ABSTRACT

THE DEVELOPMENT OF AN INSTRUMENT FOR K12 COORDINATORS IMPLEMENTING CURRICULUM VIDEOCONFERENCING AND A MODEL TO PREDICT UTILIZATION OF VIDEOCONFERENCING

by

Janine Monica Lim

Chair: Erich Baumgartner

ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

Andrews University

School of Education

Title: THE DEVELOPMENT OF AN INSTRUMENT FOR K12 COORDINATORS IMPLEMENTING CURRICULUM VIDEOCONFERENCING AND A MODEL TO PREDICT UTILIZATION OF VIDEOCONFERENCING

Name of researcher: Janine Monica Lim

Name and degree of faculty chair: Erich Baumgartner, Ph.D.

Date completed: August 2009

Problem

The role of the coordinator and factors affecting their ability to support curriculum videoconferencing in relationship to the utilization of videoconferencing in the school have not been thoroughly studied. The focus of this study is the videoconference coordinator and their influence on the utilization of videoconferencing.

Method

A measure of the usage of curriculum videoconferencing was developed and compared to a multidimensional conceptualization of factors influencing usage. The conceptualization included the development of a K12 Curriculum Videoconferencing Implementation Scale, as well as measures of educational service agency support,

technical support, administrative support, and school and demographic variables. Multiple regression analysis was used to determine the variables that predict usage of curriculum videoconferencing. The 277 coordinators who participated in the study were from six countries and 31 U.S. states.

Results

A prediction model was developed from variables that maximize the prediction of total usage of videoconferencing in the curriculum. Variables that positively contributed to the prediction model included elementary school as the level of school, female coordinators, a 2-year degree, coordinator's job title as paraprofessional or teacher, support from an educational service agency that facilitates videoconferences, location of the system as a mobile cart, the coordinator's ability to work with teachers, teacher's attitudes, and principal support. Variables that negatively contributed to the prediction model included training of mostly technical content, location of the system as coordinator supporting multiple systems, and videoconference quality.

Conclusions

The major findings of this study provide an understanding of who may be the best videoconference coordinator in a school, the importance and design of educational service agency support, the non-significance of some of the administrative variables, and the development of a scale that has good estimates of psychometric properties, reliability, and validity estimates that can predict the usage of videoconferencing. In addition, a multidimensional perspective was developed to predict the usage of videoconferencing that includes school and coordinator demographics, administrative support variables, and the K12 Curriculum Videoconferencing Implementation Scale.

Andrews University

School of Education

THE DEVELOPMENT OF AN INSTRUMENT FOR K12 COORDINATORS IMPLEMENTING CURRICULUM VIDEOCONFERENCING AND A MODEL TO PREDICT UTILIZATION OF VIDEOCONFERENCING

A Dissertation

Presented In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Janine Monica Lim

August 2009

THE DEVELOPMENT OF AN INSTRUMENT FOR K12 COORDINATORS IMPLEMENTING CURRICULUM VIDEOCONFERENCING AND A MODEL TO PREDICT UTILIZATION OF VIDEOCONFERENCING

A dissertation
presented in partial fulfillment
of the requirements for the degree
Doctor of Philosophy

by

Janine Monica Lim

APPROVAL BY THE COMMITTEE:

Chair: Erich Baumgartner	Dean, School of Education James R. Jeffery
Member: Isadore Newman	
Member: James R. Jeffery	
External: Dennis Rudy	Date approved

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGMENTS

Writing a dissertation is the culmination of many hours of work and reflection. Many people have assisted me in this journey. This dissertation started with my supervisor, Jim Bembenek, nudging me to support a new videoconferencing program in Berrien County, Michigan. His encouragement and support laid the foundation for my work in this field, and for that I am forever grateful. Thank you to Arnie Comer and Sue Porter for teaching me best practice in integrating videoconferencing in the curriculum. I also thank Roxanne Glaser for endless hours of feedback and inspiration through my research process. Thank you also to Dennis Lundgren, my current supervisor, for support of this research. I especially wish to thank my parents, Allan and Shirley Freed, for their encouragement, modeling, and inspiration. My mom, Dr. Shirley Freed, has been my research mentor and inspiration. This study has benefited from her partnership in the qualitative research on which this dissertation is based.

Thank you to my advisor, Dr. Robson Marinho; my committee chair, Dr. Erich Baumgartner; and committee members, Dr. Isadore Newman and Dr. James Jeffery. Your tireless hours of feedback and revisions have made this a more excellent document. Dr. Newman, thank you for pushing me to attempt more advanced statistical procedures than I thought were possible. Many others deserve thanks, including Dennis Rudy for assistance with the pilot version of the survey; the 10 people who reviewed the survey; the videoconference coordinators locally and nationally who regularly teach me; Brenda, Bill, Collette, and David, my leadership and learning group members for their inspiration and support; and most of all, my husband for his patience and encouragement to finish.

CHAPTER I

INTRODUCTION

Background of the Problem

Videoconferencing is becoming one of the popular educational innovations of the 21st century. In 2006, 25% of schools in the United States had access to videoconferencing within their school (Greenberg, 2006) and had grown to 30% in 2009 (Greenberg, 2009). Schools are using videoconferencing for traditional course delivery, professional development, and meetings – the first wave of videoconferencing. The second and third waves of videoconferencing provide curriculum-based experiences for K-12 students (Greenberg, 2006). Students are interacting with peers, experts, and content providers to enhance their learning in core curriculum areas. Some content providers, such as the Center of Science and Industry (COSI) in Columbus, OH, are overwhelmed by the response to their programs. COSI offers students the opportunity to interact with surgeons during heart, knee, or lung cancer surgeries. In addition, students are connecting and collaborating with peers internationally. For example, the Global Nomads Group facilitated a conversation between students in the U.S. and Iraq in 2003 just before the Iraq War began. They also have facilitated discussions between schools in North America and survivors of the genocide in Rwanda (Morrison & Macquart, 2006). These experiences are just a few examples of the quality learning experiences videoconferencing affords to K-12 schools.

Videoconferencing is a key tool for assisting students in becoming comfortable with global communication (Cifuentes & Murphy, 2000a; Howland & Wedman, 2003; Jones & Sorenson, 2001; Kinginger, 1999; Naruse et al., 2003; Ramirez, 1998; Szente, 2003; Thurston, 2004). In a global economy, some project work within companies follows time zones resulting in 24-hour work on a given project. With work being accomplished in multiple countries around the world, students need an increased understanding and appreciation of cultures and peoples. In addition, companies are increasingly outsourcing U.S. service, technology, manufacturing, financial, and other jobs to firms overseas. Thus, our students more than ever need to be competitive, creative problem solvers with the ability to communicate globally (Friedman, 2005). Using IP-based videoconference technology, students can communicate with peers around the world to solve problems, discuss global issues, and complete collaborative projects, just as they will in the workplace after they graduate.

Videoconference technology allows students to meet international technology standards. The International Society for Technology in Education publishes National Educational Technology Standards for Students (ISTE, 2007). There are six standards covering various technology skills. The second standard emphasizes the need for students to use technology to communicate, interact, and collaborate with peers.

2. Communication and Collaboration

> Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:
>
> a. interact, collaborate, and publish with peers, experts or others employing a variety of digital environments and media.
>
> b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.

c. develop cultural understanding and global awareness by engaging with learners of other cultures.

d. contribute to project teams to produce original works or solve problems. (ISTE, 2007, p. 1)

Students can share solutions and products with peer audiences around the world via videoconference; collaborate with peers and experts to investigate curriculum-related problems and issues; access remote information and experts; and discuss and investigate issues with peers globally.

Statement of the Problem

Videoconferencing has the potential to bring quality learning experiences to students in the classroom as they connect with experts and peers around the world. Whereas 30% of schools in the United States have access to videoconferencing (Greenberg, 2009), how many of them are using videoconferencing consistently across grade levels and subject areas to impact student learning? My conversations with colleagues across the United States and Canada and experience with schools in southwestern Michigan (BerrienRESA, 2009a) suggest that some schools have limited utilization. New equipment sometimes sits collecting dust on shelves and in closets.

Currie (2007) suggests that factors affecting successful implementation of videoconferencing include access to professional development, funding for programming, access to a videoconferencing system within the school, providing a dedicated support person for videoconferencing, and support from administration. In addition, Wakefield (1999) and Keefe (2003) emphasize the role of the site facilitator as critical to the successful implementation of videoconferencing. These studies have revealed factors affecting implementation, including the role of the videoconference coordinator, the person who is responsible for videoconferencing in the school. The role

of the coordinator and factors affecting their ability to support videoconferencing in relationship to the utilization of videoconferencing in the school have not been thoroughly studied. The focus of this study is the videoconference coordinator and their influence on the utilization of videoconferencing in the school.

Purpose of Study

This study investigated the coordinator's ability to support videoconferencing, to integrate videoconferencing in the curriculum, to work with teachers, and the technical and administrative issues that may affect the coordinator's ability to support videoconferencing. This study analyzed how these factors may predict the utilization of videoconferencing in the school.

Research Questions

The research questions center on the function and role of the videoconference coordinator, the technical aspects of videoconferencing, and the support structures for the coordinator and teachers using videoconferencing.

1. How do the demographic variables of the school predict the utilization of videoconferencing in the school?

2. How do the demographic variables of the coordinator predict the utilization of videoconferencing in the school?

3. How do the educational service agency support variables predict the utilization of videoconferencing in the school?

4. How do the administrative, financial, and technology support structure variables predict the utilization of videoconferencing in the school?

5. How do the technical aspects of videoconferencing predict the utilization of videoconferencing in the school?

6. How does the coordinator's ability to support videoconferencing predict the utilization of videoconferencing in the school?

7. How does the coordinator's ability to integrate videoconferencing in the curriculum predict the utilization of videoconferencing in the school?

8. How does the coordinator's ability to work with and support the teachers in using videoconferencing predict the utilization of videoconferencing in the school?

9. How does the coordinator's perception of the teacher attitudes towards videoconferencing predict the utilization of videoconferencing in the school?

10. How does the coordinator's perception of the principal's support of videoconferencing predict the utilization of videoconferencing in the school?

11. Do any of the above variables or combinations of variables predict the utilization of videoconferencing?

Rationale for the Study

Research has been done on the effectiveness of videoconferencing (Carville & Mitchell, 2001), the use of videoconferencing to promote literacy (Szente, 2003), the benefits to multicultural understanding (Cifuentes & Murphy, 2000a), and the benefits of access to remote scientists and experts (Barshinger & Ray, 1998; Kubasko et al., 2007; Lee, 2004; McCombs et al., 2007). These studies support the benefits of curriculum videoconferencing.

Some research has been done on the effective implementation of videoconferencing. Studies have found that the ability of the coordinator to assist teachers in integrating the technology in the curriculum was critical (Currie, 2007; Keefe, 2003). Other important components of a successful program included support from the technology committee and a collaborative decision-making process within the school

(Keefe, 2003). The access to, awareness of, and actual participation in staff development for new teachers and experienced teachers is important, as well as the coordinator's role in the staff development (Currie, 2007; Keefe, 2003). Access to videoconferencing within each school, the cost of programming, and the availability of programming offered by the educational service agency are also important factors in the success of the program (Currie, 2007).

Bose (2007) studied the teacher, school, and professional development factors affecting the utilization of videoconferencing and found that teacher characteristics and professional development characteristics were useful to predict utilization of videoconferencing, but that school characteristics did not predict utilization. While these studies have begun the work, a careful investigation of the specific relationship between the role of the school videoconference coordinator as an advocate and supporter of curriculum videoconferencing and the utilization of videoconferencing in the school has not been studied.

Theoretical Framework

The field of educational technology is vast and ever changing. Despite years of work, there are no universally agreed upon frameworks for educational technology (Ely, 2008). Instructional technology has adopted concepts and practices from other fields. Despite this disagreement and ambiguity, a review of the literature found a useful model to use as the theoretical framework for this study. Owston (2007) recently published an international study on the contextual factors that sustain innovative instructional technology uses. These factors were drawn from a grounded-theory qualitative analysis of 174 cases in 28 countries. His model includes essential conditions for the sustainability of classroom innovation which are necessary and found in all of the cases. The essential

conditions include the role of the teacher, teacher professional development, the principal as gatekeeper of the innovation, and the enthusiasm of the students. He also found contributing conditions which were included in at least 50% or more of the cases. Two of the contributing conditions are support for the innovation within the school and external to the school. A third contributing condition is that of an innovation champion – a teacher, technology coordinator, or principal who provides direction and leadership to the innovation. Finally funding is a contributing condition, as well as supportive plans and policies for the innovation. Figure 1 shows how the variables and concepts in this study correspond to the components of Owston's model.

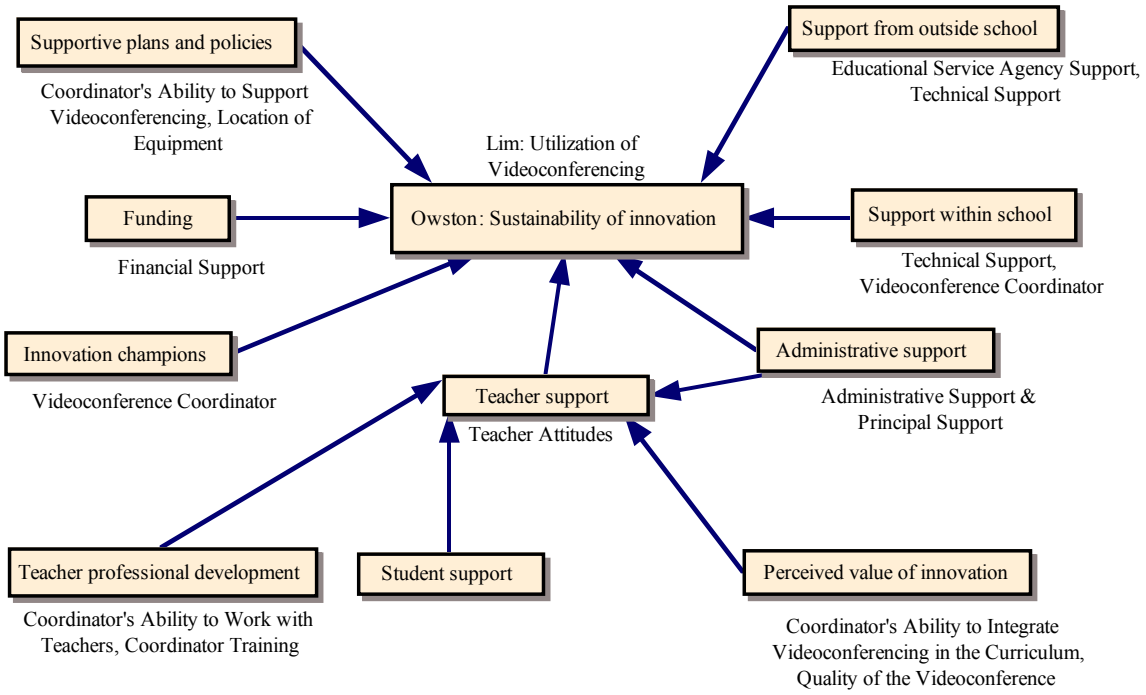


Figure 1. Theoretical Framework

In this study, I focus on the innovation champion or videoconference coordinator. Their perspective is used to study the use of videoconferencing. Videoconference coordinators can serve as innovation champions in the school. They can serve as the first point of contact, support the use of videoconferencing, and assist the other teachers in finding quality videoconference experiences for their curriculum. Their understanding of curriculum integration of videoconferencing, their attitudes towards technology and videoconferencing, and the resources they are provided with for the support of the teachers impact the way teachers use videoconferencing in their curriculum. In my experience, the videoconference coordinator is a key person affecting the utilization of videoconferencing for the school. Studying the utilization of videoconferencing from the perspective of the videoconference coordinator provided new insights into the successful implementation of videoconferencing in K-12 schools.

A successful videoconference coordinator provides non-traditional leadership for educational technology in the school. This leadership is not generally by position power, but instead by expert power, because they have become an expert on videoconferencing, and referent power, because they have a relationship with the teachers in the school and use that relationship to influence the teachers to use videoconferencing (French & Raven, 1959). Aten (1996) suggests that the leadership for educational technology in schools may be shared and is usually in addition to other school responsibilities. In addition, she suggests that interpersonal skills appear to be valued over technological expertise. These requirements apply to the use of videoconferencing in the curriculum as well and add an underlying concept of educational technology leadership to this study.

Significance of the Study

Schools are implementing videoconferencing with varying levels of use. Factors centering around the coordinator's ability to support videoconferencing in the school may predict the utilization of videoconference. These factors may be important to the effective implementation of videoconferencing. Wakefield's (1999) study suggests that site facilitators are important in many roles, including supporting videoconferencing for full course delivery and meetings. The videoconference coordinator and factors affecting their ability to support videoconferencing are critical components that make for successful implementation (Currie, 2007; Keefe, 2003). A study specifically examining the relationship between the role of the videoconference coordinator in K-12 schools and the utilization of videoconferencing was needed to further understand the importance of the coordinator.

A scale needed to be developed to evaluate implementation in the field of curriculum videoconferencing. Accountability is important, and funding often depends on appropriate evaluation and assessment. This scale can be used as a formative assessment tool for organizations implementing curriculum videoconferencing. The scale forces reflection by the coordinator completing the survey, and may inspire thought on the meaning of the use of educational technology and larger educational concerns. The scale may increase awareness not just on why to use videoconferencing in the curriculum, but also how to appropriately implement a support structure for it. The scale and procedures developed in this study can be used for other studies. The development of the scale adds to the body of knowledge in the curriculum videoconferencing field, and also to the body of literature on methodology and procedures for the development of instruments.

This study assisted in clarifying the most important factors so that schools can effectively plan implementation of videoconferencing. School districts implementing videoconferencing can use this study to gain a clearer picture of the support structure necessary for successful utilization of videoconferencing. Trainers and consultants who offer professional development and support for videoconference coordinators can gain a better understanding of how to provide appropriate targeted training and support for the coordinators. School administrators can access this research to guide them in selecting the most appropriate advocate for videoconferencing in their school when they acquire equipment. Vendors selling videoconferencing equipment can use this research to advise schools on the critical components necessary for successful utilization of curriculum videoconferencing.

Definitions and Operational Definitions

This study focuses on the role of the coordinator in supporting videoconferencing as related to the utilization of curriculum videoconferencing in the school. The definitions are organized into two categories. The first category, videoconferencing, includes videoconferencing in general, curriculum videoconferencing, and how utilization of videoconferencing is defined in this study. The second category addresses the coordinator, their ability to support videoconferencing, to integrate videoconferencing in the curriculum, and to work with teachers. In addition, the coordinator section addresses the technical aspects and administrative support that may affect utilization within the school.

Videoconferencing

This section of definitions covers the broad definition of videoconferencing used in this study and specifically the curriculum videoconferencing used in K12 schools. It

also includes the definition of utilization that was compared to the school and coordinator variables in this study.

Videoconferencing Technology

Videoconferencing technology "allows people at two or more locations to see and hear each other at the same time" (AT&T, 2007). This study focuses specifically on IP and ISDN videoconferencing as opposed to web camera and desktop videoconferencing using other protocols.

ISDN Videoconferencing

ISDN videoconferencing "connects through existing phone infrastructure" and had been the most widely used connection (AT&T, 2007) until around 2003.

IP Videoconferencing

IP videoconferencing "uses an internet protocol" named H.323 and can be used on a school's "existing connection to the Internet" (AT&T, 2007). Because of the increased network bandwidth in schools, and the lack of fees associated with ISDN videoconferencing, in the last several years, most schools and content providers have migrated from ISDN to IP videoconferencing.

Curriculum Videoconferencing

Curriculum videoconferencing is a broad term encompassing videoconferences where students connect with museums, zoos, guest experts, authors, other classrooms, and international students for cultural exchanges (Lim, 2007a) as opposed to full-length daily courses or the use of videoconferencing for administrative and professional development purposes. I believe that integrating videoconferencing experiences in the classroom is fundamentally different from daily course delivery via videoconferencing.

Curriculum videoconferencing is not a daily event; over 50 events in a school would be considered frequent use. In a school using it often, one teacher may use it four or five times in a school year. The technology is used to bring a learning experience to the students, instead of as the medium for delivery of a full-length course. The difference is similar to the contrast between using Internet resources to supplement the curriculum and using the Internet to deliver a full course. This study focuses on the specific use of curriculum videoconferencing in the school.

Curriculum videoconferencing is comprised of three main types of instructional events: connecting to content providers, participating in student projects, and creating classroom-to-classroom collaborations.

Content provider

A content provider is an organization such as a museum, zoo, university, or other organization that offers programming to schools. Programming usually consists of 45 minutes to 1-hour lessons that are accompanied by pre- and post-activities (Greenberg, 2003).

Student project

A student project is an "opportunity to learn with another school or classroom" (TWICE, 2007). These projects are

> centrally managed and coordinated by one or more persons. Information about how to participate is provided, dates and times are set, teacher training may or may not be required. . . . Interactions and presentations vary according to level of coordinator and training of teachers and building coordinators. Monster Match and Read Around the Planet are two top rated IVC projects. (Glaser, 2008)

Classroom-to-classroom collaboration

Classroom-to-classroom collaborations are student interactions, sometimes referred to as kid-to-kid collaborations.

> [They] are different from student projects in that a K2K collaboration the entire IVC event begins with an idea from a teacher. Then we find a partner for the teacher. Then we test the equipment. Most classroom collaborations are point-to-point, although not all. The teacher with the beginning idea should also have some idea of what they want their partner class to do. (Glaser, 2008)

Utilization

The utilization of videoconferencing can be defined with three measures. First, the total number of events may include professional development, meetings, connections to content providers, and collaborative projects. The total number of curriculum events that involve students is another useful measure. However, the total events are not easily compared across various sizes of schools. Therefore, dividing these numbers by the number of students in the school would allow for comparison across various sized schools. The third measure used in this study is the percentage of teachers in the school who use videoconferencing. This measure provides a picture of how well videoconferencing has been integrated throughout all grade levels and classes within the school. Utilization was measured by items 18-20 on the survey (see Appendix A). In this study, utilization was compared to demographic variables about the coordinator and the school, the variables on how the coordinator supports videoconferencing, integrates videoconferencing in the curriculum, works with the teachers, relates to the technical aspects, and is supported by administration.

Role of Videoconference Coordinator

The next set of definitions addresses the role and characteristics of the videoconference coordinator that may affect the utilization of videoconferencing. It also

includes the technical aspects and administrative support that may affect the coordinator's work and therefore potentially the utilization of videoconferencing.

Videoconference Coordinator

This study uses the term videoconference coordinator to denote the person responsible for curriculum videoconferencing in the school. Wakefield (1999) uses the term site facilitator to include the roles of technical support, scheduler, liaison, policy enforcer, administrative assistant, teaching assistant, tutor, counselor, and student. This study narrows Wakefield's definition to that of technical support and scheduler and adds the role of advocate and instructional consultant (Straessle, 2000).

This study focuses on five areas of the coordinator's work in implementing videoconferencing in the school: the coordinator's ability to support videoconferencing, to integrate videoconferencing in the curriculum, to work with teachers, how the technical aspects affect their work, and the administrative and technology support structures in place to support the coordinator. These areas are defined in the next section.

Supporting Videoconferencing

This study compared the coordinator's ability to support videoconferencing with the utilization of videoconferencing. This includes several components: their level of comfort with technology in general (Bose, 2007), their comfort level with videoconferencing, and their ability to use the videoconference controls (Wakefield, 1999). It also includes their experience with videoconferencing, the training they have received, their ability to keep track of the scheduling, their ability to conduct test calls and make the connections work, and their ability to help teachers and students with the videoconference (Currie, 2007; Keefe, 2003; Wakefield, 1999). The coordinator's ability to support videoconferencing was measured by items 29-36 in the survey shown in

Appendix A. The instrumentation section in chapter 3 details further how these items are based in the literature.

Curriculum Integration

This study compared the coordinator's ability to integrate videoconferencing in the curriculum with the school's utilization of videoconferencing. This includes a knowledge of the programs available and how they fit the curriculum, the ability to search for and share information about programs, the ability to find and share recommendations by other teachers, the ability to assist in preparing students for the videoconference, and the teachers' understanding of how to use videoconferencing in the curriculum (Keefe, 2003; Wakefield, 1999). Participants were also asked about the type of training they received and whether it included how to integrate videoconferencing in the curriculum. The coordinator's ability to integrate videoconferencing in the curriculum was measured by items 2-3 and 37-40 in the survey shown in Appendix A. The instrumentation section in chapter 3 shows in further detail how these items are based in the literature.

Working With Teachers

This study compared the coordinator's ability to work with teachers with the school's utilization of videoconferencing. This includes the coordinator's perception of teachers' interest in videoconferencing, the teachers' ability to participate in a videoconference on their own, the coordinator's ability to encourage and motivate teachers to use videoconferencing, and helping the teachers make time for videoconferencing in their curriculum (Freed & Lim, 2009). The coordinator's ability to work with teachers was measured by items 41-49 in the survey shown in Appendix A.

The instrumentation section in chapter 3 shows in further detail how these items are based in the literature.

Technical Aspects

There may be some technical aspects of videoconferencing that help or hinder the coordinator in supporting videoconferencing in the school and therefore may affect the utilization of videoconferencing. The technology infrastructure is essential to successful implementation (Keefe, 2003) and includes the location of the equipment (Currie, 2007), the reasons for the location of the equipment, and the level of satisfaction with the current location of the equipment. In addition, the quality of the sound and video in a videoconference can affect the user's satisfaction with the experience (Wegge, 2006). Technical quality in this study is defined by how often the picture freezes or breaks up, and how often the audio is hard to understand. The location of the equipment was measured by items 24-26 and the quality of the videoconference was measured by items 27-28 in the survey shown in Appendix A. The instrumentation section in chapter 3 shows in further detail how these items are based in the literature.

Administrative Support

The coordinator's ability to support videoconferencing may be affected by the support they receive. The support they need includes both administrative support and technical support. In this study, the administrative support includes the availability of technical support, the funding for programming, and the amount of time provided by the school for the coordinator to support videoconferencing (Currie, 2007; Keefe, 2003). It also includes the principal's experience with videoconferencing, and the principal's recommendations that teachers use videoconferencing (Freed & Lim, 2009). The administrative support was measured by items 4-6, 13-17, 21-23, 50-51 in the survey

shown in Appendix A. The instrumentation section in chapter 3 shows in further detail how these items are based in the literature.

Assumptions

A basic underlying assumption is that videoconferencing has the potential to offer engaging and motivating learning experiences for students at all grade levels (Cifuentes & Murphy, 2000b; McCombs et al., 2007; Yost, 2001) Therefore, increased use of videoconferencing is a worthy goal and studying the factors that are related to increased utilization contributes to the body of knowledge. In addition, the videoconference coordinator is key to the successful implementation of videoconferencing. It is possible to relate the behaviors and characteristics of the videoconference coordinator to the utilization of videoconferencing within the school. Studying the videoconference coordinator and other factors within the school provides the knowledge to increase the use of videoconferencing in low-use schools.

General Methodology

The existing studies on the role of the site facilitator or videoconferencing coordinator are qualitative studies that contributed a description of the characteristics of a coordinator (Keefe, 2003; Wakefield, 1999). However, a quantitative study to determine how those characteristics are related to the utilization of videoconferencing has not been done. In the current emphasis on quantitative studies with the No Child Left Behind Act, schools are looking for quantitative data for decision making. This study used a survey measuring the videoconferencing coordinator variables to discover if they can be used to predict the utilization of videoconferencing within the school. The variables examined were the location of the videoconferencing system, the level of technology support, the reliability and quality of the videoconference, the comfort level of the videoconference

coordinator with technology, the coordinator's ability to manage the videoconferencing, the coordinator's perception of administrator support, the coordinator's ability to integrate videoconferencing in the curriculum, and the coordinator's ability to assist teachers in using videoconferencing in the curriculum. A variety of appropriate statistical tools was used to determine the characteristics most likely to predict the utilization of videoconferencing within the school.

Delimitations

Videoconferencing coordinators can be the media specialist, librarian, instructional technology specialist, principal, teacher, paraprofessional, or even a school secretary. The sample for this study was the coordinators who responded to the survey from sending it to approximately 5,500 potential participants on videoconferencing listservs as well as mailing lists that I maintain.

Summary

Curriculum videoconferencing offers the potential of engaging learning experiences as students connect with experts, authors, scientists, and peers worldwide. However, some schools installing videoconferencing equipment have limited utilization. The role and characteristics of the videoconferencing coordinator may be related to the utilization of videoconferencing. Other implementation factors may also be related to the utilization of videoconferencing. This study identified the characteristics of videoconference coordinators in schools that have a relationship with the usage of videoconferencing and analyzed specific factors that may predict the use of videoconferencing in their school.

CHAPTER II

LITERATURE REVIEW

Introduction

The focus of this study is the videoconference coordinator and their influence on the utilization of videoconferencing in the school. This study aims to investigate the coordinator's ability to support videoconferencing, to integrate videoconferencing in the curriculum, to work with teachers, and the technical and administrative issues that may affect the coordinator's ability to support videoconferencing. This study analyzed how these factors may predict the utilization of videoconferencing in the school. Therefore, the literature review examines selected studies on videoconferencing in general and then makes a case specifically for the importance of curriculum videoconferencing as defined by connections with content providers and other classrooms.

After establishing that curriculum videoconferencing provides benefits to student learning, this chapter discusses the studies on implementation of videoconferencing and examines the studies on utilization of videoconferencing. After setting this general background, the specific role of the videoconference coordinator is examined carefully, including the demographics of the coordinator, and the coordinator's ability to support videoconferencing, to integrate videoconferencing in the curriculum, and to work with teachers.

In addition, I review the technology factors, specifically location and quality of the videoconference that may affect the coordinator's ability to support videoconferencing. Lastly, I review the coordinator's access to support. This literature

review lays the foundation for studying the videoconference coordinator's role in the utilization of curriculum videoconferencing in K-12 schools or the rationale for the study.

Videoconferencing

In this section, I examine selected studies from the broad category of videoconferencing, examine educational uses of videoconferencing, review the importance of interaction, and determine the need for further research into why some programs are successful.

Videoconferencing allows people in two or more locations to see and hear each other (BECTA, 2003). This technological tool is used by teachers and administrators in education for meetings (Fiege, 2005) and often for professional development and training (Bore, 2005; Graves et al., 2005; Hartman & Crook, 1997; Kinnear et al., 2002; Pemberton et al., 2004). The most common and traditional use in education is for full-length courses (Booth, 2006; Mitchell, 2005; Royal et al., 2005).

