Exploring relationships between configurations of technology use and professional development among Ces teachers

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EXPLORING RELATIONSHIPS BETWEEN CONFIGURATIONS OF TECHNOLOGY USE AND PROFESSIONAL DEVELOPMENT AMONG CES TEACHERS

by

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1999

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ABSTRACT

Exploring Relationships Between Configurations of Technology Use and Professional Development Among CES Teachers

by

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The purpose of this study was to determine the effect recent technology integration was having on teaching in the Church Education System (CES). Specifically, this study sought to identify (a) different configurations of technology use; (b) different forms and processes of support; and (c) examine the relationships between the two. Education change theory, particularly the Concerns-Based Adoption Model, was used to guide the research. An Innovation Configuration (IC) Map was developed and used to collect data. Three configurations of use were identified: Independent—teachers who proactively learned technology on their own and implement it well; Interdependent—teachers who are fairly new to technology and are anxious to learn but are limited by time and knowledge; and Codependent—teachers who are intimidated by technology, have limited knowledge, and rely completely on others for help.

Some of the different forms and processes of support CES teachers received were: Self-taught—nearly every teacher has learned how to use technology on their own; Help from colleagues—most teachers had someone they could go to for help and many of them
use each other to learn; and CES Help Desk—one group found it to be helpful. There was no ongoing formal professional development program.

The relationships between configurations of use and professional development revealed that Independent teachers always learn on their own, rarely get help from others, and rarely call the CES Help Desk. A lack of ongoing professional development left these teachers overloaded. The Interdependent teachers mostly learn on their own, rely heavily on Independent teachers, and get help from the CES Help Desk. They seem to be in a good position because they get help and give help without becoming overburdened. The Codependent teachers completely rely on others, rarely spend time learning on their own, and rarely call the CES Help Desk.

Conclusions reveal that teachers were given technology with little support and have had to learn on their own, thus making sustained and successful integration difficult. Also, ongoing professional development is critical for teachers to make progress in their use of technology. Finally, IC Maps are useful tools for supporting and analyzing technology integration.
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CHAPTER 1

INTRODUCTION

Purpose of Study

The purpose of this study is to determine the effect recent technology integration is having on teaching in the Church Education System (CES). Specifically, this study seeks to identify (a) different configurations of technology use among CES teachers, (b) the different forms and processes of support for technology integration, and (c) the relationships between the two—technology use and the different forms and processes of support.

Background

*Education Reform*

Education reform is an ongoing concern for teachers and administrators. The 1960s was a decade of change referred to by Fullan (2001) as the “adoption era of reform” because the intent was to get innovations out there in hopes they would bring about change (p. 5). As a result large amounts of money were given to change the curriculum, but by the 1970s it was clear that the “yield was miniscule” (p. 5). People started to recognize that implementing ideas was much more difficult than previously realized (Fullan, 2001).
Research was showing that it was time to move away from teacher-centered schools to learner-centered environments (Bransford, Brown, & Cocking, 2000). This was a major shift in the way teachers had been teaching. Students come to class with a preexisting understanding of the concept and teachers need to draw upon this knowledge in order to help them achieve the next level of comprehension (Bransford et al., 2000). Even though research has shown the need for classrooms to become more student-centered, it is difficult to break old habits (Fullan, 2001).

In the 1980s large-scale reform focused on standardization as a result of the research publicized in *A Nation at Risk* (Fullan, 2001). As states began to have more control over local schools it was thought that a greater standardization would occur. However, the top-down approach did little to affect student learning and comprehension (Furhman & Elmore, 1990).

Even though these major reform efforts were failing, a growing consensus was being created around the world that education needed to change. Fullan (2001) said that the pressure for reform had increased, but in reality little had changed. In 2001 the *No Child Left Behind Act* (NCLB) was signed into law. Every student and school would be held accountable through the use of standardized testing. A goal of every student reaching proficiency in reading and mathematics by the end of the 2013-14 school year was established. However, NCLB has caused much debate regarding implementation and effectiveness. For example, more than six years has passed and many are still arguing what ‘proficient’ means (Hoff, 2007). NCLB is not the only innovation the government and others are hoping will spur reform in education.
Since the 1980s teachers, administrators, and government officials have been looking to technology to support reform (Barrios, et al, 2004; Gulek & Demirtas, 2005; Hall, et al., 1999; Partnership for 21st Century Skills, 2006; National Education Technology Plan, 2004; Warschauer, 2006). Since the Apple Classrooms of Tomorrow (ACOT) project in the mid 1980s, computer technology has increasingly permeated education. Today students live in a world where they spend $175 billion annually as technology consumers and more than six hours a day using technology (1 to 1 Learning, 2006).

Again, the government invested large sums of money in an innovation hoping for a revolution (Cuban, 2001). One of the expectations is that teachers' pedagogy will change, thus causing teachers to become more constructivist in their approach. Cuban (2001) believes this has not occurred. In fact, he believes, and his research supports it, that technology has been oversold to schools and it is underused. In one study, Cuban, Kirkpatrick, and Peck (2001) found that when teachers used technology it sustained rather than altered existing patterns of teaching practice. The Partnership for 21st Century Skills (2006) reports: “In an era of intense global competition, there is mounting evidence and widespread public recognition that our education system is inadequately preparing students with the edge they need to compete” (p. 12). Rather than focusing on helping teachers change with technology; technology can often become the focus of the change.

Education leaders can be led to think that if teachers are given technology it will be seamlessly implemented and student outcomes increase. However, without adequate help in the process of integrating technology, often this does not occur (Fullan, 2001; Hall, et al, 1999; McKenzie, 1999). Bransford et al. (2000) state, “technologies do not guarantee
effective learning” (p. 206). However, teachers do experience predictable stages of change when integrating technology that, if properly identified and understood, can be used for effective professional development (Dwyer, Ringstaff & Sandholtz, 1990). It would be foolish to think that an immigrant from another country could learn the English language overnight or even in a year. Prensky (2006) identified the current generation of students as “digital natives” and teachers as “digital immigrants” (p. 9). Just as any immigrant needs help from others to learn the language and the culture, teachers need help to learn and teach effectively with technology.

Professional Development

At the center of any educational change is professional development (Birman, Desimone, Porter, & Garet, 2000; Guskey, 1986; Lowden, 2005; Pritchard & Marshall, 2002; Shaha, Lewis, O’Donnell, & Brown, 2004). Barrios, Ambler, Anderson, Barton, Burnett, Feyten, et al. (2004), talking about how administrators often underestimate the importance of quality professional development, stated that “the least successful projects have simply dropped hardware into classrooms” (p. 1). When this happens technology can get in the way of teaching and often frustrates teachers and students.

Frustration among teachers and students occurs because immediate results are expected as soon as technology is handed out. Hall et al. (1999) introduced the giant leap theory, which states that “as soon as the policy is approved, or the curriculum is adopted, a giant leap is assumed from where things currently are to the newly idealized state” (p. 1). It is as though those who ask others to change think that it will happen overnight and immediate results will be evident. When innovations like technology are being implemented, Hall et al. suggest that before you ask if student outcomes have improved,
you should ask if teacher's practices in the classrooms have changed to be aligned with the new technology integration. Professional development is the avenue that helps teachers gain the necessary skills to become trained or to further their skills. The current study will address the question of how practices in the classroom are being impacted by technology and professional development.

When implementing technology, professional development can help teachers understand basic integration or provide a means of collaboration among other teachers who are well on their way to successful integration of technology. Professional development that is consistent and effective can be a powerful tool in helping teachers in the change process. Understanding that teachers need help, as they try to make changes in their teaching and learning, is a fundamental part of education reform and successful technology adaptation.

Reform is not just putting a new innovation into place and hoping education changes. Fullan (2001) states: “It means changing the cultures of the classrooms, the schools, the districts, the universities, and so on” (p. 7). Understanding how teachers change, and the process they go through when making changes, is an important part of educational reform (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003).

**Educational Change Perspective**

The perspective advocated by Hall & Hord is unique because it looks at change from the individual's point of view and focuses on understanding how teachers change (Hall & Hord, 2006). Much has been written on educational change and though the research is varied, it contains many similar assumptions, such as, (a) change is an individual process, not an event; (b) change takes time, anywhere from three to eight years—Fullan (2001)
states that an elementary school can turn around in three years, a high school in six, and a
school district in eight; and (c) teachers experience phases of change that, if properly
identified and understood, can be used for effective professional development to help
create effective, lasting change occur (Dwyer et al., 1990; Fullan, 2001; Hall & Hord,
2006; Rogers, 2003).

**Concerns-Based Adoption Model.**

Hall and Hord’s (2006) Concern-Based Adoption Model (CBAM) is extremely
valuable because few tools exist that provide a way to measure the change process
(Adams, 2003). Anderson (1997), writing about CBAM, states that it is “arguably the
most robust and empirically grounded theoretical model for the implementation of
educational innovations to come out of educational change research in the 1970s and
1980s” (p. 331). CBAM was first proposed as a way to understand and facilitate change
in 1973 by Hall, Wallace, and Dossett (Hall et al., 1999). It developed from the work of
Fuller (1969) in the 1960s and has held a strong presence in educational change research
for over 30 years.

CBAM describes and explains the stages teachers (or anyone integrating an
innovation) experience when attempting to make changes. The CBAM consists of three
diagnostic tools to guide the researcher in gathering data: (a) Stages of Concern, (b)
Levels of Use, and (c) Innovations Configuration Map. Each of these tools may be used
independently or combined together. They are designed to meet the needs of whomever is
using it. Hall and Hord (2006) assert “that if individuals are provided support based on
their particular Stage of Concerns and Level of Use, the change process can be led and
guided in ways that personalizes the experience” (p. 258).
A pilot study was conducted in the Pittsburg Seminary utilizing the Stages of Concern tool to identify teachers concerns. In this study the Innovation Configurations Map (IC) will be used to guide the researcher in gathering data. Also, though the Stages of Concern and Levels of Use can be very helpful, at the recommendations of Dr. G. E. Hall (one of the authors of CBAM) and Dr. L. Donovan (who completed her dissertation using IC), the IC Map will provide the information needed for this research. The CBAM is personal in its research, making the findings valuable for anyone who is attempting to make changes. As teachers are currently trying to implement technology into their teaching and learning, CBAM becomes extremely helpful because of its ability to look closely at each individual teacher.

*Innovation Configuration Maps.*

Hall and Hord (2006) found that “many teachers and others who are expected to implement new practices ... are not clear about what they are being asked to do” (p. 110). They are then held accountable for something that they know little about. The Innovation Configuration (IC) map is a tool that takes a word snapshot of what the different configurations look like. It attempts to describe how the innovation is really being implemented. This knowledge is critical in order to provide relevant and appropriate forms of training (Hall et al., 1999). Often administrators ask for teachers to integrate technology into their teaching and learning, and then give no instruction or training on how it is to be accomplished. As a result, these education leaders are unaware of exactly how the innovation is being implemented, or if teachers are doing it at all. The Innovation Configuration Map will show how the technology is actually being integrated. After the
IC Map is created, leaders can use it as a tool to assess technology integration and see what specific professional development is needed to further the implementation process.

The IC Map was developed by the CBAM researchers when they were assessing the Levels of Use and realized that people’s descriptions of the innovations varied. This led to the development of the concept of an IC Map—“the operational forms of the innovation that result from implementation by different individuals in different contexts” (Hord, Stiegelbaur, Hall, & George, 2006, p. 4). The IC Map identifies different components and variations of the innovation. Because the IC Map displays what teachers actually do, it becomes a great resource to those who are providing professional development.

Statement of the Problem

The researcher works for the CES and teaches at one of the participant schools, Grant Seminary. The CES recently provided each of its instructors at Pittsburg and Grant with laptop computers and projectors. The researcher conducted a pilot study during the Spring 2007 Semester to find out what the current concerns were of teachers at Pittsburg Seminary. Specifically, the following research question was addressed: What are the current concerns CES teachers have as they are integrating technology (laptops, Internet, & projectors) into their teaching and learning (what stage are they at—determined by the Stages of Concern Questionnaire)?

As a group Pittsburg Seminary teachers scored an 84 in stage 1—informational. This reveals that their greatest concern about integrating technology is the lack of information. Their second highest score was found in stage 5—collaboration stage. Normally, a high
stage 5 indicates that teachers have a concern in working with others, however because stage 1 is high and stage 5 is high, it is suggested that teachers have a desire to learn from one another and would like to see what others are doing to integrate technology (George, Hall, & Steigelbauer, 2006). The lowest group score was found in stage 4—consequence. This reveals that they were not too concerned about how technology is affecting students. This is probably the result of the teachers, as a group, being non-users. Non-users do not use technology and therefore are not concerned about its effects. This pilot study led the researcher to wonder how technology was affecting the teaching in CES and thus the current study was undertaken.

CES teachers are frustrated because technology has been handed to them with little to no support. Unfortunately this is not uncommon among schools across the nation. Everyone involved (government officials, administrators, education leaders, teachers, and students) needs to understand more fully the change process itself, not just technology. Teachers need help in integrating technology and they cannot be expected to use it correctly if they have not been trained.

This study will seek to develop a tool to support the description of different classroom configurations of technology use. In addition the tool will identify the different forms and processes of support CES teachers receive. Finally, it will explore the relationship between the configurations of technology and the different forms and processes of support.
Questions Guiding the Study

Three questions will guide this study in finding what effect recent technology integration is having on the teaching in CES:

1. What are the different configurations of technology use among CES teachers?
2. What are the different forms and processes of support for technology integration among CES teachers?
3. What are the relationships between different configurations of use and the different forms and processes of support for technology integration among CES teachers?

Significance of the Study

The current study will provide insight into the effect recent technology integration is having on the teaching in the CES. Different configurations of technology use among CES teachers will be described. This study will identify the different forms and processes of support for technology integration among CES teachers. This study will also determine the relationship between different forms and processes of support and configurations of technology use. These findings are significant because no study like this has been conducted within this unique context. The results will provide valuable information for those involved in the professional development of CES teachers. The findings will also show how the different forms and processes of support are affecting the configurations of technology use. Administrators and those involved in training will find this information extremely valuable to help in guiding future successful technology integration strategies.
An important outcome of this research study is the development of an Innovation Configurations (IC) map. After the IC Map is created, administrators can use it as a tool to assess technology integration and see what specific professional development is needed to further the implementation process. The created IC Map can also be used to assess how technology is being used by any CES teacher world-wide.

The different forms and processes of support for technology integration could provide valuable insights for administrators in seeing that there are different ways teachers learn how to integrate technology. For example, workshops and inservice are not the only ways teachers receive help. By knowing the other ways teachers gain assistance, principals can more effectively provide appropriate professional development.

Theoretical Framework

Education change theory, specifically the Concerns-Based Adoption Model (CBAM), will be the theoretical framework used to guide this study. Change theory is a valuable lens for anyone to use in understanding how people change, what predictable stages they go through when changing, and how to effectively implement change (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003). Hall and Hord (2006) identify what is needed for change to be successful. They state:

Change success depends less on whether the source of the culture is internal or external and significantly more on the degree to which the culture of the organization is open and ready to consider what is currently being done and is continually examining ways to improve (p. 1).
CBAM contains some assumptions about change. Hall and Hord (2006) identify these assumptions or principles as “no longer debatable points, for they summarize predictable aspects of change” (p. 4). Often administrators want immediate results when an innovation is implemented. Hall et al. (1999) call this a “giant leap” and explain that “before there can be any change in student learning, teachers must change their classroom practices” (p. 2). Fullan (2001) states that “reform is not just putting into place the latest policy. It means changing the cultures of the classrooms, the schools, the districts, the universities, and so on” (p. 7). In order for effective and lasting results to occur, the change process must be understood and applied.

CBAM theory will focus and guide this research study effectively because it provides the necessary information for change facilitators to assess how technology is being implemented. It is also effective because it focuses the research on individuals involved in the change process, particularly CES teachers. Finally, the diagnostic data obtained using CBAM will provide the necessary information facilitators need to adjust appropriate interventions and provide whatever is necessary to meet the current needs of CES teachers. As Anderson (1997) states, “CBAM provides an elaborate framework and methodology for describing key dimensions of the process, content, and support for teacher implementation of changes” (p. 338).

In this study, recent technology integration among CES teachers will be examined using change theory. Different configurations of technology use among CES teachers will be identified and different forms and processes of support will be analyzed. Relationships between the different forms and processes of support and configurations of technology use will be determined.
CHAPTER 2

REVIEW OF RELATED LITERATURE

This review is divided into five sections. The first section is a description of the processes involved in the selection of research. The second section focuses on education change theory, providing a brief overview of differing perspectives on change. This section also discusses the Concerns-Based Adoption Model (CBAM) and identifies research that used CBAM. It also describes how CBAM can be used as a framework for conducting research. The third section identifies research in regard to the different phases teachers go through when integrating technology. It focuses particularly on the phases that impact professional development. The fourth section is on professional development. It identifies the promising proven practices of professional development that have been established in the literature. This section identifies the different forms and processes of support teachers receive in relationship to technology integration. The final section identifies gaps in the existing research.

This review of literature provides the necessary background to support the following research questions:

1. What are the different configurations of technology use among CES teachers?
2. What are the different forms and processes of support for technology integration among CES teachers?
3. What are the possible relationships between different configurations of use and the different forms and processes of support for technology integration among CES teachers?

Literature Review Procedures

Four databases were utilized in finding relevant research: 1) Education Resources Information Center (ERIC), 2) Education—Full Text, 3) Education—A Sage Collection, and 4) Professional Development Collection. Internet searches using Google and Google Scholar were also conducted. Also, University of Nevada, Las Vegas (UNLV) faculty recommended articles and books. The following search descriptors were used in the database and internet searchers: CBAM, Concerns-Based Adoption Model, Innovation Configuration Maps, IC, IC Map, education reform, technology reform, technology integration, technology integration phases, education technology, professional development, best practices, proven practices, effective practices, inservice, technology training, education technology workshops, forms of technology support, and process of technology support.

Selection Criteria

Studies included in this review of literature were based on their relevance to the purposes of the study. In particular it includes, studies that have direct implications for (a) faculty initiatives regarding technology integration, (b) professional development supporting technology integration, and (c) studies of innovation implementation and teacher development.
Educational Change

Like all educators, the CES teachers are being asked to participate in a reform by integrating technology into their teaching and learning while focusing on taking a student-centered approach (Bransford et al., 2000). It is important to understand the broader context of these reforms to better evaluate the situation in the CES system.

Education reform is an ongoing concern for teachers and administrators. Understanding how teachers change, and the process they go through when making changes, is an important part of educational reform (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003). Past efforts to reform education, if nothing else, have shown that change is more difficult than it was originally considered.

The mid 1960s and early 1970s was a time of change that Fullan (2001) labeled the "adoption era of reform" because the intent was to disseminate innovations in hopes they would bring about change (p. 5). As a result large amounts of money were given to change the curriculum, but by the 1970s it was clear that the "yield was miniscule" (p. 5). It was at this point that people started to realize that change is a complex and difficult process (Fullan, 2001; Hall & Hord, 2006).

In the 1980s, the highly publicized report A Nation at Risk led to a focus on standardization. The government put more control with the states thinking that greater curricular standardization would occur thus leading to higher test scores and better equipped graduating students. However, the change in student learning and comprehension was limited (Furhman & Elmore, 1990).

Though major reform efforts did not succeed as originally intended they were creating a growing consensus that education needed to be modified. Fullan (2001) said
that pressure for reform had increased, but the realization had not. In addition to concerns from the federal government, corporations began to take an interest in educational reform. With the invention of computer and networking technology the world was beginning to flatten. Students, upon graduating, started to compete for jobs with others across the globe (Friedman, 2005). Since technology was introduced in the classrooms in the mid 1980s, many have hoped it too would cause education to reform (Barrios et al., 2004; Gulek & Demirtas, 2005; National Educational Technology Plan, 2004; Warschauer, 2006).

One of the reasons reform efforts are not successful is because the lack of support teachers receive when making changes and the lack of understanding of the change process (Barrios et al., 2004; Fullan, 2001; Hall & Hord, 2006; Rogers, 2003). Understanding how teachers change and the processes involved in making the changes will create better opportunities for effective, lasting change to occur (Hall & Hord, 2006).

_Differing Perspectives on Change: Fullan, Rogers, and Hall & Hord_

Much has been written on education change and though the research is varied, it contains many similar assumptions. Some of the assumptions are: (a) change is an individual process, not an event; (b) change takes time, anywhere from 3 to 8 years; and (c) teachers experience phases of change that, if properly identified and understood, can be used for effective professional development to help create effective, lasting change to occur (Dwyer et al., 1990; Fullan, 2001; Hall & Hord, 2006; Rogers, 2003). Prominent theorists in education change include: Michael Fullan, Everett Rogers, Gene Hall and Shirley Hord. Their research, work, and views will be reviewed to understand the processes of change.
Fullan

Fullan (2001) has been a leader in change theory for many years and is known all over the world as an authority on educational reform. He has been involved in different aspects of change across the globe and has written many books on the topic which have been translated into many languages. One of his books, The New Meaning of Educational Change, looks at the challenge of reform in education and gives some strategies for effective and lasting change implementation. Fullan, Cuttress, & Kilcher (2005) state that most educational reform ideas fail because of the lack of change knowledge.

Fullan (2001) views educational change from three different aspects. The first focuses on the importance of understanding the foundational nature of educational change. The second looks at change that takes place at the local level—with individuals from teachers and principals to students and district administrators. The final aspect focuses on change at the regional and national level, emphasizing the need for professional preparation and development.

The Foundation.

Fullan (2001) provides an overview of different innovations that have been attempted throughout the years. In doing so, he establishes one of the biggest barriers to implementing any changes—the need for time. He concludes that “you can turn around an elementary school in about 3 years, a high school in about 6 years, and a school district (depending on size) in about 8 years” (p. 17). This is fundamentally important for anyone to understand because results are often immediately expected and when the results are not immediately positive, the innovation is deemed a failure (Hall et al., 1999).
Fullan (2001) identifies many important foundational aspects that are important to consider when asking anyone to make alterations. One of these aspects is to realize that often teachers are faced with the challenge of too many innovations in education. Fullan believes that this is one of the biggest problems facing schools because it causes “fragmentation and overload” (p. 21). This in turn leads to frustration by everyone involved—students, teachers, administrators, and government officials. Many factors make it challenging for teachers to cope with change. Fullan states, “It isn’t that people resist change as much as they don’t know how to cope with it” (p. xii). Also, people resist change for what they feel are good reasons.

Fullan (2001) identifies certain factors that may affect the implementation and continuation of innovations. He makes several valuable statements in this regard:

- “Pressure and support are necessary for success” (p. 91). When change occurs, the right amount of pressure and support has been involved that caused the individual to move towards some form of action.

- “Things get worse before they get better and clearer” (p. 92). This helps innovators be better prepared to ride through the storms and not become frustrated and quit too soon.

- “Innovators need to be open about the reality of others” (p. 97). People have feelings and are sincerely concerned about making changes. As innovators are open to others thoughts and input, ownership is created in individuals leading to longer, lasting results.

- “Do not be seduced into looking for the silver bullet” (p. 110). One size does not fit all when it comes to making changes, especially large scale
adjustments. Every individual within an organization will have a little bit different experience and though there are some general principles that can help everyone, there is not one silver bullet that will change everybody.

Change is a multifarious process; however, by understanding and implementing these key foundational components innovators will have a much greater chance at making lasting modifications.

*The individuals involved.*

Fullan (2001) looks directly at individuals involved in the change process and what they are experiencing. He reports that often people involved in the education change process feel misunderstood. Teachers, principals, students, district administrators, parents, and the community face many different challenges. By understanding what individuals are going through, change can be tackled more directly and in turn more effectively. For the most part, the daily demands expected of them make “sustained improvement” extremely difficult (p. 116).

*Regional and national level.*

The perspective of those on the regional and national levels and the importance of professional development is another aspect Fullan (2001) identifies. Fullan makes a chilling statement about what some might believe about education: “There does not seem to be a real belief or confidence that investing in teacher education will yield results. Perhaps deep down many leaders believe that teaching is not all that difficult” (p. 241). In regards to professional development, the focus must change from workshops and courses to habits of learning that are developed “day after day” (p. 253).
Fullan (2001) identifies how to make change happen more quickly and completely, by offering an invitation to the reader:

The invitation for each reader is threefold: (1) get a better understanding of your own role, and be liberated by the insights and possibilities for growth you see in the most successful examples; do not self-limit; (2) work hard at understanding the situation of other roles with which you have the most contact, and altar your approach to them accordingly...(3)...get a sense of “the big picture” (Fullan, 2001, p. 267).

Fullan stated these three points will help pave the way for continued change in the future. Once individuals take personal responsibility for their own improvements, Fullan says change will occur at a faster rate.

Fullan (2001) provides six overall lessons in regard to education change:

1. **Meaning has More Meaning Than We Thought**: Individuals must find meaning in reform or it will never have lasting effects.

2. **You Can’t Get There From Here**: As the cliché goes—If you always do what you’ve always done, you’ll continue to get what you’ve always got.

3. **Understand the Sequence**: Know what is going on and be very careful about the order of large-scale reform. What worked last time may or may not work this time.

4. **“Learning Organization” is More than a Cliché**: As great as ‘learning organization’ sounds it may not produce the exact functions that are needed in your specific work place.
5. **Outward Identity and the Convergence of the Personal and Social**: It is always important to remember the collective good—even the 'big picture'.

6. **Learn to Live with Change**: There will always be changes, some of those will be superficial, however some will be absolutely necessary to move a program to a higher level and those need to be taken very seriously. We live in a world that is constantly changing—learn to live with it well.

While there are many similarities between the ideas provided by educational change researchers, Fullan differs from Rogers (2003) and Hall & Hord (2006) in that he provides only a principle-based foundation of change that can be applied in any setting attempting to make adjustments.

*Rogers*

Roger’s (2003), like Fullan (2001) and Hall and Hord (2003) worked with change theory for decades. His seminal work, *Diffusion of Innovations*, provides an in-depth look into the change process. His influential work began over 50 years ago and has had a substantial impact on many innovation researchers. Rogers, like Fullan and Hall and Hord, agrees that change takes time and is a process. At the heart of *Diffusion of Innovation* is this statement: “Diffusion is the process by which an innovation is communicated through certain channels over time among members of a social system” (p. 5).

*Innovation.*

Rogers explains that an innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. An innovation does not have to be objectively new, but can be perceived as new. Also, the newness of an innovation may be
expressed in terms of knowledge, persuasion, or a decision to adopt. Innovations come in clusters so it can be difficult to determine where one innovation ends and another begins. Because all innovations are not equal, they must be measured separately.

Rogers describes five characteristics that have an impact on the rate of adoption of an innovation:

1. **Relative advantage**: the degree to which an innovation is perceived as better than the idea it supersedes.

