcomes (Asked to all participants)					
15. I believe my new learning is likely to increase student performance.	1	2	3	4	5

APPENDIX D

ATTITUDES TOWARD THE COLLABORATIVE EXPERIENCE

ATTITUDES TOWARD THE COLLABORATIVE EXPERIENCE

Follow-up/Collaboration (These questions will only be answered by this condition and will be evaluated separately)	
1. The discussions were an effective means of communication with colleagues within the course	1 2 3 4 5
2. Discussions with colleagues helped me to develop new understandings of course concepts.	1 2 3 4 5
3. I felt comfortable participating in discussions with colleagues	1 2 3 4 5
4. Discussion topics were relevant and useful	1 2 3 4 5
5. I saw myself as an active participant in a discussion group.	1 2 3 4 5
6. Email was an effective means of communication with colleagues within the course	1 2 3 4 5
7. Chat was an effective means of communication with colleagues within the course.	1 2 3 4 5
8. Viewing other colleagues' TAKS Support Plans helped me to create a better plan.	1 2 3 4 5
9. Comments from others on my TAKS Support Plan helped me to create a better plan	1 2 3 4 5
10 Interaction opportunities with other students provided a useful learning experience	1 2 3 4 5

APPENDIX E

ATTITUDES TOWARD THE ONLINE

FOLLOW-UP EXPERIENCE
*

ATTITUDES TOWARD THE ONLINE FOLLOW-UP EXPERIENCE

Collaborative Follow-up and Noncollaborative Follow-up (These questions will only be answered by these conditions and will be evaluated separately.)	
1. The online professional development format was a good environment for me to learn this content.	1 2 3 4 5
2. The online professional development content provided useful information	1 2 3 4 5
3. The online professional development readings (articles, websites, and PowerPoint presentations) were an effective learning medium for me.	1 2 3 4 5
4. I feel I learned at least as much from this online professional development course as I have learned in other professional development opportunities that were in a traditional format.	1 2 3 4 5
5. I looked forward to participating in the online professional development.	1 2 3 4 5
6. I felt comfortable using WebCT Vista for online professional development	1 2 3 4 5
7. I was able to easily navigate through WebCT Vista for online professional development	1 2 3 4 5
8. WebCT Vista tools were easy to use	1 2 3 4 5
9. Technical support was available when I needed it?	1 2 3 4 5
10. I would participate in another online professional development course that uses WebCT Vista	1 2 3 4 5

APPENDIX F

COLLABORATIVE COURSE OUTLINE

Week	Course Module	Objectives	Content	Discussion Question	TAKS Support Plan Assignment
1	Welcome to the course and Personal Introductions	After completing this module the school librarian will be able to: 1) Name the other colleagues in the discussion group. 2) Use the communication tools to post messages, participate in discussions or chat in real time with colleagues 3) Use the assignment tool to upload a description of their school.	Participants were introduced to WebCT tools and were asked to submit an overview of their school emphasizing its strengths and weaknesses.	Introduce yourself and briefly describe what you hope to learn in this course.	1 page paper describing the school and its strengths and weaknesses.
2	Collaboration	After completing this module, the school librarian will be able to: 1. Distinguish between coordination, cooperation and collaboration. 2. Describe the benefits of collaboration. 3. Incorporate collaboration strategies into the TAKS Support planning process.	Participants were asked to find faculty members at their school with whom they can discuss and/or collaborate with on the project as it progresses. Resources stressed the importance of collaborative partnerships.	What strategies have you used for collaboration in the past? Have they been successful? What would you change?	1 page paper describing the plan for including other members of the school community in the planning.
3	Selection of TAKS	After completing this module, the school librarian will be able to: 1. Discuss how school library programs support student achievement. 2. Analyze data on the Summary Report – Test Performance for your school 3. Identify 3 TEKS to target from the Summary Report - Test Performance.	Participants were asked to find the TAKS report to the school and to select 2-3 areas of weakness on the test. Resources stressed the importance of evidence-based practice for school librarians.	Todd gives the scenario of a newspaper calling your library and asking for evidence about how your library really helps students learn. How would you answer the call? How does the study done by the Texas State Library and Archives Commission support your answer?	1 page paper describing the TAKS chosen for remediation and why they were chosen
4	Planning for student achievement	After completing this module, the school librarian will be able to: 1. Analyze the types of library programs or librarian roles are likely to promote student achievement 2. Use the various tools to identify library initiatives for TAKS weaknesses that will facilitate student success. 3. Construct a simple plan for implementing the interventions.	Participants were asked to use a variety of information sources to create library interventions to remediate weaknesses identified on the Summary Report - Student Performance. Resources provided ideas for dealing with various TAKS weaknesses.	Valenza talks about librarian roles (teacher, instructional partner, informational specialist, and program administrator). Which of these roles will you assume to implement your initiatives to improve student performance on the TAKS?	1 page paper describing the strategies to be employed in remediation