Some creative uses of videoconferencing include school-based telehealth care (Young & Ireson, 2003), supervision of student teaching (Dudding, 2004), recruitment (Chapman, 1999), tutoring (McGinnis, 2001), tele-mentoring (Hung & Tan, 2004), and bringing opportunities to hospitalized (Weiss et al., 2001), homebound (Wong, 2008), and incarcerated students (Gilham & Moody, 2001).

Another type of videoconferencing in schools is curriculum videoconferencing, which includes accessing remote experts and authors from the classroom (Greenberg, 2003; Kettel, 2008; Lim, 2008; McCombs et al., 2007), and engaging in collaborative learning activities with remote classrooms (Cifuentes & Murphy, 2000a; Howland & Wedman, 2003; Szente, 2003; Thurston, 2004; Yost, 2001).

This study focuses specifically on curriculum videoconferencing, or those activities that use videoconferencing to address curriculum goals through engaging interactions with scientists, experts, and peers. It is my belief that there is a fundamental difference between using videoconferencing to deliver full courses and using it to bring curriculum enrichment activities to the classroom. Full-length courses are generally daily videoconferences (Royal et al., 2005), whereas connections to experts and peers may occur only a few times a year (Keefe, 2003). This difference has implications for implementation as well as differing definitions of utilization. Studies on full-course delivery focus on the effectiveness of communication (Coverdale-Jones, 2000; Massingill, 2002), how well the technology works (Slack, 2006), whether students are satisfied (Royal et al., 2005), and how the instructor adjusts to a new medium (Baker, 2002; Gill et al., 2005). These studies do not have a direct connection to the less frequent use of videoconferencing to enrich the curriculum. However, a cursory review of the studies examining the traditional uses of videoconferencing provides a broader context for the research into curriculum videoconferencing in K12 education.

Much of the research discusses the difference between teaching full courses over videoconferencing compared to teaching a face-to-face class (Amirian, 2003; Booth, 2006; Carville & Mitchell, 2001; Ehrlich-Martin, 2006; Furst-Bowe, 1997) and the limitations of using videoconferencing to teach full courses. Limitations include the difficulty of equal interaction for the on-site and remote students (Atkinson, 1999; BECTA, 2003; Booth, 2006; Bore, 2005; Tyler, 1999) and the communication, presentation, and teaching skills of the presenter (Bitterman et al., 2000; Booth, 2006; Bore, 2005; Furst-Bowe, 1997; M. Heath & Holznagel, 2002). Cavanaugh's (1999) meta-analysis of 19 studies with 929 learners found that offering courses to distance learners

"enlarges the course catalog and students' worldview at the same time" (p. 19); however, foreign language is the subject area where distance education courses should be implemented with caution. Some studies (Baker, 2002; BECTA, 2003) found that videoconferencing did not afford any significant distractions from effective classroom practices and therefore using videoconferencing as a mode for delivery of high-school courses is appropriate and deserves serious consideration by curriculum planning personnel. Another study found that videoconferencing is effective as a way to provide educational access to students in remote and rural locations; however, those with a greater need tend to be more tolerant of the medium than those who could get the education in other ways (Carville & Mitchell, 2001).

Interactivity is a theme that emerges throughout the literature (Amirian, 2003) and is critical to successful use of videoconferencing in all situations. In some studies, it is defined as simply the hindrance-free ability to actually communicate with the remote site (Atkinson, 1999; Carville & Mitchell, 2001). However Burke, Lundin, and Daunt (1997) challenged the simplicity of this definition by a study in which the two sites achieved a very high level of spontaneous interaction and were able to maintain it for a long period of time. In other studies, interactivity is defined more broadly to include constructivist methods of teaching and learning (Hayden, 1999; Sweeney, 2007) and asking questions, hands-on activities, and discussion (Haydock & Dennison, 2004). More research needs to be done on the role of interaction in K-12 settings (M. Heath & Holznagel, 2002).

Greenberg (2004) asserts that plenty of research has been done on the pedagogical worth of videoconferencing for learning; however, further research is needed on the economic benefits of reaching students, and the ways that collaboration fosters growth in understanding, assesses the return on investment, and brings to light why some programs

and networks succeed where others do not. This study addresses the latter research need by examining the role of the videoconferencing coordinator in the implementation of videoconferencing.

Curriculum Videoconferencing

Curriculum videoconferencing includes accessing remote experts from the classroom (Greenberg, 2003; McCombs et al., 2007) and engaging in collaborative learning activities with remote classrooms (Cifuentes & Murphy, 2000a; Howland & Wedman, 2003; Szente, 2003; Thurston, 2004; Yost, 2001). Newman, Falco, Silverman, and Barbanell (2008) add the further definition of multi-point videoconferencing and electronic field trips shared with a wide audience and including limited interaction. A recent book of interactive lessons includes connections to content providers, student-created content, and collaborative projects for all grade levels (Ray & Zanetis, 2009). Although there are anecdotal articles, informal case studies, printed lesson plans, and project evaluations for K12 videoconferencing, there are few research studies specifically on the use of curriculum videoconferencing in K12 schools (Anderson & Rourke, 2005). This section examines the literature on the use of videoconferencing to connect to content providers and using videoconferencing for projects and collaborations with peers and international classrooms.

Content Providers

Content providers are organizations or groups that offer specialized content to schools. The programs can include virtual field trips, visits with experts, and cultural exchanges organized by educational organizations (Greenberg, 2003).

The studies make conflicting claims on the direct impact of content-provider programs on student achievement. Cavanaugh (1999) conducted a meta-analysis of 19

studies with 929 learners and found that "supplementing traditional instruction with distance education can enable more reality-based learning, with possible achievement gains" (p. 18). However, Anderson and Rourke (2005) suggest that the literature on how videoconferencing impacts student achievement is lacking and inconclusive.

In another conflicting example, one study focused on a content provider which offered 1-hour interviews with people from other cultures. Lee (2004) found that while the programs offered students an introduction and exposure to people from other cultures, their understanding of the other cultures was shallow and stereotypical. On the other hand, anecdotal evidence (Morrison & Macquart, 2006) suggests that when done well and accompanied by preparation and post-activities, the connections can increase empathy and understanding for people in other cultures and countries (Naruse et al., 2003).

A recent study comparing synchronous and asynchronous interactions with scientists found that while student learning was equal in both interactions, the students who interacted asynchronously were more thoughtful and reflective in their questions. The students who participated in synchronous interactions were more interested in the scientist as a person than the study at hand (Kubasko et al., 2007). Yet in another study, students of mathematics benefited from interacting with people who use math in daily life (Gage et al., 2002). Sixty percent of the students in the study indicated that they felt more confident about their math skills. NASA finds that videoconferencing is an effective way to inspire the nation's next generation of scientists (Petersen et al., 2003; Townes & Caton, 2003). Research on Project View found that students do have "gains in test scores, more in-depth use of resources" and more knowledge retention (D. Newman et al., 2004). Further research comparing students receiving videoconferencing experiences and those

not receiving the experiences found that videoconferencing resulted in higher cognitive indicator scores, with students more highly motivated to learn and more interested in learning (D. Newman, 2008). These studies suggest that curriculum videoconferencing may motivate, inspire, and engage students, but may not have a measurable impact on student achievement.

While the impact on student achievement may be inconclusive, there are clear benefits to gaining access to experts. In 1996-1998 teachers in Ohio created lesson plans and action research projects to integrate community resources such as the Zoo and Center of Science and Industry in the curriculum. They found that videoconferencing allowed students and teachers direct access to specialists (M. Burke, Beach, & Isman, 1997).

An early content-provider study was on a 128K ISDN connection from Colorado to New Jersey. Students accessed scientists in New Jersey over a 3-4-week period and the researcher concluded that the students' understandings of science and the work of scientists increased as a result of the contact with scientists (Shaklee, 1998). Bringing these experts to the classroom is beneficial to teachers who may lack knowledge or experience in a particular subject (Merrick, 2005). The cost savings of a videoconference may be around $400 or more when compared to traveling by bus to visit the same museum (Pachnowski, 2002). A more recent evaluation of Mote Marine Laboratory's videoconference programs found that videoconferencing offers students the opportunity to interact with real scientists, which motivates student learning and encourages interest in science (Ba & Keisch, 2004). An evaluation of Vanderbilt University's program, which allows students to interview scientists and other experts, found that videoconferencing can bridge the gap between formal textbook learning and real-world science (McCombs et al., 2007). Videoconferencing also allows content providers to

bring their message and resources to K-12 schools (J. Heath & Niepold, 2005; WMHO, 2002).

The motivation and access to real-world practitioners is effective in the mathematics curriculum (Gage et al., 2002) as well as higher education contemporary studies in tourism (Lück & Laurence, 2005). Teachers' lesson plans incorporating videoconference content demonstrate instruction in higher level thinking skills, structured discussion, and inquiry-based learning (D. Newman et al., 2006). These studies represent only a small portion of over 250 content providers (AT&T, 2006; BerrienRESA, 2009b; CILC, 2008), offering interviews with scientists and programs by biologists, field researchers, and educational specialists. Whereas benefits to student learning are emerging in the literature, additional research needs to be done on the use and effectiveness of content-provider programs in the K-12 curriculum.

Projects and Collaborations

Many of the studies on curriculum videoconferencing are descriptions and studies on classroom-to-classroom collaborations, where teachers collaboratively design one or more activities for their students to participate via videoconference (Anderson & Rourke, 2005; Glaser, 2008). Projects, those classroom-to-classroom events coordinated by an individual or organization, are represented in opinion articles only (Glasgow & Zoellmer, 2003; Lim, 2003). Collaborations may take the form of a joint seminar, with the two classes meeting regularly for interaction (Martinez & MacMillan, 1998), or shorter one-time videoconference exchanges. Other collaborations are between classrooms and the community (Rockman, 2002), or classrooms and pre-service teachers (Rogers & Jones, 1999).

Many benefits can be found in these collaborations. Students may be challenged to identify their biases and learn from other viewpoints (Martinez & MacMillan, 1998). Sustained, multi-connection collaborations can bring greater cultural understanding (Sembor, 1997) and increased student self-concept (Cifuentes & Murphy, 2000a), a broader understanding of the content (Berson et al., 2006), and interpersonal interaction with students in another culture or country (Howard-Kennedy, 2004; Jones & Sorenson, 2001; Solvie, 2003).

A collaboration with the intention of increasing students' understanding of French uncovered complications in the difference between spoken and written French, which made the collaboration difficult. However, students learned significantly from reviewing the videotapes of the interaction and analyzing the conversation with teacher assistance (Kinginger, 1999). Other language studies found that with sustained language practice collaboration, students made positive changes in attitudes towards the language and increased their confidence with the language (Butler & Fawkes, 1999; Xiao & Yang, 2005). C. Burke et al. (1997) found that a dialogical approach in multicultural exchanges encourages more interaction between learner and learner.

Even young elementary students benefited from sustained classroom-to-classroom collaborations and interactive videoconferencing (Piecka, 2008; Yost, 2001); however, age 4 may be too young for videoconferencing (Siraj-Blatchford & Siraj-Blatchford, 2001). During in-depth community problem-based learning experiences, high-school students used data more frequently, accurately, and persuasively in their projects to effect change in the community. They also learned and exhibited better problem-solving skills and communication skills (Rockman, 2002; Sedlacek et al., 2005). A study of special-needs students collaborating across Wales found that the students were more motivated

and focused on the learning activities (Thorpe, 1998). Clearly collaborations can make a significant impact on engaging students in learning experiences.

The limitation of most of these studies is that they study one teacher in a school doing one collaboration whereas some schools in this study are participating in many events with many locations. Further research is necessary to examine the videoconferencing support necessary to sustain these types of collaborations throughout the school year and to involve a larger percentage of the teachers.

Implementation of Videoconferencing

A few studies have begun to examine the effective implementation of videoconferencing. Baber (1996) offers the Culture-Process-Technology approach as a framework for the successful implementation of videoconferencing in the corporate environment. The framework recommends:

> (1) that organizations should ensure that managers at all levels are willing to support the implementation process; (2) that videoconferencing "champions" be found to administer the system at the project level; (3) that operator training programs be developed to create a wide base of skilled end users; (4) that conference schedules be published regularly to inform end users of meeting times and to sustain ongoing interest in videoconferencing; and (5) that use of videoconferencing system features be consistently modeled to encourage the use of innovation and the re-invention of technology. (p. 128)

Baber's essential components are evidenced in the literature as well. First, leadership support is critical (Ely, 1999). One of Owston's (2007) essential conditions for the sustainability of classroom innovation is that of administrative support. In addition, Currie's (2007) study of videoconferencing within three regional service agencies in Michigan found that support of the administration was important for successful implementation of videoconferencing. Keefe (2003), in a case study of one elementary school implementing videoconferencing, found that important components of a

successful program included support from the technology committee and a collaborative decision-making process within the school. Supportive plans and policies and support from within the school are a contributing factor to the sustainability of technology innovation (Owston, 2007).

Second, the videoconference champion is key to the implementation of videoconferencing (Baber, 1996; Owston, 2007). Keefe (2003) found that the ability of the coordinator to assist teachers in integrating the technology in the curriculum was critical.

Baber's (1996) framework also suggests the need for operator training and modeling the use of videoconferencing features. Keefe (2003) suggested that the coordinator has an important role in staff development for new and experienced teachers. Currie's (2007) study of the implementation factors at the educational service agency level found that access to, awareness of, and actual participation in professional development was important in the success of the program. Bose (2007) studied the teacher, school, and professional development factors affecting the utilization of videoconferencing and found that professional development factors were important to predicting the use of videoconferencing. Teacher professional development is critical to introducing new skills, unlearning beliefs about students or instruction, and integrating the innovation into their practice (Owston, 2007).

Finally, Baber's (1996) framework suggests the need for a system for scheduling. This is another important role of the videoconference coordinator. Currie (2007) suggested that personnel at the local level to coordinate and schedule videoconferences is important to the success of the program. The coordinator's proximity to the needs of the

school makes this person key to scheduling and promoting the use of videoconferencing in the school (Drescher et al., 2005).

Important implementation factors not addressed by Baber's framework (1996) include access to the videoconferencing equipment, the cost of programming, the availability of programming offered by the regional service agency (Currie, 2007), and time, resources, and commitment to the project (Ely, 1999).

Because this study focuses on the role of the coordinator, Baber's framework (1996) was adapted to focus on the coordinator. Owston's model (2007) was also adapted to focus on the coordinator and factors affecting utilization. Baber's (1996) "management support" and Owston's (2007) administrative support and support from inside and outside the school were defined in this study as financial, technical, and administrative support for the coordinator. Baber's (1996) "modeling of videoconference features, scheduling, and professional development" is included in Baber (1996) and Owston's (2007) definitions of the role of the "champion" (coordinator). The role and characteristics of the "champion" (coordinator) were divided into the coordinator's ability to support the videoconferencing, to integrate videoconferencing in the curriculum, and to work with teachers. Additionally, in this study the location of the equipment and the quality of the videoconference were examined as variables that may affect the coordinator's ability to successfully guide the implementation of videoconferencing.

Utilization

While a few key studies examine the implementation of videoconferencing in K-12 schools, the exact nature of a successful implementation is not defined. Implementation could be defined as using the instructional strategies properly

(McDonald, 2007). However, since the field of curriculum videoconferencing is so new, this study focused specifically on utilization. Given that curriculum videoconferencing brings benefits to the educational experience (M. Burke et al., 1997; Fee & Fee, 2005; D. Newman et al., 2004), it is logical to attempt to increase the use of videoconferencing, especially when schools invest thousands of dollars to install equipment. Therefore, this study examined factors that can predict utilization.

Only two studies were found that examine utilization of curriculum videoconferencing. Currie (2007) studied the factors that impact videoconferencing within three regional service agencies in Michigan. His study examined overall usage including full-length course delivery and curriculum videoconferencing. Not surprisingly, the regions with full-length courses were using videoconferencing daily, whereas the schools under the service agency without full-course delivery were using it less often. A more fair comparison would examine only one type of videoconferencing. The nature of curriculum videoconferencing dictates that it will not be used daily; whereas the nature of full-course delivery suggests a very high likelihood of daily use of videoconferencing. Nevertheless, Currie's study uncovered some important factors for implementation that were examined in further detail in this study.

Another study by Bose (2007) examined the utilization of videoconferencing for professional development for teachers. The study examined school characteristics, professional development characteristics, and teacher characteristics, and found that the teacher characteristics were more useful predictors of utilization. While this study focused on professional development via videoconferencing, the methods are similar to this study of utilization of curriculum videoconferencing and therefore provide some insights and understanding.

Clearly there is a need to further investigate the implementation and specifically the utilization of curriculum videoconferencing in K-12 schools. This study begins to address that need.

Demographic Variables of the School

This section begins to address the variables involved in utilization in this study. The demographic variables of the school are not central to the study, but may show factors that influence the implementation of videoconferencing and therefore are included here.

The three major implementation studies examine some of the relevant school demographic variables. Currie (2007) examined the size of the school districts served and the socio-economic homogeneity of the school districts and found that these factors did not impact the success of the videoconferencing program. Keefe's (2003) case study focused on a school in a wealthy area with rich educational resources available to the school; however, in my pilot study I found that the schools with higher National School Lunch Scores used videoconferencing more than the schools with lower National School Lunch Scores (Lim, 2007b). National School Lunch Scores are a recognized measure of poverty in schools. Bose examined the school's state in adoption of technology, number of teachers trained, school size, expenditure per pupil, and school location and found that these variables did not predict utilization (Bose, 2007). An additional variable included in my pilot study found that elementary schools used videoconferencing more than secondary schools (Lim, 2007b). While Bose, Currie, and Keefe addressed some of the school demographic variables, research still needs to examine the relationship between these variables and the utilization of curriculum videoconferencing.

Other factors not found in the literature include the racial makeup of the school, and the population of the town where the city is located. These were included in this study to obtain a broader picture of schools implementing videoconferencing.

The Role of the Videoconference Coordinator

A few studies have examined or mentioned the important role of the videoconference coordinator in a successful implementation of videoconferencing. Keefe's case study (2003) on one elementary school implementing a video learning center emphasized the necessity of a trained coordinator to support the teachers and make the connections. Wakefield's survey of 27 site facilitators (coordinators) on two videoconferencing listservs found that the roles of technical expert, instructional assistant, liaison, scheduler, and trainer were "a crucial part of the system in videoconferencing" (Wakefield, 1999, p. 49). Hedestig and Kaptelinin (2005) agree that the roles of technician, coach, coordinator, administrator, and teacher's assistant are all part of the facilitator's contribution to successful learning. Currie (2007), who studied three regional service agencies in Michigan, recommended that school districts provide an individual who is in charge of facilitating videoconferences and can assist teachers in using videoconferencing in the curriculum. Bose (2007) found that the participant's prior confidence level with technology was a critical predictor of their utilization of videoconferencing. In addition, other studies have mentioned the role of the videoconference coordinator in making the videoconference successful (Ba & Keisch, 2004; Baber, 1996). Badenhorst and Axmann (2002) suggest that "there is justification for support personnel to maintain and run the equipment and leave the educators free to concentrate on the learning process" (p. 297). These studies suggest the importance of the

videoconference coordinator and their role in a successful implementation of curriculum videoconferencing.

This study examines specific characteristics of the videoconference coordinator: the demographics of the coordinator, the coordinator's ability to support videoconferencing, to integrate videoconferencing in the curriculum, and to work with teachers. In addition, the technology factors of location and quality of the videoconference are examined with the perspective of how these factors affect the coordinator's ability to support videoconferencing. Finally, the role of technical, financial, and administrative support for the coordinator is addressed.

Demographic Variables of the Coordinator

While Wakefield's (1999) study examines the site facilitator (coordinator) roles, no demographic variables were collected. Wakefield emphasizes the necessity of training and the method the training was delivered, but does not examine the type of training. Wakefield hinted that the position and other responsibilities of the facilitator may be important, but did not examine these factors in detail.

Clearly the site facilitator (coordinator) is important to the success of videoconferencing, but additional demographic information needs to be studied. This study included the gender, race, age, and level of education, as well as the job title, years of experience in education, years of experience in videoconferencing, and time commitment to videoconferencing. These variables were not found in the literature. To further examine the importance of training, the hours of training received were collected as well as what type of training was received, meaning mostly technical training or mostly curriculum integration training.

Educational Service Agency Support

In many counties, educational service agencies provide support, grant funding, and technical infrastructure for videoconferencing. Some agencies facilitate programming for their schools, others subsidize programs from content providers, and others provide only technical support. Currie (2007) suggests that educational service agencies should offer programming for their schools. However, the relationship of educational service agency support to the school's use of videoconferencing has not been studied. It may be that certain activities by educational service agencies are more effective in successful implementation of videoconferencing in schools.

These administrative and technical supports for the coordinator or site facilitator are important, but have not been studied to discover their relationship to the utilization of videoconferencing in the school.

The Coordinator's Ability to Support Videoconferencing

Many skills and abilities are included in this category of supporting videoconferencing. Bose (2007) found that the comfort level with technology in general was an important predictor of utilization of videoconferencing. Wakefield (1999) found that the most prominent role of the site facilitator was that of technical expert, which includes comfort with videoconferencing, the use of the controls, conducting test calls, and the ability to make the connection work. The ability to stay during the videoconference as well as explain the videoconference technology to the students is another important part of supporting videoconferencing. Several studies found that the mediator (coordinator) at the remote site can help the learners by interfacing with the technology and modeling appropriate participation (Atkinson, 1999; Carville & Mitchell, 2001; Wakefield, 1999). In addition, a working system for scheduling videoconferences

is a critical component of successful implementation (Baber, 1996; Wakefield, 1999). Each of these components is included in this study's definition of the coordinator's ability to support videoconferencing.

The importance of the coordinator's ability to support videoconferencing is represented well in the literature, but further research is necessary to determine if this ability predicts the utilization of videoconferencing in the school.

The Coordinator's Ability to Integrate Videoconferencing in the Curriculum

Integration of any technology in the curriculum requires a thorough knowledge of the possibilities, the curriculum, and methods of preparing and engaging students in the lessons. Studies show preparation is important in videoconferencing as well. Pre-planning and preparation for the videoconference are critical to success (Amirian, 2003; Cifuentes & Murphy, 2000a; Kinginger, 1999; Moss et al., 1997). In addition, connecting videoconferencing to the course curriculum can provide a rich and educational experience for students as well as opportunities for situated learning and construction of knowledge (Fee & Fee, 2005). Preparation of the students is important too. Students have varying levels of interest and motivation for using videoconferencing; and some students even react badly to the technology (BECTA, 2003; Tyler, 1999). Therefore it is important that the coordinator be able to assist students by orienting them to the technology and modeling appropriate participation (Arnold et al., 2004; Atkinson, 1999). The coordinator also needs to know how to find and select appropriate content for the curriculum (Greenberg, 2003).

The literature shows the importance of the coordinator's ability to integrate videoconferencing in the curriculum; however, research is needed to determine if this

characteristic of the coordinator is important in predicting the schools' utilization of videoconferencing.

The Coordinator's Ability to Work With Teachers

Teachers need support to participate in videoconferencing and to integrate new strategies in their teaching (Arnold et al., 2004; Elliott, 2003). The faculty need assistance with using the technology and adapting their teaching for videoconferencing (Amirian, 2003). Technology leadership includes encouraging teachers to use the educational technology tool (Matthews, 2002). Units of instruction that involve multiple videoconferences and a significant amount of preparation can be challenging for teachers due to the constrictions on the curriculum schedule due to high stakes testing (Gage et al., 2002). Sweeney (2007) found that teachers were more likely to use videoconferencing if they had a constructivist approach to learning. In addition, teachers' own response to various technologies plays a major role in whether they use videoconferencing or not (Collis et al., 2000). Even though the teachers may see the benefit of the videoconference, they may struggle to find time for the videoconferences. A coordinator assisting with preparation and technology can make it easier for teachers to participate in videoconferences. Bose (2007) found that teacher and professional development characteristics were useful to predict utilization of videoconferencing. To work with teachers, the coordinators or educational technology leaders need to have a good relationship with the teacher, use interpersonal skills (Aten, 1996), and use their referent power to encourage teachers to use videoconferencing (French & Raven, 1959).

It is clear from the literature that the coordinator needs to be able to support teachers as they integrate a new technology; however, research needs to be done to determine if this characteristic predicts the level of utilization in the school.

The Coordinator and the Technology Aspects

This section examines two specific technology factors that may hinder the coordinator's ability to support videoconferencing in the school. Those factors are the quality of the videoconference and the location of the videoconference equipment.

The quality of the videoconference can affect the user experience. Low or unreliable bandwidth can make videoconferencing unreliable for educational purposes (Anderson & Rourke, 2005; BECTA, 2003). It is likely that the quality of the audio or video in the videoconferencing predicts utilization, but this has not been studied for K-12 curriculum videoconferencing.

In addition, access to the videoconferencing technology is essential (Anderson & Rourke, 2005). The location of the system may affect access by teachers and the coordinator. Convenient access to videoconferencing is important for successful long-term collaborations (Abbott et al., 2004; Wideman et al., 2004). A study is needed to understand how the location of the videoconferencing equipment was decided, to evaluate the satisfaction with the location, and to determine which of these factors predicts utilization.

Administrative, Financial, and Technology Support for the Coordinator

As coordinators attempt to support videoconferencing in their schools, it is important that they are also supported with technical and administrative support. Baber's framework (1996) suggests that managers have a key role to supporting the implementation of videoconferencing. They provide motivation for people to use videoconferencing and also create the administrative structure for actually implementing videoconferencing. The lack of consistent administrative support in one of the sites in Baber's study led to failures in the cultural, process, and technical components of the

implementation. Anderson and Rouke (2005) agree that leadership and a vision for all participants is an important key to success. Strong support at the school level is an important component of implementation (Abbott et al., 2004). Specifically, that support should include a budget for videoconferencing (Currie, 2007), principal support for videoconferencing, as well as a technology infrastructure to support videoconferencing (Falco, 2008; Keefe, 2003; Wideman et al., 2004).

Summary

The literature suggests many important issues for the implementation of videoconferencing; however, these issues have not been systematically studied in relation to the utilization of curriculum videoconferencing in K-12 schools. The role of the videoconference coordinator and their ability to support videoconferencing, integrate it in the curriculum, and work with teachers is evidently critical to the successful implementation of videoconferencing. In addition, technical and administrative support factors are likely important factors to the implementation of videoconferencing. Recent studies have just begun to analyze the utilization of videoconferencing in schools (Bose, 2007; Currie, 2007), and further research is necessary to add to the body of knowledge.

The research on curriculum videoconferencing is still new and inconclusive (Anderson & Rourke, 2005), therefore much more research needs to be done. School administrators may see the benefits and value of curriculum videoconferencing for meeting educational goals, but they need assistance in designing a successful implementation (Anderson & Rourke, 2005; Baber, 1996; Keefe, 2003). This study attempted to fill part of that need by investigating the videoconference coordinator and their role in promoting the utilization of curriculum videoconferencing.

This chapter briefly examined the literature on videoconferencing and curriculum videoconferencing. Then the review summarized the literature on the implementation of videoconferencing, and detailed the role of the videoconference coordinator. In each area, the need for the research in this study was shown. In the next chapter, the methodology for the study is described.

CHAPTER III

METHODOLOGY

Introduction

This chapter describes the methodology that was used in this study. The study is an *ex post facto* study, examining the coordinator variables in relationships to the utilization of videoconferencing. This chapter reviews the research design, the population and sample, the instrumentation, and the procedures to be used in this study.

Research Design

The research design that was used in this study is *ex post facto*. This research is "initiated after the independent variable has already occurred or the independent variable is a type that cannot be manipulated" (I. Newman et al., 2006, p. 99). The independent variables in this study include the school and coordinator demographics and the characteristics of the coordinator, which are the variables that have already occurred or cannot be manipulated. In addition, the dependent variable in this study, the measure of the videoconferences the school participated in during the year preceding the survey, has also already occurred. Inferences were made about the relationships among the variables without direct intervention from "concomitant variation of independent and dependent variables" (Kerlinger, 1973, p. 379). The variables of utilization and the coordinator and school characteristics could not be manipulated as they would be for an experimental design.

Since *ex post facto* research contains assigned variables, it can only be used to demonstrate relationships, not causation. Causation can only be demonstrated from experimental design. "In *ex post facto* research, causation is sometimes improperly inferred because some people have a propensity for assuming that one variable is likely to be the cause of another because it precedes it in occurrence" (I. Newman et al., 2006, p. 101).

While causation cannot be inferred from this research, it is possible to extend the study of the relationships between variables to determine which variables predict the usage of videoconferencing. Without an experimental research design, it is not possible to conclude that a predictor variable caused the result.

The three major weaknesses in conducting a study using *ex post facto* research are "(1) the inability to manipulate independent variables, (2) the lack of power to randomize, and (3) the risk of improper interpretation which is due to lack of control" (Kerlinger, 1973, p. 390).

Even though this study is *ex post facto* in nature, it is guided by the hypotheses in this chapter and by past research. It contributes to a greater understanding of the relationships between the role of the coordinator and other implementation factors and the school's use of videoconferencing, even though those factors are not determined to cause successful implementation.

Description of the Population

Videoconferencing coordinators can be the media specialist, librarian, instructional technology specialist, principal, teacher, paraprofessional, or even a school secretary. This study used four potential participant sources and the snowball sampling method (O'Leary, 2005) to access approximately 5,500 coordinators and therefore to

achieve a wide response to the survey. This large population size was necessary due to the number of variables to be examined and to ensure an adequate response to the survey.

The first source of participants was the approximately 70 videoconference coordinators in two counties in southwestern Michigan where I support videoconferencing. Half of these participants are currently participating in a United States Department of Agriculture Rural Utilities Services Distance Learning and Telemedicine Grant. These participants have agreed to participate in evaluations and surveys related to the grant. The other half of these participants have been coordinating videoconferencing in their schools for the past several years.

The second source of 4,400 participants is five videoconferencing listservs. It is likely that the participants on these listservs overlap. Coordinators around the world use these email mailing lists to find content, projects, and partners for collaborations. Two Way Interactive Connections in Education (TWICE), Michigan's K12 videoconference organization, has a listserv with 290 educators. The Collaboration Collage, hosted by AT&T Knowledge Network, is the oldest and largest videoconferencing listserv with 2,300 subscribers as of November 2007. The K12 IVC listserv, hosted by Northwest Regional Educational Laboratory, has 300 subscribers (see Appendix D). The Megaconference Jr. listserv has 30 subscribers and has more Internet2 and international sites represented on the listserv. The fifth listserv is the Center for Interactive Learning and Research's mailing list, with 1,500 subscribers. See Appendix D for the permissions acquired to access these listservs. Other research studies have used one listserv to find survey participants with a relatively low response rate (Sweeney, 2007; Wakefield, 1999), whereas the wider distribution in this study gained a broader response.

