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Distance education via compressed video: an evaluation of the attitudes and perceptions of students and instructors

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Distance education via compressed video:
An evaluation of the attitudes and perceptions
of students and instructors

by

Karen Ann Jurasek

A Thesis Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE

Department: Curriculum and Instruction
Major: Education (Curriculum and Instructional Technology)

Signatures have been redacted for privacy

Iowa State University
Ames, Iowa
1993
This thesis is dedicated to
my grandparents,

Frances B. Jurasek
Frank A. Jurasek
John O. Smeby Sr.
Olga Smeby

Thank you for instilling in me the lessons
you learned and lived by:

To always work hard, stand-up for what I believe in,
never give up, and always keep striving
to create a better life for myself,
my family, and the world.

I treasure the times we spent together.

I love you
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ABSTRACT

The past few years have seen an increased interest in the use of compressed video technology to deliver instruction. The purpose of this study was to evaluate: (a) whether compressed video technology could be used to deliver distance education courses effectively, (b) whether instructors' and students' would have positive attitudes toward the technology, and (c) whether there was a difference in the learning of students at either the origination site or the receive site.

A literature review in the fields of distance education, compressed video, interactive two-way audio and video instruction, and adoption and diffusion of innovations theory was conducted. Considerable research has been conducted in the area of using compressed video technology to deliver distance education courses, however, most of that research has been descriptive papers explaining how institutions and groups use compressed video, rather than empirical studies on the effectiveness of this technique.

Compressed video technology has been used in the business world for years to conduct meetings and training sessions (McFadden, 1986). It offers a simple to use, viable, and money saving alternative to transporting people to and from meeting sites. The technology is also readily available and once purchased, can usually be delivered and installed within 30 days. Schools have also started to view compressed video technology as a possible method for delivering distance education courses; however, some administrators have expressed concerns about the effects of the compression techniques on student learning and achievement (Sweeney, 1992).
Studies at both the college and high school levels have indicated that the more interaction present in distance education situations the more positive the attitudes of the students toward the experience (Ellis & Mathis, 1985; Katoaka, 1987; Ritchie & Newby, 1989). Thus, many educational institutions have chosen to use two-way audio/two-way video systems for the delivery of their distance education programs because these systems most closely replicate traditional classroom settings (Conniff, 1992).

The subjects for this study were the instructors and students enrolled in courses taught using the compressed video system during the fall semester of 1991. Data were collected from four groups for this study. Group one included the graduate students enrolled in the four courses being offered by Iowa State University. The group consisted of both on and off campus students. The second group included the instructors that taught using the compressed video system. Group three consisted of the high school students enrolled in the Advanced Computer Technology course at Des Moines Central Campus. The final group was made-up of the occasional users (i.e., meetings, inservice) of the system.

Eighty-one graduate students participated in the study. Students were mostly masters students in graduate programs at Iowa State University (57%). Seventy two percent of the students were enrolled at the origination site in Ames. Only nine percent of the students said they had been involved in a distance education class before. The gender makeup of group one was 67% females and 33% males.

Four instructors taught using the system on a regular basis (at least once a week). The four instructors had an average of 25 years of teaching experience. Three of the four instructors were males. Two of the instructors
had never taught a distance education course and had no previous formal training in distance education.

The third group that participated in the study was composed of high school students enrolled in a technology course at the Central Campus of the Des Moines Public Schools. Students were asked to evaluate the instruction they received via the compressed video system as part of a class evaluation. Thirteen students completed the evaluation instrument. The students enrolled in this class were juniors and seniors in high school. There were eleven males and two females in the class. Sixty-two percent considered themselves to be B students. None of the students had been involved in a distance learning experience before.

Occasional users of the system made up the fourth group who participated in the study. Primary users (persons in charge of meeting or class) were personally interviewed by the researcher. There were five occasional users. Two occasional users also taught one of the classes using the system and were not interviewed. All of the occasional users indicated they had a knowledge of distance education. All users also indicated they had some form of previous experience (as a teacher or a student/viewer) with distance education systems.

Four surveys were developed to provide answers to the ten research questions that were formulated to address the purpose of the study. The data from the surveys were analyzed to provide a profile of the respondents and to determine their attitudes toward using compressed video technology to deliver courses at a distance.