2. **Compatibility**: the degree to which an innovation is consistent with existing values, past experiences and needs of potential adopters.

3. **Complexity**: the degree to which an innovation is perceived as difficult to understand and use.

4. **Trialability**: the degree to which an innovation may be experimented with on a limited basis.

5. **Observability**: The degree to which the results of an innovation are visible to others.

As leaders understand that these five characteristics impact how an innovation is adopted, they will be better equipped to help in the transition.

*Communication channels.*

An innovation message may be communicated over many different channels, or ways. Rogers (2003) identified two main categories of these channels: mass media and interpersonal. Most people base their decision to adopt an innovation on subjective experiences of near associates or peers through modeling and imitation. Thus, diffusion is a very social process. Mass media is a powerful tool to spread knowledge of an
innovation to a large audience quickly. However, strong interpersonal communication is more effective in formation and change of individual attitudes, particularly the attitudes of peers and leaders.

_time._

Time is an integral part of innovation diffusion studies. It can be strength, but can also be criticized due to a lack of accuracy. Innovation diffusion studies have traditionally required study participants to recall information about their adoption of an innovation. This may distort results as memory is unreliable. Each member of a social system faces his or her own innovation-decision that follows a five-step process:

1. _Knowledge:_ individual becomes aware of an innovation and gains some understanding of the innovation.

2. _Persuasion:_ individual forms a favorable or unfavorable attitude towards the innovation.

3. _Decision:_ individual engages in activities that lead to adoption of or rejection of innovation.

4. _Implementation:_ individual puts the innovation to use.

5. _Confirmation:_ individual evaluates the results of an innovation-decision already made and may change his/her mind if conflicting information is found.

Individuals are seen as possessing different degrees of willingness to adopt an innovation. As administrators understand that teachers probably fall into one of the following categories they can focus key individuals within the categories that can help in the change process. Rogers breaks them into five categories:

1. _Innovators:_ venturesome.
2. Early adopters: respectable, popular.


4. Late Majority: skeptical.

5. Laggards: traditional.

When the adoption curve is converted to a cumulative percent curve, a characteristic S curve is generated that represents the rate of adoption of the innovation within the population. An S curve depicts an initial slow change, followed by a rapid change and then ending in a slow change again. This results in an "S" shaped line when depicted graphically:

![S-curve](image)

Figure 1. S-curve.

Social systems.

Rogers (2003) describes a social system as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (p. 23). Members of a social system can be individuals or groups (formal or informal). The social structure of a system
can affect diffusion of new ideas. Change agents and opinion leaders become extremely important people in the social system. Change agents are individuals who attempt to influence people’s decisions in the desirable direction. Opinion leaders are individuals who informally influence people’s attitudes and behaviors. These two types of leaders have a strong presence and can influence the diffusion in a powerful way. When an authoritative decision is made, it can be circumvented by members of a system during implementation.

Rogers view of change focuses on how innovations are diffused and is based more on individuals than on organizations. Also, his view does not deal with the ‘how to’ of implementation. This is where Hall and Hord (2006) provide some important contributions.

_Hall and Hord_

Hall and Hord (2006) have researched education change together for over 35 years. Their studies have been duplicated world-wide and applied by education and business leaders across the country. Like Fullan’s (2001) six lessons, Hall and Hord identify the following 12 principles of change that “are no longer debatable points, for they summarize predictable aspects of change” (p. 4):

1. Change is a process, not an event.
2. There are significant differences in what is entailed in development and implementation of an innovation.
3. An organization does not change until the individuals within it change.
4. Innovations come in different sizes.
5. Interventions are the actions and events that are key to the success of the change process.

6. There will be no change in outcomes until new practices are implemented.

7. Administrator leadership is essential to long-term change success.

8. Mandates can work.

9. The school is the primary unit for change.

10. Facilitating change is a team effort.

11. Appropriate interventions reduce resistance to change.

12. The context of the school influences the process of change (pp. 4-14).

These twelve principles can help guide administrators as they help teachers and students make changes.

Like Rogers (2003), Hall and Hord (2006) identify key components to effective change. Change facilitators (people who are not only key, but influential in the change process) “provide the interventions that can increase the potential for the success of change or allow it to fail” (p. 185). Among change agents are leaders who have different leadership styles. Understanding these different styles will more effectively produce the desired results in the change process. It is important for leaders to understand that “it is not what you do that counts, but how other people perceive and interpret what you do” (p. 231). When experiencing the change process, teachers develop many different attitudes and views about the innovation. It is very important to understand these perceptions, because they will inevitably affect the outcome of an innovation.

Hall and Hord (2006) differ from Fullan (2001) and Rogers (2003) in that they have created the Concern-Based Adoption Model (CBAM) that helps administrators and
teachers with the tools for making changes. This model was built upon the work of Fuller (1969) and will be discussed in a later section. The tools within CBAM help administrators see where teachers are and what each teacher needs to progress to the next stage of implementation. It affords the idea that change is not about the innovation, but about individuals changing with an innovation (Hall & Hord, 2006).

Hall and Hord (2006) go a step further than Rogers (2003) and Fullan (2001) because they provide research-proven and time-tested diagnostic tools to help make adjustments successful. The three views from these researchers provide an excellent foundational understanding of the change process for anyone attempting to make changes in education.

**The Concerns-Based Adoption Model (CBAM)**

Much has been written about change, however there are not very many tools that exist that provide measures of the change process (Adams, 2003). This makes Hall and Hord’s (2006) Concern-Based Adoption Model (CBAM) extremely valuable. Anderson (1997), writing about CBAM, states that it is “arguably the most robust and empirically grounded theoretical model for the implementation of educational innovations to come out of educational change research in the 1970s and 1980s” (p. 331). CBAM was first proposed as a way to understand and facilitate change in 1973 by Hall, Wallace, and Dossett (Hall et al., 1999). It sprang from the work Fuller (1969) did in the 1960’s. CBAM has continued to hold a strong presence in educational change research for over 30 years.

CBAM describes and explains the changes teachers (or anyone integrating an innovation) experience when attempting to implement any changes. CBAM contains some assumptions. For example, change is a process not an event; the organization will not change until the individuals within it change; and interventions can help speed up the
change process (Hall et al., 1999). The model consists of three main elements: stages of concern, levels of use, and innovation configurations.

The first aspect of the CBAM is the Stages of Concern (SoC). Teachers tend to become very concerned when an innovation is being implemented. The Stages of Concern Questionnaire (SoCQ) is a tool that helps see what teachers are thinking and feeling about an innovation. It consists of seven stages, ranging from 0 (Awareness—no concern) to 6 (Refocusing—the individual has some ideas that would work even better) (Hall & Hord, 2006). These concerns have been labeled as stages because it is believed that teachers progress through these seven stages of concern when implementing an innovation (Hall & Hord, 2006). Therefore, understanding which stage a teacher is in will help administrators know what type of professional development is needed to get the teacher to the next stage.

The second aspect of the CBAM is the Levels of Use (LoU). Where the SoC is employed to see what teachers are thinking and feeling about an innovation—the affective side of change, the LoU is designed to see how much change is occurring and how effective it is—the behaviors (how people are acting with the change). There are eight levels that specify how people behave with change. The levels range from 0 (Nonuse—the user has little or no knowledge of the innovation) to 7 (Renewal—the state in which the user re-evaluates the quality of use of the innovation). Change is personal and individuals will vary in their levels of use with the innovation. Understanding what level a teacher is at when integrating technology allows the appropriate training to be implemented and helps researchers understand the impact of an innovation.
The final element of the CBAM model is Innovation Configurations (IC). Hall and Hord (2006) found that “many teachers and others who are expected to implement new practices...are not clear about what they are being asked to do” (p. 110). The IC is a tool that takes a word snapshot of what the different configurations look like. It attempts to describe how the innovation is really being implemented. By knowing how the innovation is actually being implemented, relevant and appropriate forms of training can be implemented (Hall et al., 1999).

The development of an IC Map is a four step process through which data are gathered using observations and interviews. The first step is to identify components—the basic components, extent of the components, and the array of component variations. This can be accomplished by asking the developer, or teachers, what the innovation is and what it should look like. The second step is to identify additional components and variations. This is accomplished by observations and interviews. The third step is to refine the IC Map. This is accomplished by discussing with the developer or teachers what was found and seeing if they understand it the same as was discovered. The final step is to test and finalize the IC Map. This is done by using the IC Map to observe and interview teachers.

Hall and Hord (2006) assert that if teachers can be provided specific support based on their level of integration “the change process can be led and guided in ways that personalizes the experience” (p. 258). The CBAM is personal in its research making the findings valuable for those attempting to make changes.

Research using the CBAM.

CBAM has been used for over 30 years both as an evaluation tool and as a theoretical lens for conducting research. To illustrate that it can be used powerfully and effectively
as an evaluation tool and a theoretical lens, a variety of studies using CBAM are listed below, emphasizing its use within educational technology.

Hall et al. (1999) report using CBAM as a tool to assess the implementation of math curriculum into the Hessen school district. The superintendent wanted to know how teachers should be supported in the curriculum integration and if the support was worth it. They used all three diagnostic tools of the CBAM (Stages of Concern, Levels of Use, & Innovation Configurations map) to find out. The findings helped the superintendent to promote a constructivist approach to implementing the math curriculum. It was revealed that teachers needed more time to effectively integrate the math curriculum. The understanding CBAM provided helped the superintendent to not become frustrated at not seeing immediate results. In the end, CBAM helped the superintendent to know the current needs of teachers allowing a more effective implementation of the math curriculum.

One of the key elements that this study shows is how CBAM can be used to help guide leaders in making timely decisions—realizing that change does not immediately happen. Hall et al. (1999) introduces the giant leap theory which is when decision makers implement some new innovation and expect immediate positive student outcomes. The CBAM helped the Hessen district superintendent to be patient in seeing positive student outcomes—bridging the giant leap.

Gershner and Snider (2001) used CBAM to examine “the change in attitudes and behaviors towards use of Internet as an instructional tool” (p. 286). There were 49 middle and high school teachers selected as the subjects. All three diagnostic tools of CBAM were used. Pre- and posttest data were collected for the Stages of Concern and Levels of
Use. Through the use of CBAM tools, the researchers were able to find out that teachers needed a sufficient amount of time (and even wanted more of it) to effectively work with the innovation. Also, they found that adequate support was necessary for effective integration of the innovation.

Newhouse (2001) identified multiple researchers who have used CBAM in regards to the implementation of computers. Newhouse focused on a longitudinal study that used CBAM to assess the concerns students had when integrating a student-owned portable computer. Each of the three diagnostic tools of CBAM was used. The Stages of Concern revealed that about 50% were in the awareness stage. Newhouse attributes such a high percentage, not because some were not interested, but possibly because they were not worried. The Levels of Use indicated that 7 of the 23 interviewed were nonusers and 6 were in the mechanical use levels. CBAM was also used to gather data with six teacher case studies. The information gathered was then used to create a personal model that explains teacher’s responses to the integration of computers.

In this research CBAM helped change agents identify the concerns students had. Understanding these concerns helped those involved meet the current needs of students. For example, had teachers never known that students were still in the awareness stage, they could have easily moved on to something else, not realizing that they were leaving the students behind.

Adams (2003) used CBAM to assess the degree “to which attendance at technology faculty development programs corresponded to use of technology in teaching practices at a metropolitan postsecondary institution” (p. 289). Adams also wanted to find out factors that influenced an individual’s willingness to participate in professional development and
integration. Adams used the CBAM (Stages of Concern and Levels of Use) as a theoretical lens in this research. Though the two CBAM diagnostic tools were not used in this study they were used as a means to discuss the findings from the research. The researcher used a different tool which used the same theoretical foundation as the Stages of Concern and Levels of Use but focused solely on statements relative to computer innovations.

Donovan (2005) used CBAM as a tool in collecting data to find out how technology was being implemented in a middle school setting. This school was unique because teachers and students had their own laptops, thus creating a one-to-one technology environment. An IC Map was created to explore the different configurations of laptop use, to explore the variety of student off-task behavior, and to see if there was a relationship between the two. The IC Map helped Donovan to identify three configurations:

- The Jetsons, in which technology is fully integrated and a natural part of teaching, learning, assessment, and communication;
- Star Trek in which technology, dependent on student access and lesson content, is used predominantly for word processing and Internet-based research, and;
- Lost in Space, in which access was minimal at best, and uses of technology were limited to word processing (p. iii).

Donovan (2005) found that one of the most frequent off-task behaviors was using the laptop to play computer games. Donovan also found that the range of off-task behavior was most prominent in the Star Trek configuration. Finally, the IC Map helped Donovan find that having more technology does not guarantee students will be academically
engaged. However, when technology is used in a constructivist environment, off-task behaviors occur less often than in a class without laptops.

The research in this section has shown how the CBAM is used as an evaluation tool and as a theoretical perspective in analyzing research. CBAM has proven very effective and useful to analyze innovations that are being integrated into education.

*The CBAM as a framework for conducting research.*

In education, change is constantly occurring as the world becomes more competitive (Friedman, 2005). Change theory is unique because it looks at change from the perspective of those who are in the process of making changes with some type of innovation (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003). Currently in education, teachers and administrators have come to a day when students, as a majority, may know more than they do in the subject of technology. Students do not know what life is like without it (Prensky, 2006). Technology has, and will continue, to change the way education is undertaken. Change theory becomes an important theoretical framework for understanding the change process teachers, students, and administrators go through when integrating technology. Fullan et al. (2005) state that most educational reform ideas fail because of the lack of change knowledge (p. 54). As everyone involved in making changes better understands the why’s, the how’s, and the predictable stages teachers undergo, then when innovations (like technology) are being integrated and teachers and students are making changes, a much greater opportunity for longer, lasting change can occur.

Change theory points out that there are key elements that, when understood, can make the change process more efficient, effective, and longer-lasting (Fullan, 2001; Hall &
By looking at change theory with the perspective of CBAM, teachers and students become the focus. As history has shown, reforming education is a complex process that can be difficult to achieve. Currently education is undergoing another effort in reform by trying to integrate technology (Barrios et al., 2004). CBAM can be a relevant tool in this process because it helps keep the focus on teachers rather than the technology. Change theory and CBAM are important for this study because like all educators, CES teachers need help in implementing technology successfully.

Technology Integration Among Teachers

Computer-based echnology has been in the classrooms since the 1980s, creating over two decades of technology integration experience. Like any other school beginning to implement technology, CES can learn a great deal from what others have already experienced as they worked to integrate technology.

Teachers, administrators, and government officials are currently looking to technology to support reform (Barrios et al., 2004; Gulek & Demirtas, 2005; Hall et al., 1999; National Education Technology Plan, 2004; Partnership for 21st Century Skills, 2006; Warschauer, 2006). Since the Apple Classrooms of Tomorrow (ACOT) project in the mid 1980s, computer technology has increasingly permeated education. Currently students live in a world where they spend $175 billion annually as consumers and more than six hours a day using technology (1 to 1 Learning, 2006).

The government again has invested large sums of money in an innovation hoping for a revolution (Bransford et al., 2000; Cuban, 2001). One of the expectations is that teachers’ pedagogy will change, thus causing them to become more constructivist in their
approach. Cuban (2001) however, believes teaching has remained the same. In fact, based on his research, he believes that technology has been oversold to schools and is underused. In one study, Cuban et al. (2001) found that when teachers used technology it sustained rather than altered existing patterns of teaching practice.

The Partnership for 21st Century Skills (2006) reports: “In an era of intense global competition, there is mounting evidence and widespread public recognition that our education system is inadequately preparing students with the edge they need to compete” (p. 12). Rather than focusing on helping teachers change with technology; technology often becomes the focus of the change (Fullan, 2001; Hall & Hord, 2006).

Mishra & Koehler (2006) explain the current need to weave technology into content and pedagogy by looking at it differently. They propose that rather than focusing on technology knowledge as a separate entity it should be intertwined with content knowledge and pedagogy knowledge (see Figure 2).
As a result of interweaving the three, the Technological Pedagogical Content Knowledge (TPCK) concept emerges. Some teachers can teach content extremely well but only use one form of pedagogy or vice versa. Similarly, just because a teacher knows how to use technology does not mean he or she can teach with it well (Mishra & Koehler, 2006). This is a current concern in higher education preservice programs (Falba et al., 1999). Mishra and Koehler (2006) believe that when a teacher understands the delicate relationship between the three and utilize them in the form of TPCK they rise to a new level of expertise.

Administrators and government officials can be led to think that if teachers are given technology it is seamlessly implemented and student outcomes increase. However, without adequate help in the process of integrating technology, often this does not occur.
Teachers experience predictable stages when integrating technology that, if properly identified and understood, can be used for effective professional development (Dwyer et al., 1990). It would be foolish to think an immigrant from another country could learn the English language overnight or even in a year. Just as any immigrant needs help from others to learn the language and the culture, teachers need help to learn and teach effectively with technology.

What has significantly changed is the type of student who now enters the classroom. These students do not know what life is like without technology. Prensky (2006) identifies the current generation of students as “digital natives” and teachers as “digital immigrants” (p. 9). Barrios et al. (2004) call these students “millennials” (p. 6). In other words student’s lives revolve around technology:

On average 13- to 18-year-olds spend more than six hours a day using digital media. As consumers, they collectively control more than $175 billion annually....Outside of school, they instant message, download and listen to music, compose and send text messages and emails, view television, exchange text messages and digital images via cell phone, browse the web, and play interactive games—all the while multitasking (1 to 1 Learning, 2006).

Unfortunately students enter the educational world and find they have entered a school system that was set up for their parents, not for them. Students feel distanced from real life as they enter the classrooms of today (1 to 1 Learning, 2006; Prensky, 2006). Technology, in all its forms, is the tool that these students need for learning, and these tools need to be available to them in the classroom, “not in a special room at the end of
the hall” (Barrios et al., 2004, p. 2). They also need to be taught by teachers who have become successful “digital immigrants” (Presnsky, 2006, p. 9).

Teachers, administrators, and government officials are trying to respond to this technological revolution with changes to their pedagogy. With the concern noted earlier of the technology overshadowing the instructional goals, it is important that change focus on the individual not the innovation (Fullan, 2001; Hall & Hord, 2006). Teachers also go through certain, predictable phases that, if properly identified and understood, can be used for effective professional development (Dwyer et al., 1990).

**Phases of Technology Integration**

The hope is that professional development will support change by expediting transitions. In the mid 1980s the idea of ubiquitous computing began to make its way into the public school systems with the Apple Classrooms of Tomorrow project where hundreds of classrooms were given computers for each student to use (Dwyer et al., 1990). With ubiquitous computing came research showing that teachers go through different phases when integrating technology. Understanding these phases will provide administrators the ability to see clearly where teachers are and where they need to go when integrating technology into their learning and teaching. Understanding these phases will also provide administrators with the ability to apply the appropriate professional development activities.

The Apple Classrooms of Tomorrow (ACOT) project by Apple Computer, Inc. began in 1985 and lasted until 1998. Teachers and students involved in ACOT were provided with the hardware and software necessary to complete a wide range of authentic hands-on learning activities. Each student and teacher had access to ubiquitous technology.
However, activities were not limited to the use of computer technology and the guiding principle for the project was to use the learning tool that best supported learning in the classroom environment (Dwyer et al., 1990; Newhouse, Trinidad, & Clarkson, 2002).

Using data collected over a four year period of ACOT implementation (1986-1989), teachers’ beliefs about teaching and learning and use of computer technology were analyzed. Initially teachers focused on the technology itself as the innovation and learning tasks remained unchanged. As teachers incorporated computer technology into their lessons, shifts in the teaching and learning began to emerge. Findings from Report #8 showed that teachers moved through several stages as they incorporated technology into their teaching (Dwyer et al., 1990). These stages included the following:

- **Entry**: technology is introduced and often one or two key ‘early adopter’ teachers begin to integrate it into learning and teaching while others remain teaching the way they have been.

- **Adoption**: technology is used to support traditional instruction. It is mostly used by the teacher in lesson preparation and not for students.

- **Adaptation**: technology begins to be in the classroom but on a limited basis such as using a word processor or spreadsheets application.

- ** Appropriation**: technology is used for things that it can only be used for. Higher order thinking skills come into play. Teachers’ focus begins to expand by seeking ideas from other teachers and becoming more involved in project-based types of work with students. Student tasks become more open-ended.
• *Invention*: technology is being fully integrated into learning and teaching.

Students and teachers are discovering new ways to use technology. Students are able to seek out other appropriate sources of knowledge besides the teacher.

These changes in the classroom environment by teachers and students were enhanced because it evolved over years in an environment where one to one computing was available and teachers and students were able to see different approaches to learning and teaching (Dwyer et al., 1990; Newhouse et al., 2002).

A similar developmental progression is described in Hall and Hord’s (2006) Concern-Based Adoption Model (CBAM). CBAM is designed to help individuals know how to make changes. It also helps predict certain stages of implementation teachers experience. This is extremely valuable to principals and administrators because knowing what stage a teacher is at allows leaders to then help the teachers progress to the next stage of implementation. The model consists of three main elements, Stages of Concern (SoC), Levels of Use (LoU), and Innovation Configuration (IC) maps. Two of the aspects (SoC and LoU) focus on phases teachers, or anyone for that matter, go through when integrating technology and will be briefly described. However, the IC is not necessarily a phase that teachers go through and therefore will not be mentioned here.

Teachers become very concerned when an innovation is being implemented. The SoC is a tool that helps see what teachers are thinking and feeling about an innovation. It consists of seven stages:

0. *Awareness*: a teacher has no concern about technology; no thought is given about it.

1. *Informational*: a teacher would like to know more about the technology.
2. **Personal:** a teacher is concerned with how the technology will affect him or her personally.

3. **Management:** a teacher is concerned that he or she is spending most of his or her time getting materials ready.

4. **Consequence:** a teacher wants to know how the technology is affecting learners and has a desire to improve teaching with technology so it can have a greater impact on student learning.

5. **Collaboration:** a teacher wants to learn what others are doing and collaborate among others to enhance teaching.

6. **Refocusing:** a teacher is very excited about integrating technology and has ideas about how to make things better.

Hall and Hord (2006) have labeled these concerns as stages because it is believed that teachers progress through these seven stages of concern when implementing an innovation in an orderly way. By knowing what stage teachers are at and being able to predict what their next stage will be provides a powerful tool for principals and administrators and professional development creators.

The LoU identifies levels of use teachers experience when using an innovation. Where the SoC was to see what teachers are thinking and feeling about an innovation—the affective side of change, the LoU is designed to see how much change is occurring and how effective it is—the behaviors (how people are acting with the change). There are eight levels that specify how people behave with change. The first three levels are considered nonusers, while the last five are different ways one might be considered a user. The levels are:
0. *Non-use*: a teacher is not using the technology and has no interest in it.

1. *Orientation*: a teacher is taking the initiative to learn more about technology.

2. *Preparation*: a teacher begins making plans to use technology.

3. *Mechanical*: a teacher is focused on planning and management of how to use technology.

4. *Routine*: a teacher is in a set pattern of use and is making no changes.

5. *Refinement*: a teacher begins making changes to better integrate technology, thus producing greater student outcomes.

6. *Integration*: a teacher begins collaborating with others to glean ideas as to how to more effectively integrate and utilize technology.

7. *Renewal*: a teacher seeks out more effective ways to integrate technology not only in their teaching and learning, but in students as well.

Knowing teachers' current level of use empowers an administrator to effectively identify the appropriate professional development that will help teachers get to the next level.

Like Hall and Hord, another leader in the field of change Rogers (2003) identifies progression that people follow when faced with a new innovation. He states that each member of a social system who faces a new innovation-decision follows a five-step process when implementing an innovation:

1. *Knowledge*: an individual becomes aware of an innovation and gains some understanding of the innovation.

2. *Persuasion*: an individual forms a favorable or unfavorable attitude towards the innovation.
3. **Decision:** an individual engages in activities that lead to adoption of or rejection of the innovation.

4. **Implementation:** an individual puts the innovation to use.

5. **Confirmation:** an individual evaluates the results of an innovation-decision already made and may change his/her mind if conflicting information is found.

As administrators understand that each teacher will go through individual adoption stages (and knows what phase they are at), they will be able to more effectively address the specific needs of the individual teacher. This allows exactly the right kind of training to get the teacher to the next level of integration. Research has shown that one of the key enablers for successful technology integration, and therefore successful education reform, is ongoing professional development (Barrios et al., 2004; Fullan, 2001; Penuel, 2006; Silvernail & Lane, 2004; Zucker & McGhee, 2005).

**Professional Development Among Technology Teachers**

CES teachers, like all educators, need help integrating technology in a way that learning remains student-centered. Barrios et al. (2004) explains that the worse thing administrators can do is to drop technology in the laps of the teachers with little to no training. Having a broad knowledge and understanding of effective professional development strategies can help CES teachers and all educators implement technology successfully.

Hall et al. (1999) introduces the giant leap theory, which states that “as soon as the policy is approved, or the curriculum is adopted, a giant leap is assumed from where things currently are to the newly idealized state” (p. 1). It is as though those who ask
others to change think that it will happen over night and immediate results will be
evident. When initiatives like technology are being implemented, Hall et al. suggest that
before you ask if student outcomes have improved, you should ask if teacher’s practices
in the classrooms have changed to be aligned with the new technology integration.

One of the key elements to helping teachers make effective changes is professional
development (Barrios et al., 2004; Fullan, 2001; Penuel, 2006; Silvernail & Lane, 2004;
Zucker & McGhee, 2005). In order for student outcome to increase teacher practice must
first change (Fullan, 2001; Strudler & Wetzel, 1999). Professional development becomes
an absolutely critical component of any effective technology integration strategy.

*Professional Developments Impact on Technology Integration*

One of the more recent areas where professional development has been called upon to
impact technology integration is one-to-one computing initiatives. The state of Maine
initiated a one-to-one laptop program where every student and teacher was given a
laptop. Another example is found in the Henrico County Public Schools (HCPS) in
Richmond, Virginia. By the Spring of 2003, more than 25,000 teachers and students in
grades 6-12 had been given a laptop in HCPS (Zucker & McGee, 2005). As research was
conducted in these schools, one of the significant findings was the importance of
professional development.

Penuel (2006) conducted a research and evaluation study that analyzed
implementation and effects of one-to-one initiatives from a range of countries and found
that professional development was a critical factor. In addition, Silvernail and Lane
(2004) reported that many teachers engaged in the one-to-one initiatives felt that one of
their biggest obstacles was the lack of professional development.
Donnelly, Dove, Tiffany-Morals, Adelman, & Zucker (2002) reviewed many different technology led initiatives and focused, in part, on the impact of professional development. Three examples from the report will be used to show how professional development impacts technology integration.