The third source of 500 participants is my own mailing lists. One mailing list is for 150 past participants in the geography project called MysteryQuest that I have facilitated annually since 2002. Another mailing list is the 114 participants who have participated in my two online classes on using curriculum videoconferencing. The third mailing list is the 60 participants who have attended my National Educational Computing Conference Best of the Best workshop titled Developing Quality Collaborative Videoconference Projects offered in 2006 and 2007. The fourth mailing list is the 84 participants in a collaborative multi-state videoconferencing workshop titled 123 VC: Jazzing Up Your Curriculum with Videoconferencing. The fifth source is my collection of about 100 people who coordinate videoconferencing in various states, Canadian provinces, and countries. These coordinators have emailed me in the past to ask questions about videoconferencing or have been partners on collaborative projects. Each of these lists was then carefully reviewed to send the survey to coordinators only and not the teachers on the lists.

I also requested the TWICE board to access the coordinators for the international videoconference project, Read Around the Planet (see Appendix D). There are approximately 450 coordinators in the database from the 2008 Read Around the Planet project. In addition, I emailed the Read Around the Planet Verification Partners to request that they forward the survey to their local listservs. The Verification Partners are usually state or provincial level videoconference support staff and have the ability to send the survey to an estimated 200-300 school-level videoconference coordinators.

Each of the coordinators described likely is using videoconferencing to connect to content providers and for collaborative projects, which are the main uses included in curriculum videoconferencing. So while they may have a wide range of utilization and

measures on the research variables, their schools are likely using videoconferencing in similar ways to meet curriculum goals.

Newman and McNeil (1998) suggest that to gain a 90% confidence level, 259 responses are needed from a population of 6,000. This study aimed to acquire a sample size of 259, and this was achieved. The initial response to the survey was from 310 participants in eight countries and 33 U.S. states. However, 33 of the cases did not have complete utilization scores; therefore the final number of participants in this study was 277 in six countries and 31 U.S. states.

Variables

The variables for this study are organized into the following categories: utilization scores, demographic data on the school, demographic data on the coordinator, variables on the support structure in place for the coordinator, variables on technical aspects that may affect the coordinator's work variables on the coordinator's ability to support videoconferencing, variables on the coordinator's ability to integrate videoconferencing in the curriculum, variables on the coordinator's ability to work with teachers, and variables on the coordinator's perception of principal support.

Utilization

Each of the predictor variables was compared with the dependent variable of the utilization score to determine a potential relationship. These measures were used to find and determine utilization as criterion variables.

1. *Total videoconference events:* This variable included all videoconference events (content providers, expert interviews, connections to peer classrooms, professional development, and meetings). Respondents were instructed not to count test calls or every

session where students participated in daily course delivery. This variable was coded as continuous data.

2. *Total student videoconference events*: This total includes all videoconference events where students participated (content providers, author and expert interviews, and connections to peer classrooms). Respondents were instructed not to include daily course delivery. This variable was coded as continuous data.

3. *Number of teachers who used videoconferencing with their students during this school year:* This variable was used to calculate percentage from the total number of classroom teachers collected earlier. This variable was coded as continuous data.

School Demographic Variables

The following demographic data were collected about the school. These variables were compared with the utilization of videoconferencing in the school.

1. *School level* (elementary, middle school, secondary): Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each level is a separate variable coded as 0 if not and 1 if yes.

2. *Number of classroom teachers:* This variable was coded as continuous data.

3. *Number of students as a measure of the size of the school:* This variable was coded as continuous data.

4. *Population of the town or city where the school is located:* This number is a measure used by the USDA RUS DLT Grant. This variable was coded as continuous data.

5. *National School Lunch Program scores:* This score is a measure of poverty in

the school. This question was asked in two parts: Do you know the NSLP score for your school? If not, please enter your best guess. The NSLP score was coded as continuous data.

6. *Racial make up of the school* (predominantly Caucasian, predominantly African American, predominantly Hispanic, predominantly Asian, mixed): Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each race is a separate variable coded as 0 if not and 1 if yes.

Coordinator Demographic Variables

The following demographic data were collected about the coordinator. These variables were compared with the utilization of videoconferencing in the school.

1. *Gender of the coordinator*: Zoomerang coded these as 1 or 2 but the data were recoded for analysis so that each gender is a separate variable coded as 0 if not and 1 if yes.

2. *Race of the coordinator* (Caucasian, African American, Hispanic, Asian, mixed): Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each race is a separate variable coded as 0 if not and 1 if yes.

3. *Age of the coordinator as a whole number:* This variable was coded as continuous data.

4. *Level of education* (High School, 2 Years College, 4 Years College, Master's Degree, and Postgraduate Degree): Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each level is a separate variable coded as 0 if not and 1 if yes.

5. *Country and state/province:* Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each country and state is a separate variable coded as 0 if not and 1 if yes.

6. *Job title of the coordinator:* Participants could select more than one. Choices were Media Specialist/Librarian, Paraprofessional, Secretary, Teacher, Technology Specialist, Principal/Administrator, District Videoconference Coordinator, Regional Videoconference Coordinator. Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each job title is a separate variable coded as 0 if not and 1 if yes.

7. *Years of experience in education:* This variable was coded as continuous data.

8. *Years of experience with videoconferencing:* This variable was coded as continuous data.

9. *Time commitment to videoconferencing:* Full-time videoconference coordinator, part-time videoconference coordinator, videoconference coordinator on top of regular job, and other. Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each level of time commitment is a separate variable coded as 0 if not and 1 if yes.

10. *Hours of videoconference training received:* This variable was coded as continuous data.

11. *Type of training received:* Choices were: Mostly technical training, mostly technical training with some curriculum training, mostly curriculum training with some technical training, and mostly curriculum training. Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each type is a separate variable coded as 0 if not and 1 if yes.

Educational Service Agency Support

Several of the variables collected information about the support the school may receive from an educational service agency.

1. Do you receive videoconference support from a consortium or educational

service agency (BOCES, ESC, IU, ISD, RESA, etc.)? This variable was coded as 0 or 1.

2. Does your educational service agency create and facilitate free programming for your school? Zoomerang coded these as 1 or 2 but the data were recoded for analysis with 0 as no and 1 for yes.

3. Does your educational service agency subsidize programming from content providers? Zoomerang coded these as 1 or 2 but the data were recoded for analysis with 0 as no and 1 for yes.

4. Estimate what percentage of the student videoconference events this year were provided or facilitated by your educational service agency. This variable was coded as continuous data.

Coordinator's Ability to Support Videoconferencing

Items 29-36 in the survey addressed the coordinator's ability to support videoconferencing. The items are described in detail in the instrumentation section and listed in Appendix A. The variables measured the coordinator's comfort level with technology in general, the coordinator's comfort level with videoconferencing, their use of the videoconference remote controls, the ability to schedule videoconferencing, the ability to make test calls, the ability to make the connection work on their own, the ability to stay with teachers during the connection, and the ability to explain videoconferencing to the students. These items were coded as continuous data.

Curriculum Integration

Items 37-40 on the survey addressed the coordinator's ability to integrate videoconferencing in the curriculum. The items are described in detail in the instrumentation section and listed in Appendix A. They include questions on the

coordinator's knowledge of appropriate programs, ability to find programs, and ability to assist the teachers in preparing the students. These items were coded as continuous data.

Working With Teachers

Items 41-43 in the survey addressed the coordinator's ability to work with teachers. The items are described in detail in the instrumentation section and listed in Appendix A. The items include measurements of the coordinator's ability to motivate and encourage teachers, and their ability to help teachers find time to integrate videoconferencing in the curriculum. These items were coded as continuous data.

Teacher Attitudes

Items 44-49 in the survey addressed the coordinator's perception of the teachers' attitudes towards videoconferencing. The items are described in detail in the instrumentation section and listed in Appendix A. The items include whether the teachers can design activities for their curriculum, the attitudes of the teachers towards videoconferencing, the teachers' experience with videoconferencing, the teachers' ability to plan ahead to incorporate videoconferencing in their curriculum, the teachers' ability to make time for videoconferencing, and their ability to operate the videoconferencing system. These items were coded as continuous data.

Technology Aspects

Items 24-28 on the survey address technical aspects that may help or hinder the coordinator's ability to support videoconferencing. The items are described in detail in the instrumentation section and listed in Appendix A. The items include the quality and reliability of the videoconference as measured by the coordinator's perception of the video quality and the audio quality measured by items 27-28 in the survey as shown in

Appendix A. These items were coded as continuous data. This section also included the following variables in a section analyzing the impact of the location of the equipment (items 24-26).

1. *Location of the videoconference equipment:* Choices provided were mobile within one school, mobile within more than one school, fixed classroom, media center/library, computer lab, conference room, and multiple systems in multiple locations. Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each location is a separate variable coded as 0 if not and 1 if yes.

2. *Level of satisfaction with the current location of the equipment*: These items were coded as continuous data.

3. *Reason for the location of the equipment*: technical reasons (wires, switches, networking, etc.), or proximity to coordinator, or only available room, and other. Zoomerang coded these as 1, 2, 3, but for analysis they were recoded so that each reason is a separate variable coded as 0 if not and 1 if yes.

Administrative Support

Items 5-6, 13-17, 21-23, and 50-51 on the survey address the administrative and technology supports that are in place to help the coordinator support videoconferencing. The items are described in detail in the instrumentation section and are listed in Appendix A. This section includes the level of school budgeting for videoconferencing, the principal's experience with videoconferencing, and the principal's support of videoconferencing, as well as the availability of technical support where there are problems, and the amount of time provided to support videoconferencing. These items were coded as continuous data.

Each of these variables was analyzed against the utilization scores to determine whether a relationship exists or if any of the variables or combinations of the variables can be used to predict utilization.

Research Hypotheses

Hypothesis 1: There is a significant relationship between one or more of the demographic variables of the school and the school's utilization of videoconferencing.

Hypothesis 2: There is a significant relationship between one or more of the demographic variables of the coordinator and the school's utilization of videoconferencing.

Hypothesis 3: There is a significant relationship between one or more of the educational service agency support variables and the school's utilization of videoconferencing.

Hypothesis 4: There is a significant relationship between the administrative, financial, and technology support structures and the school's utilization of videoconferencing.

Hypothesis 5: There is a significant relationship between the technical aspects of videoconferencing and the school's utilization of videoconferencing.

Hypothesis 6: There is a significant relationship between the coordinator's ability to support videoconferencing and the school's utilization of videoconferencing.

Hypothesis 7: There is a significant relationship between the coordinator's ability to integrate videoconferencing in the curriculum and the school's utilization of videoconferencing.

Hypothesis 8: There is a significant relationship between the coordinator's ability to work with teachers and the school's utilization of videoconferencing.

Hypothesis 9: There is a significant relationship between the coordinator's perception of teacher attitudes towards videoconferencing and the school's utilization of videoconferencing.

Hypothesis 10: There is a significant relationship between the coordinator's perception of the principal's support of videoconferencing and the school's utilization of videoconferencing.

Hypothesis 11: A combination of these variables can be used to predict the utilization of videoconferencing.

Finally, a correlation matrix was run to see the potential relationships between the variables and the utilization scores.

Instrumentation

This study is based in part on a qualitative analysis done in 2004 on the discussion posts of 30 educators from across the United States in an online class called *Planning Interactive Curriculum Connections* (Freed & Lim, 2009). This class addressed the use of videoconferencing for connecting to content providers, guest experts, and peer-to-peer collaborations. Participants made many comments about the issues and barriers to using videoconferencing in their area. Following the class, the discussion posts were analyzed and categorized. As a result, three themes emerged: concerns related to administration, curriculum, and teachers. The administrative issues included scheduling issues, technical support, budgeting, and technology placement. The curriculum issues included teacher expectations for the programs and program selection and development. The teacher issues revolved around motivating teachers and encouraging them to try something new.

These themes of administrative, curriculum, and teacher issues are evidenced in the literature as well. Keefe's case study (2003) on one elementary school implementing a video learning center emphasized the necessity of a trained coordinator to support the teachers and make the connections, as well as the critical roles of principal support and technology planning and support. Wakefield's (1999) survey of 27 site facilitators on two videoconferencing listservs found that the roles of technical expert, instructional assistant, liaison, scheduler, and trainer were "a crucial part of the system in videoconferencing" (p. 49). Currie's study (2007) of three regional service agencies in Michigan found that access to videoconferencing in an appropriate location within a school district was critical to increased utilization. In addition, he recommended that school districts provide an individual who is in charge of facilitating videoconferences and can assist teachers in using videoconferencing in the curriculum, and that administrators should support teachers who are implementing videoconferencing in their classes. Bose (2007) found that the participant's prior confidence level with technology was a critical predictor of their utilization of videoconferencing. These studies support the themes of administrative, curriculum, and teacher issues addressed in this study.

These themes were used to develop the K12 Curriculum Videoconferencing Implementation Scale to assess a videoconference coordinator's perspective on the issues and barriers to integrating videoconferencing in the curriculum. This scale was evaluated by five experts in the field of videoconferencing, including two videoconference specialists with doctoral degrees in the spring of 2007. The survey was then modified and corrected based on the feedback from the experts. After the pilot data were collected (Lim, 2007b), the questions were re-examined. A table of specifications was developed

and was sent to five expert judges for review of the content (McNeil, Newman, & Steinhauser, 2005).

Table 1 correlates the scale questions to published research and the qualitative study mentioned above. Each of the sections was combined to create one score for that measure. Table 1 shows that the survey developed is grounded in previous research.

Validity

Two methods were used to estimate validity. Expert judge validity was used on the pilot study (Lim, 2007b) as five expert judges reviewed the survey and gave feedback before it was administered in the spring of 2007. In February 2008, expert judge validity was used on a table of specifications (McNeil et al., 2005). The expert judges reviewed each item for its appropriate measurement of the concept and then reviewed the concepts to determine if the items sufficiently measured them. The second method of estimating validity was creating a table of specifications to analyze the survey for content validity.

Reliability

Two methods were used to estimate reliability. Cronbach's alpha was used to analyze the pilot data on the survey for internal consistency. This measure was used again on the current survey to estimate reliability. The results for the K12 Curriculum Videoconferencing Implementation Scale are shown in Table 2. The Cronbach's alpha for the full scale was .851, which can be used to predict a school's use of videoconferencing based on the individual coordinator's score.

Table 1

Correlating Scale Questions to Supporting Research

Scale Question Heading	Supporting Research
Subscale: Technical Aspects That Affect the Coordinator's Work	
Quality of the video	Technical Support (Freed & Lim) Technology Infrastructure (Keefe)
Quality of the audio	Technical Support (Freed & Lim) Technology Infrastructure (Keefe)
Subscale: Coordinator's Ability to Support Videoconferencing	
Comfort level with technology	Technical Support (Freed & Lim) Technical Expert (Wakefield) Participant Confidence Level (Bose) Technology Coordinator (Keefe) Videoconference Champion (Baber) Innovation Champion (Owston)
Comfort level with videoconferencing	Technical Support (Freed & Lim) Technical Expert (Wakefield) Technology Coordinator (Keefe) Videoconference Champion (Baber) Innovation Champion (Owston)
Use of the controls	Technical Support (Freed & Lim) Technical Expert (Wakefield) Technology Coordinator (Keefe) Training for End Users (Baber) Innovation Champion (Owston)
Scheduling	Scheduling (Freed & Lim) Scheduler (Wakefield) Technology Coordinator (Keefe) Conference Schedules (Baber)
Test calls	Scheduling (Freed & Lim) Technical Expert (Wakefield)

Table 1 — *Continued*.

Scale Question Heading	Supporting Research
Making the connection work	Technical Support (Freed & Lim) Technical Expert (Wakefield)
Helping teachers with a connection	Technical Support (Freed & Lim) Instructional Assistant (Wakefield) Technology Coordinator (Keefe) Videoconference Champion (Baber)
Getting students acquainted with videoconferencing	Technical Support (Freed & Lim) Instructional Assistant (Wakefield) Technology Coordinator (Keefe) Supportive Plans and Policies (Owston)
Subscale: Coordinator's Ability to Integration Videoconferencing in the Curriculum	
Knowledge of coordinator	Teacher Expectations (Freed & Lim) Instructional Assistant (Wakefield) Constructivist Learning (Keefe) Technology Coordinator (Keefe) Local Coordinator (Currie) Perceived Value of Innovation (Owston)
Finding programs	Program Dev. (Freed & Lim) Instructional Assistant (Wakefield) Constructivist Learning (Keefe) Technology Coordinator (Keefe)
Teacher recommendations	Program Dev. (Freed & Lim) Instructional Assistant (Wakefield)
Student preparation	Program Dev. (Freed & Lim) Instructional Assistant (Wakefield) Technology Coordinator (Keefe)
Subscale: Coordinator's Ability to Work with Teachers	
Coordinator and teacher attitudes	Motivating Teachers (Freed & Lim) Participant Confidence Level (Bose) Professional Development (Owston)
Helping teachers with time	Motivating Teachers (Freed & Lim) Professional Development (Owston)

Table 1 — *Continued*.

Scale Question Heading	Supporting Research
Motivating and overcoming reticence	Motivating Teachers (Freed & Lim) Trainer / Consultant (Wakefield) Technology Coordinator (Keefe) Professional Development (Owston)
Subscale: Coordinator's Perception of Teacher Attitudes	
Teacher curriculum integration	Teacher Expectations (Freed & Lim) Trainer / Consultant (Wakefield) Curriculum Enrichment (Keefe) Perceived Value of Innovation (Owston)
Teacher attitudes	Motivating Teachers (Freed & Lim) Participant Confidence Level (Bose) Teacher Support (Owston)
Teacher experience	Motivating Teachers (Freed & Lim) Participant Confidence Level (Bose) Teacher Support (Owston)
Planning for videoconferences	Motivating Teachers (Freed & Lim) Teacher Support (Owston)
Making time for videoconferences	Motivating Teachers (Freed & Lim)Teacher Support (Owston)
Teachers using the videoconference system	Motivating Teachers (Freed & Lim) Trainer / Consultant (Wakefield) Technology Coordinator (Keefe) Training for End Users (Baber) Teacher Support (Owston)
Subscale: Coordinator's Perception of Principal's Support of Videoconferencing	
Principal experience with videoconferencing	Principal Involvement (Keefe) Motivating Teachers (Freed & Lim) Administrative Support (Owston)

Table 1 — *Continued*.

Scale Question Heading	Supporting Research
Principal support	Motivating Teachers (Freed & Lim) Principal Involvement (Keefe) Support of Administration (Currie) Management Support (Baber) Administrative Support (Owston)

Table 2

Reliability Analysis of the Scale

Scale Section	# of Items	Cronbach's Alpha
Full Scale	25	.851
Videoconference Quality	2	.685
Supporting Videoconferencing	8	.665
Integrating VC in the Curriculum	4	.749
Working with Teachers	3	.755
Perception of Teachers' Attitudes	6	.747
Perception of Principal's Support	2	.717

In addition, the test-retest method (I. Newman et al., 2006) was used on a small sample of the total respondents of the survey. Thirty-five coordinators were selected from the 70 coordinators in the school districts in my service area. This convenience sample was selected because these coordinators are easily accessible. The survey was administered twice in the spring of 2008 with the two tests 1 week apart. The limitation to this procedure is that the participants are not randomly selected. Nineteen of the coordinators actually retook the survey, and the correlation is strong, which shows good test-retest reliability (r=.950, p=.000).

Pilot Studies

In the spring of 2007, the survey was piloted with 38 videoconference coordinators in Berrien and Cass counties, who are part of a U.S. Department of Agriculture Rural Utilities Service Distance Learning and Telemedicine Grant implemented in the summer of 2006 (Lim, 2007b). This survey was collected along with data on the number of videoconferences each school completed in 2006-2007, the number of classroom teachers in the school, the number of unique teachers who participated in videoconferences in that school, and some demographic data on the schools.

Six variables were examined to see if there was a relationship with the utilization of videoconferencing in the schools participating in the study. Three of the variables studied were not a significant factor in the utilization. The size of the school, the location of the videoconferencing system, and the years of experience of the videoconference coordinator are independent of the utilization of videoconferencing in the school. However, three of the variables were significant in the utilization of videoconferencing in the schools studied. The elementary schools are using videoconferencing about twice as often as the secondary schools. The National School Lunch Plan (NSLP) scores, a common measure of poverty in schools, were also analyzed. Higher scores indicate a higher number of students receiving free and reduced cost lunches. The schools with higher NSLP scores are using videoconferencing about twice as often as the schools with lower NSLP scores. The schools with videoconference coordinators who received mostly curriculum training are using videoconferencing about twice as often as the schools with videoconferencing coordinators who received mostly technical training (Lim, 2007b). See Appendix C for additional details on the results of the pilot study.

Procedures

A web-based survey was used because it was the most convenient way to access the participants around the world. In addition, most of them were comfortable with technology and found it easy to complete the survey. The survey was sent to the mailing lists described earlier on Tuesday, May 6, 2008, and left open through Friday, May 23, 2008. To increase response rate, I sent a reminder again on Monday, May 19, 2008. I also encouraged videoconference colleagues in educational service agencies across the country to remind their local videoconference coordinators to complete the survey. Phone calls were used as a follow-up to gain increased response. People were identified with a convenience sample, and a snowballing technique (O'Leary, 2005) was used for follow-up phone calls. This time-window was selected due to the close of the school year and the fact that many schools were completing their own reports and counts of videoconferences from the school year. A few weeks later in the school year, and it would have been impossible to get any responses. A few weeks earlier, and the data collected might not have been complete as the schools might have been still scheduling spring videoconferences. I selected Tuesday as a survey launch date due to the other content that is often sent out on Mondays and due to the fact that the Collaboration Collage listserv is moderated on Tuesdays and Thursdays.

The survey data were collected in Zoomerang, an online survey tool that I have access to through my workplace. It collects the survey responses in a format that is easily imported to a spreadsheet program or SPSS for analysis. Since the data were collected in Zoomerang, it was impossible for me to know who completed the survey, thus assuring anonymity and confidentiality. Zoomerang also has a feature to ensure that participants did not complete the survey more than once.

Statistical Analysis

The F test was used to test the statistical significance of the proposed relationships in the hypotheses. The F test was chosen because it is very robust. The assumptions of random selection of subjects and normal distribution of the variables can be violated without doing serious harm to the procedure (I. Newman et al., 2006).

Multiple linear regression was used in analyzing the variance in predicting from one variable to another and in covarying some of the variables to test the alternative hypotheses (I. Newman & McNeil, 1998). Multiple linear regression was chosen because it is more flexible than traditional analysis of variance. With multiple linear regression, one can write the models that reflect the specific research question being asked. In addition, McNeil, Newman, and Kelly (1996) point out that with multiple linear regression, one can test relationships between categorical variables, between categorical and continuous variables, or between continuous variables. The Bonferroni correction was used to control the type I error rate for the multiple comparisons (I. Newman et al., 2006).

Two-tailed tests of significance were used to test the relationships of those variables where the direction of the correlation was uncertain. One-tailed tests of significance were used where the direction of the correlation was quite certain based on previous research and experience.

The .05 level of significance was used since the consequences of rejecting a true null hypothesis are not so serious as to warrant a more stringent confidence level. In addition, cross validation was used to estimate the stability of the findings.

A factor analysis was performed on the scale to determine the components being measured, and the eigenvalues were calculated to understand the variance accounted for by the scale.

Limitations

The study was limited by those who responded to the survey. A collection of demographic data helped to assess the representation in the study; however, it is not known what would actually be representative of the whole population of videoconference coordinators. There may be a limitation in the type of people who answered the survey. There was no way to control who would respond. Perhaps only certain people are willing to answer a survey online, and this would limit the type of respondents included in this research.

The design of the research and survey are also limitations. In the *ex post facto* research design, causation cannot be assumed because the independent variables could not be manipulated. The reliability and validity of the instrument are good, but there is always some measurement error in this type of research.

Summary

This chapter reviewed the population to be surveyed, the variables included in the survey, and how the instrumentation was developed. The pilot study was described, and the procedures for the research were included. In chapter 4, the results are described in detail, including descriptives of the variables, correlations between the variables and the usage of videoconferencing, multiple linear regression models predicting usage of videoconferencing, and cross validation of the final prediction model.

CHAPTER IV

RESULTS

This study investigated the coordinator's ability to support and integrate videoconferencing in the curriculum, and the technical and administrative issues that affect the coordinator's ability to support videoconferencing. The results begin with the descriptives for each of the variables, followed by the correlations between the utilization of videoconferencing and the school demographics, the coordinator demographics, the educational service agency variables, the administrative support variables, and the K12 Curriculum Videoconferencing Implementation Scale. A factor analysis was completed on the scale and subscales.

The study also analyzed how these factors predict the utilization of videoconferencing in the school. Multiple regression analysis was used to determine the best combination of variables to predict the usage of videoconferencing. Cross validation was performed to determine the stability of the prediction model.

Descriptives

This study used four mailing lists and the snowball sampling method (O'Leary, 2005) to gain a response from 310 participants in eight countries and 33 U.S. states. However, 33 of the cases did not have complete utilization scores; therefore the final number of participants in this study was 277 in six countries and 31 U.S. states. In this

section the descriptive results are shared for the school variables, the participant variables, the educational service agency support variables, and the utilization variables.

School Demographic Descriptives

The demographics of the schools where the participants in this study support videoconferencing are shown in Table 3. The schools represented all levels of K-12 education. Most of the schools were elementary (44.4%), with some high schools (14.8%) and middle schools (11.2%) included. Some of the coordinators support one or more levels (7.6%) and some support all levels (22.0%). The coordinators support a wide range of number of teachers, from 3 classroom teachers to 9,000 teachers, with a mean of 164. The coordinators serve a wide range of number of students, from 50 to 36,000 students, with a mean of 1,883 students. The schools where the coordinators work range from rural to urban, with the population of the town, township, or city where the school is located ranging from 100 to 8.2 million, with a mean population of 400687. One hundred nine participants (39.4%) know the National School Lunch Program (NSLP) score for their school. A few were willing to enter their best guess. So 124 participants gave the NSLP score for their school. The scores range from 0 to 100 with a mean of 57.78. The schools represented a range of ethnicities (African American 6.5%, Asian 0.4%, Hispanic 9.7%) but were predominantly Caucasian (45.1%) or mixed (29.6%).

Description of the Study Participants

The participants' descriptives are listed in Table 4. Seventy-three percent of the participants were female, and 25% were male. The coordinators represented a range of ethnicities (African American 2%; Asian 1%, Hispanic 2%, Mixed 1%), but were predominantly Caucasian (89%). The participants ranged in age from 24 through 68, and

Table 3

School Descriptives

Variable	*n*	%
School Level		
Elementary (ages 6-10)	123	44.4
Middle School (ages 11-14)	31	11.2
High School / Secondary (ages 15-18)	41	14.8
Two Levels	21	7.6
All Levels	61	22.0
Ethnic Makeup of School		
Predominantly African America	18	6.5
Predominantly Asian	1	0.4
Predominantly Caucasian	125	45.1
Predominantly Hispanic	27	9.7
Mixed	82	29.6
Other	22	7.9
Variable	*n*	mean
Other Demographic Data		
Teachers Supported	277	164
Students Supported	277	1,883
City Population	241	400,688
National School Lunch Plan Score	125	61.80

the mean age was 47. Participants worked in education with a range of 1 to 42 years with a mean of 16.84 years. Participants had a range of 0 to 17 years of experience with videoconferencing, with a mean of 4.25 years. The participants' highest level of education ranged from high school (4.0%) and 2 years of college (8.3%) to 4 years of college (28.2%), a Master's degree (50.2%) and a postgraduate degree (9.4%). The participants were predominantly from the United States (89.5%), but also from Canada (9.0%), Australia (0.4%), Greece (0.4%), Honduras (0.4%), and the United Kingdom (0.4%). Participants identified themselves primarily as technology specialists (33.2%) with media specialist/librarians (22.7%) and teachers (18.8%) close behind. Other job titles included district videoconference coordinator (2.9%), media aide (2.9%), principal/administrator (2.5%), paraprofessional (2.2%), regional videoconference coordinator (1.1%), and secretary (0.4%). Most of the coordinators in this study support videoconferencing on top of their regular job (72.6%), but some full-time coordinators (3.6%) and part-time coordinators (9.4%) were also represented. Participants received a range of videoconference training, from 0 to 500 hours, with a mean of 17.27 hours. The type of training varied in type: 30.3% received mostly technical training, 23.5% received mostly technical training with some curriculum training, 30.0% received mostly curriculum training with some technical training, and 4.3% received mostly curriculum training.

Educational Support Agency Descriptives

In this section, the answers to survey questions about support from an educational service agency are shared (see Table 5). Most (64.6%) of the coordinators receive videoconference support in the form of technical support, content support, and/or training from their educational service agency. Over half (56%) of the coordinators have access to

Table 4

Participant Descriptives

Variable	*n*	%
Gender		
Male	69	24.9
Female	204	73.6
No Response	4	1.5
Age and Experience		
Age	257	47
Years in Education	275	17
Years Experience with Videoconferencing	277	4.25
Ethnicity		
African American	6	2.2
Asian	2	0.7
Caucasian	247	89.2
Hispanic	6	2.2
Mixed	4	1.4
Other	6	2.2
Non-response	6	2.1
Highest Level of Education		
High School	11	4.0
2 Years of College	23	8.3
4 Years of College	78	28.2
Master's Degree	139	50.2
Postgraduate Degree	26	9.4

Table 4 — *Continued.*

U.S. States and Canadian Provinces		
Alabama	2	0.7
Alaska	2	0.7
Arizona	5	1.8
California	5	1.8
Connecticut	1	0.4
Florida	1	0.4
Georgia	1	0.4
Hawaii	1	0.4
Illinois	1	0.4
Indiana	12	4.3
Kansa	2	0.7
Kentucky	1	0.4
Maine	1	0.4
Maryland	2	0.7
Massachusetts	1	0.4
Michigan	50	18.0
Minnesota	4	1.4
Missouri	2	0.7
Nevada	1	0.4
New Jersey	7	2.5
New York	21	7.6
North Carolina	1	0.4
Ohio	12	4.3
Oklahoma	1	0.4
Pennsylvania	9	3.2
South Carolina	1	0.4
Tennessee	2	0.7
Texas	87	31.3
Virginia	4	1.4
Washington	1	0.4
Wisconsin	7	2.5
Alberta	17	6.1
Ontario	1	0.4
Saskatchewan	7	2.5

Table 4 — *Continued.*

Country		
Australia	1	0.4
Canada	25	9.0
Greece	1	0.4
Honduras	1	0.4
United Kingdom	1	0.4
United States	248	89.5
Job Title		
Technology specialist	92	33.2
Media specialist/librarian	63	22.7
Teacher	52	18.8
Media aide	8	2.9
District videoconference coordinator	8	2.9
Principal/Administrator	7	2.5
Paraprofessional	6	2.2
Regional videoconference coordinator	3	1.1
Secretary	1	0.4
Other	37	13.4
Time to Support Videoconferencing		
Full-time videoconference coordinator	10	3.6
Part-time videoconference coordinator	26	9.4
Coordinator on top of regular job	201	72.6
Other	40	14.4
Hours of Training		
Hours of Training	270	17.27
Type of Videoconference Training		
Mostly technical training	84	30.3
Mostly technical with some curriculum	65	23.5
Mostly curriculum with some technical	83	30.0
Mostly curriculum training	12	4.3
Not applicable	32	11.6
Non-response	1	0.3

free programming created and facilitated by their educational service agency. Just under half (41.9%) of the participants reported that their educational service agency subsidizes programming from content providers. The percentage of student videoconferences provided or facilitated by the educational service agency ranged from 0 to 100 with a mean of 42.06.