Week	Course Module	Objectives	Content	Discussion Question	TAKS Support Plan Assignment
5	Evaluating Resources and Adapting to change	After completing this module, the school librarian will be able to: 1. Analyze TAKS Support Plan and identify resources on hand and resources that are needed. 2. Identify potential allies for funding support. 3. Identify potential sources of funding. 4. Construct and justify a budget for needed resources	Participants were asked to examine resources necessary to implement their plan including physical resources such as books, databases, hardware and software as well as human resources Resources considered funding sources and grant writing strategies.	How will you obtain the funding you need for your TAKS Support program or activity?	1 page paper describing resources on hand, the resources needed and how they will be obtained if not already present.
6	Communication Plan	After completing this module, the school librarian will be able to: 1. Differentiate the various influence networks in the school community. 2 . Identify paths for communication to influence networks and key groups. 3 . Construct a set of strategies to communicate your TAKS Support Program or Activities to key groups.	Participants were asked to describe how they will communicate their plan to members of the school community. Resources stressed the importance of school library advocacy with suggestions for creating an advocacy plan.	What strategies have you used for advocacy in the past? What was successful?	1 page paper describing the communication plan

APPENDIX G

NONCOLLABORATIVE COURSE OUTLINE

Week	Course Module	Content	Resources	Reflection Question Posted to Assignment	TAKS Support Plan Assignment
1	Welcome to the course and Personal Introductions	After completing this module school librarians will be able to: 1) Use the assignment tool to upload a short introduction of yourself to the instructor under Journal Assignment. 2) Use the assignment tool to upload a description of your school under TAKS Support Plan Assignment. 3) View or place information on the calendar. 4) View announcements.	Participants were introduced to WebCT tools and were asked to submit an overview of their school emphasizing its strengths and weaknesses.	Introduce yourself and briefly describe your library.	1 page paper describing the school and its strengths and weaknesses.
2	Collaboration	After completing this module school librarians will be able to: 1. Distinguish between coordination, cooperation and collaboration. 2. Describe the benefits of collaboration. 3. Incorporate collaboration strategies into the TAKS Support planning process.	Participants were asked to find faculty members at their school with whom they can discuss and/or collaborate with on the project as it progresses. Resources stressed the importance of collaborative partnerships.	What strategies have you used for collaboration in the past? Have they been successful? What would you change?	1 page paper describing the plan for including other members of the school community in the planning.
3	Selection of TAKS	After completing this module school librarians will be able to: 1. Discuss how school library programs support student achievement. 2. Analyze data on the Summary Report – Test Performance for your school 3. Identify 3 TEKS to target from the Summary Report - Test Performance	Participants were asked to find the TAKS report to the school and to select 2-3 areas of weakness on the test. Resources stressed the importance of evidence-based practice for school librarians.	Todd gives the scenario of a newspaper calling your library and asking for evidence about how your library really helps students learn. How would you answer the call? How does the study done by the Texas State Library and Archives Commission support your answer?	1 page paper describing the TAKS chosen for remediation and why they were chosen