The first school, in Georgia, identified teachers' concerns using CBAM when technology was introduced. After identifying the current concerns the appropriate professional development was applied. The professional development consisted of providing teachers access to technology, conducting workshops, and providing on-site help during the work day. After a year it was determined that teachers' concerns were "through the early stages of the change process" (Donnelly et al., 2002, p. 44). Teachers were being helped in making the technology change and their concerns were being resolved.

Another school in West Virginia implemented technology and teachers received professional development the summer prior to the integration as well as during the entire school year. Thirty cents of every technology dollar was spent on professional development. Teachers were allowed to obtain substitutes to participate in professional development activities. As a result teachers became better equipped in utilizing technology. Of the teachers examined, "only 19 percent reported not being confident using computers in their teaching" (Donnelly et al., 2002, p. 46). As a result teachers and students showed "more significant progress" than those who only had computers in a lab (p. 46).

Finally, Donnelly et al. (2002) reported that the Rhode Island Teacher Training Initiative (RITTI) supplied training and laptops to almost 3,000 teachers. Some of the
professional development they received included summer institute (spending more than 60 hours), incentives, and ongoing training. They found that after training teachers spent an average of 13.7 hours a week using technology. Almost half reported attending conferences on their own time. These three examples show the important impact professional development has when technology is being implemented.

Professional development that is consistent and effective can be a powerful tool in helping teachers in the change process (Birman et al., 2000). Teachers can be helped by gaining a basic understanding of the processes of support or provided with other teachers who are well on their way to successful integration of technology.

Promising Proven Practices

At the center of education reform is professional development (Birman et al., 2000; Guskey, 1986; Lowden, 2005; Pritchard & Marshall, 2002; Shaha et al., 2004). Much has been written about the promising proven practices of professional development, however Noyce (2006) states that it is expensive, time consuming, difficult to do right, and even worse—very little empirical evidence exists as to whether it even works or not (see also Garet, Porter, Desimone, Birman, & Yoon, 2001; Guskey, 2003; In Praxis Group, Inc., 2006; Lowden, 2005; Shaha et al., 2004).

In terms of costs, Noyce (2006) estimates that the K-12 School districts across the nation spend between $5 billion to $12 billion each year. Because of the expense and the potential professional development has to affect education, it is essential to, not only find out if it is effective, but to ensure the most promising practices are being used.

One initiative that has greatly influenced professional development is the Eisenhower Professional Development Program:
The Eisenhower Professional Development Program, Title II of the Elementary and Secondary Education Act (ESEA), was the federal government's largest investment that is solely focused on developing the knowledge and skills of classroom teachers. Part B of the program, with a FY 2000 appropriation of $335 million, provides funds through state education agencies (SEAs) to school districts and through state agencies for higher education (SAHEs) to institutions of higher education and nonprofit organizations (SAHE grantees). These funds primarily support professional development in mathematics and science, but also in other content areas. The goal of the Eisenhower Professional Development Program is to support professional development experiences for teachers that enhance classroom teaching and, ultimately, improve student learning (U.S. Department of Education Executive Summary, 1).

The evaluation of this program was based on three different types of data collection—The National Profile, The Case Studies, and The Longitudinal Study of Teacher Change. Over 1000 teachers were surveyed, six exploratory case studies, and 10 in-depth case studies in five states were conducted to identify the effectiveness of the professional development (Birman, et al., 2000).

Birman et al. (2000) worked on the Eisenhower Professional Development Program and found that essential structural features of professional development consisted of form, duration, and participation. They also found three core features that characterize the substance of the activity: content focus, active learning, and coherence.
Form.

Form consists of the organization of the activity. Traditional approaches were found to be less effective than reform approaches. One of the reasons reform activities are more effective is because they are usually longer which leads to “more content focus, active learning opportunities, and coherence” (Birman et al., 2000, p. 29). Reform types include “study group, teacher network, mentoring relationship, committee or task force, internship, individual research project, or teacher research center” (U.S. Department of Education Executive Summary, p. 7).

Duration.

Duration consists of the length of the activity. This includes the total number of contact hours and the period of time over which the activity spans (U.S. Department of Education Executive Summary, 1999). They concluded that “activities of longer duration have more subject-area content focus, more opportunities for active learning, and more coherence with teachers’ other experiences than do shorter activities (p. 30).

Collective Participation.

Collective participation includes the degree to which the activity involves the collective participation of groups of teachers from the same school, department, or grade (U.S. Department of Education Executive Summary, 1999). Birman et al. (2000) share some of the advantages of collective participation. First, it enables teachers to discuss challenges and concepts that may arise during an activity. Second, it affords teachers the opportunity to integrate what they learn with those in their same school. Finally, this leads to a shared professional culture in which teachers can “develop a common understanding of instructional goals, methods, problems and solutions” (p. 30).
Content.

Content is the degree to which the professional development activity has a content knowledge focus. Content is intended to improve and deepen teachers’ content knowledge (U.S. Department of Education Executive Summary, 1999). Birman et al. (2000) emphasize that generic professional development is ineffective and that “focusing on content knowledge is directly related to teachers’ reported increases in knowledge and skills” (p. 30).

Active Learning.

Active learning is designed to engage teachers in the professional development activity (U.S. Department of Education Executive Summary, 1999). Birman et al. (2000) report many different ways teachers became active learners. They include: meaningful discussion; planning and practice; observing and being observed; reviewing student work; and presenting, leading, and writing. They found that teachers who were activity engaged experienced an increase in knowledge, skills, and even changed their classroom teaching.

Coherence.

Coherence consists of the degree to which the professional development activity promotes “incorporating experiences that are consistent with teachers’ goals and aligned with state standards and assessments” (U. S. Department of Education Executive Summary, 1999, p. 7). By having professional development as part of an integrated learning program of the teacher, teacher learning and classroom teaching increases (Birman et al., 2000).
These six elements are closely related to what Donnelly et al. (2002) reported with regard to key elements of effective professional development. They include: format, duration, collective participation, inclusiveness, incentives, active learning opportunities, content focus, and coherence.

The National Staff Development Council’s (NSDC) Standards for Staff Development (2001) provide a nationwide foundation of what is considered promising proven practices in professional development. These standards are the backbone to everything it does and are focused in three areas: Context, Process, and Content. Context includes aligning goals with the school and district (Learning Communities); ensuring skillful leaders have the ability to guide continuous professional development (Leadership); and providing resources to support teacher learning and collaboration (Resources). Process includes standards that improve professional development should be data-driven, research-based, collaborative, focused on learning, designed appropriately, and include evaluation. Content focuses on ensuring that there is equity, quality teaching, and family involvement.

Pritchard and Marshall (2002) conducted research on the district level in 10 ‘healthy’ and ‘unhealthy’ districts. After each district was visited and documents and interview transcripts were analyzed, the researchers scored each district using an organizational health scale. Those that scored high were considered ‘healthy.’ In other words, the ‘healthy’ districts were the ones who successfully integrated professional development into the district strategic plan successfully. From the data collected they found that professional development was effective when:

1. It has a “protected, designated line item in budget” (p. 134).
2. It "uses assessments of district needs for setting professional development priorities" (p. 133).

3. It "provides thematic activities targeted to the district purpose and offered over time" (p. 133).

4. It "is predominantly addressed during work time" (p. 132).

5. It "involves administrators in planning and participating in professional development activities, and emphasizes that professional development assures system excellence" (p. 131).

6. It "is based first on district constancy of purpose and secondarily on individual selection" (p. 130).

7. It "is expected as a job responsibility of every employee" (p. 129).

8. It "is driven by a shared building focus aligned with the district vision; format varies by purpose" (p. 128).

9. It "is driven by a shared district focus on learning for all professionals" (p. 127).

10. It "addresses fundamental issues of curriculum and instruction as part of an integrated district strategy" (p. 126).

These 10 characteristics of ‘healthy’ professional development programs provide empirical evidence of some of the promising practices.

In one of the most extensive syntheses of research on proven promising practices of professional development to date, In Praxis Group, Inc. (2006) was contracted by the School Improvement Branch, Basic Learning, Alberta Education to conduct a research synthesis of professional development best practices. In Praxis Group, Inc. (2006) states: "The report summarizes many influences on professional development, and explores
commonalities in the indicators of effective professional development. It also examines the role of evaluation of professional development initiatives and provides a synthesis of common elements of effective evaluation practices” (p. i).

The researchers found some compelling indicators of effective professional development. Appendix B includes the full report of their synthesis of findings. They identify the different lists of effective professional development including: (a) what it should look like; (b) the different processes and approaches related to professional development; and (c) what effective environments for professional development consist of. Some of the indicators of effective professional development include, but are not limited to: centered on student achievement and student success; multiple contexts, formats and factors are used; increases teacher knowledge and understanding about their subject area and pedagogy; and is purposeful, sustained and sustainable over time (In Praxis Group Inc., 2006). Knowing that promising proven practices are essential to the effectiveness of the professional development training, it becomes essential to ensure that support is offered in as many ways as possible.

Forms and Processes of Support

Lack of support or professional development is one of the major barriers to successful technology integration and has been from the 1980s, with Apple Classrooms of Tomorrow’s project, to current one-to-one laptop initiatives (Barrios et al., 2004; Dexter, Anderson, & Ronnkvist, 2002; Fullan, 2001; In Praxis Group, Inc., 2006; Penuel, 2006; Silvernail & Lane, 2004; Strudler, Archambault, Bendixen, Anderson, & Weiss, 2003; Strudler & Wetzel, 1999; Zucker & McGhee, 2005). Dexter et al. (2002) state that “nearly all case studies of teachers’ integration efforts emphasize that teachers need ready
access to hardware, technical support, training, and instructional support...yet, little work has been done to date to conceptualize what an effective technology support environment might look like” (p. 266). It becomes critical for anyone attempting to integrate technology to identify all different forms and processes of support and then to design, develop, and deliver the best professional development possible.

To help solve this dilemma the CEO Forum released a report in 1999 outlining four key elements that can help guide teachers who are integrating technology into education. Dexter et al. (2002) write:

1. Teachers need help to integrate, not just operate, technology;
2. Teachers need regularly scheduled technology-oriented development sessions, as well as for “just-in-time” and one-on-one learning opportunities;
3. Teachers need to have access to technology resources convenient to their classrooms; and
4. Teachers need to be involved in the technology professional development program (p. 268).

Teachers who receive quality technology support will use technology more frequently and in more ways as a teacher (Dexter et al., 2002). In order for successful technology integration to occur, it becomes critical to offer professional development in as many ways as possible—ensuring that the instructional needs of teachers are met (Strudler & Wetzel, 1999). Support should not only be given when teachers are hired, but should be interwoven into preservice experiences (Strudler et al., 2003).

In Praxis Group, Inc. (2006) identifies different forms of professional development from the current research. From the National Staff Development Council (2005) research
they describe many different forms and processes of support that can be considered professional development. They include: (a) teachers planning lessons together; (b) teachers studying a topic together; (c) observing another teacher; (d) being coached by another teacher; (e) visiting model schools; (f) writing curriculum; (g) keeping a journal, etc.

From Sparks and Loucks-Horsley’s research, In Praxis Group, Inc. (2006) lists five primary models: (1) Individually guided staff development; (2) Observation/assessment; (3) Involvement in a development/improvement process; (4) Training; and (5) Inquiry. And from Reitzug’s research they report four different models:

- Training (includes workshops, presentations, lectures, skill demonstrations, modeling, simulated skill practice, and coaching);
- Embedded (includes inquiry, discussion, evaluation, consultation, and collaboration and problem solving);
- Networks (groups of teachers from different schools); and
- Professional Development Schools (schools in which different members participate as a team). (In Praxis Group, Inc., 2006, pp. 18-19).

Current one-to-one laptop initiatives reveal much about the forms and processes of support that is needed for successful technology integration. Penuel (2006) states, “Formal professional development has been a critical component of many large-scale and smaller one-to-one programs, and the features of these activities reported to be important for implementation varied from program to program” (p. 337). Though many different types of professional development occur in the one-to-one studies, Silvernail & Lane (2004) found that when teachers participated in four or more professional development
activities, teachers' usage increased. Barrios et al. (2004) also provides some successful guiding principles in regards to professional development. Professional development must:

1. Be held on a continuous basis.
2. Provide mentors, coaches, or peer teammates to model appropriate integration strategies in actual classrooms.
3. Give teachers feedback on their own performance.

These four are closely related to the four items Dexter et al., (2002) reported in their study.

Donnelly et al. (2002) concluded from their review of technology and professional development literature that teacher's attitudes toward technology, established practices, and willingness to change are essential characteristics of successful technology integration. Also, “circumstances outside the individual teacher that occur on the system level can be characterized as necessary conditions” in order for successful technology integration (p. 49). These outside influences include the following:

- **Time**: teachers need time integrating technology correctly.
- **Access to Computers and Technical Assistance**: teachers need training that "mirrors the instructional procedures" they use in the classroom (p. 50). The type of support will change as teachers experience changes.
- **Curriculum**: great effort needs to take place by those who design and develop curriculum to ensure that it incorporates the use of technology.
Leadership and Community Support: administrators must be highly involved in the professional development to help ensure that a proper balance is met between changes in the traditional classroom and standards for achievement on standardized tests. Community support can be provided from local businesses, universities, and volunteer organizations.

Scalability: getting everyone involved (teachers, parents and even school-based initiatives) can help student outcomes.

Understanding these outside influences provides insight into the different types of forms and processes of support that can influence the real needs of teachers.

As education continues to undergo reform, having an understanding of the change process and providing the appropriate professional development can help teachers integrate technology successfully (Donnelly et al., 2002; In Praxis Group, Inc., 2006).

Gaps in Existing Research

As mentioned in the beginning of this paper, professional development is at the center of educational reform (Birman et al., 2000; Guskey, 1986; Lowden, 2005; Pritchard & Marshall, 2002; Shaha et al., 2004). Even though proven promising practices have been identified, little has been done to see if those practices actually cause teachers to change. The assumption is that because teachers give the professional development high marks it is identified as proven practices, and if teachers like it, their teaching pedagogy must be changing. Research is lacking to show that teachers actually change their teaching practices after receiving professional development that includes promising proven practices (Dexter et al., 2002; Garet et al., 2001; Guskey, 2003; In Praxis Group, Inc.,
2006; Lowden, 2005; Noyce, 2006; Shaha et al., 2004). Because of the expense and the powerful platform professional development carries, it is imperative to find out if and how the proven promising practices of professional development are changing teachers learning and teaching.

Another area missing in the research is to find out what effect professional development is having on student learning and achievement. In Praxis Group, Inc. (2006) states:

There is still little substantive research that explicitly links professional development to improvements in teaching or on student outcomes. There are gaps in the research that emphasize the need for more research directly addressed at the link between various types of professional development, and their impact on student learning and achievement (p. 4).

One final gap is the understanding of what constitutes effective technology integration and professional development. As technology continues to permeate the classroom and money is put into technology and professional development, there is a need for studies that examine the different technology configurations and the different forms and processes of support to identify any relationships among the two. This will also add to the current literature of technology integration and professional development.

Summary

Reform is a constant in education. Technology, teachers, and students are not going away and with proper implementation technology integration can be successful. A brief look at history shows that innovations do not reform education—only individuals can change education. Change theory provides a perfect lens to view technology integration
through because it reminds principals, administrators, and policy makers that innovations will not change teaching. Rather, only when teachers themselves change, education will change (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003).

Administrators can use CBAM to find out teachers current concerns, levels of use, and how technology is actually being integrated. The data obtained from CBAM can then be used to apply the most appropriate type of professional development. Rather than solely focusing on technology itself, as administrators focus more on helping teachers go through the change process, the current frustration of teachers and students will be alleviated.

Professional development is at the center of education reform (Birman et al., 2000; Guskey, 1986; Lowden, 2005; Pritchard & Marshall, 2002; Shaha et al., 2004). Research studies show many proven promising practices of professional development. However, these can be very expensive, time consuming and little research exists showing if it really causes teachers practice to change (Garet et al., 2001; Guskey, 2003; In Praxis Group, Inc., 2006; Lowden, 2005; Shaha et al., 2004). Therefore, understanding what forms and processes of support teachers receive when integrating technology is essential to understanding its effectiveness. Studies need to show the relationships between the different forms and processes of support and the current configurations of technology use.

This study will contribute by developing a tool to help administrators more effectively integrate technology. It will seek to identify which forms and processes of support are being used by teachers and the relationship between the two. This study will
also contribute to the body of research knowledge with regards to change theory, CBAM, technology integration, and professional development.
CHAPTER 3

METHODOLOGY

This study was designed to examine the effect technology is having on the teaching of CES teachers. The methods and procedures of this study are outlined in this chapter. The chapter is divided into five sections: (a) research design, (b) setting, (c) participants, (d) instrumentation and procedures, and (e) treatment of data. The appropriate research protocol is followed and approved by the university and the principals where the study will be conducted.

Research Design

This study utilized both qualitative and quantitative measures in obtaining data. Resources from the CBAM model (Hall & Hord, 2006) were used to collect data in two phases. The first phase utilized observations and informal interviews to create an Innovation Configuration (IC) map. The IC Map seeks to answer the research questions: (a) what are the different configurations of technology use among CES teachers, and (b) what are the different forms and processes of support for technology integration.

The second phase of the study addressed the final research question: (a) what are the relationships between technology use and the different forms and processes of support? Follow up interviews and observations were conducted to verify the IC Map and to answer the final question.
Setting

The Church Education System (CES) is operated by The Church of Jesus Christ of Latter-day Saints and two years ago gave every full-time teacher a laptop and access to the Internet. Also, each seminary building was given at least one LCD projector. CES employs over 3,500 full-time teachers and oversees more than 38,000 volunteers who teach religion to over 360,000 students in grades 9-12 (over 150,000 of those students are outside the U.S.) and more than 350,000 students in college (over 200,000 of those students are outside the U.S.). These students and teachers span more than 130 countries (Church Educational System, 2007). CES is made up of two divisions: Institute and Seminary. Institute serves college-aged students and seminary serves students in grades 9-12. Because of the diversity of students across the globe, there are three different types of seminary programs. They include released-time seminary, daily seminary, and home-study seminary. The current study focused on released-time seminary.

Released-time seminary offers classes held during school hours for any one in grades 9-12, and are mainly taught in Utah, Idaho, Arizona, and parts of Washington. Students in these locations have the option to have parents sign a release form to be excused from public education for one period to take a seminary class. The church-owned seminary buildings are adjacent to public junior and high schools and are taught by full-time teachers (Church Educational System, 2007).

CES is organized much like public education. CES teachers report to a principal who reports to an area director (comparable to a district administrator), however the area director, no matter what part of the world he lives in, reports to one of seven assistant administrators. The assistant administrators report to the commissioner of Church
Education System. The commissioner of CES reports to the President of the Church of Jesus Christ of Latter-Day Saints.

The research was conducted in two seminaries in southern Utah: Pittsburg and Grant. Pittsburg Seminary has two buildings. The first is located adjacent to the middle school and serves 9th graders only. This seminary has two full-time CES teachers. The other seminary is next to the High School for student in grades 10-12. This seminary has six full-time teachers. Grant seminary is located between the High School and Middle School and serves students in grades 9-12. Eight full-time teachers are employed at Grant.

Grant seminary was built in 2007 and is one of the first technology-equipped buildings built by CES. Pittsburg Seminary is the oldest building in the area and is scheduled to be retrofitted with technology in the next three years. The main difference between the two schools is that Grant has a built-in projector in each classroom, where Pittsburg High has two rotating projectors and Pittsburg middle has one. The researcher has purposefully chosen these two seminaries because they represent opposite ends of the spectrum. Grant is a new building built with the latest technology and has a principal who is a technology user and advocate. In contrast, Pittsburg is the oldest building in the area and the administrator may be viewed as a non-user who is trying to become a user. Because of the physical buildings and the different administrators, it is believed that these two seminaries represent the continuum of teachers and administrators within CES. Each teacher has a laptop, given by CES, that is connected to the Internet. CES teachers are expected to get on the Internet at least once a week to obtain information from the administration. Also, it is expected that the teachers will utilize the information on CES's website: www.ldsces.org.
Participants

The participants for this study were 15 full-time CES teachers who teach released-time seminary in grades 9-12 at two seminary buildings in the St. George, UT area. The participants were all males and ranged in age from 21 to 60, with teaching experience levels varying from one year to over 30 years. Females were not included only because there were no female teachers at the two locations. Participants were given the option to participate at a local inservice. Teachers agreed to participate by signing the consent form at the inservice (Appendix A). Participants were contacted via email, phone, or face-to-face to seek permission to observe classes and conduct informal interviews. Although the researcher was in classrooms for observations, students were not involved in the research.

Instrumentation and Procedures

The study utilized observations and interviews as the means of collecting data. Also, the IC Map the researcher developed was used to guide the observations and interviews. The first phase was to collect data that was used in developing the IC Map to address (a) the different ways technology was being used, and (b) the different forms and processes of support CES teachers received. The second phase used descriptive statistics to determine the relationship between the different configurations of technology use and the forms and processes of support. The rest of this section explains the process of developing an IC Map and the types of instruments and procedures that were used (observations, interviews, and procedures).
Developing an IC Map

Hall and Hord (2006) developed the IC Map as the third diagnostic tool of CBAM because they discovered that when teachers were asked to implement some type of innovation they found that it was integrated in many different ways. An IC Map is created to offer a clear word picture of all the ways an innovation is being used. Hord, Stiegelbauer, Hall, and George (2006) describe the purpose of an IC Map:

It is called a map because it is like a road map that illustrates different ways of getting from point A to point B. An IC Map describes different possible operational forms for an innovation. The IC Map identifies the different components of an innovation and the variations in the ways each can be implemented (p. 4).

An IC Map can be used to describe effective practices to guide administrators in professional development as well as to “evaluate progress of implementation to develop supports” (Hord et al., 2006, 45).

The IC Map is not to be used for teacher evaluation; rather it is a diagnostic tool that shows the different ways an innovation is being used (Hord et al., 2006). For example, the National Staff Development Council (NSDC) developed twelve Staff Development Standards which provided a benchmark for many different groups across the nation—teachers, principals, superintendents, school boards—to name a few. To help clarify how NSDC saw the standards in use, Roy and Hord (2003) created an IC Map showing how each group could integrate the standard. In the teacher group under the standard—Learning Community—the IC Map has six different ways a teacher will “meet regularly with colleagues during the school day to plan instruction:”
Level 1: Meets regularly with learning team during scheduled time within the school day to develop lesson plans, examine student work, monitor student progress, assess the effectiveness of instruction, and identify needs for professional development.

Level 2: Meets regularly with learning team during the school day to plan instruction, examine student work, and monitor student progress.

Level 3: Works with learning team on special instructional projects during planning time.

Level 4: Works with others on non-instructional issues. Addresses personal concerns, not group issues.

Level 5: Uses planning time for individual planning.

Level 6: Uses planning time for non-instructional tasks (e.g. management, personal tasks) (p. 14).

This provides a “snapshot” of how a teacher may meet with colleagues to plan lessons. Also, a teacher or an administrator can use this to guide in professional development.

Hord et al. (2006) state that when a new program is started, teachers often do not receive enough information about what they are to do. The IC Map provides descriptions of different ways teachers can do what has been asked. Hord et al. (2006) have also identified four ways the completed IC Map can be used. First, the IC Map can be used to support team and individual self-analysis and reflection. Second, it can be used for different types of professional development such as teacher peer observation and coaching; Third, the IC Map becomes an efficient tool for planning staff development as it reveals the current uses of the innovation; and finally, it can be used to effectively evaluate the current program. The IC Map for this study was used to describe the
different configurations of technology use and the different forms and processes of support CES teachers received.

An IC Map is developed in four steps (Hord et al., 2006). Figure 3 shows the general process that is followed in developing an IC Map. The first step is to identify the innovation components. Hord et al. (2006) define components as the “major operational features” of the innovation (p. 13). For example, an operational feature or component for teachers integrating technology might be administrative purposes: tracking attendance, emailing students or parents, and grading. Components are discovered by conducting observations and interviews as well as interviewing the developer(s) of the program (if possible) to find out the original intent of the innovation. The purpose of step one is to create a list of components, the dimensions of the components, and the different variations of the components (Hord et al., 2006; Hall and Hord, 2006).

Figure 3. Developing an IC Map (Hall and Hord, 2006).
An example of this step is found in Donovan's (2005) research on technology integration in a junior high school which explored the relationship between student-off task behavior and laptop configurations. Donovan used the ISTE NETS standards to create a list of technology components.

Step two is to identify additional components and variations (Hord et al., 2006). This is accomplished by observations and interviews. Step one and two lead to the development of a cluster map which is a “schematic map of the array of possible components; their clustering; and some of the possible variations for certain components” (Hall and Hord, 2006, p. 127). Donovan (2005) conducted observations and informal interviews to discover the different ways (variations) the standards (components) were being implemented. Interviews with experts were also conducted to discover how they saw the component in action.

The third step is to refine the IC Map. An initial draft of the IC Map is created. If possible, the researcher should check with the developer to seek verification as well as to determine the most important components (Hord et al., 2006). Finally, some possible questions are created that can be used in observations. Donovan (2005) used the information from step 1 and 2 to create an initial draft of the IC Map. One teacher component reads:

Teachers include consideration of management of resources and student learning with technology: a) all the time, included in plan book, and apparent in observation; b) all the time, but mentally. Apparent in observation; c) some of the time but not consistently; d) only as the situation/need arises; and e) not at all (p. 80).
The final step in creating an IC Map is to test and finalize the map. The researcher actually uses the created IC Map to observe and interview a variety of teachers (Hord et al., 2006). After conducting the observations and interviews the researcher makes revisions as necessary. Donovan (2005) conducted additional interviews and observations using the created IC Map. Donovan found the above example too broad and broke the components into two sections: teacher and student. For the final version of the IC Map see Donovan (2005).

Observations

Observations are used to collect data by taking an ethnographic approach (Hord et al., 2006). A variety of classrooms were observed so that “all possible variations” of the innovation would be discovered (Hall and Hord, 2006, p. 126). The role of the researcher was that of ordinary observer (Spradley, 1980). The observations focused on the different types of technology used in teaching and any forms or processes or support utilized.

In this study observations took place in 15 classrooms. During phase one, descriptive observations were conducted to create the IC Map. The process consisted of the researcher observing multiple classrooms. The tool used to collect data during phase one was a laptop. Once the first draft of the IC Map was completed, the process of observing was repeated using focused observations to verify the IC Map and gather any additional data. After the initial IC Map was created, it was used during this phase as a tool to collect data. Once the IC Map was completed, it was used to collect data during phase two.
Interviews

Informal interviews were used in this study. These interviews sought to answer the research questions as well to verify the created IC Map. The informal interviews were also used to collect data to identify the different forms and processes of support CES teachers were using. Interviews were recorded using a digital tape recorder. Some participants were interviewed multiple times to clarify data gathered.