Table 5

Educational Support Agency Descriptives

Variable	*n*	%
Do you receive videoconference support from an ESA?		
Yes	179	64.6
No	97	35.0
No response	1	0.4
Does your educational service agency create and facilitate free programming?		
Yes	155	56.0
No	79	28.5
No response	43	15.5
Does your educational service agency subsidize programming from content providers?		
Yes	116	41.9
No	99	35.7
No response	62	22.4

Variable	*n*	*M*
Percentage of videoconferences provided or facilitated by ESA		
Percentage	250	42

Utilization Descriptives

Three measures were used to measure the school's utilization of videoconferencing. These three scores were then added together to arrive at a total utilization score (see Table 6).

Table 6

Utilization Descriptives

Variable	Calculation	*n*	Min	Max	Mean	*SD*
(A) Total Events Utilization	Events / # Students * 100	277	0	60.00	4.221	6.870
(B) Student Events Utilization	Student Events / #Students * 100	277	0	67.83	4.374	8.506
(C) Percentage Teachers Utilization	Teachers Used VC / Total Teachers	277	0	100.00	26.598	27.919
Total Usage Score	A+B+C	277	0	180.00	35.193	35.574

Scale Descriptives

The K12 Curriculum Videoconferencing Implementation Scale is comprised of six subscales on the videoconference quality, the coordinator's ability to support videoconferencing, the coordinator's ability to integrate videoconferencing in the curriculum, the coordinator's ability to work with teachers, the coordinator's perception of teacher attitudes, and the coordinator's perception of principal support (see Table 7). Each subscale ranges from 1 to 4 and the full-scale scores range from 33 to 98.

Table 7

Scale Descriptives

Scale	*n*	Min	Max	Mean	*SD*
Complete Scale	277	33.00	98.00	77.84	9.73
Videoconference Quality	277	1.00	4.00	3.61	0.50
Supporting Videoconferences	277	2.00	4.00	3.52	0.43
Curriculum Integration	277	1.00	4.00	3.23	0.73
Working with Teachers	277	1.00	4.00	3.19	0.80
Teachers' Attitudes	277	1.00	3.67	2.33	0.49
Principal Support	277	1.00	4.00	2.99	0.87

Note. Each subscale score ranges from 1 to 4; the full scale ranges from 0 to 100.

Factor Analysis

Factor analysis was run on the six subscales in the K12 Curriculum Videoconferencing Implementation Scale. The factor analysis indicates two concepts (see Tables 8 and 9). The first factor is the coordinator's ability to support and promote videoconferencing in their school, and the second factor is the coordinator's perception of the staff's support and interest in videoconferencing. These two factors explain 67% of the variance in the scale. The eigenvalue shows that the coordinator's ability explains most of the variance (see Tables 8 and 9). The quality of the videoconference fits best in the staff support factor, and it loads with the staff's support and interest in videoconferences (.435).

Correlations

In this section, I report the correlations with each subset of variables to the dependent variable, the use of videoconferencing or the total usage score. Each hypothesis in this research seeks to examine the relationship between a set of

Table 8

Factor Analysis on the Subscales With the Full Scale Score (Rotated Component Matrix)

Subscale	Coordinator Ability	Staff Support
Videoconference Quality	.013	.435
Coordinator's Ability to Support VC	.782	.082
Coordinator's Ability to Integrate VC in the Curriculum	.881	.074
Coordinators' Ability to Work with Teachers	.848	.114
Coordinator's Perception of Teacher Attitudes	.332	.757
Coordinators' Perception of Principal Support	.093	.817
Total Scale Score (Sum of the above)	.866	.496
Eigenvalue		
Total Eigenvalue	3.514	1.161
% of Variance Explained	50.203	16.588

Table 9

Factor Analysis on the Subscales Without the Full Scale Score (Rotated Component Matrix)

Subscale	Coordinator Ability	Staff Support
Videoconference Quality	-.001	.430
Coordinator's Ability to Support VC	.768	.090
Coordinator's Ability to Integrate VC in the Curriculum	.882	.096
Coordinators' Ability to Work with Teachers	.853	.139
Coordinator's Perception of Teacher Attitudes	.314	.763
Coordinators' Perception of Principal Support	.078	.822
Eigenvalue		
Total Eigenvalue	2.519	1.160
% of Variance Explained	41.986	19.340

variables and the school's use of videoconferencing. The school's use of videoconferencing or usage score is the sum of the percentage of teachers who used videoconferencing, the total events divided by the number of students, and the total student events divided by the number of students.

School Demographic Correlations

This first section addresses the first hypothesis: There is a significant relationship between one or more of the demographic variables of the school and the school's utilization of videoconferencing. The categorical variables are coded 1 if that category or 0 if not.

The school demographic variables that are significantly correlated to the total usage of videoconferencing are as shown in Table 10. The elementary schools use videoconferencing significantly more than the average of the other levels (r=.280, p=.000). The high schools use videoconferencing significantly less than the average of the other levels (r=-.194, p=.001). Where the coordinators support all levels, their schools are using it significantly less than the average of all the other levels (r=-.202, p=.001). For example, these coordinators are likely supporting videoconferencing in several schools as opposed to coordinators who support videoconferencing just in their school. Population and poverty scores (National School Lunch Program) are not significantly correlated to the school's use of videoconferencing. The only ethnicity that is using videoconferencing significantly more than the others is the "other" category (r=.202, p=.001). Most of the coordinators who chose the other category wrote in Native American or Canadian First Nations (16 out of 22).

Table 10

Correlations of School Demographic Variables to the Total Usage Score

Variable	Pearson *r*	Sig. (2-tailed)	*n*
School Level			
Elementary	.280	.000**	277
Middle School	-.015	.800	277
High School	-.194	.001**	277
2 or More Levels	.070	.246	277
All Levels	-.202	.001**	277
Population and Poverty			
Population	.044	.493	241
Measure of Poverty			
National School Lunch Program	.040	.656	124
Ethnicity			
Predominantly African American	-.071	.236	277
Predominantly Asian	-.054	.371	277
Predominantly Caucasian	-.028	.645	277
Predominantly Hispanic	.021	.722	277
Predominantly Mixed	-.050	.406	277
Other	.202	.001**	277

Note. The categories are coded 1 if it is that category and 0 if it is not.
*$p < .05$. ** $p < .01$.

Coordinator Demographic Correlations

Next, the second hypothesis is analyzed: There is a significant relationship between one or more of the demographic variables of the coordinator and the school's utilization of videoconferencing. The categorical variables are coded 1 if that category or 0 if not. Where the categorical variable is dichotomous, only one of the two variables was included in Table 11.

Table 11

Correlations of Coordinator Demographic Variables to the Total Usage Score

Variable	Pearson *r*	Sig. (2-tailed)	*n*
	Coordinator Demographic		
Gender: Female	.152	.012*	273
Coordinator's Age	-.142	.023*	257
	Level of Education		
High School	.098	.104	277
2 Years of College	.223	.000**	277
4 Years of College	.078	.226	277
Master's Degree	-.154	.011**+	277
Ph.D.	-.126	.036*+	277
	Country		
Canada	.158	.008*	277
United States	-.196	.001**	277

Note. Australia, Greece, Honduras, and the United Kingdom were not included due to only 1 respondent from each country. *Note 2.* The categories are coded 1 if it is that category and 0 if it is not.

+These variables are nonsignficant when using the Bonferroni correction.

*$p < .05$. ** $p < .01$.

In schools where the coordinator is female, there is a small positive correlation with the school's use of videoconferencing (r=.152, p=.012). There is a small negative correlation between the coordinator's age and the school's use of videoconferencing (r=.142, p=.023). Interestingly where the coordinator has 2 years of college, the school is using videoconferencing significantly more (r=.223, p=.000), but where the coordinator has a Master's (r=-.154, p=.011), or a Ph.D. (r=-.126, p=.036), there is a small negative correlation with the school's use of videoconferencing. The ethnicity of the coordinator is not significant. The survey respondents from Canada (r=.158, p=.008) are using videoconferencing more than those from the United States (r=-.196, p=.001); however, this correlation is probably not a fair representation since the sample from Canada is smaller than the sample from the United States.

The job title or position of the coordinator in the school was coded 1 if that category or 0 if not (see Table 12). Where the coordinator is a paraprofessional (r=.220, p=.000) or a teacher (r=.155, p=.010), there is a small positive correlation with the school's use of videoconferencing. However, if the coordinator is the technology specialist in the school, the school is using videoconferencing less than the average of the other job titles (r=-.144, p=.016).

Table 12

Correlations of Coordinator Job Title to the Total Usage Score

Job Title	Pearson *r*	Sig. (2-tailed)	*n*
Librarian	-.081	.181	277
Media Aide	.041	.499	277
Paraprofessional	.220	.000**	277
Principal	.054	.369	277
Secretary	.102	.092*+	277
Teacher	.155	.010**+	277
Technology Specialist	-.144	.016*	277
District VC Coordinator	-.111	.064	277
Regional VC Coordinator	.074	.220	277

Note. The categories are coded 1 if it is that category and 0 if it is not.
+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. ** $p < .01$.

The coordinator's years in education has a slight negative relationship on the school's use of videoconferencing (r=-.130, p=.032), as does the coordinator's years supporting videoconferencing (r=-.154, p=.010) as shown in Table 13. The number of hours of training the coordinator received is not significant. However, where the coordinators received mostly technical training, the school is using videoconferencing less than the average of the other types of training (r=-.121, p=.044). The amount of time the coordinator has to support videoconferencing was significant for those who chose "other." It seems that those who chose "other" did not feel that the term "coordinator" applied to them. They were just doing a little videoconferencing here and there as they could. Their schools were using videoconferencing significantly less than the average of the others (r=-.132, p=.028).

Table 13

Correlations of Coordinator Experience, Training, and Time to the Total Usage Score

Variable	Pearson *r*	Sig. (2-tailed)	*n*
Coordinator Experience			
Years Worked in Education	-.130	.032*	275
Years of Experience with Videoconferencing	-.154	.010**	277
Hours of Training	-.009	.877	270
Type of Training			
Mostly Technical Training	-.121	.044*+	277
Mostly Technical with Some Curriculum	.091	.131	277
Mostly Curriculum with Some Technical	-.020	.742	277
Mostly Curriculum Training	.069	.251	277
Time to Support Videoconferencing			
Full-Time Videoconference Coordinator	.016	.794	277
Part-Time Videoconference Coordinator	.055	.366	277
Coordinator on Top of Regular Job	.062	.303	277
Other	-.132	.028*+	277

+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. ** $p < .01$.

Educational Service Agency Correlations

In this section, we look at the correlations for the school's support by an educational service agency as shown in Table 14. The hypothesis addressed is the third: There is a significant relationship between one or more of the educational service agency support variables and the school's utilization of videoconferencing.

Interestingly, only the fact that the educational service agency actually facilitates videoconferences for the school is significantly related to the school's use of videoconferencing (r=.120, p=.046). However, if the school is supported by an

educational service agency, there is a relationship between support by the educational service agency, facilitation (r=.363, p=.000), and subsidization of videoconferencing (r=.383, p=.000), with a correlation with the percentage of videoconferences provided by the educational service agency (r=.316, p=.000).

Table 14

Correlations Between Educational Service Agency (ESA) Variables and Total Usage Score

Variable	Support	Facilitates	Subsidizes	Percentage
Total Usage	.024	.120*+	.086	.117
Supported by ESA		.363**	.383**	.316**
ESA Facilitates VCs			.591**	.506**
ESA Subsidizes VCs				.487**

+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. ** $p < .01$.

Administrative, Finanical, and Technology Support Correlations

In this section, we look at variables that provide a picture of the support structures in place for the coordinator and the school's use of videoconferencing (see Table 15). These variables are in the fourth hypothesis: There is a significant relationship between the administrative, financial, and technology support structures and the school's utilization of videoconferencing.

The hours that the coordinator puts in at work and at home, while correlated to each other (r=.533, p=.000), are not significantly related the school's use of videoconferencing. The amount that the school spent on videoconferencing is not significantly correlated to the school's usage score; however, it appears that the more the coordinator supports videoconferencing at work, the more the school spends on

videoconferencing (r=.188, p=.006). The amount the school spent on videoconferencing is highly correlated with the grant funding (r=.911, p=.000), which suggests that the school is using grant funding for videoconferencing and not other district or school sources of funding.

Table 15

Correlations Between Administrative Support Variables and the Total Usage Score

Variable	HrsW	HrsH	SchSpent	GrantFundYes	GrantAmt
Total Usage	.041	.069	-.102	.080	-.166
Hrs Support at Work (HrsW)		.533**	.188**	.066	-.075
Hrs Support at Home (HrsH)			.038	.067	-.100
School Spent on VC (SchSpent)				.028	.911**

*$p < .05$. ** $p < .01$.

In Table 16, we examine who supports the videoconference coordinator and how fast they receive support when something goes wrong with a videoconference. The person who supports the coordinator is not significantly related to the school's use of videoconferencing, neither is the speed of the support when there is a problem.

In Table 17, we examine three variables related to the location of the videoconferencing equipment. There is a small positive correlation between schools with a mobile within one building and the school's use of videoconferencing (r=.156, p=.009). There is a small negative correlation with the usage score for schools where the coordinator supports multiple systems in multiple locations (r=-.159, p=.008).

The coordinators answered another question about satisfaction with the current location of the videoconference system. The satisfaction was not significantly correlated

Table 16

Correlations of Support Variables to the Total Usage Score

Variable	Pearson *r*	Sig. (2-tailed)
Who Supports You?		
A technical support person in my school	-.069	.251
A technical support person in my district	-.047	.432
A technical support person at my ESA	.062	.301
The vendor who sold or made the equipment	-.065	.278
Speed of Support		
Within minutes	.085	.160
Within hours	-.012	.848
Within a day	-.062	.307
Within a week	-.050	.405

*$p < .05$. ** $p < .01$.

to the use of videoconferencing. However, the satisfaction was significantly positively correlated to the schools with a mobile videoconferencing cart (r=.151, p=.012) and significantly negatively correlated to the choice "other" on the survey (r=-.136, p=.024). It appears that a comment field was not included for the location "other."

The reason for the location was also collected in the survey as shown in Table 18. While the reason for the location of the equipment is not significantly related the school's use of videoconferencing, it is related to their satisfaction with the location. If the reason for the location of the equipment was "ease of use for teachers," there was a small positive correlation with the location of the equipment over the average of the others (r=.278, p=.000). If the reason for the location of the equipment was "only available room," there was a small negatiave correlation with the location of the equipment over the average of the others (r=-.192, p=.001).

Table 17

Correlations of Location of Equipment to the Total Usage Score and Satisfaction of Location of Equipment

Variable	Usage *r*	Sig. (2-tailed)	Satisfaction *r*	Sig. (2-tailed)
Total Usage			.027	.655
Location of Equipment				
Mobile	.156	.009**+	.151	.012*+
Mobile within multiple buildings	-.077	.202	-.014	.822
Fixed room	.000	.992	-.029	.633
Library	-.016	.788	-.069	.250
Computer lab	.117	.051	.037	.538
Conference room	-.056	.352	-.036	.549
Other	.008	.892	-.136	.024*+
Multiple systems in multiple locations	-.159	.008**+	-.038	.533

+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. ** $p < .01$.

Table 18

Correlations of Reasons for Location of Equipment to the Total Usage Score and Satisfaction of Location of Equipment

Reason for Location	Usage *r*	Sig. (2-tailed)	Satisfaction *r*	Sig. (2-tailed)
Technical reasons	.049	.417	-.025	.675
Proximity to coordinator	-.035	.564	-.016	.792
Ease of use for teachers	.049	.414	.278	.000**
Only available room	-.070	.242	-.192	.001**
Other	-.003	.965	-.075	.216

*$p < .05$. ** $p < .01$.

Scale Correlations

The correlations between the scale, the subscales, and the total usage are shown in Table 19. Since the scale is a major component of this resarch, there are six hypotheses for the six subscales.

Hypothesis 5: There is a significant relationship between the technical aspects of videoconferencing and the school's utilization of videoconferencing (1 subscale with 2 items).

Hypothesis 6: There is a significant relationship between the coordinator's ability to support videoconferencing and the school's utilization of videoconferencing (1 subscale with 8 items).

Hypothesis 7: There is a significant relationship between the coordinator's ability to integrate videoconferencing in the curriculum and the school's utilization of videoconferencing (1 subscale with 4 items).

Hypothesis 8: There is a significant relationship between the coordinator's ability to work with teachers and the school's utilization of videoconferencing (1 subscale with 3 items).

Hypothesis 9: There is a significant relationship between the coordinator's perception of teacher attitudes towards videoconferencing and the school's utilization of videoconferencing (1 subscale with 6 items).

Hypothesis 10: There is a significant relationship between the coordinator's perception of principal support of videoconferencing and the school's utilization of videoconferencing (1 subscale with 2 items).

The full scale is correlated significantly positive to the school's use of videoconferencing (r=.228, p=.000). Three of the subscales are not significantly related

Table 19

Correlations Between Subscales, Full Scale Score, and Total Usage Scores

Variable	Scale	VCQ	Supp	Curr	WwT	TAtt	Prin
Total Usage	.228**	-.113	.013	.074	.139*+	.405**	.320**
Scale Variables							
Full Scale (Scale)		.235**	.746**	.792**	.770**	.667*	.477*
VC Quality (VCQ)			.094	.089	.049	.152*+	.080
Supporting VCs (Supp)				.548**	.471**	.238**	.177**
Curriculum Integration (Curr)					.688**	.296**	.176**
Working with Teachers (WwT)						.394**	.155**
Teacher Attitudes (TAtt)							.458**
Principal Support (Prin)							---

+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. ** $p < .01$.

to the school's use of videoconferencing: the quality of the videoconference, the coordinator's ability to support videoconferencing, and the coordinator's understanding of how to use videoconferencing in the curriculum. The coordinator's ability to work with the teachers has a small positive correlation with the usage score (r=.139, p=.021). The coordinator's perception of the teachers' attitudes towards videoconferencing (r=.405, p=.000) and the principal's support of videoconferencing are positively correlated to the usage (r=.320, p=.000). Interestingly, the three subscales that are not correlated to the usage, are correlated to the teachers' attitudes towards videoconferencing, which was significantly correlated to the usage. The quality of the videoconference (r=.152, p=.012), the coordinator's ability to support videoconferencing (r=.238, p=.000), and the coordinator's ability to integrate videoconferencing in the curriculum (r=.296, p=.000) are all correlated to the teachers' attitudes towards videoconferencing. These intercorrelations within the survey may help one better interpret the survey, or may show how the coordinator supports the teachers, who in turn affect the usage of videoconferencing in the school.

Multiple Regression Analysis

In this section, regression analysis was used to address the ninth hypothesis: A combination of these variables can be used to predict the utilization of videoconferencing. Regression was used with the set of variables for each hypothesis, followed by attempting to build a regression model with the most useful predictors from all the variables.

School Demographic Variables

The first analysis is on the first hypothesis with its subhypotheses: There is a significant relationship between one or more demographic variables of the school and the school's utilization of videoconferencing.

1a: There is a significant relationship between the school level and the school's utilization of videoconferencing.

1b: There is a significant relationship between the school's ethnicity and the utilization of videoconferencing.

1c: There is a significant relationship between the population of the school's city and the utilization of videoconferencing.

1d: There is a significant relationship between the school's NSLP score and the utilization of videoconferencing.

The regression results are shown in Table 20. The models with the school level and with the population, ethnicity, and school level were significantly different from the others. The models were examined for result significance and whether the model would be appropriate to theoretical or practical interest, and therefore the third model was chosen, which included the School Level, Ethnicity, and Population variables. The significant predictors of this set (see Table 21) were high school (b=-34.40, p=.001), all levels (b=-38.29, p=.000), the "Other" ethnicity which was predominantly Native American or First Nations (b=28.588, p=.043), and population (b=-8.03, p=.021). Where the coordinators support videoconferencing for high schools or for all levels, the schools are less likely to use videoconferencing. The survey respondents from predominantly Native American or First Nations schools use videoconferencing significantly more than

Table 20

Regression Models for Hypothesis 1: School Demographics Predicting Total Usage

Subhypotheses	R^2	Adj R^2	*df*1/2	FChange	*p*	Significant
1a: School Level	.156	.122	4/101	4.651	.002	S
1b: Ethnicity	.218	.153	4/97	1.931	.111	NS
1c: Population	.260	.191	1/96	5.493	.021	S
1d: NSLP Score	.260	.183	1/95	.024	.877	NS

Note. Each of the school level variables was binary coded (Elementary, Middle School, High School, One or More Levels, All Levels). Each of the Ethnicity variables was binary coded (Caucasian, African American, Hispanic, Asian, Mixed, Other).

Table 21

Hypothesis 1: Selected School Variables to Maximize the Prediction of Total Usage

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
			School Level			
Middle School	-18.84	10.935	-.163	-1.723	.088	-.151
High School	-34.40	9.851	-.335	-3.472	.001**	-.305
All Levels	-38.29	9.028	-.425	-4.241	.000**	-.372
1 or More Levels	-11.21	15.432	-.071	-0.726	.469	-.064
			Ethnicity			
African American	-17.77	11.158	-.154	-1.592	.155	-.140
Hispanic	-0.656	11.985	-.006	-0.055	.956	-.005
Mixed	0.366	8.045	.005	0.046	.964	.004
Other	28.588	13.907	.194	2.056	.043*+	.180
			Population			
Population	-8.03	.000	-.247	-2.344	.021*	-.206

+These variables are nonsignficant when using the Bonferroni correction.
*p < .05. ** < .01.

the other ethnicities. The population of the school is significantly negatively correlated with the school's use of videoconferencing.

Coordinator Demographic Variables

The second analysis was done for the second hypothesis and its subhypotheses: There is a significant relationship between one or more of the demographic variables of the coordinator and the school's utilization of videoconferencing.

2a: There is a significant relationship between the job title of the coordinator and the school's utilization of videoconferencing.

2b: There is a significant relationship between the years of education experience of the coordinator and the school's utilization of videoconferencing.

2c: There is a significant relationship between the years of videoconference experience of the coordinator and the school's utilization of videoconferencing.

2d: There is a significant relationship between the level of education of the coordinator and the school's utilization of videoconferencing.

2e: There is a significant relationship between the type of training the coordinator received and the school's utilization of videoconferencing.

2f: There is a significant relationship between the age of the coordinator and the school's utilization of videoconferencing.

2g: There is a significant relationship between the gender of the coordinator and the school's utilization of videoconferencing.

2h: There is a significant relationship between the home country of the coordinator and the school's utilization of videoconferencing.

2i: There is a significant relationship between the hours of training the coordinator received and the school's utilization of videoconferencing.

2j: There is a significant relationship between the ethnicity of the coordinator and the school's utilization of videoconferencing.

2k: There is a significant relationship between the amount of the coordinator's time to support videoconferencing and the school's utilization of videoconferencing.

The regression results are shown in Table 22. Since SPSS takes only nine models at once, I combined 2b, 2c, and 2f in the same model because they are similar. This way I could enter all of the subhypotheses for this hypothesis. The models with the job title (2a), level of education (2d), gender (2g), home country (2h), and amount of time to support videoconference (2k) were significantly different from the others. The models were examined for result significance and whether the model would be appropriate to theoretical or practical interest, and therefore the ninth model (2k) was chosen (see Table 23). It includes all 11 variables of Job Title, Years in Education, Years of VC Experience, Age, Level of Education, Type of Training, Gender, Home Country, Hours of Training, Ethnicity, and Time to Support Videoconferencing.

The significant predictors of this set are 2-year degree for level of education (b=34.21, p=.000), female coordinator (b=17.31, p=.002), home country of the United States (b=-41.61, p=.039), full-time videoconference coordinator (b=40.78, p=.006), part-time videoconference coordinator (b=21.48, p=.032), and coordinator on top of the regular job (b=20.837, p=.001) (see Table 23). Where the videoconferencing coordinator has a 2-year degree, the school is using videoconferencing significantly more. Where the videoconferencing coordinator is female, the school is using videoconferencing more. Where the coordinator is in the United States, the school is using videoconferencing less. However, this last finding may not be accurate due to a lower sample from Canada. The fourth option for the time to support videoconferencing was "other." It seems where the

Table 22

Regression Models for Hypothesis 2: Coordinator Demographics Predicting Total Usage

Subhypotheses	R^2	Adj R^2	*df*1/2	FChange	*p*	Significant
2a: Job Title	.110	.077	9/239	3.285	.001	S
2b, 2c, 2f: Experience & Age	.135	.091	3/236	2.287	.079	NS
2d: Level of Education	.188	.132	4/232	3.736	.006	S
2e: Type of Training	.208	.138	4/228	1.436	.223	NS
2g: Gender	.230	.159	1/227	6.710	.010	S
2h: Home Country	.253	.177	2/225	3.493	.032	S
2i: Hours of Training	.253	.173	1/224	0.001	.970	NS
2j: Ethnicity	.268	.172	5/219	0.896	.484	NS
2k: Amount of Time	.312	.210	3/216	4.525	.004	S

Note. Each of the Job Title variables was binary coded (media specialist/librarian, media aide, paraprofessional, secretary, teacher, technology specialist, principal, district videoconference coordinator, regional videoconference coordinator). Each of the Level of Education variables was binary coded (high school, 2 years college, 4 years college, Master's, PhD). Each of the Type of Training variables was binary coded (Mostly technical training, most technical training with some curriculum training, mostly curriculum training with some technical training, mostly curriculum training). Each of the Country variables was binary coded (United States, Canada). Each of the Ethnicity variables was binary coded (predominantly Caucasian, predominantly African American, predominantly Hispanic, predominantly Asian, Mixed, Other). Each of the Amount of Time variables was binary coded (Full-time coordinator, part-time coordinator, videoconference coordinator on top of regular job, other).

Table 23

Hypothesis 2: Selected Coordinator Variables to Maximize the Prediction of Total Usage

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
			Job Title			
Librarian	-11.73	7.64	-.136	-1.534	.126	-.087
Media Aide	-3.28	14.74	-.015	-0.222	.824	-.013
Paraprofessional	25.58	17.91	.100	1.428	.155	.081
Principal	17.58	14.93	.081	1.177	.240	.066
Secretary	57.72	33.92	.101	1.702	.090	.096
Teacher	9.23	8.07	.101	1.145	.254	.065
Tech Specialist	-12.10	7.08	-.159	-1.709	.089	-.096
District Coordinator	-24.81	15.46	-.106	-1.605	.110	-.091
Regional Coordinator	-6.04	20.82	-.018	-0.290	.772	-.016
			Experience			
Years in Education	.17	.32	.043	0.510	.610	.029
Years of VC Experience	-1.01	.75	-.087	-1.335	.183	-.075
Age	-.30	.29	-.084	-1.046	.297	-.059
			Level of Education			
High School	5.94	12.53	.034	0.474	.636	.027
2-year Degree	34.45	9.07	.254	3.799	.000**	.214
4-year Degree	5.16	5.38	.065	0.958	.339	.054
PhD	-10.55	7.86	-.083	-1.343	.181	-.076
			Type of Training			
Mostly Technical Training	-12.47	7.65	-.160	-1.631	.104	-.092
Mostly Technical Some Curriculum Training	-1.77	8.17	-.021	-0.217	.828	-.012
Mostly Curriculum Some Technical	-4.83	7.71	-.062	-0.627	.532	-.035
Mostly Curriculum	3.03	12.47	.017	0.243	.809	.014

Table 23 — *Continued.*

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
			Gender			
Female	19.21	5.53	.232	3.473	.001**	.196
			Country			
Canada	-44.60	22.68	-.359	-1.967	.051	-.111
US	-53.79	21.71	-.457	-2.478	.014*	-.140
			Hours of Training			
Hours of Training	-.013	.06	-.014	-0.227	.821	-.013
			Ethnicity			
African American	-8.79	13.65	-.037	-0.644	.520	-.036
Asian	5.79	25.24	.014	0.230	.819	.013
Hispanic	-26.94	14.27	-.115	-1.888	.060	-.107
Mixed	-25.38	17.48	-.089	-1.453	.148	-.082
Other	5.34	15.40	.187	0.347	.729	.020
			Time to Support Videoconferencing			
Full-Time Coordinator	40.78	14.60	.187	2.793	.006**	.158
Part-Time Coordinator	21.48	9.92	.173	2.165	.032*+	.122
On Top of Job	20.84	6.42	.256	3.246	.001**	.183

+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. **$p < .01$.

person responsible for videoconferencing considers herself a coordinator for videoconferencing, the school is using it more, no matter how much time the coordinator has been given to support videoconferencing.

Educational Service Agency Variables

The third analysis was done for the third hypothesis and its subhypotheses: There is a significant relationship between one or more of the educational service agency support variables and the school's utilization of videoconferencing.

3a: There is a significant relationship between support by an educational service agency and the school's utilization of videoconferencing.

3b: There is a significant relationship between facilitation of videoconferences by an educational service agency and the school's utilization of videoconferencing.

3c: There is a significant relationship between subsidies of videoconferences by an educational service agency and the school's utilization of videoconferencing.

3d: There is a significant relationship between the percentage of videoconferencing facilitated by an educational service agency and the school's utilization of videoconferencing.

The regression results are shown in Table 24. Model 3b was significantly different from the others. The models were examined for result significance and whether the model would be appropriate to theoretical or practical interest, and therefore the second model was chosen (3b), which includes the variables of Support by an Educational Service Agency and whether the ESA facilitates videoconferences for the school. The significant predictor of this set (see Table 25) is that the educational service agency facilitates videoconferences for the school (b=9.582, p=.038). The fact that the school has support from an educational service agency, or subsidies on paying for

videoconference programming is not a significant predictor, only that the educational service agency facilitates and runs programs for its schools.