Week	Course Module	Content	Resources	Reflection Question Posted to Assignment	TAKS Support Plan Assignment
4	Planning for student achievement	After completing this module school librarians will be able to: 1. Analyze the types of library programs or librarian roles are likely to promote student achievement 2. Use the various tools to identify library initiatives for TAKS weaknesses that will facilitate student success. 3. Construct a simple plan for implementing the interventions.	Participants were asked to use a variety of information sources to create library interventions to remediate weaknesses identified on the Summary Report - Student Performance. Resources provided ideas for dealing with various TAKS weaknesses.	Valenza talks about librarian roles (teacher, instructional partner, informational specialist, and program administrator). Which of these roles will you assume to implement your initiatives to improve student performance on the TAKS?	1 page paper describing the strategies to be employed in remediation
5	Evaluating Resources and Adapting to change	After completing this module school librarians will be able to: 1. Analyze TAKS Support Plan and identify resources on hand and resources that are needed. 2. Identify potential allies for funding support. 3. Identify potential sources of funding. 4. Construct and justify a budget for needed resources	Participants were asked to examine resources necessary to implement their plan including physical resources such as books, databases, hardware and software as well as human resources Resources considered funding sources and grant writing strategies.	1. How will you obtain the funding you need for your TAKS Support program or activity?	1 page paper describing resources on hand, the resources needed and how they will be obtained if not already present.
6	Communication Plan	After completing this module school librarians will be able to: 1. Differentiate the various influence networks in the school community. 2 . Identify paths for communication to influence networks and key groups. 3 . Construct a set of strategies to communicate your TAKS Support Program or Activities to key groups.	Participants were asked to describe how they will communicate their plan to members of the school community. Resources stressed the importance of school library advocacy with suggestions for creating an advocacy plan.	1. Hartzell talks about influence networks in his article, Heard it through the grapevine. What influence networks do you find at your school? How do these affect advocacy? 2. What strategies have you used for advocacy in the past? What was successful?	1 page paper describing the communication plan

APPENDIX H

NONCOLLABORATIVE/NO FOLLOW-UP COURSE OUTLINE

Week	Content	TAKS Support Plan Assignment
Week 1	Introduction to the WebCT Assignment Tool Message stating, "Welcome to TAMU. Thank you for participating in the study. Please upload your TAKS Support Plan no later than (November 1, 2004)." Course Evaluation will appear when TAKS Plan is uploaded.	6 page TAKS Support Plan.
Week 2	Introduction to the WebCT Assignment Tool Message stating, "Welcome to TAMU. Thank you for participating in the study. Please upload your TAKS Support Plan no later than (November 1, 2004)." Course Evaluation will appear when TAKS Plan is uploaded.	6 page TAKS Support Plan.
Week 3	Introduction to the WebCT Assignment Tool Message stating, "Welcome to TAMU. Thank you for participating in the study. Please upload your TAKS Support Plan no later than (November 1, 2004)." Course Evaluation will appear when TAKS Plan is uploaded.	6 page TAKS Support Plan.
Week 4	Introduction to the WebCT Assignment Tool Message stating, "Welcome to TAMU. Thank you for participating in the study. Please upload your TAKS Support Plan no later than (November 1, 2004)." Course Evaluation will appear when TAKS Plan is uploaded.	6 page TAKS Support Plan.
Week 5	Introduction to the WebCT Assignment Tool Message stating, "Welcome to TAMU. Thank you for participating in the study. Please upload your TAKS Support Plan no later than (November 1, 2004)." Course Evaluation will appear when TAKS Plan is uploaded.	6 page TAKS Support Plan.
Week 6	Introduction to the WebCT Assignment Tool Message stating, "Welcome to TAMU. Thank you for participating in the study. Please upload your TAKS Support Plan no later than (November 1, 2004)." Course Evaluation will appear when TAKS Plan is uploaded.	6 page TAKS Support Plan.

APPENDIX I

QUALITATIVE QUESTIONS

QUALITATIVE QUESTIONS

1. How did your perception of the library's relationship to student achievement change after participating in the program?
2. How has your participation in the online staff development impacted your practice as a school library media specialist?
3. What influenced your decision for taking the course?
4. How has the online professional development helped you?
5. What do you view as the strengths of the program?
6. What you view as the weaknesses of the program?
7. What aspects of the online professional development contributed most to your learning?
8. What aspects of the online professional development detracted from your learning?
9. How did your collaborating faculty contribute to the final product?
10. What would you change about the online professional development?

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