During the first phase, interviews were used to determine the different ways teachers were integrating technology and the different variations of professional development. An interview with the developer was also conducted. The researcher was informal in these interviews because, at this point, the different variations were not known. During phase two the researcher used focused interviews to ensure the different variations of the components of the IC Map were thorough enough.

Some topics and questions that were used to guide the researcher during the informal interviews include the following:

**Topic: Current concerns in integrating technology.**

**Possible Questions:**

- What concerns do you have in using the technology?
- What are your current concerns as you integrate technology?
- How have your concerns changed as you have used technology?
- What would you say is your biggest concern?
- Why have you chosen to use/not use technology in your teaching and learning?

**Topic: Forms and processes of technology support.**

**Possible Questions:**
• How do you get help when you need it?
• What do you do if your computer has problems?
• What types of technology support have you received from CES? Which one has been most/least helpful?
• Do you have someone on your faculty that you can go to quickly to get technology help? Who? How are they helpful? In what ways?
• Are there other types of technology support that you would like to receive?
• What has been your experience with the CES Help Desk?

Topic: Thoughts on effectiveness of using technology in their teaching and learning.

Possible Questions:
• How effective do you feel technology is being used in CES classrooms?
• What do you use technology the most for?
• What do you wish you could do with technology that you currently cannot?
• How has technology helped you in your teaching and learning?
• How has technology hindered you in your teaching and learning?

Topic: Thoughts on effectiveness of technology support.

Possible Questions:
• What type of form or process of technology support do you feel has been most valuable?
• What type of form or process of technology support do you wish you had more of?
• How do you feel CES has been in giving you adequate technology support? What more do you wish they would do?
Topic: Clarification of observations about technology use in the classroom.

Possible Questions:

• This is how I saw technology being used in the classroom, is this correct?

Procedures

The first phase of the study focused on using observations and informal interviews. Observations were set up by the teacher and the researcher via email, phone, or personal contact. The researcher used a laptop to take notes of what was happening and stayed for the entire class period. Informal interviews took place before or after the observations and via email. Data gathered from informal interviews was recorded and immediately transcribed. Once the first draft of the IC Map was created, it was then used guide observations. It was also given to participants to help create discussion during informal interviews. The IC Map was used to collect and analyze data during phase two of the study.

Treatment of Data

Data were analyzed using resources created by Hord et al. (2006). The observations and interviews were used to collect data for the Innovations Configurations map. Domain analyses were used to help describe certain categories that shared similar types of relationships. Spradley (1980) has identified several different relationships that researchers can look for when using domain analysis. Some relationships that were useful for this study included the following: strict inclusion (X is a kind of Y and X is a type of Y); means-end (X is a way to do Y); and rationale (X is a reason for doing Y).
Descriptive statistics were also in this study including frequency counts, and comparison with other data (Hord et al., 2006).

Frequency counts simply tally the number of teachers who used a component variation. This can be used to “profile how a component is implemented by a teacher within a … school” (Hord et al., 2006, p. 33). Frequency counts helped show where teachers were integrating well (i.e., many teachers using a and b variations) and where teachers were struggling (i.e., many teachers using d and e variations) (Hall & Hord, 2006).

The IC Map was compared with other data (Hord et al., 2006). Comparison with other data included clusters of technology use and frequency counts with the types of forms and processes of support received. Comparing the data revealed relationships between the two.
CHAPTER 4

RESULTS

The purpose of this study was to determine what effect recent technology integration is having on the teaching of Church Education System (CES) teachers. Data was collected in two phases. Phase one was the creation of an Innovation Configuration (IC) map. The purpose of the IC Map was to identify the different configurations of technology use and different forms and processes of support teachers were receiving. The second phase examined the relationship between the different configurations of technology use and the forms and processes of support teachers receive. The results of this study will be outlined in three sections: (a) development of Innovation Configuration Map, (b) identification of configuration of technology use and professional development, and (c) exploring the relationships between professional development and configurations of technology use.

Development of Innovation Configuration (IC) Map

An IC Map is the third diagnostic tool of CBAM and is used to create a clear word picture of all the different ways an innovation can be implemented (Hall & Hord, 2006). Phase one of this study was to create an IC Map to describe the different configurations of technology use and the different forms and processes of support CES teachers are receiving. The researcher used procedures described by Hord et al., (2006), Hall & Hord
(2006), and Donovan (2005) as models in creating the IC Map. The creation of this IC Map consisted of four steps: (a) identifying innovation components, (b) identifying dimensions, variations, additional components, and clusters, (c) refining the IC Map, and (d) testing and finalizing the IC Map (Hord et al., 2006).

**Identifying Innovation Components**

The first step was to identify technology integration and professional development components—the “major operational features” of the innovation (Hord et al., 2006, p. 13). Components were discovered by searching the CES policy manual and interviewing the administrator over all of technology within CES.

*Searching the documents.*

Hall and Hord (2006) suggest searching any available documents that may help in identifying components. The CES Policy Manual was used to gather information about how CES teachers were expected to use technology. Under the section ‘Computers’ the purpose is described as follows:

Computers are provided for professional use by CES employees to accomplish the objectives of CES and for the following business purposes:

1. Administrative functions;
2. Communication tools for CES personnel, including e-mail and access to the Internet;
3. Lesson preparation and presentation; and
4. Training.

These four purposes were to be configured as five components of the IC Map.
Also, the policy manual stated that CES teachers were expected to make regular use of e-mail, online training and Internet resources such as www.lds.org and www.ldsces.org. These were later made into IC Map components (see Appendix H, components 5, 6, 9, and 11). In addition to searching printed documents, Hord et al. (2006) recommend interviewing the developer to determine how he or she sees the innovation in application.

*Interviewing the developer.*

Hord et al. (2006) recommend asking the developer questions such as:

- Please describe for me what you would see if you were observing a classroom in which technology (laptops, Internet, & projectors) were being used most effectively—for example a best case scenario.
- Please describe a worst case scenario.

The interview occurred over the phone with the administrator tasked with overseeing technology in CES schools. He is located in Salt Lake City, Utah. Though the administrator did not develop the technology, he is the person who is overseeing its current integration. Questions were asked to the developer based on recommendations from Hord et al. (2006).

In describing the best-case scenario the following phrases were used by the administrator: “technology is to facilitate the teacher,” “technology is a tool,” “the greatest technology is the teacher,” and “technology is to create meaningful learning outcomes.”
In describing the worst-case scenario such phrases as the following were used: “technology is not used all year,” “technology is used all the time,” “teacher could not teach without it,” and “variety was not used.”

Hord et al. (2006) recommend further questioning until the developer shares how he or she sees the innovation in its perfect state. The researcher sought further clarification as to the meaning of ‘properly trained’ from the CES Policy Manual. The administrator indicated that when teachers have been properly trained they are able to use technology effectively to perform the “needed tasks”. When asked for further clarification on how he saw that happening, he explained, “a teacher could take a training lesson designed to help walk him through the learning. As for a new teacher becoming ‘properly trained’ the CES Help Desk would be a resource to him and hopefully we are hiring those who already have a good technology background.”

During the course of the interview it was also mentioned that the real reason CES teachers were given technology was for administrative, communicative, and training resources. Lesson preparation and presentation was a natural consequence but not the justification. The administrator said that if the priorities were numbered in the CES Policy Manual “lesson preparation and presentation” would be last.

After researching the documents and interviewing the developer, the researcher began to create a tentative list of components, dimensions, and variations (Hord et al., 2006). Domain analysis was used to help analyze the data gathered after step one, see Appendix C for the complete analysis (Spradley, 1980). (A more complete discussion of the analysis of the research findings is included after step two). The following components
and dimensions were discovered (variations were also discovered, though not included here):

1) Component 1: Uses technology for administrative purposes.
   a) Dimensions: Attendance-STAR; parents; priesthood leaders; ldsces.org—news.

2) Component 2: Uses technology for communication purposes.
   a) Dimensions: Email, other supplemental communication—blogs, etc.

3) Component 3: Uses technology for training.
   a) Dimensions: Training from ldsces.org; trained by administrator using technology.


5) Component 5: Uses technology for lesson presentation.

Once step one was completed teacher interviews and observations needed to be conducted to identify additional components, dimensions, variations, and clusters.

Identifying Dimensions, Variations, Additional Components, and Clusters

The next step in creating an IC Map was to identify dimensions, variations, additional components, and clusters (Hord et al., 2006). In order to identify all the different aspects needed to create an IC Map the researcher needed to observe and interview CES teachers teaching with technology.

The researcher attended the local inservice at Grant and Pittsburg to introduce the study and obtain signed consent forms (see Appendix A). Of the potential 16 full-time CES teachers, 15 signed the waiver—resulting in a 94% participation rate. The teacher who did not sign was absent for an indefinite period of time due to health issues.
**Observations.**

Observations were conducted using an ethnographic approach (Hord et al., 2006). In other words, the researcher attempted to record every technology use and every comment by participants (Hord et al., 2006). Participants knew the researcher was coming. The researcher stayed for the entire class period (all schools were on the block schedule—84 minute classes) and took notes on a laptop. Descriptive notes were recorded while observing six formal classrooms to complete step two (overall thirteen formal observations were completed). In addition to the formal observations, multiple “snapshots” were taken as the researcher briefly observed classrooms from the hall to see how teachers were using technology. The researcher recorded what was witnessed.

**Interviews.**

Hord et al. (2006) suggest interviewing a wide range of teachers so that multiple variations could be discovered. Pittsburg and Grant Seminaries were purposefully chosen for this reason. The participants in these two Seminaries represent an array of technology users and non-users alike. The initial six interviews were conducted in a similar manner. Each interview was recorded and later transcribed. The interviews were informal and designed to clarify how each teacher was using technology and what different forms and processes of support they were receiving. It was quickly determined that teachers were anxious to express their feelings about technology as they had not had the opportunity to prior to this. For example, one participant said, “This is awesome; I have never been able to talk like this before.” Informal interviews allowed the researcher to gather as much information as possible without guiding the conversations.
The first six interviews were to complete step two. Overall, fifteen structured interviews were conducted (six informal and nine formal) and multiple One-Legged Interviews took place (Hall & Hord, 2006).

In order to obtain as much information as possible to identify dimensions, variations, additional components, and possible clusters, six teachers were observed and interviewed during step two. The data were then analyzed using domain analysis. Spradley (1980) recommends using different types of domain analysis depending on the relationships being examined. The following relationships were utilized (Spradley, 1980): *X is a type of Y; X is a way to Y; X is a reason why Y; and X is a kind of Y.* See Table 1 for examples of domain analysis conducted for this study (see Appendix C for the complete list).

After completing the domain analysis more components and dimensions were identified. Each component has one or more dimensions or aspects and contains multiple variations (Hord et al., 2006). Dimensions and variations for each component were discovered by looking for descriptive words or phrases from the domain analysis and findings from observations and interviews (see Appendix D for a list of components and dimensions from the Table of Contents). For example, the component *accesses CES’s website to obtain information* contains the three dimensions (frequency, news, announcements), and includes the following variations:

- Stays informed by reading the news and announcements weekly from CES’s website.
Table 1: Examples of domain analysis

<table>
<thead>
<tr>
<th>Domain 1: X is a type of technology used in the CES classroom</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Is a type of</td>
</tr>
<tr>
<td>Laptop</td>
<td>Technology used in the CES classroom</td>
</tr>
<tr>
<td>Projector</td>
<td></td>
</tr>
<tr>
<td>Powerpoint</td>
<td></td>
</tr>
<tr>
<td>Windows Media Player</td>
<td></td>
</tr>
<tr>
<td>Lds.org—hymns</td>
<td></td>
</tr>
<tr>
<td>Lds.org—talks</td>
<td></td>
</tr>
<tr>
<td>Internet</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain 2: X is a way CES teachers receive Professional Development</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Is a way</td>
</tr>
<tr>
<td>CES Help Desk</td>
<td>CES teachers receive professional development</td>
</tr>
<tr>
<td>Learning on own</td>
<td></td>
</tr>
<tr>
<td>Asking others</td>
<td></td>
</tr>
<tr>
<td>Analyzing another’s work</td>
<td></td>
</tr>
<tr>
<td>Software help</td>
<td></td>
</tr>
</tbody>
</table>
• Tries to stay informed by reading the news and announcements a couple of times a month from CES’s website.

• Reads the news once a month from CES’s website.

• Reads the news and announcements once or twice a year from CES’s website.

• Never reads the news and announcements from CES’s website. Obtains information from colleagues or administrators.

After a review of the CES Policy Manual and an interview and follow-up email with the developer, it was determined that each of the original components would be better placed as clusters (Hord et al., 2006). This helped add clarification and focus as the components and variations emerged. For example, under the original component ‘training’ the CES Policy Manual states that every CES teacher should be properly trained in such things as the use of computers, software applications, e-mail, and Internet. Training is better identified as a cluster because the different types of training would become components.

Initially three clusters were identified: Teachers, professional development, and technology. However, as the IC Map was being created, it was clear that for this study teachers are being analyzed and professional development and technology are a part of what teachers experience. Following the lead of Roy & Hord (2003) in their development of an IC Map for the NSDC’s Staff Development Standards, clusters were created from the five categories identified in the CES Policy Manual under the heading “purposes of technology.” The clusters are: a) Uses technology for administrative purposes; b) Uses technology for communication purposes; c) Uses technology as a medium for training; d) Uses technology for planning lessons; e) Uses technology for lesson presentation; and f)
Professional development for technology CES teacher receives—forms and processes of support. (Later a seventh cluster was created: System Support).

Once clusters, components, dimensions, and variations were identified an IC Map was created. After reviewing the initial draft it was recommended that a table of contents be created (which would provide a big picture of the IC Map) and that some of the language of the variations should be adjusted (G.E. Hall, personal communication, October 23, 2007). See Appendix D for the Table of Contents and Appendix E for initial draft of the IC Map.

Refining the IC Map

The third step was to refine the IC Map. At this point, Hord et al. (2006) recommend that the researcher return to the developer(s) to discuss what has been discovered in an effort to seek further clarification on the most important parts. It is also a time when questions should be developed to guide future observations and interviews (Hord et al., 2006).

Re-contact developer.

The CES administrator over technology was again contacted in order to obtain input and seek further clarification. The researcher wanted to clarify what the needed tasks were in which CES teachers should be trained. However, the administrator was reluctant to identify them. From the observations and interviews the researcher identified the needed tasks as email, presentation software, word processing software, and web browsing capabilities. This resulted in creating a component.

At this point in creating the IC Map questions were developed to help guide future interviews and observations. Questions needed to be sufficient to cover each of the
components in the IC Map. For example, some of the questions to guide interviews included the following: How often do you use technology in the classroom; what do you mostly use technology for; and where do you go when you need help. Some of the questions used to guide observations include: What technology is used in the classroom; how is technology used in a variety of ways; and how does the technology help keep the lesson focused on student learning? See Appendix F for the complete list of questions.

Draft of IC Map.

Creating the Table of Contents revealed that some of the components overlapped each other. For example, training was located in three different clusters and could be consolidated into one. It was also recommended that the variations needed to have a little more grey area, the descriptions needed to be a little more expressive, and opinions, feelings and attitude should to be taken out (G.E. Hall, personal communication, October 23, 2007). For example, one variation of a component designed to measure motivation read: Teacher would like to learn how to use technology. However, this attitude is difficult to ‘see’ in action. Therefore, it was removed. Also, words like never and all were changed to rarely and frequently to allow more flexibility.

Various checklists were also added to the IC Map allowing the observer to quickly determine what technology the teacher had and what was being used. The components were renumbered so that they did not start over at every cluster—allowing ease of readability and functionality. Also, some of the components were adjusted because they overlapped and a cluster of system support was added. Finally, the layout of the IC Map was adjusted to conform towards more of the standardized IC Map formats.
Thus, after interviewing the developer, searching the policy manual, observing and interviewing, and re-interviewing the developer (completing the first three steps) a second draft of the IC Map was produced (see Appendix F).

Testing and Finalizing the IC Map

The final step in creating an IC Map is to test and finalize the map (Hord et al, 2006). During this step the created IC Map was actually used to conduct focused observations and interviews.

The researcher used the IC Map to observe four teachers and to interview five. Using the IC Map to observe and interview provided rich data that helped finalize the IC Map. For example one component ranked the ability of the teacher to perform a needed task. During interviews and observations it was not feasible to be able to identify the ability of a teacher. As a result the component was changed and integrated into another. Minor grammatical adjustments were made and some components were made more descriptive or removed all together as they were found unnecessary. For example, originally one component read technology is used to help the teacher. To help clarify, it was changed to technology is used to help the teacher during classroom teaching.

Finally, some components were redundant and therefore combined. For example component 12, Church's Official Websites, and component 13, Utilizes resources from Church's official website—www.lds.org, repeated the same thing only in a different way. They were combined to create a new component (see Figure 4 taken from Appendix I).
Component 11
Use of various websites

<table>
<thead>
<tr>
<th>Site</th>
<th>Frequency</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ldsees.org</td>
<td>D= Daily,</td>
<td></td>
</tr>
<tr>
<td>Lds.org</td>
<td>W= Weekly,</td>
<td></td>
</tr>
<tr>
<td>Josephsmith.net</td>
<td>M= Monthly,</td>
<td></td>
</tr>
<tr>
<td>Byu.edu</td>
<td>R= Rarely</td>
<td></td>
</tr>
<tr>
<td>Providentliving.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Besmart.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mormon.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ldscatalog.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairlds.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Official Church Websites:
- Ldsees.org
- Lds.org
- Josephsmith.net
- Byu.edu
- Providentliving.org
- Besmart.com
- Mormon.org
- Ldscatalog.com
- Fairlds.org
- Other:

Unofficial Websites:
- Google.com

Figure 4. Component 11: Teachers uses of various websites.

A cover page was created to provide a brief overview and identify clear ways the IC Map can be used. Also, formatting adjustments were made and the IC Map was considered complete (G. E. Hall, personal communication, November 9, 2007). The final version was used to observe and interview three additional teachers. However, no additional data were found significant for refining the IC Map, thus the creation of the IC Map was complete (see Appendix G for the final IC Map).
Identification of Configurations of Technology Use
and Professional Development

The first phase of research described the method used in creating an IC Map, identifying the different ways technology was being implemented, and the different forms and processes of support CES teachers were receiving. The second phase of this study utilized the created IC Map to answer the following research questions: (a) what are the different configurations of technology use among CES teachers, and (b) what are the different forms and processes of support CES teachers receive for technology integration?

Technology Use

Three teachers were observed and four were interviewed using the final version. The final version was used to go back over the observation notes and interview transcripts of the other 12 participants. Not all participants were seen using every component, nor did the interviews cover each component. Three tables were created from the IC Map. The first shows which variation of the components had the most/least teachers combined (see Appendix H). The second reveals the components not included in the first table and the teacher percentages (see Appendix I). Finally, the last table shows the variation each teacher was at with each component (see Appendix J).

Teachers.

CES teachers were given laptops about two years ago and provided very little to no training on how to use them. However, despite being given little training, teachers are using technology in a variety of ways: administrative, communication, and preparing and presenting lessons. Figure 5, taken from the table in Appendix H, reveals how teachers
are using technology. The data gathered under the administrative, communication, and training clusters came from interviews. Data gathered for how teachers prepared and presented lessons came from observations and interviews.

<table>
<thead>
<tr>
<th>Component</th>
<th>Variations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Technology Available</td>
<td>A</td>
</tr>
<tr>
<td>Cluster A: Administrative</td>
<td></td>
</tr>
<tr>
<td>2- STAR</td>
<td>50%</td>
</tr>
<tr>
<td>3- STAR for Communication</td>
<td>77%</td>
</tr>
<tr>
<td>4- CES’s Website</td>
<td>36%</td>
</tr>
<tr>
<td>Cluster B: Communication</td>
<td></td>
</tr>
<tr>
<td>5- Email Purpose</td>
<td></td>
</tr>
<tr>
<td>6- Email Frequency</td>
<td>93%</td>
</tr>
<tr>
<td>7- CES’s Website</td>
<td>69%</td>
</tr>
<tr>
<td>8- Collaborative</td>
<td>25%</td>
</tr>
<tr>
<td>Cluster C: Training</td>
<td></td>
</tr>
<tr>
<td>9- CES’s Website</td>
<td>16%</td>
</tr>
<tr>
<td>Cluster D: Planning Lessons</td>
<td></td>
</tr>
<tr>
<td>10- Technology Helps</td>
<td>50%</td>
</tr>
<tr>
<td>11- Various Websites</td>
<td></td>
</tr>
<tr>
<td>12- Organize Information</td>
<td>67%</td>
</tr>
<tr>
<td>Cluster E: Lesson Presentation</td>
<td></td>
</tr>
<tr>
<td>13- Technology Helps</td>
<td>36%</td>
</tr>
<tr>
<td>14- Variety of Technology</td>
<td>36%</td>
</tr>
<tr>
<td>15- Software &amp; Hardware</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5. How teachers are using technology.
Over half of the teachers are using technology to perform administrative tasks by recording attendance daily and by writing descriptive notes about their student's attendance, conversations with parents or leaders, concerns, or successes. At Pittsburg, teachers are required to record attendance and notes daily. On the other hand, teachers at Grant are told not to record attendance on the computer system daily (teachers record it on paper for the secretary to input). However, teachers at Grant are encouraged to record notes. The administrator at Pittsburg has found the note section extremely helpful. When a parent calls with a concern the Principal is able to read what teachers have written about the student, therefore giving better feedback to the parents. Because Pittsburg's teachers are required to input attendance daily on the computer the administrator has found that they record more information in the notes section. Also, at both schools, most teachers (77%) are using their laptops to obtain phone numbers or email parents and leaders of youth.

Teachers, at both schools, are also using technology for communicative purposes. Communication consists of email, obtaining information from CES via its website, and sharing electronic files. Almost all teachers (93%) check their email daily and the other 7% check it at least a couple times each week. Figure 6 reveals that 50% of teachers use email to communicate with colleagues.

The majority of teachers are staying informed as to the needs of CES by reading the news and announcements at least weekly. However, 24% of teachers are not accessing the weekly news and announcements. Most teachers do not use technology to share files. However, a few teachers at Pittsburg and Grant are using it as a way to collaborate and
share teaching ideas with each other. One teacher regularly modifies and uses another teacher’s presentations.

<table>
<thead>
<tr>
<th>Component 5</th>
<th>Uses email (Colleagues/Administration, Parents, Priesthood leaders, Others)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email is used for:</td>
<td>Percentage of Teachers</td>
</tr>
<tr>
<td>o Contacting priesthood leaders</td>
<td>20%</td>
</tr>
<tr>
<td>o Contacting parents of seminary students</td>
<td>10%</td>
</tr>
<tr>
<td>o Communicating with colleagues</td>
<td>50%</td>
</tr>
<tr>
<td>o Conducting other business contacts</td>
<td></td>
</tr>
<tr>
<td>o Personal correspondence</td>
<td>20%</td>
</tr>
<tr>
<td>o Other</td>
<td></td>
</tr>
</tbody>
</table>

Figure 6. Teachers use of email.

One of the purposes of technology, according to the CES manual and the developer, is to provide training. However, data revealed that over 75% of teachers do not use CES’s website to receive training. Interviews revealed that some teachers do not know how to use the computer and therefore do not use it to be trained. Also, some teachers reported not being aware of the training resources available online. Still others simply reported not having sufficient time during the school year to receive training. Seventy-seven percent of teachers were in the c/d variation of the Training component. However, both administrators reported using training videos from CES’s website during faculty inservice.

When preparing lessons, only 50% of teachers were using the technology resources available to CES teachers online through CES’s website. Twenty-nine percent of teachers reported that technology hindered their preparation and as a result have backed away
from using it when preparing lessons. Interviews revealed that a teacher’s preparation
time is ‘sacred’ and teachers cannot afford to spend that time learning how to use
technology. One teacher said:

The other day I tried to create a picture of the plan of salvation and spent 45 minutes
trying to make it into a PowerPoint and finally scrapped it all together. It was a waste
of my time and I went back to drawing it on the white board...I just don’t know how
to do that.

Teachers did not use web-based applications to create and store lesson outlines. However,
67% use their laptop to create lesson outlines (e.g. Microsoft Word) and store their files
electronically. Figure 7 shows the different websites teachers are using.

| Component 11 |
| Use of various websites |
| Site | Frequency | Purpose |
| Daily | Weekly | Monthly | Rarely |
| **Official Church Websites:** | | | |
| o Ldsces.org | 60% | 40% | | |
| o Lds.org | 20% | 70% | 10% | |
| o Josephsmith.net | | 17% | 83% | |
| o Byu.edu | 13% | 50% | 43% | |
| o Providentliving.org | | | 100% | |
| o Besmart.com | | | 100% | |
| o Mormon.org | 14% | 86% | | |
| o Ldscatalog.com | | | 100% | |
| o Fairlds.org | | | 100% | |
| o Other: | | | | |
| **Unofficial Websites:** | | | | |
| o Google.com | 44% | 56% | | |

Figure 7. Different websites teachers are using.
On a daily basis 60% of teachers use resources from CES's website and 44% use Google to search for information. On a weekly basis 40% of teachers reported accessing resources from CES's website (thus every teacher reported accessing CES’s website at least once a week). Also, 56% of teachers reported that they get information from Google daily and 44% reported using Google weekly (thus 100% of teacher use Google at least once a week).

Only 36% of teachers reported using technology in a variety of ways in the classroom. However, this was not consistent with what was observed in most of the classes. Observations revealed that most teachers only used PowerPoint, and these types of lessons were mostly used to teach the memorization of key scriptural passages and to display statements. Some used a media player to play a song for devotionals. All observations and interviews revealed that technology is used in one direction: Teacher to student.

**Configurations of Technology use in CES**

CES teachers were using technology in many different configurations. For this study three different types of configurations have been identified. Much like Hall & Hord's (2006) Levels of Use and Rogers (2005) adoption categories, it was discovered that CES teachers may fall into one of three technology configurations. The three configurations are: (a) Independent, (b) Interdependent, and (c) Codependent.

*Independent teacher.*

The Independent CES teachers are those who are “digital natives” and “digital immigrants,” (Prensky, 2006, p. 9) who either came into CES having already learned technology or who have assimilated extremely well. As a result, they have a very good
understanding of basic software and hardware and can easily perform the needed tasks. These teachers are not afraid to try new things, proactively seek opportunities to use technology, and have embraced it and see it as a powerful tool in aiding their teaching.

This type of teacher knows how important it is to keep their technology skills sharp. They are busy like everyone else but they seem to be able to find time to use CES’s website for quick training. They seek to learn how to use technology on their own initiatives and know that they do not understand all things therefore, they are always trying to learn. They seem to realize that, though they are good with technology, they know there is another level they (and their students) can achieve. These are the types of teachers who do not mind providing help to others—especially those who really want to learn. They enjoy sharing technology ideas with other teachers including those in other seminaries. However, this type of teacher may become overburdened by helping too many other teachers learn technology.