Table 24

Regression Models for Hypothesis 3: Educational Service Agency Support Predicting Total Usage

Subhypotheses	R^2	Adj R^2	*df*1/2	FChange	*p*	Significant
3a: Support by ESA	.004	.000	1/247	0.984	.322	NS
3b: ESA Facilitates VCs	.021	.013	1/246	4.365	.038	S
3c: ESA Subsidizes VCs	.027	.015	1/245	1.526	.218	NS
3d: Percentage VCs by ESA	.028	.012	1/244	0.245	.621	NS

Table 25

Hypothesis 3: Selected ESA Variables to Maximize the Prediction of Total Usage

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
ESA Support Yes	1.065	4.866	.015	0.219	.827	.137
ESA Facilitates Yes	9.582	4.486	.140	2.089	.038*+	.103

+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. **$p < .01$.

Administrative Support Variables

The fourth analysis was done on the fourth hypothesis and its subhypotheses: There is a significant relationship between the administrative, financial, and technology support structures and the school's utilization of videoconferencing.

4a: There is a significant relationship between hours spent supporting videoconferencing at work and the school's utilization of videoconferencing.

4b: There is a significant relationship between hours spent supporting videoconferencing at home and the school's utilization of videoconferencing.

4c: There is a significant relationship between the amount the school spent on videoconferencing programming and the school's utilization of videoconferencing.

4d: There is a significant relationship between the existence of grant funding for programming and the school's utilization of videoconferencing.

4e: There is a significant relationship between the amount of grant funding for programming and the school's utilization of videoconferencing.

4f: There is a significant relationship between the source of support and the school's utilization of videoconferencing.

4g: There is a significant relationship between the speed of support and the school's utilization of videoconferencing.

4h: There is a significant relationship between the location of the equipment and the school's utilization of videoconferencing.

4i: There is a significant relationship between the school's satisfaction with the location of the equipment and the school's utilization of videoconferencing.

The regression results are shown in Table 26. SPSS did not include the Grant Funding Yes variable (4d) because it "was a constant or missing correlations." None of the models was significantly different from the others. The models were examined for result significance and whether the model would be appropriate to theoretical or practical interest, and therefore Model 4i was selected. This model includes all eight variables for administrative support. The significant predictors of this set (see Table 27) are that the school receives support from a technical support person at the educational service agency (b=67.06, p=.011) and the hours spent supporting videoconferencing at work (b=-3.40, p=.050). The other administrative support variables are not significant.

Table 26

Regression Models for Hypothesis 4: Administrative Support Variables Predicting Total Usage

Subhypotheses	R^2	Adj R^2	*df*1/2	FChange	*p*	Significant
4a Hrs Support at Work	.015	-.010	1/40	0.605	.441	NS
4b Hrs Support at Home	.016	-.034	1/39	0.056	.814	NS
4c School Spent	.032	-.044	1/38	0.616	.438	NS
4e Grant Funding Received	.051	-.052	1/37	0.736	.396	NS
4f Who Supports You	.163	-.040	4/33	1.106	.370	NS
4g Speed of Support	.342	.069	4/29	1.965	.126	NS
4h Location of Equipment	.443	.008	6/23	0.701	.651	NS
4i Satisfaction with Location	.486	.043	1/22	1.845	.188	NS

Note. Each of the Who Supports You variables was binary coded (tech at school, tech in district, tech at ESA, vendor). Each of the Speed of Support variables was binary coded (within minutes, within hours, within days, within a week). Each of the Location variables was binary coded (mobile in 1 school, mobile in multiple schools, fixed room, library, computer lab, conference room).

Table 27

Hypothesis 4: Selected Administrative Variables to Maximize the Prediction of Total Usage

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
			Hours and Funding			
Hrs Support Work	-3.400	1.640	-.864	-2.07	.050*	-.404
Hrs Support Home	4.020	2.620	.399	1.532	.140	.310
School Spent	.006	.004	1.190	1.425	.168	.291
Grant Funding	.000	.000	-1.038	-1.281	.214	-.263
			Who Supports You			
Tech at School	2.42	23.09	.020	0.105	.917	.022
Tech in District	16.21	20.50	.196	0.742	.466	.156
Tech at ESA	67.06	24.20	.835	2.720	.011*	.507
Vendor	-40.00	26.29	-.337	-1.522	.142	-.309
			Speed of Support			
Within Minutes	-36.89	36.17	-.471	-1.020	.319	-.213
Within Hours	-53.65	38.62	-.520	-1.389	.179	-.284
Within Days	-21.81	34.41	-.184	-0.634	.533	-.134
Within a Week	47.27	58.63	.262	0.806	.429	.169
			Location of Equipment			
Mobile	-6.55	26.06	-.080	-0.251	.804	-.053
Multiple Systems	-35.15	47.84	-.195	-0.735	.470	-.155
Fixed	19.20	25.47	.175	0.734	.459	.159
Library	-59.31	36.97	-.540	-1.605	.123	-.324
Computer Lab	-67.19	48.54	-.372	-1.384	.180	-.283
Conference Room	-44.74	40.83	-.248	-1.096	.285	-.228
			Satisfaction with Location			
Satisfaction with Location	15.54	11.44	.295	1.358	.188	.278

*$p < .05$. **$p < .01$.

Scales

The next analysis was done on the hypotheses from the subscales.

Hypothesis 5: There is a significant relationship between the technical aspects of videoconferencing and the school's utilization of videoconferencing.

Hypothesis 6: There is a significant relationship between the coordinator's ability to support videoconferencing and the school's utilization of videoconferencing (1 scale with 8 items).

Hypothesis 7: There is a significant relationship between the coordinator's ability to integrate videoconferencing in the curriculum and the school's utilization of videoconferencing (1 scale with 4 items).

Hypothesis 8: There is a significant relationship between the coordinator's ability to work with teachers and the school's utilization of videoconferencing (1 scale with 3 items).

Hypothesis 9: There is a significant relationship between the coordinator's perception of teacher attitudes towards videoconferencing and the school's utilization of videoconferencing (1 scale with 6 items).

Hypothesis 10: There is a significant relationship between the coordinator's perception of the principal's support of videoconferencing and the school's utilization of videoconferencing (1 scale with 2 items).

The regression results are shown in Table 28. The last three models were significant, which include the coordinator's ability to work with teachers (hypothesis 8), the teachers' attitudes towards videoconferencing (hypothesis 9), and the principal support of videoconferencing (hypothesis 10). The models were examined for result significance and whether the model would be appropriate to theoretical or practical

interest, and therefore Model 10 was selected (see Table 29). It includes all of the variables from this hypothesis. The significant predictors in this set were the technical quality of the videoconferencing (b=-12.34, p=.002), the coordinator's perception of the teachers' attitudes towards videoconferencing (b=26.56, p=.000), and the coordinator's perception of the principal's support of videoconferencing (b=7.53, p=.003). Where the schools had a higher quality of videoconferencing they were using videoconferencing less. Where the teachers had a positive attitude towards using videoconferencing, the school had a higher usage score for videoconferencing. Where the principals positively supported videoconferencing, the school had a higher usage score for videoconferencing.

Table 28

Regression Models for Hypotheses 5-10: Subscales Predicting Total Usage

Subhypotheses	R^2	Adj R^2	df1/2	FChange	p	Significant
5 Technical Quality	.013	.009	1/275	3.548	.061	NS
6 Coordinator Support of VC	.013	.006	1/274	0.161	.688	NS
7 Coordinator & Curriculum	.021	.010	1/273	2.006	.158	NS
8 Coordinator & Teachers	.036	.022	1/272	4.429	.036	S
9 Teacher Attitudes	.201	.186	1/271	55.842	.000	S
10 Principal Support	.227	.210	1/270	9.100	.003	S

Combination of Variables

The last hypothesis was tested with multiple linear regression: A combination of these variables can be used to predict the utilization of videoconferencing. The models were built with the variables that were significant in the correlation analyses or the multiple regression analyses, with each major hypothesis as a potential model. The models are shown in Table 30. Model 11e was chosen for its more complete picture of

successful implementation of curriculum videoconferencing. The variables selected are shown in the regression coefficients in Table 31.

Table 29

Hypotheses 5-10: Selected Subscale Variables to Maximize the Prediction of Total Usage

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
5 Technical Quality	-12.34	3.870	-.173	-3.190	.002**	-.191
6 Coordinator Support of VC	-7.73	5.410	-.093	-1.428	.154	-.087
7 Coordinator and Curriciculum	-0.12	3.856	-.025	-0.317	.751	-.019
8 Coordinator and Teachers	1.68	3.481	.038	0.483	.629	.029
9 Teacher Attitudes	26.56	4.784	.362	5.551	.000**	.320
10 Principal Supp	7.53	2.497	.183	3.017	.003**	.181

*$p < .05$. **$p < .01$.

Table 30

Regression Models for Hypothesis 11: A Combination of Variables Predicting Total Usage

Subhypotheses	R^2	Adj R^2	*df*1/2	FChange	*p*	Significant
11a: School Variables	.147	.141	2/270	23.287	.000	S
11b: Coordinator Variables	.287	.260	8/262	6.434	.000	S
11c: ESA Variables	.292	.259	2/260	0.874	.419	NS
11d: Admin Variables	.295	.257	2/258	0.650	.523	NS
11e: Subscales	.429	.383	6/252	9.782	.000	S

The significant predictors in this set are the school level as elementary (*b*=15.269, *p*=.000), the "other" ethnicity, which was mostly First Nations and Native American (*b*=26.249, *p*=.000), the level of education of the coordinator as 2 years of college (*b*=20.544, *p*=.002), the job title of the coordinator as paraprofessional (*b*=31.413,

Table 31

Hypothesis 11: Selected Variables to Maximize the Prediction of Total Usage

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
School Variables						
Level: Elementary	15.269	4.144	.212	3.685	.000**	.175
Ethnicity: Other	26.249	6.863	.200	3.825	.000**	.182
Coordinator Variables						
Gender: Female	6.422	4.408	.078	1.457	.146	.069
Level of Ed: 2Year	20.544	6.573	.160	3.125	.002**	.149
Job Title: Parapro	31.413	12.547	.129	2.504	.013*+	.119
Job Title: Teacher	11.752	5.071	.128	2.318	.021*+	.110
Job Title: Tech Sp	-.340	4.257	-.004	-0.080	.936	-.004
Years Experience with VC	-.517	0.600	-.047	-0.863	.389	-.041
Type Training: Mostly Technical	-5.331	4.031	-.068	-1.322	.187	-.063
Time to Support VC: Other	-10.465	5.324	-.102	-1.966	.050*+	-.094
Educational Service Agency (ESA) Variables						
ESA Facilitates VCs: Yes	3.165	3.894	.044	0.813	.417	.039
Support by ESA Tech Person	4.486	3.986	.062	1.125	.261	.054
Administrative Variables						
Location: Mobile Cart	2.695	4.137	.036	0.651	.515	.031
Location: Multiple Systems	-8.015	4.908	-.089	-1.633	.104	-.078

Table 31 — *Continued.*

Variable	*b*	*SE*	*Beta*	*t*	*p*	Part correlation
			Subscale Variables			
Videoconference Quality	-7.612	3.599	-.106	-2.115	.035*+	-.101
Supporting Videoconferences	-.690	5.302	-.008	-0.130	.897	-.006
Curriculum Integration	-.960	3.695	-.020	-0.260	.795	-.012
Working With Teachers	2.112	3.265	.047	0.647	.518	.031
Teacher Attitudes	24.902	4.431	.333	5.619	.000**	.268
Principal Support	3.167	2.323	.077	1.363	.174	.065

+These variables are nonsignficant when using the Bonferroni correction.
*$p < .05$. **$p < .01$.

Table 32

Cross Validation of Prediction Formula

	Hypothesis 11 R^2	Cross Validation R^2	Shrinkage
Random Sample of 50% of the Cases	.429	.423	1%
Second Random Sample of 50% of the Cases	.429	.416	3%

p=.013), the job title of the coordinator as teacher (*b*=11.752, *p*=.021), the time to support videoconferencing: other, which is the coordinators who are responsible for the equipment but do not see "coordination" as part of their responsibility (*b*=-10.465, *p*=.050), the scale for videoconference quality (*b*=-7.612, *p*=.035), and the scale for teachers' attitudes towards videoconferencing (*b*=24.902, *p*=.000). All of these variables positively affect the school's total usage score, except the videoconference quality and the time to support videoconferencing: other, which both show a negative relationship with the school's total use of videoconferencing.

Cross Validation

To determine the stability of the regression prediction shown in Table 31, cross validation was performed using a random sample of half of the cases in the study. The results are shown in Table 32. Two random samples were analyzed to ensure a reliabile result. The results of this study are satisfactorily stable with a very small shrinkage.

Conclusion

In this chapter, the descriptive statistics for each variable were reported. A factor analysis was completed on the subscales, and two factors were extracted. The first factor was the coordinator's ability to support and promote videoconferencing in the school, and the second factor is the coordinator's perception of the staff support of videoconferencing. These factors explain 67% of the variance of the scale and the coordinator's ability explains most of the variance.

Correlations for each set of variables were analyzed with the total utilization score. Four of the school demographic variables were significantly related to the total usage score and all but two of the coordinator demographic variables were significantly related to the total usage. Four of the coordinator job titles, two experience variables, and a training variable were significantly related to the total usage of videoconferencing. Only one of the educational service agency variables was correlated to the utilization of videoconferencing. None of the administrative and financial support variables were significantly correlated to the utilization of videoconferencing. Two of the videoconference system location variables were significantly correlated to the utilization of videoconferencing. The K12 Curriculum Videoconferencing Implementation Scale was significantly positively correlated to the school's use of videoconferencing.

Multiple regression was also performed on each hypothesis and the results reported. Eleven hypotheses were analyzed with multiple regression, with 36 models considered. Fourteen of the models were significant. The final prediction model included the significant variables of elementary level, "other" ethnicity, 2 years of college, paraprofessional job title, teacher job title, "other" time to support videoconferencing, the subscale of videoconference quality, and the subscale of teacher attitudes. The non-significant variables in the final prediction model were female gender, tech specialist job title, years of experience with videoconferencing, mostly technical type of training, educational service agency facilitates videoconferences, technical support from the educational service agency, mobile cart location of system, multiple systems location of system, the subscale of coordinator's ability to support videoconferencing, the subsclae of the coordinator's abilty to integrate videoconferencing in the curriculum, the coordinator's ability to work with teachers, and the coordinator's perception of principal support. Cross validation was used to determine that the regression predition is satisfactorily stable with very small shrinkage.

In the next chapter, the results are discussed and recommendations for practice and future research are shared.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter contains a summary of the study, which includes a review of the problem, procedures, and research hypotheses. Finally, conclusions from the research are shared, along with recommendations for practice, and recommendations for further research.

Summary of the Study

In this section, the problem of the study is reviewed, followed by a summary of the procedures used in the study. The research hypotheses are listed.

Problem

Videoconferencing has the potential to bring quality learning experiences to students in the classroom. However, some schools purchase equipment that is then rarely used. Wakefield (1999) and Keefe (2003) emphasize the role of the coordinator as critical to the successful implementation of videoconferencing. The role of the coordinator and factors affecting their ability to support videoconferencing in relationship to the utilization of videoconferencing in the school have not been thoroughly studied. The focus of this study is the videoconference coordinator and their influence on the utilization of videoconferencing in the school.

Purpose

This study investigated the coordinator's ability to support videoconferencing, to integrate videoconferencing in the curriculum, and the technical and administrative issues that affect the coordinator's ability to support videoconferencing. The study analyzed how these factors predict the utilization of videoconferencing in the school.

The two major contributions of this study are a measure of the usage of curriculum videoconferencing, and the ability to predict usage from a multidimensional conceptualization that includes education service agency support, technical support, location of equipment, administrative support, school level coordinators, teacher attitudes, and principal support.

Procedures

The research design for this study was *ex post facto*, where variables are assigned and have already occurred. Since the variables cannot be manipulated, causation cannot be determined. However, inferences can be made about the relationships among the variables. The population studied was that of school videoconference coordinators, who are usually media specialists, teachers, paraprofessionals, or instructional technology personnel. A snowball sample method was used to access videoconference coordinators on five listservs, the Read Around the Planet database, and the videoconference coordinators served by Berrien Regional Education Service Agency where I work. The K12 Curriculum Videoconferencing Implementation Scale was developed from previous qualitative research (Freed & Lim, 2009) on the issues and barriers to successful implementation of videoconferencing. An online survey was sent to the listservs and contacts via email. The survey included the K12 Curriculum Videoconferencing Implementation Scale and other questions related to demographics and administrative

support. The survey was open for about 6 weeks during May and June 2008 and 277 responses were collected. Statistical analysis included reporting the descriptive statistics, the correlations between variables, and the utilization of videoconferencing, and then using multiple regression analysis to determine which variables predict utilization of videoconferencing.

Research Hypotheses

The research hypotheses examine a variety of variables for their relationship with the school's utilization of videoconferencing. These hypotheses were derived from a previous qualitative study on coordinator concerns and barriers to using videoconferencing (Freed & Lim, 2009), and reinforced with insights and data from previous research on the implementation of videoconferencing specifically and instructional technology in general.

Hypothesis 1: There is a significant relationship between one or more of demographic variables of the school and the school's utilization of videoconferencing.

Hypothesis 2: There is a significant relationship between one or more of the demographic variables of the coordinator and the school's utilization of videoconferencing.

Hypothesis 3: There is a significant relationship between one or more of the educational service agency support variables and the school's utilization of videoconferencing.

Hypothesis 4: There is a significant relationship between the administrative, financial, and technology support structures and the school's utilization of videoconferencing.

Hypothesis 5: There is a significant relationship between the technical aspects of videoconferencing and the school's utilization of videoconferencing.

Hypothesis 6: There is a significant relationship between the coordinator's ability to support videoconferencing and the school's utilization of videoconferencing.

Hypothesis 7: There is a significant relationship between the coordinator's ability to integrate videoconferencing in the curriculum and the school's utilization of videoconferencing.

Hypothesis 8: There is a significant relationship between the coordinator's ability to work with teachers and the school's utilization of videoconferencing.

Hypothesis 9: There is a significant relationship between the coordinator's perception of teacher attitudes towards videoconferencing and the school's utilization of videoconferencing.

Hypothesis 10: There is a significant relationship between the coordinator's perception of the principal's support of videoconferencing and the school's utilization of videoconferencing.

Hypothesis 11: A combination of these variables can be used to predict the utilization of videoconferencing.

Conclusions

The major findings of this study are a better understanding of who may be the best videoconference coordinator in a school, of the importance and design of educational service agency support, of the non-significance of some of the administrative variables, and of the development of a scale that has good reliability and validity estimates that can predict the usage of videoconferencing. In addition, a multidimensional perspective was developed to predict the usage of videoconferencing

that includes school and coordinator demographics, administrative support variables, and the K12 Curriculum Videoconferencing Implementation Scale.

In this section, each hypothesis is examined in detail. Each hypothesis in this research seeks to examine the relationship between a set of variables and the school's use of videoconferencing.

Utilization

Three measures were used to measure the school's utilization of videoconferencing: The total events from the 2007-2008 school year, the total student events from the 2007-2008 school year, and the percentage of teachers who used videoconferencing in the 2007-2008 school year. These three scores were then added together to arrive at a total utilization score. All of the hypotheses compare various variables to the school's utilization of videoconferencing as measured by these three scores added together.

The total events for the 2007-2008 school year ranged from 0 to 60 videoconference events, with a mean of four events. The total student events for the 2007-2008 school year ranged from 0 to 68, with a mean of four events. The percentage of teachers who used videoconferencing ranged from 0 to 100%, with a mean of 26% of the teachers in a school using videoconferencing in the school year. The total utilization score was a sum of these three scores, and ranged from 0 to 180, with a mean of 35 as shown in Table 33. These data show that most of the schools were using videoconferencing less than the top videoconferencing schools represented in the study.

Table 33

Utilization Descriptives

Variable	Calculation	*n*	Min	Max	Mean	*SD*
(A) Total Events Utilization	Events / # Students * 100	277	0	60.00	4.221	6.870
(B) Student Events Utilization	Std. Events / #Students *100	277	0	67.83	4.374	8.506
(C) Percent Teachers Utilization	Teachers Used VC / Total Teachers	277	0	100.00	26.598	27.919
Total Usage Score	A+B+C	277	0	180.00	35.193	35.574

Demographic Variables of the School

The first hypothesis was: There is a significant relationship between one or more of demographic variables of the school and the school's utilization of videoconferencing. The first demographic variable that was significantly correlated to the school's use of videoconferencing was the level of the school. Subjects chose from the options of elementary, middle school, high school, and all levels. The elementary schools were using videoconferencing significantly more than the average of the other levels (r=.280, p=.000). The high schools used videoconferencing less (r=-.194, p=.001), and where the coordinators support all levels, the schools used videoconferencing less (r=-.202, p=.001). It is not surprising that where the coordinators support several schools (all levels); the schools are using it less. Wakefield (1999) describes the coordinator's roles as including technical support and scheduling, and Straessle (2000) adds the roles of advocate and instructional consultant. These roles are difficult to play well when the coordinator is not based in the school.

The result of the elementary schools using videoconferencing more may be surprising, until one considers the challenges of real-time experiences for the middle- and

high-school schedules. Freed and Lim (2009) found that scheduling was a significant concern for coordinators implementing videoconferencing. Middle and high schools have tight schedules, with multiple sections of classes needing to experience the same instructional activities. This scheduling challenge makes it difficult for these teachers to adequately and fairly bring videoconferencing experiences to each of their classes (Wideman et al., 2004). Elementary schools have more flexible schedules and more flexible curriculum. A system for addressing the scheduling challenges is important to the sustainability of the innovation (Baber, 1996).

Another reason that middle and high schools may use videoconference less is that the students are self-conscious and prefer not to be on camera (Eales et al., 1999). Some students enjoy watching the interaction but do not want to talk or be seen. Owston (2007) emphasized the importance of students' support of the innovation, and their discomfort with videoconferencing may contribute to middle schools and high schools using it less. The use of ice-breakers and increased confidence on the teachers' part may minimize some of this discomfort (Jones & Sorenson, 2001).

Population and poverty scores were not significantly correlated to the school's use of videoconferencing. This result is not surprising because all students can benefit equally from the engaging learning experiences provided by videoconferencing. The results for the ethnicity of the students are intriguing. The only ethnicity that was using videoconferencing significantly more than the others was the "other" category (r=.202, p=.001). Upon examination of the write-ins for the other category, 16 out of 22 wrote in Native American or Canadian First Nations. It may be that the remote and rural Native American and First Nations schools find videoconferencing an appealing way to bring outside experiences to their students. It may also be that these schools are smaller in size,

and therefore were able to score higher on the percentage of teachers using videoconferencing, which would push their total usage of videoconferencing score much higher in comparison to larger schools.

After correlations were examined, multiple regression was used to determine which variables predict the use of videoconferencing in schools. A model using the School Level, Ethnicity, and Population variables was chosen for its usefulness (adjusted R^2 of .191). The significant predictor variables were High School and All Levels as predicting a lower use of videoconferencing, the "other" ethnicity as predicting a higher use of videoconferencing, and the population, predicting a slightly lower use of videoconferencing as the population rises. The data suggest that schools in larger populated areas may use videoconferencing slightly less than those in the rural areas. Urban schools may use videoconferencing slightly less because they have more access to resources such as zoos and museums, whereas rural schools tend to rely on videoconferencing to access these learning opportunities. It may also be that additional funding such as the United States Department of Agriculture Rural Utilities Service Distance Learning and Telemedicine Grant for rural schools provides more access than is available for more urban schools.

Demographic Variables of the Coordinator

The second hypothesis was: There is a significant relationship between one or more of the demographic variables of the coordinator and the school's utilization of videoconferencing. The variables examined in this hypothesis included the coordinator's job title, years of education experience, years of videoconferencing experience, level of education, type of training received, age, gender, home country, hours of training, ethnicity, and amount of time to coordinate videoconferencing. These demographic

variables have not been addressed in the literature reviewed, so this study adds to the understanding about videoconferencing coordinators.

The female gender of the coordinator correlated positively with the usage of videoconferencing (r=.152, p=.012). The gender correlation may be explained when noticing from hypothesis 1 that the schools at the elementary level are using videoconferencing more. Elementary schools tend to have a majority of female teachers, so the teachers may relate better to a female coordinator.

The level of education variable results are intriguing. There was a positive relationship between the coordinator with a 2-year degree and the school's use of videoconferencing (r=.223, p=.000). There was a negative correlation between the use of videoconferencing and coordinators with a Master's (r=-.154, p=.011) or PhD level (r=-.126, p=.036). However, this result may be explained by considering the job title correlations. The school paraprofessional coordinators correlated positively with the use of videoconferencing (r=.220, p=.000). The paraprofessional usually has a 2-year college degree, and therefore does not have full-time teaching responsibilities. The paraprofessional coordinator may have more time to support videoconferencing than the teacher or librarian coordinators who have teaching responsibilities to fill up their day. In addition, school paraprofessionals by definition and training see their responsibility as supporting teachers (Lockett, 2008) and therefore may do well supporting teachers in videoconferencing as well.

Teacher coordinators were also correlated positively to the use of videoconferencing in the school (r=.155, p=.010). While teachers are very busy, it may be that they have more credibility with other teachers because they have used videoconferencing successfully in their own classroom before convincing other teachers

to do the same. The technology specialist job title was negatively correlated to the use of videoconferencing (r=-.144, p=.016), and this result may be because the technology specialist has so many other technologies to fix, support, and promote that videoconferencing may not have the priority. Some of the significant differences between the job title of the coordinators (teachers, media specialists, or paraprofessionals) may be evident only because there are a very small number of paraprofessionals included in the study. If more were included, the differences may no longer be significant.

The variable of Canada as the country of origin (r=.158, p=.008) had a positive correlation with the use of videoconferencing, whereas the variable of the United States as the country correlated negatively with the usage (r=-.196, p=.001). The country correlations found in this study should be considered carefully due to the large sample from the United States compared to the other countries. The significant differences between countries are probably not representative due to the relatively smaller number of respondents from countries outside of the United States. However, this result may be explained by realizing that the majority of the Canadian respondents were from First Nations schools located in remote rural areas. These schools may have smaller numbers of teachers, and therefore find it easier to score high on the percentage of teachers using videoconferencing, which boosts the total usage score. In addition, remote rural schools may find more value in videoconferencing due to less access to global learning experiences and cultural institutions locally.

Another variable that correlated negatively with the usage was the coordinator's age (r=.142, p=.023) and the coordinator's years of experience in education (r=-.130, p=.032). This result may be explained by the tendency of younger educators to be more enthusiastic about technology, although there are certainly exceptions to this inclination.

However, the coordinator's years of experience with videoconferencing (r=-.154, p=.010) correlated negatively with the school's use of videoconferencing. Why are more years of videoconference experience correlated negatively with the use of videoconferencing? This result may be because there was an early novelty effect in the use of videoconferencing in the school (Wideman et al., 2004). It may also be that other newer technologies have taken precedence. Staying up to date with technology is exhausting and stressful with all new learning required for changes in technology. Further research is warranted to understand why the coordinator's years of videoconference experience is negatively correlated with the use of videoconference.

The variable of receiving mostly technical training was negatively correlated to the school's use of videoconferencing (r=-.121, p=.044). Each of the other choices on this item included some training on how to use videoconferencing in the curriculum. It seems clear that coordinators who know only how to operate the equipment and troubleshoot are not able to help teachers use videoconferencing in the curriculum. This skill is critical for the successful implementation of videoconferencing in the curriculum (Owston, 2007).

For the variable of time to support videoconferencing, the "other" choice was negatively correlated to the school's use of videoconferencing (r=-.132, p=.028). The study participants selected from four choices: full-time coordinator, part-time coordinator, coordinator on top of a regular job, and other. Upon examination of the write-in responses for "other," it appears that the participants who chose "other" did not see themselves as a coordinator. They were responsible for the equipment, but they did not see "coordination" as part of their responsibilities. This attitude may explain why

their schools are using videoconferencing less; they are not promoting it as much as the other coordinators do.

The multiple regression analysis confirms the bivariate correlation results with the 2-year degree, female, U.S. as home country, full-time coordinator, part-time coordinator, and "on top of regular job" variables as the significant predictors for this model.

Educational Service Agency Variables

The third hypothesis was: There is a significant relationship between one or more of the educational service agency support variables and the school's utilization of videoconferencing. An educational service agency (ESA) is an organization that provides support to the local districts, such as Board of Cooperative Education Services in New York, and Education Service Center in Texas. Four variables were examined: Support by an ESA, ESA facilitates videoconferencing, ESA subsidizes videoconferencing, and percentage of videoconferences provided by the ESA. The only variable of these that was correlated to the school's use of videoconferencing was the ESA facilitates videoconferences for the school (r=.120, p=.046). There was a correlation between the variables, however, which shows that ESAs that facilitate videoconferences also tend to subsidize videoconferences for the schools (r=.383, p=.000), and the percentage of videoconferences from the ESA is higher for those schools (r=.316, p=.000).

The regression analysis confirmed the bivariate correlation results. The model chosen included the two variables of whether the school has support from an educational service agency, and if the educational service agency facilitates videoconferences for the school. The significant predictor was whether the ESA facilitates videoconferences for the school or not. This result confirms the suggestion by Currie (2007) that educational service agencies should offer programming to their local schools. Schools that receive

content facilitated by their educational service agency are using videoconferencing more than those that do not have access to or take advantage of this service. The educational service agency can be one of the ways to provide external support for the innovation (Owston, 2007).

Administrative, Financial, and Technology Support Variables

The fourth hypothesis was: There is a significant relationship between the administrative, financial, and technology support structures and the school's utilization of videoconferencing. The variables examined included Hours Supporting Videoconferencing at Work, Hours Supporting Videoconferencing at Home, School Spent on Videoconferencing, Grant Funding, and Amount of Grant Funding. None of these variables were significantly correlated to the use of videoconferencing. Although coordinators often complain about the time it takes to support videoconferencing (Freed & Lim, 2009), the amount of time they put in is not significantly related to the school's use of videoconferencing. In addition, some schools cite lack of funds for programming as a barrier to use videoconferencing (Freed & Lim, 2009); however, there is not a significant correlation between the amount spent on videoconferencing, whether the school had grant funding, or the amount of grant funding with the use of videoconferencing in the school. This result suggests that many of the successful schools in this study are finding plenty of free programs to sustain their videoconference program. None of the support personnel or speed of support variables were significantly correlated to the school's use of videoconferencing.

The locations of the equipment that were significant were a mobile cart within one school (positively correlated, r=.151, p=.012) and multiple systems in multiple locations (negatively correlated, r=-.136, p=.024). The data suggest that it may be best to

have a videoconference coordinator located in one school supporting one mobile videoconference cart compared to a coordinator responsible for videoconferencing in multiple schools with more than one system. The latter coordinators may be stretched too thin to successfully support videoconferencing. The reasons for the location of the equipment and the satisfaction for the location of the equipment were not correlated to the use of videoconferencing. However, schools that decided to place equipment based on ease of use for teachers were more satisfied with the location of the equipment (r=.278, p=.000) than those that put the equipment in the only available room (r=-.192, p=.001).

Interestingly, when building a regression model with these variables, only two of the administrative support variables were significant predictors. The hours spent supporting videoconferencing at work had a small negative B weight (b=-3.40, p=.050). This result may be because these coordinators are responsible for more units and therefore spread too thin. Other explanations may be valid as well. The other significant predictor was that of support from a technical person at the educational service agency. The data suggest that of all the administrative variables in this section, it may be most effective to support schools administratively by providing a technical support person for videoconferencing at the educational service agency who is available to assist schools with the technical aspects of using videoconferencing.

Scale Variables

The last set of hypotheses is based on the K12 Curriculum Videoconferencing Implementation Scale developed for this study. The Scale was developed because no appropriate measurement existed. The Scale was developed based on the comments by coordinators in the Freed and Lim study (2009) as they described the challenges of

implementing videoconferencing in their schools. This study expanded those qualitative findings into a scale that could be used to predict usage of curriculum videoconferencing. The subscales looked at the videoconference quality, the coordinator's ability to support videoconferencing, the coordinator's ability to integrate videoconferencing in the curriculum, the coordinator's ability to work with teachers, the coordinator's perception of teachers' attitudes towards videoconferencing, and the coordinator's perception of principal support of videoconferencing. The quality of the videoconference was not correlated to the school's use of videoconferencing, which suggests that if teachers and coordinators see value in the curriculum content received, they can be quite tolerant of some freezing and pixelation in the videoconference as long as the content is understandable. The quality of the videoconference does have a small positive correlation to the teachers' attitudes (r=.152, p=.012), so it is certainly still an important factor in the use of videoconferencing.

The other three subscales that correlate with the school's use of videoconferencing are the coordinator's ability to work with teachers (r=.139, p=.021), the coordinator's perception of the teacher's attitudes (r=.405, p=.000), and the principal's support of videoconferencing (r=.320, p=.000). Two of these scales seem to be out of the coordinator's control, but on further examination, the coordinator's ability to support videoconferencing, integrate it in the curriculum, and work with teachers are all correlated both to the teachers' attitudes and the principal's support of videoconferencing. The data suggest that a complete relationship of staff support may include the principal supporting the coordinator and teachers' use of videoconferencing, the coordinator positively impacting teachers' attitudes towards videoconferencing, and

the teachers having a positive attitude towards videoconferencing as encouraged by the coordinator.

From a closer examination of the items in each subscale, it may be inferred what actions may be able to increase the teachers' positive attitudes towards videoconferencing. The scale of supporting videoconferencing includes being comfortable with technology in general and specifically with videoconferencing. The coordinator needs to be able to use the videoconference controls, help the teachers schedule videoconferencing, complete the necessary test calls, make the connection work, stay with the teachers during the videoconferencing, and orient the students to the videoconference. In supporting the curriculum use of videoconferencing, the coordinator needs to know how to find programs that are appropriate for the curriculum and help teachers know how to prepare students for a videoconference. The coordinator also needs to be able to motivate and encourage teachers to use videoconferencing, to help teachers make time for videoconferencing, and overcome their reticence to using the videoconferencing. Training also can help improve teachers' attitudes towards videoconferencing. This subscale includes teachers' ability to find and design their own activities for videoconferencing, interest in videoconferencing, experience with videoconferencing, making time for videoconferencing, and starting to use the camera controls on their own. This training may come from the coordinator or another source such as the educatioanl service agency, which may partly explain why the coordinator's skills in teaching this to the teachers are not significant.

The regression analysis confirmed the bivariate correlation results. The best model for predicting use of videoconferencing included all the subscales. The subscales that were significant predictors were the technical quality of the videoconference, the

teachers' attitudes towards videoconferencing, and the principal's support of videoconferencing. Interestingly, the technical quality had a negative B weight (-12.34, p=.002), which may suggest that schools with high-quality videoconferencing are using it less than those with average quality. It may be that in these cases, more funding and effort have gone into the infrastructure for videoconferencing and not enough into the staff support and curriculum integration of videoconferencing.

A Combination of Predictor Variables

The last hypothesis was: A combination of these variables can be used to predict the utilization of videoconferencing. Multiple linear regression was used to determine the best combination of variables. Cross validation was used to determine if this prediction formula is stable, and it is sufficiently stable.

The school variables included for their significance in previous analyses were the level of the school as elementary (b=15.269, p=.000), and the ethnicity of the school as other (mostly First Nations and Native Americans, b=26.249, p=.000). Both of these variables were significant predictors of the school's use of videoconferencing. Although schools cannot control the ethnicity of the students who attend, school districts just starting in videoconferencing may find it most effective to begin installations at the elementary level to gain the best results for their investment.

The coordinator variables included were the gender of the coordinator: female, the level of education as a 2-year college degree, the job titles of paraprofessional, teacher, and technology specialist, years of experience with videoconferencing, mostly technical type of training, and time to support videoconferencing: other, which was the option coordinators chose when they felt they were not responsible for "coordinating" videoconferencing. Schools certainly should not use the gender of an educator as

selection criteria for a coordinator for videoconferencing; however the data and other research suggest that it may be wise to select someone who has a good relationship with the other teachers (Aten, 1996). It appears from the data that selecting a paraprofessional or a teacher (or pair of teachers) as the coordinator is better than the other choices, with the technology specialist a less desirable choice for coordinating videoconferencing. The paraprofessional may be a better coordinator because she sees her responsibility as a supporting role for teachers with a natural support role for videoconferencing. It may also be that a teacher has more credibility with the other teachers once she has used videoconferencing successfully in her own classroom.

Many of the administrative variables that seemed important in the coordinator's concerns expressed in previous qualitative research (Freed & Lim, 2009) did not show up as significant in this research. The need for funding for programming was not as evident in this study as in the Freed and Lim (2009) study. Those data were from 2004, when schools were still mostly in the second wave of videoconferencing, using content providers for programming (Greenberg, 2006). Funding to pay the content providers was very important in those days of curriculum videoconferencing. These data were collected in the spring of 2008, when many schools are using free collaborative projects as a staple for their distance learning program, and funding for programming might not have been as essential.

However, one variable was significant: the location of the equipment. Where the coordinator was responsible for a mobile unit in one school, the school was using videoconferencing more. Where the coordinator was responsible for multiple systems in multiple locations, there was less use of videoconferencing. This result suggests that a coordinator within the school to promote and support the use of videoconferencing is

critical to a successful implementation. It is probably also important that the coordinator have support and training from the district or regional level, but it is still important to have a coordinator "on the ground" (Owston, 2007).

The K12 Curriculum Videoconferencing Implementation Scale provides a more complete picture of how the school is doing with implementing videoconferencing. The subscales that were significant predictors in this set were the Videoconference Quality and Teachers Attitudes. The Videoconference Quality subscale is a negative predictor (b=-7.612, p=.035); as the quality goes higher, the school is using videoconferencing somewhat less. This results sounds contradictory to what one would expect, however, when one looks closely, in some states funding has primarily been invested in infrastructure and bandwidth with less investment in training, content, and support of curriculum videoconferencing. Owston (2007) found that essential conditions for the sustainability of classroom innovations include administrative support, teacher support, teacher professional development, student support, and perceived value of innovation. It may be that where the emphasis has been on high bandwidth and quality infrastructure, the quality of the videoconference is excellent, but the other essential conditions have been neglected. It may also be that schools that regularly experience high quality are less tolerant of freezing and pixilation in the video quality.

The Teacher Attitudes subscale is a strong positive predictor (b=24.902, p=.000), and it seems logical that the schools would have a higher use of videoconferencing when the teachers have a positive attitude towards it. The challenge is how to increase teachers' positive attitudes towards videoconferencing or new technologies in general. Elliot (2003) suggests a program for training to build teacher confidence which includes actual conferences and starting off with bringing virtual visitors to the classroom. Owston

(2007) suggests that teachers need to perceive the value of the innovation, so further work may be necessary to determine the value of curriculum videoconferencing and the best ways to assist teachers in perceiving that value.

The data in this study included 53 Michigan cases, some of which are the coordinators in my service area. I work at an educational service agency in Michigan, supporting 70 schools with videoconferencing in 22 school districts. There may have been some research bias introduced with the inclusion of my videoconference coordinators in the study. Therefore, a cross validation test was run without the 53 Michigan cases to determine if the prediction model is still valid without my own schools in the study. Compared to the predicted R^2 of .429, the cross validation without my school is .373. There is more shrinkage of 13%; however, it is still within acceptable ranges.

Unexpected Findings

The unexpected findings in this study included the lack of significance of administrative support variables such as the funding for videoconference programming and the amount of time spent supporting videoconferencing. Coordinators have complained of the time it takes to support videoconferencing (Freed & Lim, 2009); however, the amount of time they put in was not found to be significantly related the school's use of videoconferencing. Some schools cite lack of funds for programming as a barrier to use videoconferencing (Freed & Lim, 2009); however, there was no significant correlation between the amount spent on videoconferencing, whether the school had grant funding, or the amount of grant funding with the use of videoconferencing in the school. This result suggests that many of the successful schools in this study are finding plenty of free programs to sustain their videoconference program.

Another surprising finding was that the years of experience correlated negatively with the use of videoconferencing. The novelty effect or overloading of new technologies may explain this result. Staying up to date with technology can be exhausting and stressful.

The negative B weight of the technical quality section of the Scale (-12.34, p=.002) in the multiple linear regression was also a surprising finding. It may be that schools with a greater need are more tolerant of the media and are using it more often (Carville & Mitchell, 2001). It may also be that schools with fiber or high bandwidth and high-quality videoconferencing experience are using videoconferencing less than those with average quality. This result is a caution to those who would spend funding mainly on infrastructure, to the neglect of programming, training, and support required to successfully support a videoconferencing program.

Recommendations for Practice

The research results presented contribute to the literature and research on videoconferencing. The results also contribute several recommendations for practice that will be useful to educators in the field implementing videoconferencing. This study contributes to a better understanding of the coordinator and school demographics that are related to the use of curriculum videoconferencing, the importance and design of educational service agency support, and the location of the videoconference system.

In this study, a multidimensional perspective was developed to predict the usage of videoconferencing that includes school and coordinator demographics, administrative support variables, and the K12 Curriculum Videoconferencing Implementation Scale. The stability of these predictor variables is good, with very little shrinkage in cross-validation tests. The predictor variables suggest a picture of a successful videoconference

program. A successful videoconference program may be more effective by beginning with installation of a mobile cart in an elementary school. The data suggest that videoconferencing in the school may be more successful when supported by one videoconference coordinator in the school, who has principal support and technical and content support from an educational service agency. From the results of this research, we can infer that an effective coordinator would have received training on how to integrate videoconferencing in the curriculum, and is either a teacher or a media aide/paraprofessional working in the school. In addition, it appears important that everyone in the support team has strategies to assist teachers in seeing the benefit of videoconferencing to their students. These recommendations and others are now described in detail.

1. *Use the K12 Curriculum Videoconference Implementation Scale*. One important contribution of this study is the development of the K12 Curriculum Videoconferencing Implementation Scale. This Scale has good estimates of reliability. The Cronbach's alpha score of .851 shows that the Scale has good internal consistency. The test-retest measure of reliability was also strong (r=.950, p=.000). In addition, the Scale was reviewed twice in development to gain expert judge validity. The components of the survey were developed from a qualitative analysis of the coordinator's concerns of implementing videoconferencing, and correlated to previous research in several main research studies. A scale of this type did not exist before this research, and the new Scale can now be utilized to understand the training and support needs of the school-level coordinator. District or educational service agency level personnel may find the Scale useful in evaluating the needs of the school level coordinators that they support so they can plan programs and training acccordingly.

2. *Choose the School Level Videoconference Coordinator Carefully.* The role of the coordinator to promote and support videoconferencing is supported by this research. It appears best to have the videoconference coordinator responsible for one unit in their building. Coordinators who are paraprofessionals or who have a 2-year degree seem to have more time to support videoconferencing. Teachers are also a great choice as a videoconferencing coordinator, as long as they are given plenty of technical support. When choosing a coordinator, remember that the majority of the coordinators surveyed in this study were technology specialists or media specialist/librarians. The correlations for paraprofessional and teacher were fairly low correlations. Therefore consider the people available, who interacts most successfully with the teachers (Aten, 1996), and has a good understanding of how to encourage teachers to use new technologies in their curriculum. The ability to increase teachers' comfort level with videoconferencing is also critical, as the teacher attitudes were such an important predictor in this study. If the coordinator can help teachers feel comfortable with videoconferencing, the school may be more successful in implementation.

While the amount of time the coordinator has to support videoconferencing may vary, it is also important that the coordinator perceive their function as including "coordination" – including promoting videoconferencing to the teachers and helping them to be successful in integrating videoconferencing in their curriculum. While the supporting videoconferencing subscales were not correlated to the use of videoconferencing, they were correlated to the teacher attitudes, which are correlated to the school's use of videoconferencing. Thus it seems important that the coordinator be able to successfully work with teachers. School districts planning for the implementation of videoconferencing may consider rotating the coordinator position so that one person

does not get burnt out on the responsibilities. This may reduce the effects of the decline in use over longer years of experience with videoconferencing by the coordinator.

3. *Provide Proper Videoconference Coordinator Training*. The data suggest that training for coordinators should include not only how to use the videoconferencing system, but also how to integrate videoconferencing in the curriculum. Teachers and coordinators both need to see the curriculum value of videoconferencing (Owston, 2007). Just technical training on how to use the system is not sufficient. Coordinators need to know how to make the connections, and also how to help teachers select programs, see how to arrange their time for videoconferences, how to assist teachers with student preparation, and how to help teachers experience their first videoconference and overcome reticence. In addition, coordinators may need assistance with training the teachers. Teachers need to experience videoconferencing, see how it can enhance their curriculum instruction, and understand exactly what students will do in a videoconference. In addition, training can assist teachers is designing activities, building partnerships, gaining confidence (Moss et al., 1997). Training should include the principal as well, so that adequate encouragement and support for the use of videoconferencing will be given to the teachers and coordinator.

4. *Create Positive Teacher Attitudes and Principal Support*. While the coordinator is important to the support of videoconferencing, the data suggest that the teacher attitudes and the principal support play a greater role in the succcessful use of videoconferencing. Particular attention should be paid to improving teacher attitudes and principal support of videoconferencing. The staff need to have successful experiences with videoconferencing, which can be arranged with demonstrations during staff meetings or inviting other teachers and the principal to view a successful

videoconference. Teachers need extensive support with finding, scheduling, and preparing for their first few videoconferences. This support helps them overcome their fear and reticence for using an unknown technology. Once they see the benefit to their students, as Owston (2007) suggests is so important, such extensive support may not be as necessary.

5. *Install Mobile Carts in Elementary Schools*. The results of this study suggest two recommendations for the installation of equipment for curriculum videoconferencing. If a school cannot afford to purchase equipment for all the schools in the district, planners may be more effective by installing systems first in the elementary schools. An investment into curriculum videoconferencing at the elementary level may provide opportunities to more students than at the middle- and high-school levels. Beginning with elementary level may prepare the rest of the district to successfully adopt curriculum videoconferencing. In addition, mobile carts seem to be the most effective as opposed to computer labs, fixed rooms, or the library. The mobile carts can be moved throughout the school so videoconferences can occur in the classroom, the auditorium, the library, or even an empty room. This flexibility allows the school to adjust the location of the videoconferencing equipment as dictated by the needs of the learning experience instead of being stuck with a specific fixed location.

6. *Pursue Free Collaborative Programming*. Many of the content providers that offer content to schools have high-quality programs, yet the programs have a cost (BerrienRESA, 2009b). These programs are appropriate to supplement learning as budgets and grant funding allow. However, videoconferencing can be used to integrate in the curriculum effectively and at no cost by connecting with other schools for engaging learning experiences. Students of all abilities can connect to peers globally for quality

learning experiences (Abbott et al., 2004; Thurston, 2004), to practice language learning (Norwood, 2006), for literature clubs (Howland & Wedman, 2003), to compare weather (Yost, 2001), and to share art projects (Cifuentes & Murphy, 2000b) to name a few examples. Resources are available on the Internet to support these types of learning activities. A booklet of collaborative project templates can be used to design videoconference learning experiences (Lim & Comer, 2009) and then educators can use the CILC Collaboration Center (CILC, 2009) or Collaborations Around the Planet (TWICE, 2009) to find partner classrooms.

7. *Provide Educational Service Agency Support*. In this time of a tight budget crunch and accountability for funding and performance, it appears that this research study indicates that educational service agency resources should be used to facilitate programming for their schools and to provide technical support. Currie (2007) suggested the importance and role of the educational service agency, and these data confirm and strengthen that view.

Wherever possible, schools may find it most helpful to take advantage of the support of an educational service agency for using videoconferencing. Educational service agencies may be more effective by offering videoconference content for their schools. Examples of this content can be found by studying the distance learning programs of Berrien Regional Education Service Agency, Michigan; Education Service Agency Region 12, Texas; Muskingum Valley Education Service Center, Ohio; and Keewatin Career Development Corporation in Saskatchewan. Schools that do not have access to an educational service agency should find support through organizations such as the Center for Interactive Learning and Collaboration (CILC, 2008), Two Way Interactive Connections in Education (TWICE, 2007), Greenbush (Greenbush, 2009),

Alberta's community of users (Hinger, 2007; King & Macklam, 2007), and similar organizations. The programs offered by these organizations may provide enough content and support to promote a successful implementation of videoconferencing. In addition, educational service agencies may find it effective to offer technical support to schools implementing videoconferencing.

The data suggest that the two most important activities of educational service agencies are facilitating programming for the schools and providing technical support. Examples of programming include Monster Match run by ESC Region 12 in Waco, Texas, and the ASK author and specialist interview programs run by Macomb ISD in Michigan. Bringing in guest speakers, veterans, authors, and facilitating collaborative projects are important staples of successful educational service agencies' videoconference programs. School districts rely on this support for their successful implementation of videoconferencing. In addition, the educational service agency technical support is critical. District level technical support staff are often overworked and burdened with many different technologies to support. A dedicated videoconference techincal support person at the educational service agency can specialize and learn the details of supporting H.323 on school networks and working with firewalls. These technical support staff often run a Multipoint Control Unit which allows the educational service agency to bring content to multiple schools in one session. This research suggests that facilitating programming for the schools and providing technical support should be the staple of a videoconference program at the educational service agency level.

Recommendations for Further Research

The field of curriculum videoconferencing is very new and additional research is necessary to expand our understanding.

1. Further research should examine successful schools to confirm the important factors for implementation, why use of videoconferencing declines as the coordinator has more experience with it, the relationship of the administrative and financial support variables, and student achievement. Keefe (2003) completed a careful case study of one school using videoconferencing, but now additional case studies examining particularly the significant variables in this study would provide a thick description of schools that are successful with videoconferencing. Additional insights may be gained in this research.

2. In addition, the administrative and financial variables that seemed so important in previous research (Freed & Lim, 2009) were not significant in this study. Further research with more careful definitions may clarify the role of administrative and financial support in successful implementation of curriculum videoconferencing. Why does the school's use of videoconferencing taper off as the coordinator has used it longer? Is the use of curriculum videoconferencing sustainable? What does it take to sustain long-term use of this technology? Further research would provide additional insight into these questions.

3. The K12 Curriculum Videoconferencing Implementation Scale does not have a very high correlation with the use of videoconferencing in the school. Additional research and refining of the instrument would provide a more useful tool for predicting the use of videoconferencing in a school.

4. Schools often ask for research on the impact on student achievement when using curriculum videoconferencing. Further research would clarify the benefits and student impact of this communciation technology.

Summary

The use of curriculum videoconferencing is increasing in schools. This study focused on the school, coordinator, and support variables that are related to the school's use of videoconferencing. The major findings of this study are a better understanding of school videoconference coordinators, the importance and design of educational service agency support, the non-significance of some of the administrative variables, and the development of a scale that has good estimates of reliability and validity. In addition, a multidimensional perspective was developed to predict the usage of videoconferencing that includes school and coordinator demographics, administrative support variables, and the K12 Curriculum Videoconferencing Implementation Scale. These results can be used to further understand why some schools use videoconferencing more than others, and to plan future implementations of videoconferencing in schools.

APPENDIX A

SURVEY INSTRUMENT

The survey was administered in the online survey tool Zoomerang, so this is a list of questions in the order presented.

Coordinator Demographic Questions

1. Years of experience with videoconferencing:
2. Hours of videoconference training received:
3. Type of videoconference training received:
   - mostly technical training
   - mostly technical training with some curriculum training
   - mostly curriculum training with some technical training
   - mostly curriculum training
4. Time commitment to support videoconferencing:
   - full time coordinator
   - part time coordinator
   - videoconference coordinator on top of regular job
   - other
5. How many hours a week do you spend supporting videoconferencing during your regular work hours?
6. How many hours a week do you spend supporting videoconferencing outside of your regular work hours?

School Demographic Questions

7. School level:
   - Elementary
   - Middle School
   - Secondary
   - One or More Levels
   - All Levels
8. Number of Classroom Teachers:
9. Number of Students:
10. Population of the town or city where the school is located:
11. Do you know the National School Lunch Program score for your school? yes / no. If yes, please enter the NSLP score or your best guess.

12. Ethnic makeup of the school:
    - predominantly Caucasian
    - predominantly African American
    - predominantly Hispanic
    - predominantly Asian
    - mixed
    - other, please specify
13. Do you receive videoconference support (technical, content and/or training) from a consortium or educational service agency (BOCES, BOE, DOE, ESC, IU, ISD, RESA, LEA, etc.)? If yes, enter the name of the educational service agency here.
14. How much did your school spend on videoconference programming this past school year?
15. Did your school receive grant funding for videoconference programming? If so, how much?
16. If you have a problem with a videoconference, which of the following sources of technical support are available to you?
    - a technical support person in my school
    - a technical support person in my district
    - a technical support person at my educational service agency
    - a phone number for the vendor who sold or made the equipment
    - other, please specify
17. If you have a problem with a videoconference, how fast can you usually get support to help solve the problem?
    - within a few minutes
    - within an hour
    - within a day
    - within a week
    - other, please specify

Videoconference Utilization for 2007-2008 School Year

18. Please enter the **total number of videoconference** events for this past school year. Please include all videoconference events (content providers, expert interviews, connections to peer classrooms, professional development, meetings). This should not include test calls. It **should not** include every session where students participated in daily course delivery
19. Please enter the **total number of student videoconference events** for the past school year. Please include all videoconference events where students participated (content providers, author and expert interviews, connections to peer classrooms). It **should not** include daily course delivery.
20. Please enter the **number of teachers who used videoconferencing** with their students during this past school year.

Educational Service Agency Support

21. Does your educational service agency create and facilitate free programming for your school?
22. Does your educational service agency subsidize programming from content providers?
23. Estimate what **percentage** of the student videoconference events this year were provided or facilitated by your educational service agency.

Location of Videoconference System

24. Where is the videoconference system located?
    - mobile within one school
    - mobile within more than one school
    - fixed classroom
    - media center/library
    - computer lab
    - conference room.
    - other
    - I work with more than one system/unit

25. Location of the videoconference system.
    - The current location/mobility of the VC unit works well in our building.
    - The current location of our VC unit usually works but could be better.
    - The current location/mobility of our VC unit makes it hard to use.
    - We haven't decided yet which location is best for our VC unit.

26. What is the primary reason the videoconference system is located where it is?
    - Technical reasons (wires, switches, networking, etc.)
    - Proximity to coordinator
    - Ease of use for teachers
    - Only available room
    - Other, please specify

Quality of the Videoconference

27. Quality of the video
    - The picture rarely freezes and is only occasionally fuzzy.
    - The picture freezes sometimes and is occasionally pixilated or blocky.
    - The picture freezes often and sometimes there are big blocks on the screen.
    - Usually the picture is frozen for a long time before it moves.

28. Quality of the audio
    - The audio rarely breaks up and is only occasionally hard to understand.
    - The audio breaks up sometimes and is occasionally hard to understand.
    - The audio breaks up often and sometimes is hard to understand.
    - Usually the sound is garbled and hard to understand.

Supporting Videoconferencing

29. Comfort level with technology
    - □ I love technology and learning new things.
    - □ I can figure out what I need to do with technology.
    - □ I'm ok using technology if I have assistance.
    - □ I am generally frustrated by technology.

30. Comfort level with videoconferencing
    - □ I enjoy VC as an instructional tool in the curriculum.
    - □ I am gaining a sense of confidence in using VC in the curriculum.
    - □ I am currently trying to learn the basics. I am sometimes frustrated with VC.
    - □ I am anxious about using videoconferencing.

31. Use of the videoconference controls.
    - □ I can mute the microphone, solve common audio problems, use camera presets, and use different video source inputs such as a document camera.
    - □ I can mute the microphone, change the volume, move the camera, and use camera presets.
    - □ I can mute the microphone and move the camera.
    - □ I do not know how to use the controls.

32. Scheduling
    - □ I schedule all the VC programs, and I have a good system for keeping track of them all.
    - □ I know how to schedule VC events, but do not have an adequate system for keeping track of everything.
    - □ I know that I have to reserve the VC equipment, the room, and the place I'm connecting to, but I don't know exactly how to do it.
    - □ I am unsure about how to schedule VCs.

33. Test Calls
    - □ I do almost all of the test calls and connections on my own.
    - □ I sometimes do my own test calls and connections.
    - □ Occasionally I do my own test call and connection, but usually I have help.
    - □ The tech staff does all the test calls and connections for me.

34. Making the connection work
    - □ I feel confident when connecting a videoconference and I know what to do when there are problems.
    - □ I sometimes need assistance when connecting to a videoconference.
    - □ I am hesitant to try to connect a VC but am willing to try even if I don't have technical support.
    - □ I will not connect a VC unless I have technical support.

35. Helping teachers with a connection
    - I usually stay and assist teachers during the whole videoconference.
    - I usually stay for about half the VC.
    - I usually connect at VC and stay for the first few minutes.
    - Teachers usually connect on their own.

36. Getting students acquainted with technology.
    - I feel confident to explain VC to the students before a connection.
    - I can explain the basics of VC to the students.
    - I can repeat to the students what others have told me about how VC works.
    - I usually do not explain VC to the students before a connection.

Curriculum Integration

37. Knowledge of curriculum integration.
    - I know of programs appropriate for the curriculum and I persuade teachers to use VC.
    - Sometimes I can help teachers find VCs for their curriculum.
    - I have seen a few VCs that are good for our curriculum, but not enough to promote it.
    - I let the teachers decide what programs are appropriate for their curriculum.

38. Finding programs.
    - I can find VC programs and the accompanying teacher materials that align with the state curriculum.
    - I can navigate websites to find programs, but have difficulty knowing which programs are best for the teachers I support.
    - I find out about programs via emails and/or listservs. I don't know of any other way to know what is available.
    - I don't know of any resources that help me find VC programs.

39. Teacher recommendations.
    - I use more than one source to find programs other teachers recommended.
    - I can use at least one source to find programs other teachers have recommended.
    - I have a hard time remembering how to find teacher recommended programs.
    - I didn't know that teachers can recommend programs.

40. Student preparation.
    - I assist teachers in using the preparation materials for their program, or if none, I help them prepare the students.
    - I am able to assist teachers in using preparation materials for their program.
    - I forward teachers the preparation materials but I usually can't answer any questions about them.
    - I let the teachers take care of the student preparation for a videoconference.

Working with Teachers

41. Coordinator and teacher attitudes
    - I actively motivate and strongly encourage the teachers to try videoconferences that meet their curriculum.
    - Sometimes I encourage the teachers to try videoconferences that meet their curriculum.
    - Occasionally I encourage teachers to try videoconferences.
    - I let the teachers take the initiative to ask for help with a videoconference.

42. Helping teachers with time
    - I actively help teachers see how to make time for videoconferencing in their curriculum.
    - Sometimes I help teachers see how to make time for videoconferencing in their curriculum.
    - Once in a while, I suggest ways to make time for videoconferencing in the curriculum.
    - I let the teachers decide if they have time to use videoconferencing.

43. Motivating and overcoming reticence
    - I feel confident and comfortable in helping all the teachers and students overcome reticence to using VC
    - I am able to help some teachers and students overcome reticence to using VC
    - Once in a while I try to help teachers and students overcome reticence to using VC
    - I do not usually talk to teachers or students about the reticence to use VC

Teachers

44. Teacher curriculum integration.
    - Most of the teachers can design their own activities using videoconferencing.
    - A few teachers are starting to design their own curriculum activities using VC.
    - Teachers need ideas and prompting to use VC in their curriculum.
    - Teachers don't have ideas or interest in using VC in their curriculum.

45. Teacher attitudes
    - Most of the teachers in my school are excited about using VC.
    - Some of the teachers in my school are interested in using VC.
    - A few teachers are trying VC because they have to, but most don't want to.
    - None of the teachers are interested in VC.

46. Teacher experience
    - All of the teachers in my school have used videoconferencing.
    - Most of the teachers in my school have done at least one VC.
    - Only one or two of the same teachers use videoconferencing.
    - None of the teachers have tried a videoconference.

47. Planning for videoconferences
    - Most of the teachers plan ahead to incorporate VC in their curriculum.
    - Some of the teachers plan ahead to incorporate VC in their curriculum.
    - A few of the teachers plan ahead to incorporate VC in their curriculum.
    - Most of the teachers plan ahead to incorporate VC in their curriculum.

48. Making time for VCs
    - Teachers scheduling time for VC experiences because they are a curriculum priority.
    - Teachers feel that the time to select and prepare for a videoconference is worth it.
    - Teachers struggle to find time to select and prepare for VCs and aren't sure that it's worth the effort.
    - Teachers feel they don't have time to use VC.

49. Using the videoconference system
    - Most of the teachers in my school are comfortable making the connection and operating the camera on their own.
    - Some of the teachers in my school are comfortable making the connection and operating the camera on their own.
    - A few of the teachers in my school can operate the camera on their own.
    - None of the teachers in my school can operate the camera on their own.

Principal / Administrator

50. Principal experience with VC
    - My principal has had positive experiences seeing students engaged in VCs.
    - My principal has had at least one positive experience seeing students engaged in a VC.
    - My principal has seen professional development over videoconferencing, but not a student videoconference.
    - My principal has not experienced a videoconference.