Email is utilized effectively by these types of teachers in a variety of ways. The STAR attendance software is used extensively, including the use of the note taking feature. These teachers skill level with hardware and software is at a level that technology has become an effective tool. For example they can quickly find resources from CES’s website, create a PowerPoint with ease, and if a hardware glitches occur they can quickly adjust.

Technology is a valuable tool for these teachers as they prepare lessons. They easily use technology resources to quickly find information that will help them in their preparations. They use some form of technology in almost every lesson, but are careful as they have learned that it can become the focus if not used appropriately. When deciding
how to teach a topic, if technology is not the best method to use, it is not used. Their
technology skill level is such, that technology is another tool to help achieve the end
result: students learning principles and applying them in their daily lives.

During lesson presentation, technology is used in effective ways. As good as this
teacher is with technology, he or she has not forgotten the value of the whiteboard for
some tasks and will often toggle back and forth between it and computer technology
during the lesson.

*Interdependent teacher.*

Interdependent CES teachers are teachers who are trying the best they can to
implement technology. They progress at a slow but steady pace; this is not because they
do not want to move faster, but because they have limited time to learn. These teachers
know that technology is important because they see it being used daily in the lives of
their students and they see how much money is invested into it by their employer.

These teachers were introduced to technology only a few years ago (when CES gave
them a laptop) and have been trying to learn to use it ever since. However their
technology use is limited because they have had very little training. To learn, these
teachers will first spend time trying to figure it out on their own. But, they are not afraid
to ask for help. They want to learn and appreciate inservices that teach them how to use
technology effectively—especially when the training is during their contracted hours.
They thrive on the little ‘tricks-of-the-trade’ that others show them.

These teachers are normally pretty quick to respond to emails and often use
technology resources to communicate with parents. They regularly read the news,
announcements, and teaching manuals from CES's website. However, they rarely use
CES's website for anything else.

These teachers know enough about software programs like Microsoft Word and
PowerPoint to make a lesson outline and a brief presentation. However, because of their
lack of knowledge, they are still intimidated and only use it when they have extra
preparation time. Technology has not yet become an efficient tool; however they are
making progress to that end.

In teaching, this teacher uses technology more effectively than the Codependent
teacher, but not as efficiently as the Independent teacher. When teaching with
technology, this teacher does pretty good; however, students can often become more
focused on the technology than the lesson. Technology is often used in the same
repetitive format (e.g. same type of PowerPoint lesson). Technology problems often go
unfixed because past experiences have shown that it takes too much of their time. It is
important to note, that this is not because this teacher does not want to know how, but
because he or she has not been taught how.

Codependent teacher.

For the purposes of this study, codependent is used in a manner that is not entirely
consistent with the general use of the term. Specifically, while codependent generally
refers to a relationship that is mutually unhealthy, in this usage, the dependence does not
extend in both directions. Codependent CES teachers are teachers who at one time
thought they would never need to use technology in class. They are often seasoned
veterans who have been teaching without using technology and feel like what they have
been doing is good enough. They are intimidated because of their lack of technology
skills and feel so overwhelmed that they do not know where to start. However, they also feel pressured to learn it because of the message CES is sending by investing large amounts of money into providing teachers with technology. They rely heavily on others to learn technology.

These teachers need a lot of fundamental help to perform basic needed tasks. They are afraid to ask others for help, not because they do not want to (in fact they are often craving help), but because they are respectful of others’ time and do not want to infringe. They are somewhat nervous to attend any type of training, because they do not want to appear stupid.

These teachers need to be told and shown how to use email and as a result they may take longer than normal to respond to emails—if they do at all. Often this type of instruction needs to be repeated over and over before they truly understand. They will look at CES’s website if they can, but often get the CES information from their administrator.

These types of teachers may use one or two types of technology software when preparing lessons, however most of the time they will do what they have been doing for years. It takes this teacher a long time to prepare a lesson using PowerPoint, and as a result these types of lessons are rarely used. This type of teacher often becomes frustrated with technology and finds that it wastes more time than it is worth.

When technology is used in the classroom this type of teacher often uses only one form of variety—PowerPoint. Also, students may focus more on the technology, not because it is an ineffective PowerPoint, but because this teacher rarely uses technology.
Range of Professional Development

The second part of the research question was to identify the different forms and processes of support CES teachers are receiving while integrating technology. Figure 8 is taken from Appendix H and shows how CES teachers are receiving professional development.

<table>
<thead>
<tr>
<th>Cluster F: Professional Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>16- Type of Training</strong></td>
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<tr>
<td><strong>17- Teacher’s Effort</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cluster G: System Support</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>18- Training from Administration</strong></td>
</tr>
<tr>
<td><strong>19- Colleagues Help</strong></td>
</tr>
<tr>
<td><strong>20- CES Help Desk</strong></td>
</tr>
</tbody>
</table>

Figure 8. Percentage of teachers in the variations of professional development.

Component 17 (Teachers’ efforts to learn technology) revealed that 71% of teachers were seeking to improve technology skills on their own. Teachers learn on their own by ‘playing’ with the software or hardware whenever they can. They also learned on their own by proactively getting ideas from other teachers—whether it was during a conversation or witnessing it.

The administrators from each of the schools were different in their technology trainings. This is manifested in component 18, where 54% of teachers did not receive...
technology training from their administrator. Teachers at Grant reported receiving more
one-on-one training from their administrator and occasional technology training at faculty
inservices. Both administrators tried to teach faculty inservices using technology (eg.
lessons using PowerPoint’s or videos from ldsces.org).

One of the major processes of support was found to be teachers asking each other for
help. Component 19 shows that 100% of teachers said they had someone they could
quickly go to for help. Of the 100%, 13% did not feel comfortable going to another for
help (one teacher said this was because he did not want to infringe on other teachers’
time). The researcher frequently observed teachers helping each other at Grant Seminary
and the same was reported in interviews by teachers at Pittsburg. However, interviews
revealed that some teachers (the Independent teachers) become overburdened with
helping others. As a result of the frustration, they found themselves wanting to help less.

The CES Help Desk, which has been established to provide technology assistance for
teachers, was reported to be of little help to 85% of teachers. This was expressed in
interviews. Many said they were frustrated because when they called they were told they
would have to wait until someone would call them back—sometimes not for a day or
more. One teacher was waiting until the end of the semester to fix an essential hardware
problem because he did not have the time it would take for the help desk to get it fixed.
The additional 15% reported that the CES Help Desk had been very helpful and that they
would call them again.

Figure 9 shows the types of training teachers received for software and hardware.
Ninety-two percent of teachers have not received any formal technology training for any
hardware or software. For example, despite being given a laptop almost two years ago,

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91% of teachers have had to learn how to use the hardware on their own. Help has also come from colleagues, but no formal technology training has occurred. In almost every aspect of software and hardware, teachers have had to learn on their own or get help from a colleague.

<table>
<thead>
<tr>
<th>Component 16</th>
<th>Type of training teacher has received (Software, Hardware)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software</strong></td>
<td>Type of training</td>
</tr>
<tr>
<td>o Star</td>
<td>Self-Study 80% 20%</td>
</tr>
<tr>
<td>o Email</td>
<td>80% 20%</td>
</tr>
<tr>
<td>o Word Processing</td>
<td>89% 11%</td>
</tr>
<tr>
<td>o Presentation</td>
<td>50% 48% 8%</td>
</tr>
<tr>
<td>o Web Browser</td>
<td>91% 9%</td>
</tr>
<tr>
<td>o Media Player</td>
<td></td>
</tr>
<tr>
<td>o Other:</td>
<td></td>
</tr>
<tr>
<td><strong>Hardware</strong></td>
<td></td>
</tr>
<tr>
<td>o Laptop</td>
<td>91% 9%</td>
</tr>
<tr>
<td>o LCD Projector</td>
<td>60% 40%</td>
</tr>
<tr>
<td>o Printer</td>
<td>100%</td>
</tr>
<tr>
<td>o Scanner</td>
<td>80% 20%</td>
</tr>
<tr>
<td>o Other:</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9. Types of training.

No teachers reported participating in any type of ongoing technology-related professional development program. Interviews revealed that many teachers are looking for some technology support from CES, but are not getting it. In interviews comments were often made about how CES teachers are now on a 12 month contract and the summer would be a great time to learn technology. They also expressed great interest at having some type of formal ongoing training throughout the year.
Exploring the Relationships Between Professional Development and Configurations of Technology Use

The previous section focused on answering the research questions: (1) what are the different configurations of technology use among CES teachers, and (2) what are the different forms and processes of support CES teachers are receiving. The final section of this chapter will seek to find out the answer to the final research question: (3) what are the relationships between technology use and the different forms and processes of support.

Professional development normally consists of many different forms and processes of support. However, this study revealed that the professional development CES teachers are receiving is minimal. CES teachers have integrated technology mostly by themselves and by receiving help from colleagues. Also, some teachers have received help from the CES Help Desk. CES teachers do not have any type of ongoing, formal professional development training.

This study identified three different technology configuration uses among CES teachers. The first group, the Independent teachers, are actively integrating technology well. Many are the digital natives who have a good grasp of technology, and are constantly improving themselves despite what anyone else does. Also, almost everything they have learned has been on their own. The second configuration is the Interdependent teacher. These teachers have only recently been introduced to technology and are trying (as time permits) to learn to teach with technology. They need help and are getting it only from the Independent group. The final configuration is the Codependent teacher. These
teachers have only started using technology because they feel forced. They need a lot of help and want to learn, but are afraid because they know so little about technology. These three configurations will be compared to the different forms and processes of support CES teachers are receiving.

The three different configurations of technology teachers can often take on different roles and help each other. Table 2 shows the relationship between the configurations of technology use and professional development. Four key forms of professional development were used to compare with the different configurations. They were measured based upon their dependency level.
Table 2. Relationship between Professional Development and Configurations of Technology Use.

<table>
<thead>
<tr>
<th>Forms of Professional Development</th>
<th>Dependency Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Always</td>
</tr>
<tr>
<td>Self-Trained</td>
<td>Independent</td>
</tr>
<tr>
<td>Help from Colleagues</td>
<td>Codependent</td>
</tr>
<tr>
<td>Help Desk</td>
<td>Interdependent</td>
</tr>
<tr>
<td>Ongoing-formal training</td>
<td>Interdependent</td>
</tr>
</tbody>
</table>

Although *ongoing-formal training* was not found in use by CES teachers, it is included as a key form of professional development because it is a type of effective professional development (In Praxis Group, Inc., 2006). Also, each configuration of technology teacher was found to help each other in different ways. Figure 10 shows the direction of help teachers are giving.
Independent Teacher

The Independent teacher was found to be almost completely self-sufficient. In the first form of professional development, *self-trained*, they were found to always be learning on their own. They are constantly finding ways to adjust what they are doing to improve their teaching with technology. Most teachers who were found to be in the a/b variation of the Innovation Configuration Map were those who had learned technology by themselves. In terms of getting help from colleagues, they rarely asked for assistance. This is not because they do not want it, but because they often know more than their colleagues. Also, they rarely call the CES *Help Desk* because they can figure it out much faster on their own. With respect to the final category, *ongoing-formal training*, they...
would participate in if it was on their level. More often than not, they would probably be found giving the training.

Figure 10 shows that the Independent teacher provides most of the help to the Interdependent and Codependent teachers. They do not have reassigned time for this and as a result find themselves using too much of their preparation time to help others. This leads to a loss of desire to help the other two groups and frustration.

*Interdependent Teacher*

The Interdependent teacher is mostly *self-trained*, but relies heavily upon the assistance of the Independent teacher to know what technology possibilities exist. This teacher really wants to learn, but only learns as fast as he or she has time. This teacher is also limited by his or her own lack of knowledge. As for the second category, *help from colleagues*, without the Independent teacher the Interdependent teacher would be left without much direction and would be found integrating technology at a much slower pace. This teacher relies upon the CES *Help Desk* more than the Independent teacher but less than the Codependent teacher. This teacher has found the help desk to be useful and helpful. This type of teacher would love to have any kind of *ongoing-formal training* as long as it was during their contracted work day. This would be a key part of improving their technology integration because they would not rely so heavily on the Independent teachers. This also leads to their own technology knowledge increasing.

As they move towards integrating technology in the most ideal manner, the Interdependent teachers do not become overburdened by helping the Codependent teachers. Ironically, the Interdependent teachers are in the best position to get help and to give help. Like any educator, the teacher always learns more than the student because he
or she is the one who prepares and then teaches. The Interdependent teacher learns from the Independent and then teaches the Codependents. Also, because they only have one group that asks for help they are not overburdened like the Independent teacher. As a result of learning and teaching (on a balanced level) they may be found to be learning more quickly than the other two configurations.

**Codependent Teacher**

The Codependent teacher is rarely *self-taught*. The Codependent teacher would probably not even use technology if it was not for the Interdependent and Independent teachers. This is because they do not know what to do or where to go and will often remain that way until someone shows them. The second category, *help from colleagues*, is intertwined with the first because these teachers would not succeed without help from others. Their knowledge of technology is extremely limited and based on what others have taught them. These teachers only use the CES *Help Desk* occasionally because if the other two groups cannot help them, they will use something else. They mainly call when a serious hardware problem occurs. The final category, *ongoing-formal training*, would be critical for this group. However, it would need to be on their level and small class sizes so they would feel comfortable in asking questions.

Finally, Codependent teachers need help from both the Independents and the Interdependents because they rely so heavily upon getting help from others. If they had only one group to get help from they would tax them too much.
Summary

This purpose of this study was to determine what effect recent technology integration is having on CES teachers by answering the following questions: (a) what are the different configurations of technology use among CES teachers; (b) what are the different forms and processes of support CES teachers are receiving; and (c) what are the relationships between the two—technology use and the different forms and processes of support.

An Innovation Configuration Map was developed through observations and interviews and then used to answer the first two research questions. Three different configurations emerged: The Independent teacher, The Interdependent teacher, and The Codependent teacher. The IC Map revealed that the different forms of professional development CES teachers were receiving were very limited. Most teachers learned what they know by teaching themselves, help was given from other colleagues, and the CES Help Desk helped out a few. CES teachers were not receiving any type of formal, ongoing professional development training.

To answer the third question, what are the relationships between professional development and configurations of use, a table was created to cross check each form with the different configurations. The Independent teacher learned almost always on his or her own, and was the person to whom the Interdependent and Codependent teachers would go to for help. Because the Independent teacher was constantly in need, this teacher could quickly become over burdened. The Independent teacher reveals that those who spend time learning on their own seem to use technology the most. The Interdependent teacher moved forward at a steady pace with help from the Independent teachers. The
Interdependent teacher was the teacher who seemed to have the most ideal situation. This is because this teacher is able to get help from the Independent teacher and teach what has been learned to the Codependent teacher, thus learning more quickly. They also received the most help from the CES Help Desk. The Codependent teacher was found to be in an unhealthy place because of their complete dependency on the other two groups of teachers. If it was not for the Independent and Interdependent teachers the Codependent teachers would probably not even use technology.
CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This study analyzed the effect recent technology integration is having on Church Education System (CES) teachers. This chapter will discuss the conclusions and recommendations and is outlined in five sections: (a) summary of study, (b) discussion of research findings, (c) limitations of present study, (d) implications of present study, and (e) recommendations for further study.

Summary of Study

Education reform has been an ongoing concern for teachers and administrators for some time (Fullan, 2001). Major reform efforts have been undertaken in hopes to change education (Bransford et al., 2000; Fullan, 2001; Furhman & Elmore, 1990; Hoff, 2007). Recently technology has been looked at by administrators, government officials, teachers, and parents to help transform education (Barrios, et al, 2004; Gulek & Demirtas, 2005; Hall et al., 1999; Partnership for 21st Century Skills, 2006; National Education Technology Plan, 2004; Warschauer, 2006). However, rather than focusing on helping teachers change with technology; technology can often become the focus of the change (Fullan, 2001; Hall & Hord, 2006; Rogers 2003). When this happens it becomes easy to deem technology integration a failure, when all that is really needed is for teachers to receive some guidance.
The purpose of this study was to determine the effect recent technology integration is having on teaching in the Church Education System (CES). Specifically, this study sought to identify (a) the different configurations of technology use among CES teachers, (b) the different forms and processes of support for technology integration, and (c) the relationships between the two—technology use and the different forms and processes of support.

This study used education change, particularly the Concerns-Based Adoption Model (CBAM) as the theoretical lens to conduct research (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003). The change perspective advocated by Hall & Hord is unique because it looks at change from the individual’s point of view and focuses on understanding how teachers change (Hall & Hord, 2006). Much has been written on educational change and, though the research is varied, it contains many similar assumptions, such as: (a) change is an individual process, not an event; (b) change takes time; and (c) teachers experience phases of change that, if properly identified and understood, can be used for effective professional development to help create effective, lasting change occur (Dwyer et al., 1990; Fullan, 2001; Hall & Hord, 2006; Rogers, 2003).

Participants included full-time CES teachers at Pittsburg and Grant Seminaries located in the Utah South Area of the Church Education System. These two schools were purposefully chosen because Grant was the newest technology-built building and Pittsburg was the oldest building in the area. Fifteen full-time teachers, representing an array of technology users, volunteered to be involved in the study. Observations and interviews were conducted between September 2007 and January 2008.
This study used both qualitative and quantitative measures to gather and analyze the data. An Innovation Configuration (IC) map was created. Data was gathered from the CES Policy Manual and interviews were conducted with the CES administrator over technology. An initial draft of the IC Map was created after six observations and six interviews were conducted. Using the initial draft of the IC Map contact was again made with the CES administrator and four more teachers were observed and five more were interviewed. Once the final version of the IC Map was created, it was tested on three more teachers with observations and interviews.

Following the creation of the IC Map, it was used to gather data on how CES teachers were using technology and what the different forms and processes of support were. Three technology configurations were identified in this study: Independent, Interdependent, and Codependent. The Independent teacher configuration consisted of those teachers who are integrating technology extremely well and doing it on their own. They have learned most everything they know by themselves and are constantly helping the other two groups. The Interdependent teacher configuration consisted of teachers who have recently (within two years) begun adopting technology into their teaching and learning. They are anxious to learn and much of what they know they have learned by experimenting and from the Independent teachers. They also provide help to the Codependent teachers. The Codependent teacher configuration consisted of teachers who would rather teach the way they always have, not because they do not want to use technology, but because they do not know how to use it. They rely heavily on the other two groups of teachers for help. They only know what they know because of the other two groups and they do not venture out much beyond what they have been taught.
The IC Map was also used to answer the second research question by identifying the different forms and processes of support CES teachers were receiving. It was found that most teachers were self-trained and support each other. There is no formal ongoing technology training currently for CES teachers, which forces them to learn on their own. Many teachers have done this by ‘playing’ with the software and hardware until they learn. Most teachers have a colleague they can go to for help and many of them use each other to learn. The CES Help Desk was found to be useful by some (Interdependent teachers), frustrating to others (Independent teachers), and of no use still to others (Codependent teachers).

The final research question sought to find relationships between configurations of use and professional development. It was found that Independent teachers always learn on their own, rarely get help from others, and rarely call the CES Help Desk. They would participate in ongoing training if it were offered at their level. They can become overburdened because of the amount of help they give to the Interdependent and Codependent teachers. The Interdependent teachers mostly learn on their own and rely heavily on the Independent teachers for help and ideas. The CES Help Desk is of help to them, and they provide help to the Codependent teachers. They would like some form of ongoing training. They seem to be in a good position because they get help and give help without becoming overburdened. The Codependent teachers were found to be in an unhealthy position because they are completely reliant on the Independent and Interdependent teachers for help. Also, they rarely call the CES Help Desk and urgently need some form of ongoing training. They rarely spend time learning on their own and have a hard time sharing what they learn with others.
Discussion of Research Findings

Research findings will be discussed in relation to each of the three questions that guided the research: (a) what are the different configurations of technology use among CES teachers; (b) what are the different forms and processes of support; and (c) what relationships exist between the configurations of technology use and professional development?

Question 1: Different Configurations of Technology Use

The first question sought to find all the different ways technology was being used among CES teachers who had recently (within two years) begun integrating technology into their teaching and learning. An Innovation Configuration (IC) map was created to show all the different variations of how technology was being implemented (Hall & Hord, 2006). Once the IC Map was completed it was used to discover the different configurations. Three configurations of technology use among Church Education System (CES) teachers evolved: Independent, Interdependent, and Codependent.

One important aspect is how the three configurations emerged from the data. The researcher initially avoided the three configurations because Donovan's (2005) research revealed three different types of classroom configurations (Jetsons, Star Trek, and Lost in Space). Although Donovan's configurations are on classrooms and the current study reveals teacher configurations, the researcher did not want to be overly influenced by the earlier findings. However, after looking for alternative ways to describe the configurations it became clear that three distinct technology configurations existed: The Independent, Interdependent, and Codependent teachers.
The Independent teachers were found to be “digital natives” and “digital immigrants” (Prensky, 2006, p. 9). They work hard at trying to integrate technology with a constructivist approach and are constantly looking for ways to increase their technology skills. These teachers saw the relative advantage (Rogers, 2003) of technology many years ago and have been trying to integrate it ever since. The model discovered in the ACOT studies would probably place these teachers at the Appropriation level because these teachers are seeking ideas from other teachers and using technology to guide students to higher order thinking (Dwyer et al., 1990). For example, one teacher was observed using PowerPoint to effectively guide students throughout the class in a discussion about the principle being taught. The only thing keeping them from the Invention level is CES not allowing students to have computers in the classroom. However, as soon as students have access, these teachers will be the first to integrate as they are the early adopters and innovators (Rogers, 2003). Their level of technology use is between the Integration and Refinement stages of Hall & Hord’s Level of Use measurements. As a result of being comfortable and confident in their technology use, they are not afraid to try new things and can easily fix glitches as they happen in the classroom. The Independent teacher configuration uses technology in a way that is natural and allows the focus on the classroom to be learner-centered (Bransford et al., 2000).

The Interdependent teacher was the second configuration of technology use identified in this study. Within the last two years these teachers have really started to try and become “digital immigrants” (Presnky, 2006, p. 9). They see the relative advantage of technology (Rogers, 2003); however, they are limited in their progression. This limitation
occurs because these teachers only learn as fast as what the Independent teachers teach them. As their technology skills increase they begin to spend more time learning on their own.

Although they get to the point of where they want to spend more time learning, their time is very limited. The Interdependent teachers fall into Rogers (2003) early majority with some late majority category. They want to see what others are doing and its effect in the classroom before they move forward. In the ACOT model of stages teachers go through when integrating technology most of these teachers are in the adaptation category (Dwyer et al., 1990). The Level of Use proposed by Hall & Hord (2003) would most likely find these teachers in the LoU 3: Mechanical Use category. The Interdependent configuration is seen using similar types of lessons in the classroom and the same type of technology use in their preparations. In a way they are stuck, but only because they do not have the time or understanding of how to move on. With the proper types of interventions this group can move forward at a faster pace. They are an example of what change theory teaches, namely that change takes time and is a process, and teachers need help (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003).

The final configuration of technology use is the Codependent teachers. These types of teachers are what Rogers (2003) would call laggards. They have only recently begun using technology because they feel the pressure CES is putting on them by giving them a laptop and a projector. (During the last few months of this study every teacher in CES was given a projector to accompany their laptop). Many Codependent teachers have been teaching for most of their career without technology and feel they have done well enough and wonder why they need to change now. They do see the relative advantage of using
technology, but they also see that it is a very complex process and, unfortunately, the complex process outweighs the relative advantages (Rogers, 2003). Their attitudes are such that they want to learn but need a lot of time and support—something they feel they do not get. This is consistent with change theory as change is a difficult process and without proper help it is extremely difficult to do right (Hall & Hord, 2006). Cuban (2001) found that technology had been oversold and underused. This group and even some of the Interdependent teachers, unfortunately support this finding. However, this is not at the fault of the teachers, but could be traced to the lack of training, support, and understanding of the change process (Hall & Hord, 2006).

**Configurations of use and change theory.**

Change theory is unique because it looks at change from the perspective of the individuals involved in the process and seeks to understand how they change (Fullan, 2001; Hall & Hord, 2006, Rogers, 2003). One perspective of change theory, CBAM, is of special interest because it provides a way to understand and facilitate the change processes (Hall et al., 1999). One aspect of CBAM is the creation of IC Maps which provide a way for administration to see how technology is really being implemented. Often teachers do not have a clear vision of what is expected of them when asked to implement an innovation and the IC Map seeks to answer that question (Hall & Hord, 2006).

The three configurations of technology use in this study confirm many of the assumptions consistent with change theory. For example, (a) change is an individual process, not an event—this is particularly evident in the Independent configuration where these teachers have had to learn all they know by themselves; (b) change takes time,
anywhere from three to eight years—this is evident in all three configurations and especially in the Interdependent and Codependent configurations; and (c) teachers experience predictable phases of change that, if properly identified and understood, can be used for effective professional development—this is true of all three configurations, however, none of them have received the type of professional development needed for their level of integration (Dwyer et al., 1990; Fullan, 2001; Hall & Hord, 2006; Rogers, 2003).

The Interdependent and Codependent configurations confirm some unfortunate research. First, Cuban (2001) found that when technology was purchased for teachers, too much money was spent and too little use occurred. This is especially evident in the Codependent configuration where laptops sat for many months unopened and the same is most likely to occur with the projectors if help is not given. Second, these two configurations confirm the findings from Cuban et al. (2001) where they learned that technology sustained rather than altered existing patterns of teaching practices. Finally, all three configurations confirmed the giant leap theory by Hall et al. (1999). This has happened because technology was given to teachers with little to no support and it was assumed teachers would know what to do.

Many teachers did not know what was expected of them when they were given technology. They knew they should use it but many did not know how. The creation of the IC Map sought to provide answers for how technology was actually being implemented. The creation of this tool helped discover the three different types of technology configuration use and confirmed the important role of IC Maps in general (Hall & Hord, 2006). The IC Map was also consistent in CBAM research, revealing that
there are many different variations of how technology was being implemented among CES teachers.

Question 2: Different Forms and Processes of Support

The second question in this study was to identify the different forms and processes of support CES teachers were receiving. The IC Map was used to identify these interventions.

Barrios et al. (2004) reported that the least successful technology projects have simply dropped hardware into the laps of teachers and in their classrooms. Despite the fact that CES gave laptops to all of its teachers a few years ago, 91% have spent that last two years learning to use it on their own. This is consistent with all three configurations of use. Although CES offers some training through its website, most teachers (85%) do not use it. When teachers were asked why, some reported that they were not aware of it while others said they did not have time for it. None of the teachers have been involved in an ongoing technology professional development program and yet research reveals that ongoing professional development is one of the key enablers for successful technology integration (Barrios et al., 2004; Fullan, 2001; Penuel, 2006; Silvernail & Lane, 2004; Zucker & McGhee, 2005).