51. Principal support
    - My principal sees the value of VC programs and strongly recommends that teachers participate in VCs.
    - My principal sees the value of VC and sometimes recommends that teachers use VC.
    - My principal is beginning to see the value of VC but leaves the decision to use VC to the teachers.
    - My principal doesn't see the value of videoconference programs and is not supportive of VC.

Coordinator Demographic Information

52. Gender:
    - Male
    - Female

53. Ethnicity:
    - Caucasian
    - African American
    - Hispanic
    - Asian
    - Mixed
    - Other please specify.
54. What is your birth year?
55. Level of education:
    - High school
    - 2 years college
    - 4 years college
    - Master's Degree
    - Postgraduate Degree
56. Country:
57. State/province:
58. Please select the job title that most closely matches yours:
    - media specialist / librarian
    - media aide
    - paraprofessional
    - secretary
    - teacher
    - technology specialist
    - principal/administrator
    - district videoconference coordinator
    - regional videoconference coordinator
59. Years of experience in education:

Thank you for your time in completing this survey. Your support of videoconferencing in your school is much appreciated!

APPENDIX B

PILOT SURVEY

This is the version that was used for the pilot study in May 2007.

K12 Videoconferencing Implementation Rubric

Section 1: Demographic Data

1. Name/Code

2. Job Title. Please select the position that most closely matches yours.
   - Media Specialist
   - Librarian
   - Paraprofessional
   - Secretary
   - Teacher
   - Technology Specialist
   - Principal
   - Other

3. Length of Time Supporting Videoconferencing (in years): _____

4. Videoconference Unit Location. Where is the videoconferencing system usually located in your school? Circle one.
   - Mobile cart
   - Library/Media Center
   - Fixed Room

5. Number of Professional Development/ Training Hours on Videoconferencing: _____

6. Type of Training / Professional Development:
   - Predominantly how to integrate VC in the curriculum
   - Mostly curriculum integration with some technical training
   - Mostly technical training with some curriculum integration
   - Predominantly technical training

Instructions: Please check the box beside each description that best matches your current opinion. Note that the abbreviation VC is used in this rubric to denote videoconferencing.
In the Zoomerang version, a final option of "Not applicable" was included for each question.

Section 2: Coordination				
7. Comfort level with technology in general.	□ I love technology and learning new things.	□ I can figure out what I need to do with technology.	□ I'm ok using technology if I have assistance.	□ I am generally frustrated by technology.
8. Comfort level with VC	□ I enjoy VC as an instructional tool in the curriculum.	□ I am gaining a sense of confidence in using VC in the curriculum.	□ I am currently trying to learn the basics. I am sometimes frustrated with VC.	□ I am anxious about using videoconferencing.
9. Use of the controls.	I can mute the microphone, solve common audio problems, use camera presets, and use different video source inputs such as a document camera.	I can mute the microphone, change the volume, move the camera, and use camera presets.	I can mute the microphone and move the camera.	I do not know how to use the controls.
Section 3. Technical Quality				
10. Quality of video	□ The picture rarely freezes and is only occasionally fuzzy.	□ The picture freezes sometimes and is occasionally pixilated or blocky.	□ The picture freezes often and sometimes there are big blocks on the screen.	□ Usually the picture is frozen for a long time before it moves.
11. Quality of audio	□ The audio rarely breaks up and is only occasionally hard to understand.	□ The audio breaks up sometimes and is occasionally hard to understand.	□ The audio breaks up often and sometimes is hard to understand.	□ Usually the sound is garbled and hard to understand.

Section 4: Supporting the Videoconferences				
12. Time to support VC	□ My school/district provides more than one hr/week release time to support VC.	□ My school/district provides 30-50 min / week release time to support VC	□ My school/district gave 30 min or less/week release time to support VC.	□ My school/district does not provide any release time to support VC.
13. Scheduling	□ I schedule all the VC programs, and I have a good system for keeping track of them all.	□ I know how to schedule VC events, but do not have an adequate system for keeping track of everything.	□ I know that I have to reserve the VC equipment, the room, and the place I'm connecting to, but I don't know exactly how to do it.	□ I am unsure about how to schedule VCs.
14. Test Calls	□ I do almost all of the test calls and connections on my own.	□ I sometimes do my own test calls and connections.	□ Occasionally I do my own test call and connection, but usually I have help.	□ The tech staff do all the test calls and connections for me.
15. Making the connection work	□ I feel confident when connecting a videoconference and I know what to do when there are problems.	□ I sometimes need assistance when connecting to a videoconference.	□ I am hesitant to try to connect a VC but am willing to try even if I don't have technical support.	□ I will not connect a VC unless I have technical support.
16. Availability of tech support	□ I have timely support from both my district and educational service agency.	□ I have timely support from either my district or my educational service agency, but not from both.	□ I have access to support from either my district or my educational service agency, but their time is limited to assist me with VC.	□ I do not have access to any tech support (local or educational service agency) to assist me with VC.
17. Helping teachers with a connection	□ I usually stay and assist teachers during the whole videoconference.	□ I usually stay for about half the VC.	□ I usually connect at VC and stay for the first few minutes.	□ Teachers usually connect on their own.

18. Getting students acquainted with technology.	□ I feel confident to explain VC to the students before a connection.	□ I can explain the basics of VC to the students.	□ I can repeat to the students what others have told me about how VC works.	□ I am not able to explain VC to the students before a connection.
Section 5: Administrative Issues				
19. Budget	□ My school has set aside adequate funds for using VC.	□ The district has a limited budget for VC.	□ Alternative funds from non-district sources are available to support VC within my school.	□ There is no funding for videoconferencing in my school.
20. Principal experience with VC	□ My principal has had positive experiences seeing students engaged in VCs.	□ My principal has had at least one positive experience seeing students engaged in a VC.	□ My principal has seen professional development over videoconferencing, but not a student videoconference.	□ My principal has not experienced a videoconference.
21. Principal support	□ My principal sees the value of VC programs and strongly recommends that teachers participate in VCs.	□ My principal sees the value of VC and sometimes recommends that teachers use VC.	□ My principal is beginning to see the value of VC but leaves the decision to use VC to the teachers.	□ My principal doesn't see the value of videoconference programs and is not supportive of VC.
22. Location	□ The current location/mobility of the VC unit works well in our school.	□ The current location of our VC unit usually works but could be better.	□ The current location/mobility of our VC unit makes it hard to use.	□ We haven't decided yet which location is best for our VC unit.
Section 6: Curriculum Integration				
23. Knowledge	□ I know of programs appropriate for the curriculum and I persuade teachers to use	□ Sometimes I can help teachers find VCs for their curriculum.	□ I have seen a few VCs that are good for our curriculum, but not enough to promote it.	□ I haven't seen any programs that are appropriate for our

	VC.			teachers' curriculum.
24. Finding programs	□ I can find VC programs and the accompanying teacher materials that align with the state curriculum.	□ I can navigate websites to find programs, but have difficulty knowing which programs are best for the teachers I support.	□ I find out about programs via emails and/or listservs. I don't know of any other way to know what is available.	□ I don't know of any resources that help me find VC programs.
25. Teacher Recommendations	□ I use more than one source to find programs other teachers recommended.	□ I can use at least one source to find programs other teachers have recommended.	□ I have a hard time remembering how to find teacher recommended programs.	□ I didn't know that teachers can recommend programs.
26. Student preparation	□ I assist teachers in using the preparation materials for their program, or if none, I help them prepare the students.	□ I am able to assist teachers in using preparation materials for their program.	□ I forward teachers the preparation materials but I usually can't answer any questions about them.	□ I don't know how teachers should be preparing their students for a videoconference.
Section 7: Teachers				
27. Attitudes	□ Most of the teachers in my school are excited about using VC.	□ Some of the teachers in my school are interested in using VC.	□ A few teachers are trying VC because they have to, but most don't want to.	□ None of the teachers are interested in VC.
28. Experience	□ All of the teachers in my school have used videoconferencing.	□ Most of the teachers in my school have done at least one VC.	□ Only one or two of the same teachers use videoconferencing.	□ None of the teachers have tried a videoconference.
29. Time	□ Most of the teachers plan ahead to incorporate VC in their curriculum.	□ Some of the teachers plan ahead to incorporate VC in their curriculum.	□ A few of the teachers plan ahead to incorporate VC in their curriculum.	□ Most of the teachers plan ahead to incorporate VC in their curriculum.

30. Using the videoconference system	□ Most of the teachers in my school are comfortable doing the connections on their own.	□ Some of the teachers in my school are comfortable doing the connections on their own.	□ A few of the teachers in my school can operate the camera on their own.	□ None of the teachers in my school can operate the camera on their own.
24. Curriculum design	□ Most of the teachers can design their own activities using videoconferencing.	□ A few teachers are starting to design their own curriculum activities using VC.	□ Teachers need ideas and prompting to use VC in their curriculum.	□ Teachers don't have ideas or interest in using VC in their curriculum.

Thank you for your time in completing this rubric. Your support of videoconferencing in your school is much appreciated!

APPENDIX C

PILOT STUDY RESULTS

The participants in the pilot study were videoconference coordinators in elementary, middle and high schools in southwest Michigan. The frequencies are shown in Table 34. Most of the videoconference coordinators are female (38 female; 1 male). All of them are Caucasian. Data on age, level of education, and socio-economic status were not collected. The position the videoconference coordinators held within the district included teacher (39%), media specialist (28%), paraprofessional (27%), secretary (2%), technology specialist (2%), and principal (2%). Most of the videoconference coordinators had just completed their first year of supporting videoconferencing (72%) since the USDA RUS DLT grant provided equipment at the beginning of the 2006-2007 school year and this survey was given in May 2007. However, some of the building coordinators were more experienced (10% with 2-3 years experience; 10% with 4-5 years experience; and 8% with 6 or more years experience). Most of the videoconference coordinators also had just begun their training in videoconferencing. 64% had received 1-15 hours of professional development; 15% had received 16-30 hours of professional development; 20% had received 31-50 hours of professional development; and 3% had received more than 51 hours of professional development.

The schools in this study were mostly elementary schools (67%). The frequencies are shown in Table 35. Most of the high schools in Berrien and Cass counties already had videoconferencing equipment. However the schools include a few middle schools, junior highs, and mixed middle and high school buildings (33%), referred to in this study as

secondary schools. The schools ranged in size from small (8 teachers) to large (74 teachers). Most of the schools had 20-25 teachers (47%). The schools in this study

Table 34

Videoconference Coordinator Demographic Frequencies Table

Variable	*n*	%
Gender		
Male	1	3
Female	38	97
Position in School		
Media Specialist	11	28.2
Paraprofessional	10	25.6
Secretary	1	2.6
Teacher	15	38.5
Technology Specialist	1	2.6
Principal	1	2.6
Years Supporting Videoconferencing		
0-1 Years	28	71.8
2-3 Years	4	10.3
4-5 Years	4	10.3
6 or more Years	3	7.7

were particularly poor and rural due to the requirements of the USDA RUS DLT grant. The USDA defines an "exceptionally rural area" as having a population of less than 5000 people. 77% of the schools fit into this category. The rest (23%) were in the USDA rural area, with a population of 5001-10,000 people. The National School Lunch Program (NSLP) is a recognized measure of poverty in education grants and programs. Higher

scores indicate higher numbers of students participating in the free and reduced lunch program, which indicates higher poverty among the students. The videoconference equipment was located in one of three areas in the school: a mobile cart (33%), the library or media center (43%), or a fixed room (23%).

Table 35

Research Site Demographic Frequencies Table

Variable	*n*	%
School Level		
Elementary	26	67
Secondary	13	33
USDA Rurality Score		
30 – Rural Area 5001-10,000 pop	9	23
45 – Exceptionally Rural Area, Less than 5000 pop	30	77
Location of Videoconference Equipment		
Mobile Cart	13	33
Library/Media Center	17	44
Fixed Room	9	23

To examine the utilization of videoconferencing compared to the variables in this study, it was necessary to develop a usage score formula. This formula takes into consideration the size of the school (number of teachers) as well as the number of videoconference events that occurred during the 2006-2007 school year. The total events were multiplied by the percentage of teachers in the school who used videoconferencing to create a "usage score" that allows for comparison of total use of videoconferencing in

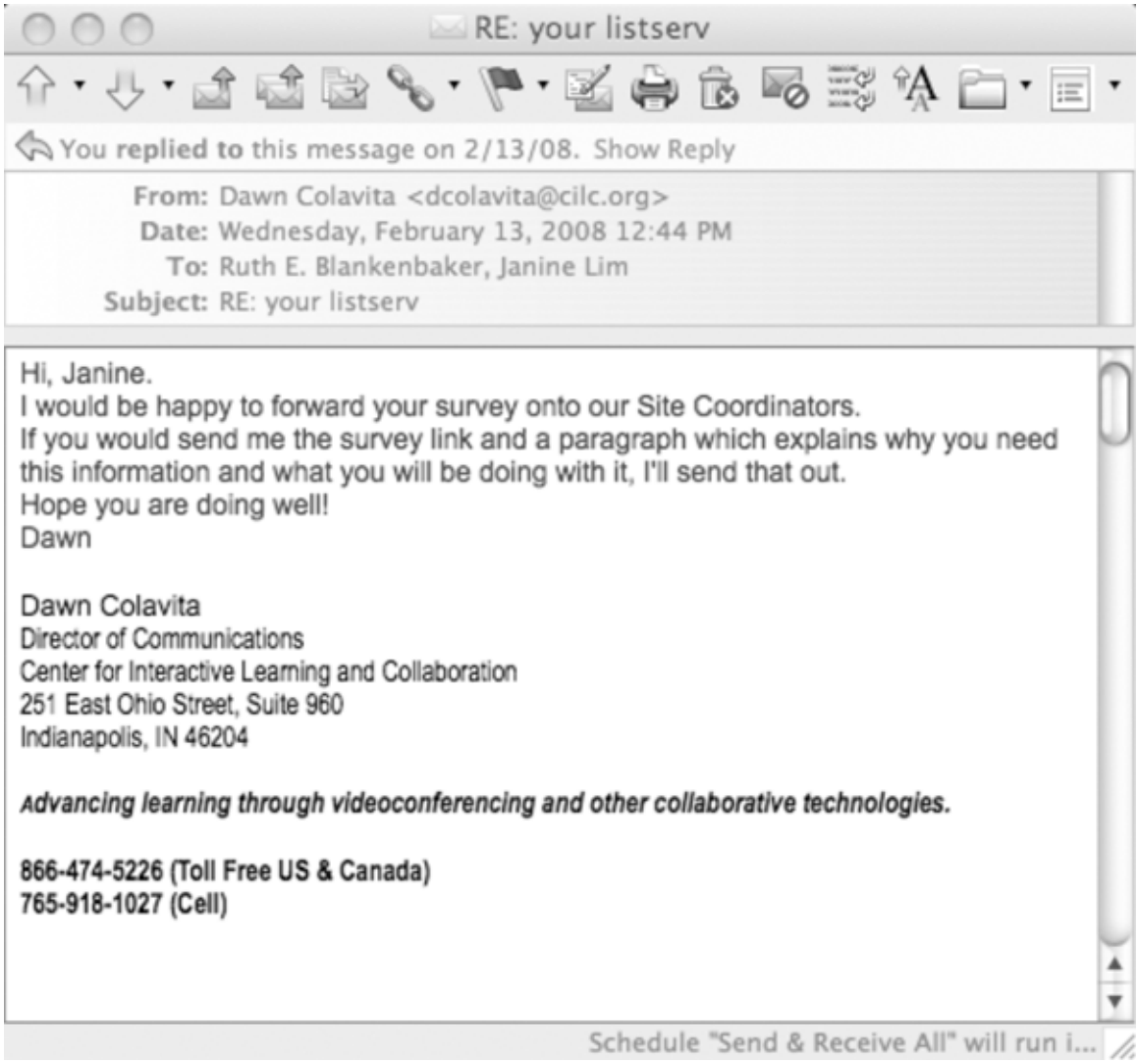
various sized schools. The usage score is the total events for the building (including content providers, collaborative projects, meetings, and professional development) multiplied by the percentage of teachers in the school who used videoconferencing. This score gives an estimate of the extent of videoconferencing use in the building. It is a rare school that has every teacher participating in videoconferencing. The schools in this study had usage scores ranging from 0.3 to 25.8. In these results, only six of the schools had more events than they had teachers. These usage scores are above 13. The mean was 5.3, median 3, and mode 3.

Six variables were examined to see if there was a relationship with the utilizations of videoconferencing in the schools participating in the study. Three of the variables studied were not a significant factor in the utilization. The size of the school, the location of the videoconferencing system, and the years of experience of the videoconference coordinator are independent of the utilization of videoconferencing in the school. However, three of the variables were significant in the utilization of videoconferencing in the schools studied. The elementary schools are using videoconferencing about twice as often as the secondary schools. The poorer schools are using videoconferencing about twice as often as the richer schools. The schools with videoconference coordinators who received mostly curriculum training are using videoconferencing about twice as often as the schools with videoconferencing coordinators who received mostly technical training (Lim, 2007).

APPENDIX D

LISTSERV PERMISSIONS

Center for Interactive Learning and Collaboration (CILC) Listserv


RE: your listserv

You replied to this message on 2/13/08. Show Reply

From: Dawn Colavita <dcolavita@cilc.org>
Date: Wednesday, February 13, 2008 12:44 PM
To: Ruth E. Blankenbaker, Janine Lim
Subject: RE: your listserv

Hi, Janine.
I would be happy to forward your survey onto our Site Coordinators.
If you would send me the survey link and a paragraph which explains why you need this information and what you will be doing with it, I'll send that out.
Hope you are doing well!
Dawn

Dawn Colavita
Director of Communications
Center for Interactive Learning and Collaboration
251 East Ohio Street, Suite 960
Indianapolis, IN 46204

Advancing learning through videoconferencing and other collaborative technologies.

866-474-5226 (Toll Free US & Canada)
765-918-1027 (Cell)

Schedule "Send & Receive All" will run i...

Collaboration Collage Listserv (AT&T or Edvidconf1)

Linda this is for you

You **replied to** this message on 3/14/08. Show Reply

From: Linda Woods <lwhyman@pacbell.net>
Date: Thursday, March 13, 2008 1:14 PM
To: jlim@remc11.k12.mi.us
Subject: Linda this is for you

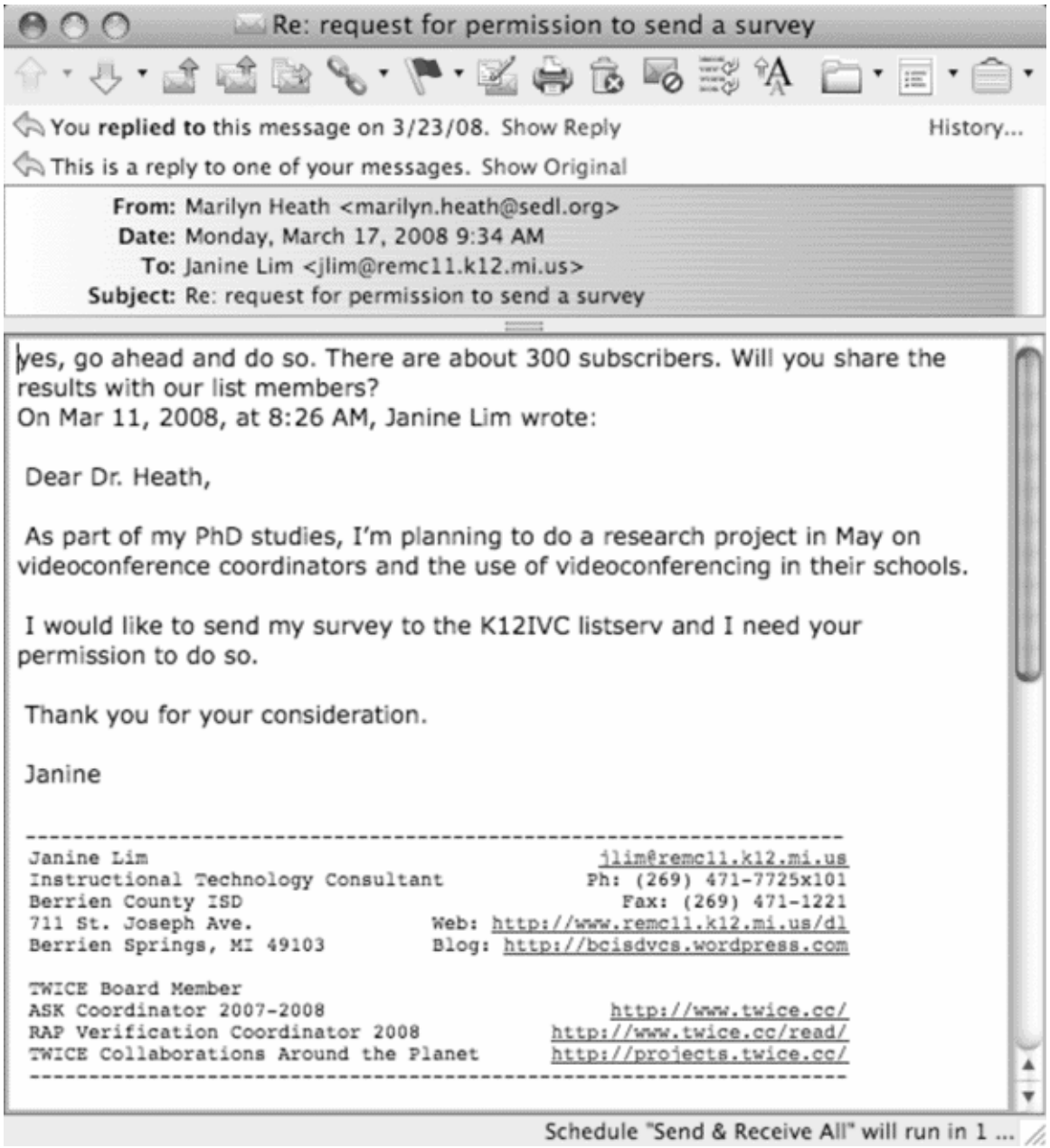
Hello Janine. Of course you may send your survey to the list or the URL of the online tool, whichever. This is from my personal email address. My work address is linda.woods@att.com

So, how are things going?

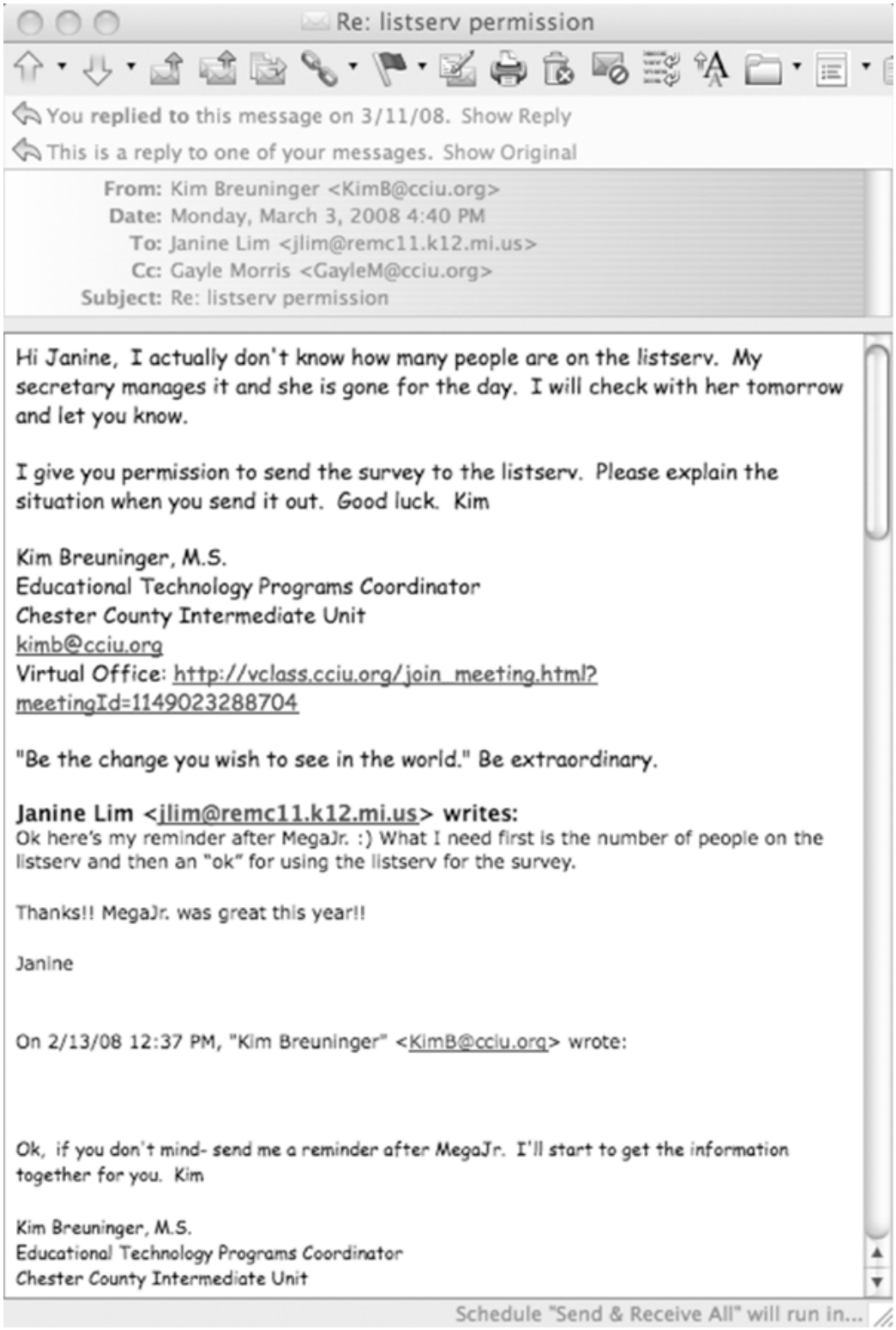
>> Date: Tue, 11 Mar 2008 09:29:57 -0400
>> Subject: Linda this is for you
>> From: Janine Lim <jlim@remc11.k12.mi.us>
>> To: <ed1vidconf@YAHOO.COM>
>>
>> Dear Linda,
>>
>> I couldn't find a direct email for you. Please don't
>> send this to the
>> listserv.
>>
>> As part of my PhD studies, I'm planning to do a
>> research project in May on
>> videoconference coordinators and the use of
>> videoconferencing in their
>> schools.
>>
>> I would like to send my survey to the Collaboration
>> Collage listserv and I
>> need your permission to do so.
>>
>> Thank you for your consideration.
>>
>> Janine
>>
>----------
>> Janine Lim
>> jlim@remc11.k12.mi.us
>> Instructional Technology Consultant Ph:
>> (269) 471-7725x101
>> Berrien County ISD
>> Fax: (269) 471-1221
>> 711 St. Joseph Ave. Web:
>> http://www.remc11.k12.mi.us/dl
>> Berrien Springs, MI 49103 Blog:
>> http://bcisdvcs.wordpress.com

Schedule "Send & Receive All" will run in...

K12 IVC Listserv



Megaconference Jr. Listserv



Re: listserv permission

You replied to this message on 3/11/08. Show Reply

This is a reply to one of your messages. Show Original

From: Kim Breuninger <KimB@cciu.org>
Date: Monday, March 3, 2008 4:40 PM
To: Janine Lim <jlim@remc11.k12.mi.us>
Cc: Gayle Morris <GayleM@cciu.org>
Subject: Re: listserv permission

Hi Janine, I actually don't know how many people are on the listserv. My secretary manages it and she is gone for the day. I will check with her tomorrow and let you know.

I give you permission to send the survey to the listserv. Please explain the situation when you send it out. Good luck. Kim

Kim Breuninger, M.S.
Educational Technology Programs Coordinator
Chester County Intermediate Unit
kimb@cciu.org
Virtual Office: http://vclass.cciu.org/join_meeting.html?meetingId=1149023288704

"Be the change you wish to see in the world." Be extraordinary.

Janine Lim <jlim@remc11.k12.mi.us> writes:
Ok here's my reminder after MegaJr. :) What I need first is the number of people on the listserv and then an "ok" for using the listserv for the survey.

Thanks!! MegaJr. was great this year!!

Janine

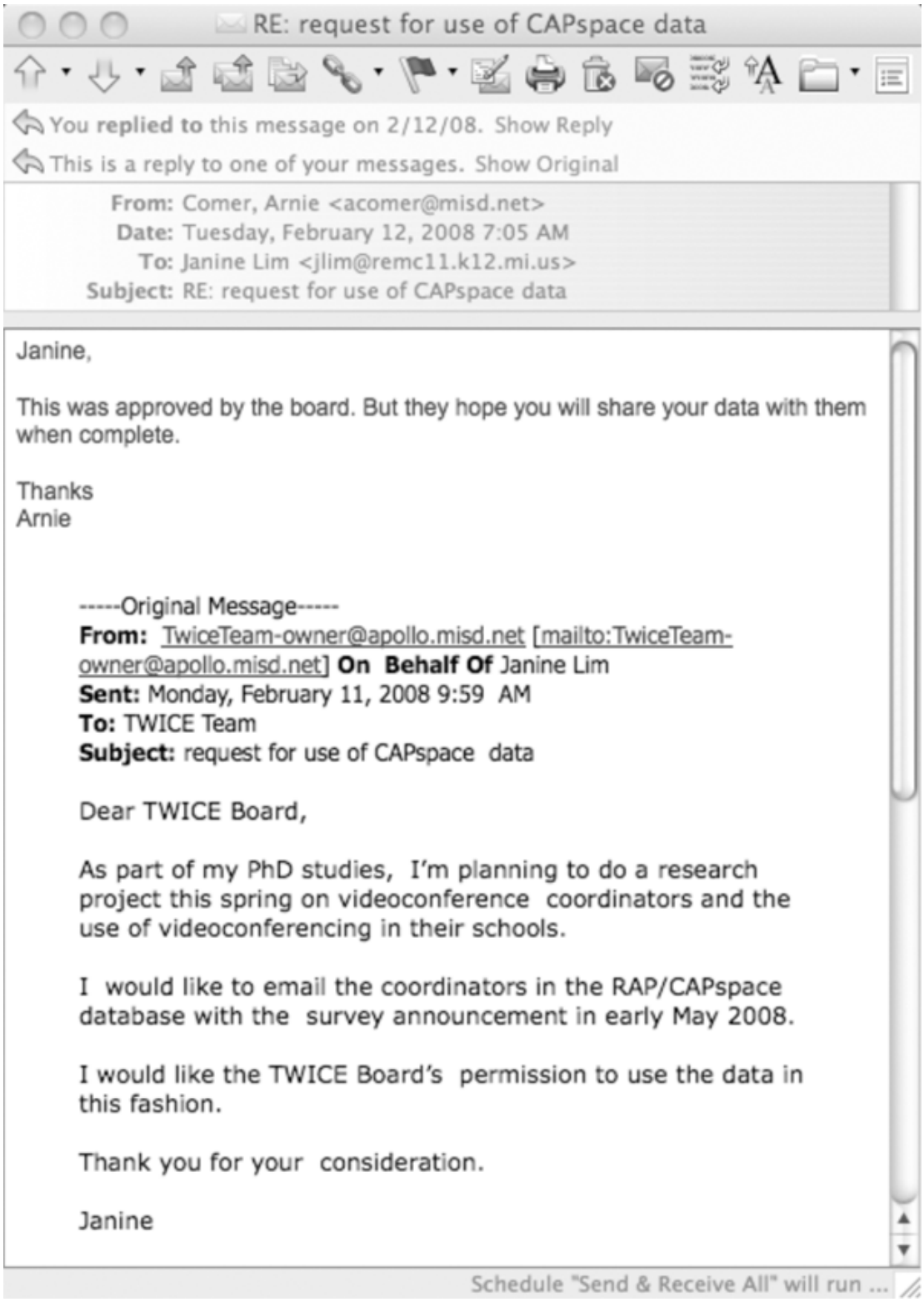
On 2/13/08 12:37 PM, "Kim Breuninger" <KimB@cciu.org> wrote:

Ok, if you don't mind- send me a reminder after MegaJr. I'll start to get the information together for you. Kim

Kim Breuninger, M.S.
Educational Technology Programs Coordinator
Chester County Intermediate Unit

Schedule "Send & Receive All" will run in...