Research shows that many different forms and processes of support are essential to effective professional development (In Praxis Group, Inc., 2006). Four key elements of professional development include: (a) actively learning on your own (Birman et al., 2000; In Praxis Group, Inc., 2006); (b) obtaining help from others (In Praxis Group, Inc., 2006); (c) access to technical assistance (Donnelly et al., 2002); and (d) ongoing professional development (Barrios et al., 2004; Dexter et al., 2002). Three of these four were
manifested in all three of the configurations of technology use. Ongoing professional
development was not found in any of them.

The Giant Leap Theory (Hall et al., 1999) is evident in the lack of professional
support CES teachers have received. Teachers were expected to integrate technology with
very little, to no support. Lack of support is a main reason reform efforts are not
successful (Barrios et al., 2004; Fullan, 2001; Hall & Hord, 2006; Rogers, 2003).

On a positive note, every teacher in each configuration had someone they could go to
for technology help. Though the Independent teachers rarely have someone that can give
help beyond what they already know, they are able to work it out with someone on the
same level as them. The Interdependent and Codependent configurations had someone
they could go to who knew more than they. This is consistent with professional
development research in that it is important to have other colleagues to collaborate and
work with when integrating technology (Barrios et al., 2004; Dexter et al., 2002; In
Praxis Group, Inc., 2006). Thus, the Interdependent and Codependent teachers are having
some success in integrating technology thanks to the help they receive from colleagues in
the Independent group.

Question 3: Relationships between Configurations of Technology Use and Forms and
Processes of Support

The final research question in this study was to find relationships between
configurations of technology use and professional development. The three configurations,
Independent, Interdependent, and Codependent, were analyzed against four key elements
of professional development: self-taught, help from colleagues, CES Help Desk
(technical assistance), and ongoing professional development.
The Independent teachers were found to be providing help to the other two groups of teachers, however no extra time was provided in their work day. This resulted in what Fullan (2001) called fragmentation and overload. Teachers in this configuration want to help but they become overburdened with the amount of support needed. Rather than having a designated technology person, these teachers become the just-in-time help that Dexter et al. (2002) propose is needed to effectively integrate technology.

Teachers in this configuration have a lot of knowledge about technology and use it more than the other two groups. This confirms education change theory that teachers go through predictable stages when integrating technology as each of these teachers started out as beginners. Also, their skill has come as a result of spending their own time learning. This shows that individual effort is a key indicator of someone’s ability to progress from one stage to another (Dwyer et al, 1990; Hall & Hord, 2006).

One of the barriers to effective technology integration is lack of technical assistance (Penue, 2006). Independent teachers found the CES Help Desk to be of little help to them. They often knew more than the Help Desk personnel they were talking too.

The Interdependent teacher configuration was found to be in a good position. This is because they had someone they could quickly go to for help (Independent teachers) and someone they could teach what they had learned (Codependent teachers). Barrios et al. (2004) reported that having mentors or coaches as a means of effective professional development is needed. The Interdependent configuration has this with the Independent teachers. Without mentors, teachers in this configuration would probably look more like the Codependent teachers because there has been no ongoing formal training. This is consistent with change theory that teachers go through stages in their integration (Dwyer
et al., 1990; Hall & Hord, 2006). These teachers could move faster with the appropriate types of interventions. Having to move through the stages on their own is a challenge and one of the barriers to effective integration.

One of the elements keeping this group from progressing through other stages of integration is lack of time. Fullan (2001) reported that daily demands make sustained improvement extremely difficult. Technology is new to these teachers and until basic technology skills are gained, it takes too long to prepare a technology lesson. As a result technology is used less than the Independent configurations.

The technical assistance provided from the CES Help Desk was not a barrier to integration for the Interdependent teachers (Penuel, 2006). The CES Help Desk was of help to these teachers because Help Desk personnel knew more than they.

The Codependent configuration was found to be in an unhealthy position. Teachers in this configuration are completely reliant upon the other two groups. These teachers feel pressure but do not have adequate support. Thus, they are a testament to the principle that it takes both pressure and support for successful implementation to occur (Fullan, 2001). Codependent teachers feel pressure to integrate technology because of the amount of money spent in providing them with laptops and projectors. Their technology remained unopened for months because they had no support. The only support they have received has come from teachers in the other two configurations.

At first, these teachers may come across as reluctant teachers (McKenzie, 1999). However, they are individuals involved in the change process and although they are at different stages, if the appropriate intervention was provided their resistance could be reduced (Hall & Hord, 2006).
Here again is another group that may be failing in integrating technology, not because of the teachers lack of effort, but because of the lack of understanding the change process (Fullan et al., 2005). Teachers need help to operate and integrate technology and this help needs to be directed to the appropriate stage the teacher is at currently (Dexter et al., 2002; Dwyer et al., 1999; Hall & Hord, 2006).

Each of three configurations are consistent with change theory, especially the assumption that teachers progress through stages (Fullan, 2001; Hall & Hord, 2006). This study found that teachers go through a learning curve when integrating technology (see Figure 11). When a teacher first learns about technology (Codependent configuration) their use may be minimal—if any. As they begin to learn more, their use may become too technology-centered and the students may become less focused on the lesson (this occurs when someone moves from Codependent to Interdependent). As their skills increase, (moving from Interdependent to Independent) technology becomes a well polished tool that is used to keep learning central (Bransford et al., 2000). This also corresponds with Mishra & Koehler (2006) TPCK diagram (Figure 2). Teachers work through a process until they can mingle technology with pedagogy and content in a way that causes student learning to increase.
Too much focus on technology

Focus is too much on technology and students are often more interested in it than the lesson.

Ideal level of technology integration
TPCK (Mishra & Koehler, 2006)

Focus is on students and principle being taught, not on technology.

Not using technology

Codependent  Interdependent  Independent

Figure 11: The learning curve.

The idea that teachers progress through stages is particularly consistent with two aspects of Hall & Hord’s CBAM: Stages of Concern (SoC) and Levels of Use (LoU) (Hall & Hord, 2006). Within each of these a teacher will progress and move from being teacher centered or technology focused to becoming student centered and using technology as a tool to aid their teaching. In the SoC, a person has concerns that need to be addressed. As those concerns are appropriately addressed the user often progresses from being teacher centered to student centered. The same applies to the LoU where an individual starts out with no to little knowledge of the innovation and works his or her way to the final level—renewal (Hall & Hord, 2006). In order for teachers to progress through any stage they must receive the appropriate intervention. Professional development is a key aspect of any technology integration effort and can help speed up the integration process; without it a teacher may remain at their current level indefinitely.
(Barrios et al., 2004; Fullan, 2001; Penuel, 2006; Silvermail & Lane, 2004; Zucker & McGhee, 2005).

Limitations of Current Study

The limitations of this study will be discussed in four sections: (a) development of IC Map; (b) participants and settings; (c) research findings; and (d) researcher bias.

Development of IC Map

Hord et al. (2006) state, “There are several problems related to the analysis and interpretation of information on component use and Innovation Configurations” (p. 34). First, though the researcher had access to one of the developers of CBAM, this was the researcher’s first attempt at creating an IC Map. Second, the development of the IC Map was created from CES teachers only, and though participants spanned 9-12 grades, it does not include public education teachers or classrooms. Third, not all teachers interviewed or observed in the development of the IC Map were interviewed or observed again following the creation of the IC Map. Finally, because participants knew the researcher wanted to observe a technology lesson, the technology use by CES teachers may have been adjusted.

Participants and Setting

This study may have been limited by the participants and setting. The setting was purposefully chosen because Grant represented the newest technology built building (where teachers had built-in projectors in each room) and Pittsburg was the oldest building (where teachers had two projectors to share). Also, the participants at each school volunteered for the study. Participants knew the researcher wanted to observe a
technology lesson and as a result the image may not represent a true picture of the day to
day classroom. Students did not have access to technology. If they had, the outcomes
would probably be different. CES provided no ongoing, formal professional development
which may have affected the amount of technology use among participants. Also,
participants varied in their level of technology skills. As a result participants used
technology on varying levels.

Research Findings
The findings in this research are limited in different ways. First, a relatively small
population was studied. A larger population may have produced more conclusive results.
Second, the findings are from schools that teach religious education and the results might
be different in varying subjects. Third, the two schools have only received laptops within
the last two years and within the last few months each teacher was given a projector. The
same study conducted after years of using technology may produce different results.
Finally, the study was mainly conducted by one researcher; had multiple researchers
undertaken the same study the results could be different because of the multiple
perspectives involved.

Researcher Bias
The researcher tried to keep personal biases out of the research; however, some
elements could affect the study. First, the researcher is a CES teacher at one of the
participant schools. Second, the researcher initially started the study based on
observations of other teachers who needed technology help but were not getting it. As a
result of not getting help, the technology remained unused. Third, because the researcher
taught at one of the participant schools, teachers may have reacted differently in interviews and observations than the other school.

Implications of Present Study

The current study sought to find what effect current technology integration is having on the teaching among CES teachers. It had three purposes: (a) to find all the different ways technology was being used by identifying configurations of technology use; (b) to determine the different forms and processes of support teachers are receiving; and (c) to explore relationships between configurations of technology use and professional development. Implications of this study may be applied to any teacher or administrator within CES. Although the context in CES is different than public education some of the principles gained from this study may be applied generally to all teachers, administrators, and government officials seeking to integrate technology effectively.

Implications Within CES

The implications within CES are very clear. First, the configurations of use identified can help administrators in identifying the current stage teachers are at and help them progress to the next level (Hall & Hord, 2006). There are many different ways teachers can receive help to progress, but the important element is that they actually get help. The current study reveals the need to formalize the relationships between the different configurations. Three different configurations of technology use were discovered in this study: Independent, Interdependent, and Codependent. Currently in CES these three configurations are the foundation of the support structure teachers receive. Research shows how important it is to for teachers to be provided mentors, prepare lessons
together, and have someone they can quickly get help from (Barrios et al, 2004; In Praxis Group, Inc., 2006). Teachers, especially those in the Codependent configuration, could be assigned a mentor from the other groups to help assist them in gaining technology skills and providing them with immediate help when needed. Also, relationships between configurations need to be addressed by helping administration realize the giant leap theory still occurs (Hall et al., 1999). The current study has shown that change is a complex process that does not happen overnight and teachers need help to do it right (Fullan, 2001; Hall & Hord, 2006; Rogers, 2003). Administrators should not expect—nor will it likely occur if they do—teachers to make a giant leap into successful integration without being provided the appropriate help along the way. By understanding the level of integration teachers are at and applying the right kind of training, more teachers have a greater chance of more quickly moving to the Independent configuration.

The second implication within CES is impact on, or rather need for, ongoing professional development. Many studies have proved the importance of not only providing different forms and processes of support, but also the need to have ongoing professional development (In Praxis Group, Inc., 2006). This study can help others see what happens when professional development is weak as teachers try to implement technology. There was no ongoing professional development occurring during this study and, as a result, Independent teachers were becoming over burdened and the other groups were not progressing as fast as they could. Independent teachers did not have extra time to help others and yet they were the main source of help for everyone else. Teachers need to be given adequate time and help to learn the skills necessary to use technology, because without it they will rarely progress—especially those in the Codependent
configuration. Even though teachers may be motivated to learn technology on their own, sustainability is highly unlikely without ongoing professional development. These factors may help other CES schools and administrators see why ongoing professional development is a critical factor in any technology integration—especially during the beginning phases. Any school looking to integrate technology into their teaching and learning should, at the beginning, have a technology plan that includes how ongoing professional development will occur. By identifying the types of professional development that are—or are not—being offered, administrators can employ any additional needed form(s) of professional development, thus enhancing the integration process. The findings from this study have already begun to influence the administration in the Utah South Area. By informing him about the lack of ongoing professional development and its effects on the implementation process, this summer a technology professional development plan will be developed and implemented the following year.

The third implication within CES is using the IC Map to gauge how technology is being implemented and to use it in training. An IC Map is a unique tool because it shows how technology is actually being implemented, not what people think is happening, but what actually is happening (Hall & Hord, 2006). The IC Map created from this study can be used by any administrator in CES as a guide in evaluating how technology is being integrated in their local areas. This can also lead to ideas that administrators can use for local inservices (Hall & Hord, 2006). The IC Map is also a powerful tool that individual teachers can use to identifying areas that can be improved upon in a non-threatening environment (Hord et al., 2006). Also, teachers can use the IC Map to observe other colleagues to see how they are integrating technology.
The final implication within CES is that those teachers who were self-taught were also the ones who used technology the most. This was manifested in the Independent and much of the Interdependent configurations. These teachers were self-taught and actively solved their own problems. Just as teachers expect students to take ownership for their learning, teachers need to remember the same principle applies to them. However, as seen in this study they should not be left to do it all on their own (Hall et al., 1999). It is important to remember that continuous professional development and individuals taking ownership are important factors to successful technology integration (In Praxis Group, Inc., 2006).

*General Implications*

As well as having implications within CES, the implications of the present study can be applied generally to anyone involved in making changes. First, the current study adds to the body of literature for technology integration, education change, and professional development. An understanding of the principles involved in the change process is essential for any one attempting to make changes. Second, the creation of the IC Map and the identification of different configurations of technology use and professional development can help inform any administrator about the complex process teachers go through when making changes. It can also help inform any administrator about the need to provide adequate help in all stages of technology integration. And finally, administrators and teachers can use the principles from this study to see what can happen when the following occurs: there is not any ongoing professional development; teachers work diligently on their own; and teachers rely upon each other for help.
Recommendations for Further Study

This study sought to find the effect recent technology integration is having on teachers within the Church Education System. Although many of these findings will add to the base research, many other studies need to occur to confirm the findings of this study and to further the work of successful technology integration.

The current study is unique because it is one of the first of its kind to be conducted, within the context of CES, that specifically sought to evaluate the effect technology is having on teaching. Although this study revealed many findings, additional studies need to be conducted within this context to confirm the findings and to see if any additional ones occur. For example, this study focused on the effect technology was having on teaching and did not involve students. Therefore, it would be extremely important to find out what effect different configurations of technology use is having on student learning within CES; especially because CES teachers are being asked to move towards a student-centered approach and yet no studies exist to see how technology integration is affecting students in CES. These studies (and others using CBAM like SoC and LoU) could lead to better implementation within the CES school system.

A ‘snapshot’ was taken of how the implementation of technology was affecting the teaching in CES and three different configurations of technology were discovered. Studies that mirror the current study, but include a larger population base, need to take place to validate these findings and see if any other configurations exist. Also, the same studies could be performed at Institutes (University level schools within CES). By doing this, not only could the current research be validated, but more information could be gathered to help the integration process.
Another opportunity for future research is couples with Donovan’s (2005) study where three different configurations of one-to-one classroom technology use were discovered and compared with student off-task behaviors. The present study discovered three different configurations of technology use among teachers. Further research could be conducted to discover if the pattern of three is consistent with any configuration. Also the findings from these two studies could be compared with each other to see if there are any relationships between the three configurations of teachers and the three configurations of classrooms.

As technology continues to permeate education, future studies need to continue to evaluate and educate leaders so that the giant leap does not occur (Hall et al., 1999). Many studies have shown how important ongoing professional development is in helping teachers make changes (In Praxis Group, Inc., 2006). One finding of this study was the lack of ongoing professional development. Even though it seems obvious that professional development needs to be continuous and is a critical factor in helping teachers assimilate, the current study shows that technology is still being placed in the laps of teachers without adequate support. This study needs to be replicated in a setting within CES where an ongoing professional development program exists. This may reveal different configurations and different forms of professional development and their effect on each other.

Additional research into the effectiveness of professional development programs is also needed. Many different types of professional development programs exist, however they can be very expensive, time consuming and little research exists showing if they really cause teacher practice to change and student learning to be enhanced (Garet et al.,
2001; Guskey, 2003; In Praxis Group, Inc., 2006; Lowden, 2005; Noyce, 2006; Shaha et al., 2004). This is important for future studies because knowing whether or not a professional development program is effective has major implications for everybody.

The current study found that those teachers who used technology the most were self-taught. Future studies could seek to find what motivates these teachers to be proactive when they are not receiving adequate technology support from CES. The results could also help administrators know how to encourage teachers when being asked to implement an innovation. Repeating this study in a setting where teachers are receiving ongoing professional development may provide different results.

Related research questions exist in the area of the created IC Map, which is a tool used to identify the many different ways technology is being implemented. The creation of the IC Map in this study was unique and studies need to be conducted using it as a tool to validate its effectiveness. Also, within CBAM many studies focused on using Stages of Concern and Levels of Use however, Innovation Configuration Maps were lacking. Not only do more studies need to be conducted using IC Maps, but more tools like this need to be developed. This could lead to the creation of more resources to help administrators know how to better implement innovations.
APPENDIX A

INFORMED CONSENT FORM

INFORMED CONSENT

Department of Curriculum and Instruction, UNLV

TITLE OF STUDY: Technology Integration: What effect is it having on the Teaching and Learning of CES teachers?

Recently CES teachers have been given computer technology to use in teaching and learning and we are interested in learning more about its use, and would like to invite you to participate in this study. The purpose of the study is to see what effect the technology is having on the teaching and learning of CES teachers at Pittsburg and Grant Seminaries. Your personal effectiveness is not the goal of the research, but rather to see how the technology is being used and the types of support you are receiving in your effort to integrate the technology. You are being asked to participate in the study because you are directly involved with the technology, and your input will be valuable for the purpose of the study. Participation in this study is for a research being conducted in partial fulfillment of dissertation requirements. If you agree to participate in this study:

- You must be male or female at least 21 years of age and teach seminary for CES at Pittsburg or Grant.
- You will be asked to allow one of the researchers to observe (not evaluate) the way you and your students are using technology in the educational setting.
- You will also be asked to allow one of the researchers to participate in an ongoing discussion (approximately 9 discussions about 10 minutes each) about your involvement and use of the technology.

There may be no direct benefits to you as a participant in this study, however, we hope to learn from your experiences so we can contribute to decisions about the best way to continue with the technology integration and provide the most beneficial professional development. There are risks involved in all research studies. This study may include only minimal risks. You may be uncomfortable being observed by the researcher. If you
agree to participate in an ongoing discussion you may be asked to meet during lunch, on
your preparation time, or before or after school. You will not be compensated for your
time.

**Confidentiality:** *All of the information collected will be kept strictly confidential.* A
final report will be shared with the CES central office. They may choose to use the results
of this study when making decisions about future technology integration and professional
development trainings. Information and quotations may be reported in professional
journals and/or at professional meetings; however, the information will be presented in
such a way that individuals cannot be identified. All data collected will be stored in
locked files at an undisclosed location at UNLV for at least three years after completion
of the study. At the conclusion of the three years all data collected will be deleted.

**Consent:** *Your participation in this research is strictly voluntary.* Non-participation will
not result in any penalty or loss of benefits to which you are otherwise entitled. No
identifying information will be recorded in the data. Your signature certifies that you
have read the information presented. You may ask any questions concerning the research
before agreeing to participate or during the study. You also may withdraw from the
project at any time without penalty if you do not wish to complete the interview process.
If you have any questions about your rights as a research participant that have not been
addressed by the investigator, you may contact the UNLV Office for the Protection of
Research Subjects: telephone (702) 895-2794 or email OPRSHumanSubjects@unlv.edu.
If you have any questions about this study, you may contact the research team at any
time.

Signature of Research
participant
Signature of Research participant agreeing to allow interviews to be recorded:

Name (please print)                                      Date

Thank you for your assistance and time.

                                          2466)
mcarthurah@gmail.com                                      khartley@unlv.nevada.edu

**Participant Note:** Please do not sign this document if the Approval Stamp is missing or
is expired.
APPENDIX B

INDICATORS OF EFFECTIVE PROFESSIONAL DEVELOPMENT

The following is taken from In Praxis Group, Inc. (2006):

<table>
<thead>
<tr>
<th>Indicators of effective professional development</th>
<th>Support from the literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective professional development recognizes multiple contexts, formats and factors. It uses combinations of different approaches, models and mediums, based on the needs of the school community.</td>
<td>Guskey (2004); Richardson (2003); Pritchard and Marshall (2002); Sparks (2002); Garet, Porter, Desimone, Birman and Yoon (2001); Lee (2001); Hawley and Valli (2000); Loucks-Horsley in Sparks (1999); Laferrière (1997); Lieberman (1995).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators of effective professional development</th>
<th>Support from the literature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effective professional development focuses on increasing knowledge and skills to bring about change in teaching practice. It models high-quality instruction. It recognizes the impact teachers have on students and honours their decision-making abilities.</strong></td>
<td><strong>Guskey (2004), Reitzug (2002), Senge (2001), Loucks-Horsley and Matsumoto (1999), Boudah and Mitchell (1998). See also National Staff Development Council Standards (2001), Alberta Teachers' Association Framework (2002).</strong></td>
</tr>
<tr>
<td>Effective professional development recognizes the ways adults learn, and the impact of constructivist learning theory on organizations and structures for professional development.</td>
<td>Richardson (2003); Danielson (2002); Garet, Porter, Desimone, Birman and Yoon (2001); Senge (2001); Hawley and Valli (2000); Loucks-Horsley and Matsumoto (1999); Alexander and Murphy (1998); Darling-Hammond and Loewenberg-Ball (1998).</td>
</tr>
<tr>
<td><strong>Indicators of effective professional development</strong></td>
<td><strong>Support from the literature</strong></td>
</tr>
<tr>
<td>Professional development is centred in the school community and based on teachers' identified needs. It occurs within the context of the school community and involves people resources and models that include mentoring and community building.</td>
<td>Alberta Teachers' Association (2004); Guskey (2004); Marzano (2003); Richardson (2003); Danielson (2002); Reitzug (2002); Sparks (2002); Garet, Porter, Desimone, Birman and Yoon (2001); Senge (2001); Hawley and Valli (2000); Loucks-Horsley and Matsumoto (1999); Little (1994). See also Alberta Teachers' Association Framework (2002).</td>
</tr>
<tr>
<td>Effective professional development recognizes and explores the impact of initiatives on school culture and is centred on a goal of organizational improvement. It makes connections between school culture, collaborative working teams, learning teams, communities of teacher researchers, collaborative exchanges and learning communities.</td>
<td>Guskey (2004, 2003 and 1995); Gamoran and Grodsky (2003); Morris, Chrispeels and Burke (2003); Marzano (2003); Richardson (2003); Danielson (2002); Sparks (2002 and 2002a); Fullan (2002 and 2001b); Guskey and Sparks (2002 and 1996); Hawley and Valli (2000); Busick, Hammond and Inos (1993). Alberta Teachers’ Association Framework (2002), U.S. Department of Education principles (2000).</td>
</tr>
<tr>
<td>Indicators of effective professional development</td>
<td>Support from the literature</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>Effective evaluation uses both formative and summative processes to assess the effectiveness of professional development initiatives.</td>
<td>Kelleher (2003), Killion (2001). See also NCRED's Critical Issues series: Accessible at <a href="http://www.ncred.org/sdrs/areas/issues/educatrs/profdevl/pd500.htm">www.ncred.org/sdrs/areas/issues/educatrs/profdevl/pd500.htm</a></td>
</tr>
<tr>
<td>The processes inherent in teacher evaluation and assessment, including collaborative approaches such as mentoring and coaching, are part of effective evaluation practices for professional development initiatives.</td>
<td>Kelleher (2003), Danielson (2002).</td>
</tr>
</tbody>
</table>
## APPENDIX C

### DOMAIN ANALYSIS

#### Types of relationships
- X is a way to Y
- X is a type of Y
- X is a kind of Y
- X is a reason for Y

<table>
<thead>
<tr>
<th>Item</th>
<th>Relationship</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laptop</td>
<td>Is a type of</td>
<td>Technology used in the CES classroom</td>
</tr>
<tr>
<td>Projector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powerpoint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows Media Player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lds.org—hymns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lds.org—talks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES Help Desk</td>
<td>Is a way</td>
<td>CES teachers receive professional development</td>
</tr>
<tr>
<td>Learning on own</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asking others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyzing another’s work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software help</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of time to learn</td>
<td>Is a reason</td>
<td>CES teachers do not use technology more</td>
</tr>
<tr>
<td>Lack of skill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.ldsces.org">www.ldsces.org</a></td>
<td>Is a kind of</td>
<td>Technology resource used in preparing lessons</td>
</tr>
<tr>
<td>Scanning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>News—world</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training (online)</td>
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<td>STAR</td>
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</tr>
<tr>
<td>PowerPoint</td>
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</tr>
<tr>
<td>Google</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clip Art</td>
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<td>Gospel Link</td>
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<td><a href="http://www.lds.org">www.lds.org</a></td>
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<td>DVD Player</td>
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<tr>
<td>File Storage/Retrieval</td>
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<tr>
<td>Pictures/Quotes</td>
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</table>
APPENDIX D

TABLE OF CONTENTS FOR THE IC MAP

Key:
Cluster
  1. Component
     o Dimension

1. Available Technology

<table>
<thead>
<tr>
<th>Site</th>
<th>Additional Items</th>
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<tr>
<td>Laptop</td>
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<td>Internet</td>
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<td>Fixed—Cart</td>
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<td>Printer</td>
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<td>Scanner</td>
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<td>Overhead Projector</td>
<td></td>
</tr>
<tr>
<td>Whiteboard</td>
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</tr>
</tbody>
</table>

Cluster A: Technology used for Administrative purposes:
  2. Recording
     o Attendance
     o Notes
  3. Contacting
     o Frequency
     o Email
     o Phone
  4. CES’s website
     o Forms
     o Frequency

Cluster B: Communication
  5. Email (Checklist)

<table>
<thead>
<tr>
<th>Email is used for:</th>
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<tbody>
<tr>
<td>o Contacting priesthood Leaders</td>
</tr>
<tr>
<td>o Contacting parents seminary students</td>
</tr>
<tr>
<td>o Communicating with colleagues</td>
</tr>
<tr>
<td>o Conducting other business contacts</td>
</tr>
<tr>
<td>o Personal correspondence</td>
</tr>
<tr>
<td>o Other</td>
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</tbody>
</table>
6. Email-frequency
   o Frequency
   o Purpose
7. CES’s Website—to obtain information
   o Frequency
   o News
   o Announcements
8. Other Forms of Communication
   o File Sharing
   o Web 2.0

Cluster C: To receive Training
9. CES’s Website—to be trained
   o Online Self-Training

Cluster D: Planning Lessons
10. Used to Help the Teacher
    o Resourceful
    o Guide
    o Simplicity
11. CES’s Website--Resources
    o Frequency
    o Manual

12. Sites (checklist)

<table>
<thead>
<tr>
<th></th>
<th>Site</th>
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<td>D=W=M=R</td>
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<td>Lds.org</td>
<td>D W M R</td>
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<td>Joseph Smith.net</td>
<td>D W M R</td>
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<td>BYU.edu</td>
<td>D W M R</td>
<td></td>
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<td>Providentliving.org</td>
<td>D W M R</td>
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<td></td>
</tr>
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<td>Besmart.com</td>
<td>D W M R</td>
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<td>Mormon.org</td>
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<td>Ldscatalog.com</td>
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</tr>
<tr>
<td>Fairlds.org</td>
<td>D W M R</td>
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<tr>
<td>Other:</td>
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</tbody>
</table>

13. Other Official Websites
    o Frequency
    o Variety

14. Un-official Church websites
    o Teaching
    o Personal development
    o Search Engines
15. Organization
   - Word Processing
   - Web 2.0
   - File structure

**Cluster E: Lesson Presentation**

16. Used to Help the Teacher
   - Presenting Lessons
   - Learning Outcomes

17. Time
   - Frequency
   - Reliance

18. Variety
   - PowerPoint
   - Whiteboard
   - Video/Audio

19. Software/Hardware needed Tasks

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Ability (Scale of 1 to 10, 10 being very proficient)</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Star</td>
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</tr>
<tr>
<td>Email</td>
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<td>Word Processing</td>
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<td>Presentation Software</td>
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<tr>
<td>Media Player</td>
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<tr>
<td>Laptop (hardware)</td>
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</tr>
<tr>
<td>LCD Projector (hardware)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
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</tr>
</tbody>
</table>

20. Complete Needed Tasks
   - Tasks
   - Adequate
   - Timely

**Cluster F: Professional Development—received forms and processes of support**

21. Properly Trained
   - Software

<table>
<thead>
<tr>
<th>✓</th>
<th>Software</th>
<th>Trained (Scale of 1 to 10, 10 being fully trained)</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Star</td>
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<tr>
<td></td>
<td>Word Processing</td>
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<tr>
<td></td>
<td>Presentation</td>
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<td></td>
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<tr>
<td>Hardware Trained (Scale of 1 to 10, 10 being fully trained) Frequency</td>
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</tr>
<tr>
<td>-------------------------</td>
<td>-------------------</td>
<td></td>
<td></td>
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<tr>
<td>Laptop</td>
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<td>Scanner</td>
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<tr>
<td>LCD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projector</td>
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</tbody>
</table>

o Philosophy
22. Needs Assessed by Teacher
  o Personally
  o Administrator
23. Trained by Him/Her self
  o Initiative
  o Frequency
  o Competent

Cluster G: System Support
24. Trained by Administrators
  o Frequency
  o Needful
  o Exemplary
25. Colleagues
  o Frequency
  o Access to
  o Exemplary
26. CES Help Desk
  o Timely
  o Knowledgeable
APPENDIX E

INITIAL DRAFT OF THE IC MAP
AFTER STEP ONE AND TWO

Cluster A: Uses technology for Administrative purposes

Component 1: Uses technology to record student information to STAR (Attendance, Notes)

a) Records attendance daily and often records descriptive comments on students in the ‘comment’ section of STAR
b) Records attendance daily but rarely writes in the ‘comments’ section
c) Records attendance but does not write in the ‘comments’ section
d) Does not use STAR at all for recording attendance or notes. Records attendance on paper for secretary to input

Component 2: Uses resources from STAR to contact parents and priesthood leaders (Frequency, Email, Phone numbers)

a) Weekly emails or calls parents and priesthood leaders about students progress
b) Once or twice a month emails parents and priesthood leaders about students progress
c) Rarely emails parents or priesthood leaders about students progress
d) Once or twice a year emails parents or priesthood leaders
e) Never emails parents or priesthood leaders

Component 3: Utilizes CES’s website to obtain necessary forms and other resources (Forms, Frequency)
a) Obtains needed forms from 'Administrative' section of CES website before asking administrators for it.

b) Obtains needed forms from 'Administrative' section by asking the administrator to find it for him.

c) Obtains needed forms from 'Administrative' section by having the administrator/secretary print it off for him.

d) Never uses the forms from the 'Administrative' section of the CES website.