TWICE (Two Way Interactive Connections in Education) Permission



RE: request for use of CAPspace data

You **replied to** this message on 2/12/08. Show Reply

This is a reply to one of your messages. Show Original

From: Comer, Arnie <acomer@misd.net>
Date: Tuesday, February 12, 2008 7:05 AM
To: Janine Lim <jlim@remc11.k12.mi.us>
Subject: RE: request for use of CAPspace data

Janine,

This was approved by the board. But they hope you will share your data with them when complete.

Thanks
Arnie

-----Original Message-----
From: TwiceTeam-owner@apollo.misd.net [mailto:TwiceTeam-owner@apollo.misd.net] **On Behalf Of** Janine Lim
Sent: Monday, February 11, 2008 9:59 AM
To: TWICE Team
Subject: request for use of CAPspace data

Dear TWICE Board,

As part of my PhD studies, I'm planning to do a research project this spring on videoconference coordinators and the use of videoconferencing in their schools.

I would like to email the coordinators in the RAP/CAPspace database with the survey announcement in early May 2008.

I would like the TWICE Board's permission to use the data in this fashion.

Thank you for your consideration.

Janine

Schedule "Send & Receive All" will run ...

REFERENCE LIST

Abbott, L., Austin, R., Mulkeen, A., & Metcalfe, N. (2004). The global classroom: Advancing cultural awareness in special schools through collaborative work using ICT. *European Journal of Special Needs Education, 19*(2), 225-240. doi:10.1080/08856250410001678504

Amirian, S. (2003). Pedagogy and videoconferencing: A review of recent literature. *First NJEDge.NET Conference*. Retrieved from http://oit.montclair.edu/documentationpdf/amirian_megacon.pdf

Anderson, T., & Rourke, L. (2005). *Videoconferencing in kindergarten-to-grade 12 settings: A review of the literature*. Retrieved from http://www.vcalberta.ca/research/

Arnold, T., Cayley, S., & Griffith, M. (2004). *Videoconferencing in the classroom: Communications technology across the curriculum*. In T. Arnold (Eds.). Available from http://www.global-leap.com/casestudies/book2/index.htm

AT&T. (2006). *Videoconference adventures*. Retrieved from http://www.kn.pacbell.com/wired/vidconf/adventures.html

AT&T. (2007). *Videoconferencing for learning*. Retrieved from http://www.kn.att.com/wired/vidconf/

Aten, B. M. (1996). *An analysis of the nature of educational technology leadership in California's SB 1274 Restructuring Schools.* Retrieved from ProQuest Digital Dissertations. (AAT 9626215)

Atkinson, T. R., Jr. (1999). *Toward an understanding of instructor-student interactions: A study of videoconferencing in the postsecondary distance learning classroom.* Retrieved from ProQuest Digital Dissertations. (AAT 9925524)

Ba, H., & Keisch, D. (2004). *Bridging the gap between formal and informal learning: Evaluating the Seatrek distance learning project*. Retrieved from http://cct.edc.org/report_summary.asp?numPublicationId=177

Baber, J. R. (1996). *Re-visioning corporate communication: A case study of videoconferencing implementation.* Retrieved from ProQuest Digital Dissertations. (AAT 9700122)

Badenhorst, Z., & Axmann, M. (2002). The educational use of videoconferencing in the arts faculty: Shedding a new light on puppetry. *British Journal of Educational Technology, 33*(3), 291-299. doi:10.1111/1467-8535.00264

Baker, D. R. (2002). *Teacher perceptions of the educational outcomes for direct instruction compressed video classroom environment within remote classrooms at the secondary school level.* Retrieved from ProQuest Digital Dissertations. (AAT 3056384)

Barshinger, T., & Ray, A. (1998). From volcanoes to virtual tours: Bringing museums to students through videoconferencing technology. *14th Annual Conference on Distance Teaching & Learning*. Retrieved from http://eric.ed.gov/

BECTA. (2003). *What the research says about video conferencing in teaching and learning*. Retrieved from http://publications.becta.org.uk/display.cfm?resID=25801

BerrienRESA. (2009a). *Southwestnet distance learning annual reports*. Retrieved from http://www.remc11.k12.mi.us/dl/reports/

BerrienRESA. (2009b). *Videoconference content providers database*. Retrieved from http://www.VCContentProviders.org/

Berson, M. J., Carano, K., Carlson, L. A., Mixon, N. K., Rodriguez, P., Sheffield, C. C., et al. (2006). The use of videoconferencing as a medium for collaboration of experiences and dialogue among graduate students: A case study from two southeastern universities. *Society for Information Technology and Teacher Education International Conference 2006*, 262-267. Retrieved from http://www.editlib.org/

Bitterman, J. E., Schappert, J., & Schaefer, J. (2000). Overcoming remoteness in CME videoteleconferencing: I want my MD TV. *Journal of Continuing Education in the Health Professions, 20*(1), 7-12. doi:10.1002/chp.1340200103

Booth, G. W. (2006). *High school students' experiences taking a calculus course through video conferencing: A case study.* Retrieved from ProQuest Digital Dissertations. (AAT NR13923)

Bore, J. C. (2005). *Distance education in the preparation of special education personnel: An examination of videoconferencing and web-based instruction.* Retrieved from ProQuest Digital Dissertations. (AAT 3196134)

Bose, M. (2007). *Influencing the utilization of videoconferencing technology: Teacher, school and professional development characteristics.* Retrieved from ProQuest Digital Dissertations. (AAT 3271340)

Burke, C., Lundin, R., & Daunt, C. (1997). Pushing the boundaries of interaction in videoconferencing: A dialogical approach. *Distance Education, 18*(2), 349-360. doi:10.1080/0158791970180210

Burke, M., Beach, B., & Isman, A. (1997). Learning community link: Enhancing learning using telecommunication technologies. *THE (Technological Horizons in Education) Journal, 25*(1). Retrieved from http://www.thejournal.com/

Butler, M., & Fawkes, S. (1999). Videoconferencing for language learners. *Language Learning Journal, 19*(1), 46-49. doi:10.1080/09571739985200091

Carville, S., & Mitchell, D. R. (2001). It's a bit like Star Trek: The effectiveness of video conferencing. *Innovations in Education and Training International, 37*(1), 42-49. doi:10.1080/135580000362070

Cavanaugh, C. (1999). The effectiveness of interactive distance education technologies in K-12. *International Journal of Educational Telecommunications, 7*(1), 73-88.

Chapman, D. S. (1999). Expanding the search for talent: Adopting technology-based strategies for campus recruiting and selection. *Journal of Cooperative Education, 34*(2), 35-41.

Cifuentes, L., & Murphy, K. L. (2000a). Promoting multicultural understanding and positive self-concept through a distance learning community: Cultural connections. *Educational Technology Research and Development, 48*(1), 69-83. doi:10.1007/BF02313486

Cifuentes, L., & Murphy, K. L. (2000b). Sharing art via videoconference: Between Mexico and Texas. *TechTrends, 44*(3), 52.

CILC. (2008). *Content provider programs*. Retrieved from http://www.cilc.org/c/education/content_provider_programs.aspx

CILC. (2009). *Collaboration Center*. Retrieved from http://www.cilc.org/c/community/collaboration_center.aspx

Collis, B., Peters, O., & Pals, N. (2000). Influences on the educational use of the WWW, email and videoconferencing. *Innovations in Education and Teaching International, 37*(2), 108-119. doi:10.1080/13558000050034466

Coverdale-Jones, T. (2000). The communicative effects of videoconferencing as a language learning environment: a reduced social and linguistic medium. In P. Howarth & R. Herington (Eds.), *EAP Learning Technologies*. Leeds, UK: Leeds University Press.

Currie, N. J. (2007). A study of the factors that impact videoconferencing as a learning tool within three regional service agencies in Michigan. Unpublished dissertation. Oakland University, Rochester, MI.

Drescher, P., Hyjek, P., Campbell, R., Biggam, C., & Jones, C. (2005). *Videoconferencing in Vermont schools.* Paper presented at the Society for Information Technology and Teacher Education International Conference 2005, Phoenix, AZ, USA.

Dudding, C. C. (2004). *Perceptions of the use of videoconferencing for supervision: Differences among graduate students.* Retrieved from ProQuest Digital Dissertations. (AAT 3108759)

Eales, R. T. J., Neale, D. C., & Carroll, J. M. (1999). *Desktop videoconferencing as a basis for computer supported collaborative learning in K-12 classrooms.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 1999.

Ehrlich-Martin, S. M. (2006). *A case study of an American Sign Language course taught via videoconferencing.* Retrieved from ProQuest Digital Dissertations. (AAT 3218060)

Elliott, J. (2003). *Confidence as a vital influence in the adoption of videoconferencing technologies.* Paper presented at the Society for Information Technology and Teacher Education International Conference 2003, Albuquerque, New Mexico, USA.

Ely, D. (1999). Conditions that facilitate the implementation of educational technology innovations. *Journal of Research on Computing in Education, 23*(2), 298-305.

Ely, D. (2008). Frameworks of educational technology. *British Journal of Educational Technology, 39*(2), 244-250. doi:10.1111/j.1467-8535.2008.00810.x

Falco, J. (2008). Leading the art of the conference: revolutionizing schooling through interactive videoconferencing. In D. Newman, J. Falco, S. Silverman & P. Barbanell (Eds.), *Videoconferencing technology in K-12 instruction: Best practices and trends* (pp. 133-143). New York, NY: Information Science Reference.

Fee, S., & Fee, L. (2005). *The pedagogical value of videoconference technology.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2005, Montreal, Canada.

Fiege, K. H. M. (2005). *Educational researchers using real-time videoconferencing to collaborate: Thoughts and feelings shared.* Retrieved from ProQuest Digital Dissertations. (AAT MR09088)

Freed, S., & Lim, J. (2009). *We have the videoconference equipment installed, now what?* Manuscript submitted for publication to *The Qualitative Report*.

French, J., & Raven, B. H. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies of social power*. Ann Arbor, MI: Institute for Social Research.

Friedman, T. L. (2005). *The world is flat: A brief history of the twenty-first century*. New York, NY: Farrar, Straus and Giroux.

Furst-Bowe, J. A. (1997). Comparison of student reactions in traditional and videoconferencing courses in training and development. *International Journal of Instructional Media, 24*(3), 197-206.

Gage, J., Nickson, M., & Beardon, T. (2002). *Can videoconferencing contribute to teaching and learning? The experience of the Motivate project.* Paper presented at the Annual Conference of the British Educational Research Association.

Gilham, C., & Moody, B. (2001). Face to face: Videoconferencing creates opportunities for incarcerated youth. *Journal of Correctional Education, 52*(1), 29-31.

Gill, D., Parker, C., & Richardson, J. (2005). Twelve tips for teaching using videoconferencing. *Medical Teacher, 27*(7), 573-577. doi:10.1080/01421590500097026

Glaser, R. (2008). *Videoconference glossary* [Blog]. Retrieved from http://www.edlink12.net/vcrox/2008/02/01/videoconference-glossary/

Glasgow, D., & Zoellmer, D. (2003). TWICE connects readers across America via two-way videoconferencing. *MACUL Newsletter*. Retrieved from http://www.macul.org/

Graves, J., Ridgway, E., & Tomaras, M. (2005). *Videoconferencing: Using an old dog to teach new tricks.* Paper presented at the Society for Information Technology and Teacher Education International Conference 2005, Phoenix, AZ, USA.

Greenberg, A. (2003). *Best practices in live content acquisition by distance learning organizations*. Retrieved from http://www.polycom.com/common/documents/whitepapers/best_practices_in_live_content_acquisition_by_distance_learning_organizations.pdf

Greenberg, A. (2004). Navigating the sea of research on videoconferencing-based distance education: A platform for understanding the technology's effectiveness and value. Retrieved from http://www.wainhouse.com/files/papers/wr-navseadistedu.pdf

Greenberg, A. (2006). *Taking the wraps off videoconferencing in the U.S. classroom: A state-by-state analysis*. Retrieved from http://www.wrplatinum.com/content.aspx?CID=5912

Greenberg, A. (2009). *The 2009 update: Taking the wraps off videoconferencing in the U.S. classroom: A national and state-by-state analysis*. Retrieved from http://www.wrplatinum.com/Content.aspx?CID=10122

Greenbush. (2009). *Greenbush interactive distance learning network*. Retrieved from http://www.greenbush.org/

Hartman, H., & Crook, B. (1997). Faculty development videoconferences: What we have learned. *T.H.E. Journal, 24*(8), 69-72. Retrieved from http://www.thejournal.com

Hayden, K. L. (1999). *Videoconferencing in K-12 education: A Delphi study of characteristics and critical strategies to support constructivist learning experiences.* Retrieved from ProQuest Digital Dissertations. (AAT 9934596)

Haydock, P. G., & Dennison, J. A. (2004). *Assessing the needs of K-12 audiences in synchronous educational videoconferencing*. Paper presented at the 20th Annual Conference on Distance Teaching and Learning. Retrieved from http://www.dlt.ncssm.edu/distance_learning/forms/AssessNeedsInIVC.pdf

Heath, J., & Niepold, S. (2005). *Making videoconference museum tours substantive.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2005, Montreal, Canada.

Heath, M., & Holznagel, D. (2002). Interactive videoconferencing: A literature review. *K-12 National Symposium for Interactive Videoconferencing*. Retrieved from http://neirtec.terc.edu/K12vc/resources/litpolicy.pdf

Hedestig, U., & Kaptelinin, V. (2005). Facilitator's roles in a videoconference learning environment. *Information Systems Frontiers, 7*(1), 71-83.

Hinger, D. (2007). *Developing a community of videoconference users.* Paper presented at the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2007, Quebec City, Canada.

Howard-Kennedy, J. (2004). Benefits of Videoconferencing in Education. *Media & Methods, 41*(1), 17.

Howland, J., & Wedman, J. (2003). *Experiencing diversity: Learning through videoconference technology.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2003, Honolulu, Hawaii, USA.

Hung, D., & Tan, S. (2004). Bridging between practice fields and real communities through instructional technologies. *International Journal of Instructional Media, 31*(2), 167-175.

ISTE. (2007). *National educational technology standards for students: The next generation*. Retrieved from http://www.iste.org/

Jones, T. C., & Sorenson, K. (2001). Combining studio videoconferencing and the internet to promote intercultural understanding (Vol. 2008, pp. 8): For full text: http://www.mtsu.edu/~itconf/proceed01/10.pdf.

Keefe, D. D. (2003). *A case study of the integration of a video learning center at an elementary school.* Retrieved from ProQuest Digital Dissertations. (AAT 3091163)

Kerlinger, F. N. (1973). *Foundations of behavioral research* (2nd ed.). New York, NY: Holt, Rinehart and Winston.

Kettel, R. P. (2008). *The ASK program: Understanding social issues of the past and present through children's literature*. Paper presented at the National Social Science Association.

King, C., & Macklam, C. (2007). *Constructivist and collaborative perspectives on building a provincial network in support of teaching and learning using videoconferencing in Alberta.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2007, Vancouver, Canada.

Kinginger, C. (1999). Videoconferencing as access to spoken French. *Canadian Modern Language Review, 55*(4), 468-489.

Kinnear, H., McWilliams, S., & Caul, L. (2002). The use of interactive video in teaching teachers: an evaluation of a link with a primary school. *British Journal of Educational Technology, 33*(1), 17-26.

Kubasko, D., Jones, M. G., Tretter, T., & Andre, T. (2007). Is it live or is it Memorex? Students' synchronous and asynchronous communication with scientists. *International Journal of Science Education, 30*(4), 495-514. doi:10.1080/09500690701217220

Lee, M. M. (2004). *Going global: The complexities of fostering intercultural understanding in a rural school using videoconferencing technology.* Retrieved from ProQuest Digital Dissertations. (AAT 3141606)

Lim, J. (2003). MysteryQuest video conference exercises give middle school students a reason to research. *MACUL Newsletter*. Retrieved from http://www.macul.org/

Lim, J. (2007a). *Curriculum videoconferencing*. Retrieved from http://bcisdvcs.wordpress.com/2007/09/28/curriculum-videoconferencing/

Lim, J. (2007b). *A study of the implementation of videoconferencing in 35 schools in southwest Michigan*. Unpublished data.

Lim, J. (2008). Using the ASK process to interview authors and specialists. *Media Spectrum, 35*(1), 24-26.

Lim, J., & Comer, A. (2009). *Planning kid2kid videoconference projects*. Retrieved from http://www.remc11.k12.mi.us/dl/media/ProjectsBooklet.doc

Lockett, L. T. (2008). *A critical analysis of a paraprofessional training program: Teacher aides managing their journey to self-sufficiency.* Retrieved from ProQuest Digital Dissertations. (AAT 3338614)

Lück, M., & Laurence, G. (2005). Innovative teaching: Sharing expertise through videoconferencing. *Innovate, 2*(1). Retrieved from http://www.innovateonline.info/

Martinez, M. D., & MacMillan, G. (1998). A joint distance learning course in American government (pp. 15).

Massingill, K. B. (2002). *A comparison of communication motives of on-site and off-site students in videoconference-based courses.* Retrieved from ProQuest Digital Dissertations. (AAT 3065704)

Matthews, A. W. (2002). *Technology leadership at a junior high school: A qualitative case study.* Retrieved from ProQuest Digital Dissertations. (AAT 3067355)

McCombs, G. B., Ufnar, J. A., & Shepherd, V. L. (2007). The virtual scientist: Connecting university scientists to the K-12 classroom through videoconferencing. *Advances in Physiology Education, 31*(1), 62-66. doi:10.1152/advan.00006.2006

McDonald, S. R. (2007). *Characteristics leading to a successful implementation of laptop computers: A case study.* Retrieved from ProQuest Digital Dissertations. (AAT 3255301)

McGinnis, V. L. C. (2001). *Examining the effects of tutoring sixth-grade math students at a distance using videoconferencing.* Retrieved from ProQuest Digital Dissertations. (AAT 3038257)

McNeil, K. A., Newman, I., & Kelly, F. J. (1996). *Testing research hypotheses with the general linear model*. Carbondale, IL: Southern Illinois University Press.

McNeil, K. A., Newman, I., & Steinhauser, J. (2005). *How to be involved in program evaluation: What every administrator needs to know*. Lanham, MD: Scarecrow Education.

Merrick, S. (2005). Videoconferencing K-12: The state of the art. *Innovate, 2*(1). Retrieved from http://www.innovateonline.info/

Mitchell, L. S. (2005). *Learning through laughter: A study on the use of humor in interactive classrooms.* Retrieved from ProQuest Digital Dissertations. (AAT 3171414)

Morrison, J., & Macquart, D. (2006). World's youth connect through Global Nomads Group: An interview with GNG's David Macquart. *Innovate, 2*(4). Retrieved from http://www.innovateonline.info/

Moss, D., Amodeo, A., Bullowa, J., & Detjen, T. (1997). The SAXophone project: Connecting classrooms around the world. *Learning and Leading with Technology, 25*(3), 49-51.

Naruse, Y., Yamanishi, J., & Farrell, D. (2003). *An effective interactive project based on the use of videoconferencing.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2003, Honolulu, Hawaii, USA.

Newman, D. (2008). The impact of multimedia videoconferencing on children's learning: Positive outcomes of use. In D. Newman, J. Falco, S. Silverman & P. Barbanell (Eds.), *Videoconferencing technology in K-12 instruction: Best practices and trends* (pp. 227-239). New York, NY: Information Science Reference.

Newman, D., Barbanell, P., & Falco, J. (2004). *Documenting value added learning through videoconferencing: K-12 classrooms' interactions with museums*. Paper presented at the E-Learn Conference. Retrieved from http://www.editlib.org/

Newman, D., Du, Y., Bose, M., & Bidjerano, T. (2006). *A content analysis of videoconference integration plans.* Paper presented at the Society for Information Technology and Teacher Education International Conference, Orlando, FL.

Newman, D., Falco, J., Silverman, S., & Barbanell, P. (2008). *Videoconferencing technology in K-12 instruction: Best practices and trends*. New York, NY: Information Science Reference.

Newman, I., & McNeil, K. A. (1998). *Conducting survey research in the social sciences*. Lanham, MD: University Press of America.

Newman, I., Newman, C., Brown, R., & McNeely, S. (2006). *Conceptual statistics for beginners* (3rd ed.). Lanham, MD: University Press of America.

Norwood, A. L. (2006). *The acquisition of Spanish through videoconferencing and video-based lessons by individual fifth graders.* Retrieved from ProQuest Digital Dissertations. (AAT 3240408)

O'Leary, Z. (2005). *Researching real-world problems: A guide to methods of inquiry*. London: SAGE.

Owston, R. (2007). Contextual factors that sustain innovative pedagogical practice using technology: an international study. *Journal of Educational Change, 8*(1), 61-77. doi:10.1007/s10833-006-9006-6

Pachnowski, L. (2002). Virtual field trips through videoconferencing. *Learning And Leading With Technology, 29*(6), 10-13.

Pemberton, J., Cereijo, M., Tyler-Wood, T., & Rademacher, J. (2004). Desktop videoconferencing: Examples of applications to support teacher training in rural areas. *Rural Special Education, 23*(2), 3-9.

Petersen, R., Starr, B., & Anderson, S. (2003). Real NASA inspiration in a virtual space. *Learning and leading with technology, 31*(1), 14-21.

Piecka, D. C. B. (2008). *Show and tell: Learning with interactive videoconferencing in kindergarten.* Retrieved from ProQuest Digital Dissertations. (AAT 3338618)

Ramirez, M. (1998). *Conversations from afar: Improving conversation skills and cultural understanding through videoconferencing*. Paper presented at the Annual Meeting of the Sunshine State Teachers of English to Speakers of Other Languages. Retrieved from http://www.eric.ed.gov/

Ray, K., & Zanetis, J. (2009). *Interactive videoconferencing: K-12 lessons that work.* Eugene, OR: International Society for Technology in Education.

Rockman. (2002). *CILC Vistas and their impact on students, teachers and communities*. Retrieved from http://www.cilc.org/pdfs/CILC.final.pdf

Rogers, D., & Jones, C. (1999). *Partnership learning: New models of videoconferencing in education*. Paper presented at the Proceedings of Society for Information Technology and Teacher Education International Conference 1999. Retrieved from http://www.editlib.org/

Royal, K., Bradley, K., & Lineberry, G. T. (2005). Evaluating interactive television courses: An identification of factors associated with student satisfaction. *Online Journal of Distance Learning Administration, 8*(2). Retrieved from http://www.westga.edu/%7Edistance/ojdla/summer82/royal82.htm

Sedlacek, N., Young, J. A., Acharya, C., Botta, D., & Burbacher, T. M. (2005). Linking the classroom to the community. *Science Teacher, 72*(4), 44-45.

Sembor, E. C. (1997). Citizenship, diversity and distance learning: Videoconferencing in Connecticut. *Social Education, 61*(3), 154-159.

Shaklee, J. M. (1998). *Elementary children's epistemological beliefs and understandings of science in the context of computer-mediated video conferencing with scientists.* Retrieved from ProQuest Digital Dissertations. (AAT 9902429)

Siraj-Blatchford, J., & Siraj-Blatchford, I. (2001). *Developmentally appropriate technology in early childhood: 'Videoconferencing' - a limit case?* Paper presented at the American Educational Research Association Annual Meeting., Retrieved from http://www.ioe.ac.uk/cdl/datec/aera2001/paper1.pdf

Slack, V. K. F. (2006). *Technical difficulty and its effect on distance education students during two-way videoconferencing courses.* Retrieved from ProQuest Digital Dissertations. (AAT 3251697)

Solvie, P. (2003). *Videoconferencing: Creating a space for new discourse in literacy and language education.* Paper presented at the Society for Information Technology and Teacher Education International Conference 2003, Albuquerque, New Mexico, USA.

Straessle, G. A. (2000). *Teachers' and administrators' perceptions and expectations of the instructional consultation role of the library media specialist.* Retrieved from ProQuest Digital Dissertations. (AAT 1400457)

Sweeney, M. A. (2007). *The use of videoconferencing techniques which support constructivism in K-12 education.* Retrieved from ProQuest Digital Dissertations. (AAT 3257352)

Szente, J. (2003). Teleconferencing across borders: Promoting literacy and more in the elementary grades. *Childhood Education, 79*(5), 299-304.

Thorpe, R. (1998). The use of personal video conferencing with special needs pupils from three schools serving rural areas: a case of successful adoption of new technology. *Journal of Information Technology for Teacher Education, 7*(3), 395-412.

Thurston, A. (2004). Promoting multicultural education in the primary classroom: broadband videoconferencing facilities and digital video. *Computers and Education, 43*(1-2), 165-177. Retrieved from http://www.sciencedirect.com/

Townes, K., & Caton, R. (2003). *Using the NASA LIVE videoconferencing program in teacher education.* Paper presented at the Society for Information Technology and Teacher Education International Conference 2003, Albuquerque, New Mexico, USA.

TWICE. (2007). *Videoconferencing collaborative projects*. Retrieved from http://www.twice.cc/projects.html

TWICE. (2009). *Collaborations around the planet*. Retrieved from http://projects.twice.cc/

Tyler, C. (1999). Beyond the content: Videoconferencing. *Speaking English, 32*(2), 15-27.

Wakefield, C. K. (1999). *Site facilitator roles in videoconferencing: Implications for training.* Retrieved from ProQuest Digital Dissertations. (AAT 9960871)

Wegge, J. (2006). Communication via videoconference: Emotional and cognitive consequences of affective personality dispositions, seeing one's own picture, and disturbing events. *Human-Computer Interaction, 21*(3), 273 - 318. doi:10.1207/s15327051hci2103_1

Weiss, T., Whiteley, C., Treviranus, J., & Fels, D. I. (2001). PEBBLES: A personal technology for meeting educational, social and emotional needs of hospitalized

children. *Personal and Ubiquitous Computing, 5*(3), 157-168. doi:10.1007/s007790170006

Wideman, H., Owston, R., Morbey, M. L., & Granger, C. (2004). *The ABEL project final research and evaluation report*. Retrieved from http://www.yorku.ca/irlt/reports/ABELFinalReport.pdf

WMHO. (2002). Videoconferencing exposes students to new worlds. *T.H.E. (Technological Horizons in Education) Journal, 29*(8), 53-54. Retrieved from http://thejournal.com/

Wong, W. (2008). A healthy education: Videoconferencing allows a Florida boy with an immune system deficiency to attend school for the first time. *EdTech: Focus on K-12, February/March*. Retrieved from http://www.edtechmag.com/k12/

Xiao, M., & Yang, X. (2005). *The effects of internet-based desktop videoconference on EFL students: Oral skills in terms of linguistic accuracy, fluency and complexity.* Paper presented at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2005, Montreal, Canada.

Yost, N. (2001). Lights, camera, action: Videoconferencing in kindergarten, *Society for Information Technology and Teacher Education International Conference*. Norfolk, VA.

Young, T. L., & Ireson, C. (2003). Effectiveness of school-based telehealth care in urban and rural elementary schools. *Pediatrics, 112*(5), 1088-1094.

Vita

Janine M. Lim
janine@janinelim.com

Academic Preparation

Andrews University, Berrien Springs, MI
- Doctoral Candidate, Leadership, May 2010
- Master of Arts in Teaching, Secondary Level, June 1996
  - Michigan Secondary Teaching Certification, June 1996
  - Michigan Reading Endorsement, K-12 June 1996
  - SDA Basic Certification, June 1996
- B.A. Degree in Communication, June 1995

Professional Experience

Instructional Technology Consultant
- Berrien Regional Education Service Agency, Berrien Springs, MI 1998-present

Instructional Technologist
- Berrien County Intermediate School District, Berrien Springs, MI 1997-1998

Teacher, 5-10 Language Arts and Bible
- Griswold Christian Academy, Worthington, OH 1996-1997

Publications

Lim, Janine. (Spring 2008). Using the ASK Process to Interview Authors and Specialists. *Media Spectrum*, (35)1, 24-26.

Lim, Janine and Porter, Sue. (December 2001). TWICE Supports Distance Learning in Michigan. *'etin* (Newsletter for the National Association of Media and Technology Centers). 2-4.

Lim, Janine. (September/October 2001). Effective Internet Research. *The Clearing House*, 75(1), 35-36.

Lim, Janine. (Fall 2000-present). Out on a Lim with EdTech. Regular columnist. *MACUL Newsletter and Journal*.

Lim, Janine. (Dec. 98-2004). OUT ON A LIM with Educational Technology. Regular columnist. *The Journal of Adventist Education*.

Freed, Janine. (1996). Exemplary Software for Teaching Writing. *The Journal of Adventist Education*, 58(5), 27-28.

Freed, Janine (1996). Special Education Metaphor Number Two: Two Gardens. *The Journal of Adventist Education*, 58(2), 44-45.

Awards

2008 United States Distance Learning Association Outstanding Leadership Award
2005 Adventist Virtual Learning Network Individual Collaborative Spirit Award
2004 Center of Science and Industry Excellence in Education Through Technology
2003 Two Way Interactive Connections in Education President's Award for Outstanding Achievement in Distance Learning
2000 WebCT Exemplary Online Course