**Cluster B: Uses technology for Communication purposes**

Component 1: Uses email (Colleagues/Administration, Parents, Priesthood leaders, Others)

a) Makes regular use of email by contacting priesthood leaders, parents of seminary students, colleagues, potential institute students, other business contacts and responds timely. No personal email communication is used with a seminary student. Email is not used for counseling or discussing personal matters.

b) Regularly emails colleagues and occasionally parents or priesthood leaders. Responds to emails when he gets around to it. Emails a student once or twice a year.

c) Occasionally communicates with others via email. Only emails others when responding to their emails. Prefers making contact via phone.

d) Email is used for personal reasons and rarely for business items.

e) Teacher has never even set up email account.

Component 2: Uses email (Frequency)

a) Checks email daily.
b) Checks email a couple times a week

c) Checks email once a week

d) Checks email a couple times a month

e) Checks email once a month/ never

Component 3: Accesses CES’s website to obtain information (Frequency, News, Announcements)

a) Stays informed by weekly reading the news and announcements from CES’s website

b) Tries to stay informed by reading a couple of times a month the news and announcements from CES’s website

c) Once a month reads the news from CES’s website. Obtains news and announcements from colleagues

d) Once or twice a year reads the news and announcements from CES’s website

e) Never reads the news and announcements from CES’s website.

Component 4: Uses other forms of communication (File sharing, Web 2.0).

a) Shares files with other colleagues via file sharing on the network.

b) Uses Web 2.0 resources for communicating with other colleagues.

c) Does not use any other forms of communication

CLUSTER C: Uses Technology as a medium for Training

Component 1: Accesses resources from CES’s website to be trained (Online training, Teaching Emphasis Ideas, Software help)

a) Seeks to improve teaching skills by using online training resources from CES’s website weekly. Practices the skills in class. Uses CES’s website to locate ideas to
better teach using the teaching emphasis. When teacher does not know what to do he will first seek to figure it out on his own by using the help section from the software

b) Utilizes online training, but does not practice the skill. Obtains ideas from other teachers in how to better implement the teaching emphasis. Asks colleagues for help

c) Uses online training once or twice a school year. During the summer, teacher uses it once or twice a month. Asks for teaching emphasis ideas, during the summer, from other teachers

d) Obtains training from local inservice and Area inservice in Summer

e) Never access any training online

Component 2: Teacher is motivated to learn how to use technology by his self.

(Initiative, Frequency, Competent)

a) Is highly motivated and seeks to improve technology skills on own initiative by spending time daily learning how to use technology. Seeks out other exemplary colleagues to learn what they are doing

b) Is motivated to learn technology but does not have the time daily to learn new technology skills. Teacher uses non-teaching days and summers to gain technology skills. If teacher sees something he likes, he asks for a copy of it

c) Would like to learn how to use technology but waits until someone shows him how to use it

d) Learns technology when administration tells him. Technology is used to perform the tasks required by administration
e) Does not and will not learn technology

Component 3: Receives technology training from administrators (Frequency, Needful, Exemplifies)

a) Administrator finds out the current technology needs of all the faculty and holds inservice frequently based on those needs. Administrator teaches by example.

b) Administrator finds out the current needs or one or two teachers and holds an inservice or two based on those needs. Administrator teachers inservice with technology when necessary.

c) Administrator holds inservice to train on better use of technology according to the skills he thinks the faculty needs. Administrator teaches inservice using only whiteboard and overhead projector.

d) Administrator holds inservice. Never uses technology.

CLUSTER D: Uses technology for Planning Lessons

Component 1: Technology is used to help the teacher. (Resourceful, Guide, Simplicity)

a) Technology is used seamlessly by enhancing teachers ability to prepare lessons. Teacher can quickly and efficiently use technology resources to build lessons. Technology acts as an efficient tool to guide the teacher as he prepares. Technology is used to help organize lesson outlines because it frees up more preparation time.

b) Technology is used to build lesson outlines and to organize lessons. Is not used to enhance the content knowledge of the teacher. Teacher uses hard copies of books and manuals to prepare lessons.

c) Teacher is frustrated with technology and sees it as hindering his preparation time.
d) Teacher uses hard copy of the manuals and/or materials he created
e) Teacher uses old lesson outlines

Component 2: Utilizes resources from CES’s official website—ldsces.org (Frequency, Manual).

a) Uses online resources daily from CES’s website. Reads manuals online and utilizes online features. For example, uses copy and paste features to quickly create PowerPoints from online manuals.
b) Uses online resources once or twice a week and reads the manuals from a hard copy
c) Uses online resources once or twice a month. Obtains resources from old lesson files
d) Never uses online resources. Uses old lesson outlines to teach from

Component 3: Utilizes resources from Church’s official website—www.lds.org (Frequency, General Conference, Talks, Pictures)

a) Daily utilizes resources from Church’s official website to enhance lessons with current pictures, news, audio clips, general conference talks and other resources.
b) Weekly uses resources from Church’s official website to enhance lessons with current pictures, news, audio clips, general conference talks and other resources.
c) Rarely accesses the Church’s official website

Component 4: Utilizes resources from other official websites (JosephSmith.net, BYU.edu, Frequency)

a) Daily uses resources from other official websites to enhance lesson preparation. Is actively trying to use purposeful variety in the lesson
b) Weekly uses resources from other official websites to enhance the lesson preparation. Is trying to use variety in the lesson

c) Monthly uses resources from other official websites. Is trying to use variety in the lesson for the sake of variety

d) Rarely if ever uses resources from other official websites

Component 5: Obtains resources from un-official Church websites (Teaching, Personal development, Search Engines Frequency)

   a) Actively goes online to find materials that will increase his teaching and presentation skills. Knows how to effectively use Search Engines to find information. All these resources are used purposefully to enhance the lesson

   b) Finds online materials once a week to help give some variety to the lesson. Search Engines are used but could be used more effectively.

   c) Finds online materials once a month.

   d) Does not feel confident in searching the Internet to find materials

Component 6: Organizes thoughts and information (Word processing, Web 2.0)

Web 2.0 (such as iGoogle) or word processing is used to create lesson outlines.

   a) Paper is used to organize lessons and stored in a file

   b) Lesson outlines are not written down

   c) Old lesson outlines are used

CLUSTER E: Uses technology for Lesson Presentation

Component 1: Technology is used to help the teacher (Preparing lessons, Presenting lessons, Personal development)
a) Technology is used seamlessly in preparing lessons; Teacher understands how to use technology, it has become 2\textsuperscript{nd} nature to him. Technology is a guide and a resource during classroom instruction, the focus is consistently on the principle being taught—not the technology. Teacher regularly uses technology as a resource to his professional development.

b) Technology is used seamlessly in preparing lessons. Technology is used as a guide occasionally in classroom instruction. Focus toggles back and forth from the technology to the principle being taught. Teacher seeks help on own with out using technology.

c) Technology is occasionally used in preparing lessons. Technology gets in the way of teaching in the classroom, becoming the focus rather than the principle being taught. Teacher seeks help from administrator for personal development.

d) Other materials are used in preparing lessons. Teacher feels that technology takes away too much of his prep time. Technology is used in the classroom to show a video. Teacher does not seek to improve.

Component 2: Technology is used to create meaningful learning outcomes (Guide, Engage/Focuses/Involves Students)

a) Technology is used to guide teacher and students into and through the scriptures. It is used to help students stay focused on the principle. It does not become the sage on the stage (replacing the teacher).

b) Technology is used to guide teacher and students into the scriptures. Occasionally it takes priority over the principle being taught.
c) Teacher focuses too much on technology. Students get into the technology more than they do the scriptures.

Component 3: Amount of time technology is used (Frequency, Reliance)

a) Technology is used when it is the best methodology to use in teaching the principle. Other forms of teaching are used (whiteboard or walls). Teacher is flexible enough that the lesson can continue if technology breaks or crashes.

b) Technology is used when it is convenient; other materials are used to assist the teacher. When technology crashes or breaks the teacher can quickly fix the problem and move on.

c) Technology is only used to show a movie or teach scripture mastery. When technology crashes or breaks the teacher spends a large amount of time in class trying to fix it.

d) Technology is used all class period every day; the class becomes a PowerPoint—day in and day out. Teacher becomes so reliant on it that he cannot teach without it.

e) Technology is never used.

Component 4: Technology is used in a variety of ways (PowerPoint, Whiteboard, Video/Audio)

a) Technology is used in a variety of effective ways. Type of technology is used because it is the best methodology to teach the principle. PowerPoint lessons have purposeful variety. Video and audio are used effectively and efficiently. The white board is used interactively with technology. Technology is used by teacher to help class stay student-centered.
b) Technology is used to present PowerPoint lessons that contain variety.
Technology is used in conjunction with the white board to engage students.

c) Technology is only used to technology to present a PowerPoint lesson that does not engage students. Video/Audio clips are not edited but shown in their entirety.

d) Technology is not used. White board is used effectively. Video/Audio are used only through the DVD player.

e) Teacher lectures with no use of technology or white board.

Component 5: Technology is used effectively to perform the needed tasks (Adequate, Timely)

a) Technology is used effectively to perform the needed tasks in an adequate and timely manner

b) Some tasks are performed in an adequate and timely manner

c) Administrator performs needed tasks for teacher

d) Needed tasks are not performed in a adequate or timely manner

CLUSTER F: Professional Development for Technology CES teacher receives—forms and processes of support.

Component 1: Teacher is properly trained in (Software, Hardware, Philosophy)

a) Teacher has been trained and is continually being trained by administration in the proper use of computers (software applications, e-mail, the Internet, copyrights and software licenses, and information security). If administration has not trained the teacher, then he takes it upon him self to become familiar and comfortable with each of the areas described above. As needs arise the teacher has been sufficiently trained by administration (if not by administration than by him self) to
easily manage hardware issues with the laptop and projector. Teacher understands that technology is a tool to assist him and continues to focus on fundamental philosophies of teaching.

b) Teacher has attended some inservice’s on how to use some software, hardware. Teacher seeks to learn through trial and error how to use software and hardware. Teacher understands that technology is a tool, but often uses it as ‘just another form of variety’ in the classroom.

c) Teacher is somewhat familiar with basic software procedures, but could not fix a hardware problem if a problem occurred. Teacher often goes to other teachers for help in how to do certain tasks.

d) Teacher uses one software program. Rarely uses the laptop or projector and does not have much hardware knowledge.

e) Teacher does not know how to properly use computer software, fix hardware problems, and continues to teach the way he has always taught.

Component 2: Teacher is trained by Administrators (Frequency, Needful)

a) Administration seeks to consistently find out the current needs of all the teachers and based on these needs provides appropriate, timely, and frequent training. These trainings are consistently provided throughout the entire school year and summer training is also provided.

b) Administration meets with a few teachers to discuss what they feel is needed. Administrator teaches multiple inservices based upon the results. Most training is held during the summer, with a few trainings held during the school year
c) Administration meets with a few teachers to discuss what they feel is needed. Administrator teachers one or two inservices based upon the results.

d) Administration does not collect any data on the current needs of its teachers. Inservice is taught on what he feels is necessary.

e) Administration does not collect any data on the technology needs of its teachers, nor are any inservices held to better train its teachers in how to use technology.

Component 3: Teacher assesses current needs (Personally, Administrator)

a) Teacher is actively engaged in seeking to learn new ways to learn and teach with technology by observing others, asking others, and learning by oneself. Teacher openly desires administration to come and observe his teaching and invites him to provide feedback so he can improve teaching with technology. Teacher initiates the needed changes.

b) New ways to teach are used when it is convenient. Listens as others talk about how they are using technology but does not ask many questions or observe any classes. Invites administration to come and observe a class but does not apply what was said.

c) Occasionally asks other teachers how they teach with technology when they see something they like. Invites administration to come and observe but inside does not really want them to come and is glad when it is over.

d) Teacher feels that they do not need any help with technology.

Component 4: Trains himself (Motivated, Time, Goals)

a) Is highly motivated to improve teaching skills with technology. Is constantly working on one or two technology skills. Loves feedback, especially from
exemplary technology teachers. Spends time daily seeking to learn new ways to teach with technology or improve the current ways. Has a vision of where he wants to go and has written goals to improve his technology skills. Refers to goals often.

b) Is motivated to improve technology teaching skills. Works sporadically on one or two technology skills. Spends time weekly seeking to learn new ways to teach with technology or improve his current ways. Teacher wrote down some goals but does not refer to them.

c) Likes technology and feels that it is useful but does not have the time to learn new skills. Only when an administrator teaches a new skill in an inservice does this teacher learn something. Did not write down any goals.

d) Is content to teach the way he has always taught and sees technology as getting in the way and inconvenient. Does not use technology.

Component 5: Receives timely support (CES Help Desk, Colleagues)

a) Can confidently call the CES Help Desk and know that timely support will be given. If hardware or software needs arise, teacher knows that the help desk will walk him through the process and fix it in an efficient manner. Has a colleague he can quickly get help from for times right before class or during class.

b) Calls the CES Help Desk but is put on hold or told they will call back tomorrow or another day. Has a colleague he can ask for help but does not feel comfortable asking for help.

c) Has lost confidence in the CES Help Desk because they have had bad experiences in the past, or the help desk has taken too long in helping them, or felt that the
help desk has wasted their time by not having properly trained employees to help. Has a colleague that knows some things about computers but does not have the time to help others.

d) Does not call the CES Help Desk because it is a waste of time. Teacher tries to fix it himself. Does not have a colleague to ask for help.
APPENDIX F

INNOVATION CONFIGURATION MAP DRAFT 2
AFTER STEP THREE

Some of the questions include:
- How often do you use technology in the classroom?
- How often do you use technology when you are preparing your lessons?
- How often do you use email?
- Technology is used mostly for: (Overheads, Quotes, Pictures; PowerPoint; Storing/Retrieving files)
- What technology resources do you use?
- Where do you go for help? To Learn? (CES Help Desk; learn on own; ask other teachers; help).
- When do you learn on your own?
- Do you feel like you are getting enough training? What would you like to have more training of?

Some of the guidelines for observation include:
- What technology is used in the classroom (Powerpoint—lesson, scripture mastery; lds.org; windows media player; dvd)?
- Is the technology helping to guide the students through the scriptures or is it the focus?
- How long is technology used for?
- Is technology used in a variety of ways?

Component 1: Technology Available for CES Teachers

<table>
<thead>
<tr>
<th>Site</th>
<th>Additional Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laptop</td>
<td></td>
</tr>
<tr>
<td>Internet</td>
<td>Wireless—Hardwired Dial-up—Broadband</td>
</tr>
<tr>
<td>LCD Projector</td>
<td>Fixed—Cart</td>
</tr>
<tr>
<td>Printer</td>
<td></td>
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<tr>
<td>Scanner</td>
<td></td>
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<tr>
<td>Whiteboard</td>
<td></td>
</tr>
<tr>
<td>Overhead Projector</td>
<td></td>
</tr>
</tbody>
</table>

CLUSTER A: Uses technology for Administrative purposes
Component 2: Uses technology to record student information to STAR (Attendance, Notes)

| a | b | c | d | e |
Records attendance daily and often records descriptive comments on students in the ‘comment’ section of STAR

Records attendance daily but rarely writes in the ‘comments’ section

Records attendance weekly but does not write in the ‘comments’ section

Records attendance monthly but does not write in the ‘comments’ section

Records attendance on paper for secretary to input

**Component 3: Uses resources from STAR to contact parents and priesthood leaders (Frequency, Email, Phone numbers)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly emails or calls parents and priesthood leaders about students progress</td>
<td>Once or twice a month emails parents and priesthood leaders about students progress</td>
<td>Rarely emails parents or priesthood leaders about students progress</td>
<td>Once or twice a year emails parents or priesthood leaders</td>
<td>Never emails parents or priesthood leaders</td>
</tr>
</tbody>
</table>

**Component 4: Utilizes CES’s website to obtain necessary forms and other resources (Forms, Frequency)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtains needed forms from ‘Administrative’ section of CES website before asking administrators for it</td>
<td>Obtains needed forms from ‘Administrative’ section by asking the administrator to find it for him/her</td>
<td>Obtains needed forms from ‘Administrative’ section by having the administrator/secretary print it off for him/her</td>
<td>Obtains some of the forms from ‘Administrative’ section</td>
<td>Never uses the forms from the ‘Administrative’ section of the CES website</td>
</tr>
</tbody>
</table>

**Component 5: Uses email (Colleagues/Administration, Parents, Priesthood leaders, Others)**

Email is used for:

- Contacting priesthood Leaders
- Contacting parents seminary students
- Communicating with colleagues
- Conducting other business contacts
- Personal correspondence

**Cluster B: Uses technology for Communication purposes**
### Component 6: Uses email (Frequency, purpose)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checks email daily. Makes regular use of email by contacting others. Email is not used for counseling or discussing personal matters</td>
<td>Checks email a couple times a week. Regularly emails others. Usually takes a few days to respond to emails.</td>
<td>Checks email once a week. Occasionally communicates with others via email. Only emails others when responding to their emails. Prefers making contact via phone</td>
<td>Checks email a couple times a month. Uses email for personal reasons and rarely for business items</td>
<td>Checks email once a month. Makes contact with seminary students</td>
<td>Teacher has no email account or access.</td>
</tr>
</tbody>
</table>

### Component 7: Accesses CES's website to obtain information (Frequency, News, Announcements)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stays informed by weekly reading the news and announcements from CES's website</td>
<td>Tries to stay informed by reading a couple of times a month the news and announcements from CES's website</td>
<td>Once a month reads the news from CES's website.</td>
<td>Once or twice a year reads the news and announcements from CES's website.</td>
<td>Never reads the news and announcements from CES's website. Obtains information from colleagues or administrators</td>
</tr>
</tbody>
</table>

### Component 8: Uses other forms of communication (File sharing, Web 2.0).

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares files with other colleagues via file sharing on the network</td>
<td>Uses Web 2.0 resources for communicating with other colleagues</td>
<td>Does not use any other forms of communication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CLUSTER C: Uses technology as a medium for Training

### Component 9: Accesses resources from CES's website to be trained (Online self-training)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifies teaching skills to improve by using online training</td>
<td>Identifies teaching skills to improve by using online training</td>
<td>Uses online training occasionally. During the summer, teacher</td>
<td>Obtains training from local inservice and Area inservice in</td>
<td>Rarely accesses any training online</td>
</tr>
</tbody>
</table>
CLUSTER D: Uses technology for Planning Lessons

Component 10: Technology is used to help the teacher. (Resourceful, Guide, Simplicity)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher understands available resources and technology enough to use it seamlessly in preparing lessons. Teacher can use technology resources effectively to guide lesson preparation. Technology is used to organize lesson outlines</td>
<td>Technology is used to build lesson outlines and to organize lessons. Teacher uses hard copies of books and manuals to prepare lessons</td>
<td>Technology often hinders lesson preparation</td>
<td>Teacher creates lesson outline on paper</td>
<td>Teacher uses old lesson outlines</td>
<td></td>
</tr>
</tbody>
</table>

Component 11: Utilizes resources from CES’s official website—ldsces.org (Frequency, Manual).

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses online resources daily from CES’s website. Reads manuals online and utilizes online features. For example, uses copy and paste features to quickly create PowerPoints from online manuals</td>
<td>Uses online resources once or twice a week and reads the manuals from a hard copy</td>
<td>Uses online resources once or twice a month. Obtains resources from old lesson files</td>
<td>Seldom uses online resources. Uses old lesson outlines to teach from</td>
<td>Teacher uses old lesson outlines</td>
<td></td>
</tr>
</tbody>
</table>
**Component 12: Church's Official Websites**

<table>
<thead>
<tr>
<th>Site</th>
<th>Frequency</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lds.org</td>
<td>Daily, Weekly, Monthly, Rarely</td>
<td></td>
</tr>
<tr>
<td>Josephsmith.net</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Byu.edu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Providentliving.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Besmart.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mormon.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ldscatalog.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairlds.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Component 13: Utilizes resources from Church’s official website—www.lds.org**

<table>
<thead>
<tr>
<th>Frequency, Variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily utilizes resources from Church’s official website to enhance lessons with current pictures, news, audio clips, general conference talks and other resources.</td>
</tr>
<tr>
<td>Weekly uses resources from Church’s official website to enhance lessons with current pictures, news, audio clips, general conference talks and other resources.</td>
</tr>
<tr>
<td>Monthly uses resources from Church’s official websites to enhance lessons.</td>
</tr>
<tr>
<td>Rarely accesses the Church’s official website.</td>
</tr>
</tbody>
</table>

**Component 14: Obtains recourses from un-official Church websites (Teaching, Personal development, Search Engines Frequency)**

<table>
<thead>
<tr>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actively goes online to find materials that will increase his/her teaching and presentation skills. Knows how to effectively use Search Engines to find.</td>
</tr>
<tr>
<td>Finds online materials once a week to help give variety to the lesson. Search Engines are used but could be used more effectively.</td>
</tr>
<tr>
<td>Finds online materials once a month.</td>
</tr>
<tr>
<td>Utilizes books, old notes, or colleagues.</td>
</tr>
</tbody>
</table>

168
Component 15: Organizes thoughts and information (Word processing, Web 2.0, File Structure)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Web 2.0 (such as iGoogle) or word processing is used to create lesson outlines. Files are organized and stored electronically</td>
<td>Paper is used to create lesson outlines and stored in a file system not on the computer</td>
<td>Lesson outlines are not written down</td>
<td>Old lesson outlines are used from old paper files</td>
<td></td>
</tr>
</tbody>
</table>

Cluster E: Uses technology for Lesson Presentation

Component 16: Technology is used to help the teacher (Presenting lessons, learning outcomes)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technology is a guide and a resource or tool during classroom instruction, the focus is consistently on the principle(s) being taught—not the technology</td>
<td>Technology is used as a tool and often as a guide in classroom instruction, keeping students focused on the scriptures. Focus toggles back and forth from the technology to the principle being taught</td>
<td>Technology is used as a tool and occasionally as a guide in classroom instruction. Focus is often on the fascination of the technology</td>
<td>Using technology becomes the focus rather than the principle being taught. Students get into the technology more than they do the lesson</td>
<td>Technology is used in the classroom to show a video</td>
</tr>
</tbody>
</table>

Component 17: Amount of time technology is used (Frequency, Reliance)
<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology is used when it is the best methodology to use in teaching the principle. Other forms of teaching are used (whiteboard or walls). Teacher is flexible enough that the lesson can continue if technology breaks or crashes.</td>
<td>Technology is used when it is convenient; other materials are used to assist the teacher. When technology crashes or breaks the teacher can quickly fix the problem and move on.</td>
<td>Technology is only used to show a movie or teach scripture mastery. When technology crashes or breaks the teacher spends a large amount of time in class trying to fix it.</td>
<td>Technology is never used in the classroom.</td>
<td>Technology is used for the entire class period every day. The class becomes a PowerPoint—everyday. Teacher becomes so reliant on it that he/she cannot teach without it.</td>
</tr>
</tbody>
</table>

**Component 18: Technology is used in a variety of ways (PowerPoint, Whiteboard, Video/Audio)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology is used in a variety of effective ways. Type of technology is used because it is the best methodology to teach the principle. PowerPoint lessons have purposeful variety. Video and audio are used effectively and efficiently. The white board is used ineractively with technology. Technology is</td>
<td>Technology is used to present PowerPoint lessons that contain variety. Technology is used in conjunction with the white board to engage students.</td>
<td>Technology is only used to present a PowerPoint lesson that does not engage students. Video/Audio clips are not edited but shown in their entirety.</td>
<td>Technology is not used. White board is used effectively. Video/Audio are used only through the DVD player.</td>
<td>Teacher lectures with no use of technology or white board.</td>
</tr>
</tbody>
</table>
Component 19: Software/Hardware necessary to perform needed tasks

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Ability (Scale of 1 to 10, 10 being very proficient)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Star</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Email</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Word Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Presentation Software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Web Browser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Media Player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Laptop (hardware)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Projector (hardware)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Component 20: Technology is used effectively to perform the needed tasks (Tasks, Adequate, Timely)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology is used effectively to perform the needed tasks in an adequate and timely manner</td>
<td>Some tasks are performed in an adequate and timely manner</td>
<td>Administrator performs needed tasks for teacher</td>
<td>Needed tasks are not performed in an adequate or timely manner</td>
<td></td>
</tr>
</tbody>
</table>

Cluster F: Professional Development for Technology CES teacher receives — forms and processes of support.

Component 21: Teacher is properly trained in (Software, Hardware, Philosophy)

<table>
<thead>
<tr>
<th>Software</th>
<th>Trained (Scale of 1 to 10, 10 being fully trained)</th>
<th>Frequency of training</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Star</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Email</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Word Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Presentation Software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Web Browser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Media Player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>o Laptop</td>
<td></td>
</tr>
<tr>
<td>o LCD Projector</td>
<td></td>
</tr>
</tbody>
</table>
### Philosophy:
Teacher understands that technology is a tool to assist him/her and continues to focus on fundamental philosophies of teaching.

### Component 22: Teacher assesses current needs (Personally, Administrator)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher is actively engaged in seeking to learn new ways to learn and teach with technology by observing others, asking questions, and learning by oneself. Asks others to come and observe his/her teaching. Invites feedback.</td>
<td>New ways to teach are used when it is convenient. Listens as others talk about how they are using technology but does not ask many questions or observe any classes.</td>
<td>Occasionally asks other teachers how they teach with technology when they see something they like. Invites administration or other teachers to come and observe.</td>
<td>Teacher makes little to no effort to learn.</td>
<td></td>
</tr>
</tbody>
</table>

### Component 23: Teacher is motivated to learn how to use technology by his/her self. (Initiative, Frequency, Competent)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeks to improve technology skills on own initiative by spending time daily learning how to use technology. Seeks out other exemplary.</td>
<td>Teacher uses non-teaching days and summers to gain technology skills. If teacher sees something he/she likes, he/she asks for.</td>
<td>Learns technology when administration tells him/her. Technology is used to perform the tasks required by administration.</td>
<td>Waits until someone shows him/her how to use technology.</td>
<td>Does not use technology.</td>
</tr>
</tbody>
</table>
colleagues to learn what they are doing | a copy of it

### Component 24: Receives technology training from administrators (Frequency, Needful, Exemplifies)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Administrator finds out the current technology needs of all the faculty and holds inservice frequently based on those needs. Administrator teaches by example</td>
<td>Administrator finds out the current needs of one or two teachers and holds an inservice or two based on those needs. Administrator teachers inservice with technology when necessary</td>
<td>Administrator holds inservice to train on better use of technology according to the skills he/she thinks the faculty needs. Administrator teaches inservice using only whiteboard and overhead projector</td>
<td>Administrator holds inservice. Seldom uses technology</td>
<td></td>
</tr>
</tbody>
</table>

### Component 25: Teacher receives help from Colleagues (Frequency, Access, Exemplary)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Has a colleague he/she can quickly get help from for times right before class or during class</td>
<td>Has a colleague he/she can ask for help but does not feel comfortable asking for help</td>
<td>Has a colleague that knows some things about computers but does not have the time to help others</td>
<td>Does not have a colleague to ask for help</td>
<td></td>
</tr>
</tbody>
</table>

### Component 26: Receives support from the CES Help Desk (timely, knowledgeable)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Calls the CES Help Desk confidently and receives timely support will be given. If hardware or software needs arise, teacher knows that the help desk will</td>
<td>Calls the CES Help Desk but is put on hold or told they will call back tomorrow or another day</td>
<td>Waits until a non-teaching day or summer to fix hardware/software problems</td>
<td>Hardware and software problems go unfixed</td>
<td></td>
</tr>
</tbody>
</table>
walk him/her through the process and fix it in an efficient manner
Innovation Configuration Map for Technology Use Among Church Education System (CES) Teachers
Church Education System: Utah South Area
St. George, UT

Innovation Configuration Map for Technology Use and Professional Development among CES Teachers

A very important part of teaching is choosing from the wide variety of strategies and techniques that could be used. Making choices is particularly important when a new teaching approach or curriculum is being implemented. Often there is need of a road map or a list of the alternative ways that teachers and students could use the new approach. Change researchers have developed a tool—an Innovation Configuration Map—that consists of "snapshots" of likely practices that can be seen in different situations. It describes the operational forms that an innovation or change can take.

The following pages contain descriptions of technology use, and the professional development related to it, among CES teachers. The descriptions are organized according to key components that are designated to be reflective of research-based practice. Each component includes a number of possible variations that describe different ways that technology and professional development may function or be carried out.

The Innovation Configuration Map for technology use among CES teachers may be used in a number of ways:

1. **Seminaries and individual self-analysis and reflection:** Frequently when new programs are implemented, too little information is provided to teachers about what they can do. The IC Map presents descriptions of different configurations or ways that teachers can approach technology use. Teachers and administrators can review their practice and ways they are implementing technology and compare it with those practices presented on the Map.

2. **Teacher peer observation and coaching:** Teachers can use the IC Map to observe colleagues. The Map serves as a guide for planning, for observing, and for follow-up dialogue about what is going on in the classroom.

3. **Planning for professional development:** The IC Map can be used by teachers and administrators as a communication and diagnostic tool to help in clarifying and focusing on those aspects of technology that are most in need of attention.

4. **Program evaluation:** The IC Map can be used by principals, administrators, and other CES personnel to evaluate the extent to which innovation components are being implemented.
The IC Map SHOULD NOT be used for teacher evaluation. This is a diagnostic tool and one that can be used for professional development. An IC Map can be useful in thinking about current practice and for getting ideas about what could be done differently. It is not appropriate for teacher evaluation.

Acknowledgements
The principal developer of this IC Map is Andrew H. McArthur. Also, Dr. Gene Hall and Dr. Kendall Hartley provided crucial guidance in its creation.

The developers wish to acknowledge the assistance and contribution of those teachers and principals who invited Andrew to visit their classrooms and who offered suggestions for improvements in earlier drafts.

The Innovation Configuration Map is part of the Concerns-Based Adoption Model (CBAM). For more information, see the following publications:


Property of Andrew H. McArthur
Contact Andrew H. McArthur for the latest version of this IC Map
INNOVATION CONFIGURATION MAP

Innovation Configuration Map for Technology Use and Professional Development among CES Teachers

Some of the questions to guide interviews include:
- How often do you use email? What for? (Component 5, 6)
- How do you use technology to communicate? (Component 2, 3, 4, 5, 7, 8)
- What do you use technology mostly for? How often? (Component 2, 11, 12, 14)
- What technology resources do you use when you prepare your lessons? When you teach? How often? (Component 11, 13, 15)
- Where do you go for help? To learn? (Component 9, 16, 18, 19, 20)
- When do you learn on your own? (Component 14, 17)
- Do you feel like you are getting enough training? In what areas would you like to have more training? How would you like the training? (Component 16, 17)

Some of the guidelines for observation include:
- What technology is used in the classroom? (Component 14)
- Is the technology helping to guide the students through the scriptures, or is it the focus? (Component 10)
- Is technology used in a variety of ways? (Component 14, 15)

Component 1
Technology available for CES teachers

<table>
<thead>
<tr>
<th>Site</th>
<th>Additional Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laptop</td>
<td>Wireless—Hardwired</td>
</tr>
<tr>
<td>Internet</td>
<td>Dial-up—Broadband</td>
</tr>
<tr>
<td>LCD Projector</td>
<td>Fixed—Cart</td>
</tr>
<tr>
<td>Printer</td>
<td></td>
</tr>
<tr>
<td>Scanner</td>
<td></td>
</tr>
<tr>
<td>Whiteboard</td>
<td></td>
</tr>
<tr>
<td>Overhead Projector</td>
<td></td>
</tr>
</tbody>
</table>

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Andrew H. McArthur (mearthurah@gmail.com)
**Cluster A: Uses technology for Administrative purposes**

**Component 2**

**Uses technology to record student information to STAR (Attendance, Notes)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Records attendance daily and regularly records descriptive comments on students in the ‘comment’ section of STAR</td>
<td>Records attendance daily and often writes in the ‘comments’ section</td>
<td>Records attendance weekly but rarely writes in the ‘comments’ section</td>
<td>Records attendance monthly but does not write in the ‘comments’ section</td>
<td>Records attendance on paper for secretary to input</td>
<td>Secretary records attendance</td>
</tr>
</tbody>
</table>

**Component 3**

**Uses resources from STAR to contact parents and priesthood leaders (Frequency, Email, Phone numbers)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly emails or calls parents and priesthood leaders about students progress</td>
<td>Once or twice a month emails parents and priesthood leaders about students progress</td>
<td>Rarely emails parents or priesthood leaders about students progress</td>
<td>Once or twice a year emails parents or priesthood leaders</td>
<td>Phones parents or priesthood leaders or has administrators do it</td>
</tr>
</tbody>
</table>

**Component 4**

**Utilizes CES’s website to obtain necessary forms and other resources (Forms, Frequency)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtains needed forms from ‘Administrative’ section of CES website before asking administrators for it</td>
<td>Obtains needed forms from ‘Administrative’ section by asking the administrator to find it for him/her</td>
<td>Obtains needed forms from ‘Administrative’ section by having the administrator/secretary print it off for him/her</td>
<td>Obtains some of the forms from ‘Administrative’ section</td>
<td>Never uses the forms from the ‘Administrative’ section of the CES website</td>
</tr>
</tbody>
</table>

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Andrew H. McArthur (mcarthurah@gmail.com)
CLUSTER B: Uses technology for Communication purposes

Component 5
Uses email (Colleagues/Administration, Parents, Priesthood leaders, Others)
   Email is used for:
   - Contacting priesthood leaders
   - Contacting parents of seminary students
   - Communicating with colleagues
   - Conducting other business contacts
   - Personal correspondence
   - Other ___________________

Component 6
Uses email (Frequency, Purpose)

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Checks email daily. Makes regular use of email by contacting others. Email is not used for counseling or discussing personal matters with seminary aged students</td>
<td>Checks email a couple times a week. Regularly emails others. Usually takes a few days to respond to emails</td>
<td>Checks email once a week. Occasionally communicates with others via email. Only emails others when responding to their emails. Prefers making contact via phone</td>
<td>Checks email a couple times a month. Uses email for personal reasons and rarely for business items</td>
<td>Checks email once a month. Makes contact with seminary students</td>
<td>Teacher has no email account or access</td>
</tr>
</tbody>
</table>
Component 7

**Accesses CES's website to obtain information (Frequency, News, Announcements)**

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Stays informed by reading the news and announcements weekly from CES’s website</td>
<td>Stays informed by the news and announcements a couple of times a month from CES’s website</td>
<td>Reads the news once a month from CES’s website</td>
<td>Reads the news and announcements once or twice a year from CES’s website</td>
<td>Never reads the news and announcements from CES’s website. Obtains information from colleagues or administrators</td>
</tr>
</tbody>
</table>

Component 8

**Using collaborative technologies (File sharing, Web-based collaboration)**

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Shares files with other colleagues via file sharing on the network</td>
<td>Uses Web-based resources for communicating with other colleagues</td>
<td>Does not use any other forms of communication</td>
</tr>
</tbody>
</table>

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Andrew H. McArthur (mcarthurah@gmail.com)
CLUSTER C: Uses technology as a medium for Training

Component 9
Accesses resources from CES’s website to be trained (Online self-training)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
</tr>
<tr>
<td>Identifies teaching skills to improve by using online training resources from CES’s website Regularly. Practices the skills in class</td>
<td>Identifies teaching skills to improve by using online training resources, but occasionally practices the skills. Asks colleagues for help</td>
<td>Uses online training occasionally. During the summer, teacher uses it more often. Asks for ideas from other teachers</td>
<td>Obtains training from local inservice and Area inservice in Summer</td>
<td>Relies on past experience or own knowledge for training</td>
</tr>
</tbody>
</table>

CLUSTER D: Uses technology for Planning Lessons

Component 10
Technology is used to help the teacher (Resourceful, Guide, Simplicity)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
<td>e</td>
</tr>
<tr>
<td>Teacher understands available resources and technology adequately enough to use it seamlessly in preparing lessons. Teacher can use technology resources effectively to guide lesson preparation. Technology is used to organize lesson outlines</td>
<td>Technology is used to build lesson outlines and to organize lessons. Teacher uses hard copies of books and manuals to prepare lessons</td>
<td>Technology often hinders preparation due to increased focus on how to use technology</td>
<td>Teacher creates lesson outline on paper from a hard copy of the manual</td>
<td>Teacher comfortably uses old lesson outlines routinely</td>
</tr>
</tbody>
</table>
Component 11
Use of various websites

<table>
<thead>
<tr>
<th>Site</th>
<th>Frequency</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Official Church Websites:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Ldsces.org</td>
<td>D= Daily, W= Weekly, M= Monthly, R= Rarely</td>
<td></td>
</tr>
<tr>
<td>o Lds.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Josephsmith.net</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Byu.edu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Providentliving.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Besmart.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Mormon.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Ldscatalog.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Fairlds.org</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Other:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unofficial Websites:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Google.com</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Component 12
Organizes thoughts and information (Word processing, Web-based Applications, File Structure)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web-based applications (e.g. google docs) are used to create lesson outlines. Files are organized and stored electronically</td>
<td>Word processing software is utilized to create lesson outlines. Files are stored electronically. Paper is used to create lesson outlines and stored in a file system not on the computer</td>
<td>Lesson outlines are not written down</td>
<td>Old lesson outlines are used from old paper files</td>
<td></td>
</tr>
</tbody>
</table>
Component 13
Technology is used to help the teacher during classroom teaching (Presenting lessons, Learning outcomes)

Technology is integrated seamlessly as a guide and a resource or tool during classroom instruction, the focus is consistently on the principle(s) being taught—not the technology

Technology is used as a tool and often as a guide in classroom instruction, keeping students focused on the scriptures. Focus toggles back and forth from the technology to the principle being taught

Technology is used as a tool and occasionally as a guide in classroom instruction. Focus is often on the fascination of the technology

Using technology becomes the focus rather than the principle being taught. Students get into the technology more than they do the lesson

Occasional use of technology such as showing a video

Component 14
Technology is used in a variety of ways (PowerPoint, Whiteboard, Video/Audio)

Technology is used in a variety of effective ways. A variety of software and technology applications are used. Video and audio are used effectively and efficiently. The white board is used interactively with technology. Technology is used by teacher to help class stay student-centered

Teacher uses two types of technology software or applications to enhance lessons. Technology is used in conjunction with the white board to engage students

Teacher predominantly uses one type of technology software. Video/Audio clips are not edited but shown in their entirety

Technology is not used. White board is used effectively. Video/Audio are used through the DVD player

Teacher lectures with no use of technology or white board

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Component 15
Software/Hardware used to perform needed tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Star</td>
<td></td>
</tr>
<tr>
<td>o Email</td>
<td></td>
</tr>
<tr>
<td>o Word Processing</td>
<td></td>
</tr>
<tr>
<td>o Presentation Software</td>
<td></td>
</tr>
<tr>
<td>o Web Browser</td>
<td></td>
</tr>
<tr>
<td>o Media Player</td>
<td></td>
</tr>
<tr>
<td>o Laptop (hardware)</td>
<td></td>
</tr>
<tr>
<td>o Projector (hardware)</td>
<td></td>
</tr>
<tr>
<td>o Other:</td>
<td></td>
</tr>
</tbody>
</table>

Used for: P= Planning; I= Instruction; O= Other (write in)

Cluster F: Professional Development for Technology CES teacher receives—forms and processes of support.

Component 16

Type of training teacher has received (Software, Hardware)

<table>
<thead>
<tr>
<th>Type of training</th>
<th>Self-Study</th>
<th>Colleague</th>
<th>Formal Training</th>
<th>Other (write in)</th>
<th>Comments</th>
</tr>
</thead>
</table>

Software

| o Star              |          |
| o Email             |          |
| o Word Processing   |          |
| o Presentation Software |      |
| o Web Browser       |          |
| o Media Player      |          |
| o Other:            |          |

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Andrew H. McArthur (mcarthurh@gmail.com)
Hardware

- Laptop
- LCD Projector
- Printer
- Scanner
- Other: _________

Component 17
Teacher's efforts to learn how to use technology (Initiative, Frequency, Competent)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeks to improve technology skills on own initiative. Seeks out other exemplary colleagues to learn what they are doing</td>
<td>Teachers gains technology skills when he/she has available time. If teacher sees something he/she likes, he/she asks for a copy of it</td>
<td>Learns technology when administration tells him/her</td>
<td>Waits until someone shows him/her how to use technology</td>
<td>Does not use technology</td>
</tr>
</tbody>
</table>

Component 18
Receives technology training from administrators (Frequency, Needful, Exemplary)

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator finds out the current technology needs of the entire faculty and holds inservice frequently based on those needs.</td>
<td>Administrator finds out the current needs of one or two teachers and holds an inservice or two based on those needs. Administrator</td>
<td>Administrator holds inservice to train on better use of technology according to the skills he/she thinks the faculty</td>
<td>Administrator holds inservice where technology is seldom used. Administrator provides one on one training</td>
<td>Administrator leaves teachers to learn technology for his/her self</td>
</tr>
</tbody>
</table>

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Andrew H. McArthur (mearthurah@gmail.com)
Component 19

**Teacher receives help from colleagues (Frequency, Access, Exemplary)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has a colleague he/she can quickly get help from for times right before class or during class.</td>
<td>Has a colleague he/she can ask for help but does not feel comfortable asking.</td>
<td>Has a colleague that knows some things about computers but does not have the time to help others.</td>
<td>Does not have a colleague to ask for help.</td>
</tr>
</tbody>
</table>

Component 20

**Receives support from the CES Help desk (Timely, Knowledgeable)**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calls the CES help desk confidently and receives timely support. If hardware or software needs arise, teacher knows that the help desk will walk him/her through the process and fix it in an efficient manner.</td>
<td>Calls the CES help desk but is put on hold. He/She is told the helpdesk will call back tomorrow or another day.</td>
<td>Waits until a non-teaching day or summer to fix hardware/software problems. Teacher adapts what he/she is doing.</td>
<td>Hardware and software problems go unfixed. Teacher utilizes other means to prepare and present lessons.</td>
<td>Teacher unable to cover lesson or skips sections.</td>
</tr>
</tbody>
</table>
# APPENDIX H

## COMPONENTS

### Table H1. ALL.

<table>
<thead>
<tr>
<th>Component</th>
<th>Variations</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1-Tech. Available</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cluster A: Administrative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2- STAR</strong></td>
<td></td>
<td>50%</td>
<td>7%</td>
<td>23%</td>
<td>43%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3- STAR for Communication</strong></td>
<td></td>
<td>77%</td>
<td>7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4- CES’s Website</strong></td>
<td></td>
<td>36%</td>
<td>18%</td>
<td>27%</td>
<td>18%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cluster B: Communication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5- Email Purpose</strong></td>
<td></td>
<td>93%</td>
<td>7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6- Email Frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7- CES’s Website</strong></td>
<td></td>
<td>69%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td><strong>8- Collaborative</strong></td>
<td></td>
<td>25%</td>
<td>17%</td>
<td></td>
<td></td>
<td>58%</td>
<td></td>
</tr>
<tr>
<td><strong>Cluster C: Training</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>9- CES’s Website</strong></td>
<td></td>
<td>16%</td>
<td>7%</td>
<td>31%</td>
<td>46%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cluster D: Planning Lessons</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>10- Technology Helps</strong></td>
<td></td>
<td>50%</td>
<td>14%</td>
<td>29%</td>
<td>7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>11- Various Websites</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12- Organize Information</strong></td>
<td></td>
<td>67%</td>
<td>25%</td>
<td></td>
<td></td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td><strong>Cluster E: Lesson Presentation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>13- Technology Helps</strong></td>
<td></td>
<td>36%</td>
<td>21%</td>
<td>21%</td>
<td>7%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td><strong>14- Variety of Technology</strong></td>
<td></td>
<td>36%</td>
<td>21%</td>
<td>36%</td>
<td>7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15- Software &amp; Hardware</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cluster F: Professional Development</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>16- Type of Training</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>17- Teacher’s Effort</strong></td>
<td></td>
<td>50%</td>
<td>21%</td>
<td>14%</td>
<td>14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cluster G: System Support</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

187
| 18- Training from Administration | | 46% | | 54% |
| 19- Colleagues Help | 80% | 13% | 7% |
| 20- CES Help Desk | 15% | 38% | 8% | 23% | 15% |

Table H2. Grant.

<table>
<thead>
<tr>
<th>Variations</th>
<th>Component</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Tech. Available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster A: Administrative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2- STAR</td>
<td>14%</td>
<td>86%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3- STAR for Communication</td>
<td>57%</td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4- CES’s Website</td>
<td>29%</td>
<td>29%</td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster B: Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5- Email Purpose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6- Email Frequency</td>
<td>86%</td>
<td>14%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7- CES’s Website</td>
<td>71%</td>
<td>14%</td>
<td>14%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8- Collaborative</td>
<td>29%</td>
<td>71%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster C: Training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9- CES’s Website</td>
<td>29%</td>
<td></td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster D: Planning Lessons</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10- Technology Helps</td>
<td>43%</td>
<td>14%</td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11- Various Websites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12- Organize Information</td>
<td>71%</td>
<td>14%</td>
<td>14%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cluster E: Lesson Presentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13- Technology Helps</td>
<td>29%</td>
<td>29%</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14- Variety of Technology</td>
<td>14%</td>
<td>43%</td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15- Software &amp; Hardware</td>
<td></td>
<td></td>
<td></td>
<td></td>
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Table H3. Pittsburg.

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<td>29%</td>
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<td>15-Software &amp; Hardware</td>
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<td>Cluster E: Lesson Presentation</td>
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<td>16-Type of Training</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>17-Teacher’s Effort</td>
<td>57%</td>
<td>29%</td>
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189
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<td>63%</td>
<td>25%</td>
<td>12%</td>
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<tr>
<td>20- CES Help Desk</td>
<td>33%</td>
<td>50%</td>
<td>17%</td>
</tr>
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APPENDIX I

COMPONENTS AND TEACHER PERCENTAGES

Component 5

Uses email (Colleagues/Administration, Parents, Priesthood leaders, Others)

<table>
<thead>
<tr>
<th>Email is used for</th>
<th>Percentage of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Contacting priesthood leaders</td>
<td>20%</td>
</tr>
<tr>
<td>o Contacting parents of seminary students</td>
<td>10%</td>
</tr>
<tr>
<td>o Communicating with colleagues</td>
<td>50%</td>
</tr>
<tr>
<td>o Conducting other business contacts</td>
<td></td>
</tr>
<tr>
<td>o Personal correspondence</td>
<td>20%</td>
</tr>
<tr>
<td>o Other</td>
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Component 11

Use of various websites

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<th>Site</th>
<th>Frequency</th>
<th>Purpose</th>
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<tr>
<td></td>
<td>D= Daily, W= Weekly, M= Monthly, R= Rarely</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D  W  M  R</td>
<td></td>
</tr>
<tr>
<td><strong>Official Church Websites:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Ldsces.org</td>
<td>60% 40%</td>
<td></td>
</tr>
<tr>
<td>o Lds.org</td>
<td>20% 70% 10%</td>
<td></td>
</tr>
<tr>
<td>o Josephsmith.net</td>
<td>20% 70% 10%</td>
<td></td>
</tr>
<tr>
<td>o Byu.edu</td>
<td>17% 83%</td>
<td></td>
</tr>
<tr>
<td>o Providentliving.org</td>
<td>13% 50% 43%</td>
<td></td>
</tr>
<tr>
<td>o Besmart.com</td>
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</tr>
<tr>
<td>o Mormon.org</td>
<td>14% 86%</td>
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<tr>
<td>o Ldscatalog.com</td>
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<tr>
<td>o Fairlds.org</td>
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<tr>
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<td><strong>Unofficial Websites:</strong></td>
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<td>o Google.com</td>
<td>44% 56%</td>
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### Component 15

**Software/Hardware used to perform needed tasks**

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<td>o Web Browser</td>
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<tr>
<td>o Media Player</td>
<td></td>
<td>57%</td>
</tr>
<tr>
<td>o Laptop (hardware)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Projector (hardware)</td>
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<tr>
<td>o Other:</td>
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### Component 16

**Type of training teacher has received (Software, Hardware)**

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<th>Self-Study</th>
<th>Colleague</th>
<th>Formal Training</th>
<th>Other (write in)</th>
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</table>
APPENDIX K

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Date

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REFERENCES


Hoff, D. J. (2007). Not all agree on meaning on NCLB proficiency. *Education Week*, 27(33), 1, 23.


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for Latter-Day Saint Families: The Doctrine and Covenants. Salt Lake City, Utah,
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Presentations:
Cedar City, Utah.

Strudler, N., Luz, T., McArthur, A., Levitt, L. & Hartley, K. (February, 2007). One-
to-One Laptop Projects in Teacher Education: Dreams & Realities. Presentation at the
Annual Meeting of the Association of Teacher Educators. San Diego, CA.

Between Configurations of Technology Use and Professional Development Among
Teachers. Presentation at the Annual Meeting of Society for Information Technology
& Teacher Education. Las Vegas, NV.

Dissertation Title: Exploring Relationships Between Configurations of Technology Use
and Professional Development Among CES Teachers.

Dissertation Examination Committee:
Chairperson, Dr. Kendall Hartley, Ph.D.
Committee Member, Dr. Neal Strudler, Ph.D.
Committee Member, Dr. Cyndi Giorgis, Ph.D.
Committee Member, Dr. Gene Hall, Ph.D.
Graduate Faculty Representative, Dr. David Holland, Ph.D.