Generally, this study found that students and instructors held positive attitudes toward the use of compressed video technology to deliver courses.
Students felt compressed video instruction offered many positive aspects, there was sufficient interaction between students and their instructor, and the technology offered benefits beyond the course content. This study also resulted in a list of strengths and weaknesses of compressed video and distance education, and a list of suggestions for improvements.

Suggestions for future research include: (a) the exploration of what causes people to choose to support the technology, (b) the role interaction plays in students' attitudes and suggestions for ways to improve the interaction between sites, and (c) a study that more fully addresses the attitudes of students and instructors to determine if attitudes change over time.

There is a great deal of interest in interactive distance education technologies because interactive systems offer students the opportunity to see and verbally interact with an instructor or speaker in the same manner as they would if they were in a traditional classroom. The issues raised for educators are cost, availability, and effectiveness of the different technologies. Compressed video technology offers educators the opportunity to implement interactive distance education programs quickly at relatively low costs, with no apparent loss in effectiveness.
CHAPTER I. INTRODUCTION

As school districts, universities and other institutions experience declines in enrollments and budgets, and states raise their curriculum requirements for graduation and certifications, many are looking toward distance education technology as a way to offer learning opportunities to students. Distance education technology makes it possible for schools to: share resources with neighboring schools, bring experts into the classroom, offer a wider variety of curriculum choices, offer inservice training, and reach students who are geographically separated (U.S. Congress, 1989).

Many educators are no longer worried about whether or not distance education is effective. Research results have indicated that receive site students earn grades that are as good as, and often better than, origination site students (Katoaka, 1987; Stone, 1988; Weinand, 1984). What has become a larger issue to educators is the cost, availability, and the effectiveness of the different technologies that are available for use in distance education situations. Some of those technologies include: transmission of television signals using satellites, microwave, instructional television fixed service (ITFS), fiber optics, and leased telephone lines (compressed video).

The focus of this study was the evaluation of the effectiveness of a system that used leased telephone lines and special equipment that compressed the video signals (often called compressed video). Compressed video is term used to identify the process of using compression techniques to alter video signals. A computer devise known as a CODEC (COder/DECoder) removes redundant information before transmitting a signal. A CODEC is needed at both the origination and receive sites for a system to work. An
example of redundant information would be the background behind a teacher. The information that makes up the background usually does not change and therefore is not transmitted as often as the image of the teacher that does change. The resulting video contains some loss of quality and may look a bit "jerky" when rapid motion is transmitted.

This chapter serves as an introduction to the study. It consists of six sections: (a) a brief literature review that provides background information on distance learning, information about instruction by two-way audio and video, and a summary of "compressed video" technology; (b) a statement of the problem; (c) the purpose of the study; (d) the study's research questions; (e) definition of terms; and (f) a chapter summary.

Background

Distance education

Distance education is a very broad term with its roots in correspondence study. Simply stated, distance education is education in which the instructor and the students are separated by a physical distance. That distance could theoretically be as far as halfway around the world or as close as another classroom in the same building.

Keegan (1986) has developed a more formal definition of distance education. It includes: (a) the separation of the teacher and the learner; (b) the presence of an educational organization to help with planning and providing educational and student support materials; (c) the use of some type of technological medium such as print, audio, video, or computers to bring the student and the teacher together; (d) the presence of two-way
communication to facilitate interaction; (e) the industrialization of the
instructional process; and (f) the lack of a large learning group, or the
entire absence of a learning group.

The last 10 years have seen tremendous growth in distance education
in the United States. This growth has been due to numerous changes and
innovations, both in education and the telecommunications industry. These
include issues raised in publications such as A Nation at Risk (U.S. Congress,
1983) and Linking for Learning (U.S. Congress, 1989). Both publications
discussed problems such as: (a) educating an information age work force,
(b) pupil and teacher shortages, and (c) the need for educational equity
between rural and urban schools (U.S. Congress, 1983; and U.S. Congress,
1989).

Instruction by two-way audio and video

The various technologies available for distance education can be used
to deliver a signal in several ways including: (a) two-way audio, (b) one-
way audio/one-way video, (c) two-way audio/one-way video, (d) two-way
audio/two-way video, (e) computers, and (f) fax. Research has indicated
that regardless of the medium used for instruction or the location of the
student, students generally perform at comparable levels (Clark, 1983; 1989).

Studies at both the college and high school levels have indicated that
the more interaction present in distance education situations the more
positive the attitudes of the students toward the experience (Ellis & Mathis,
1985; Katoaka, 1987; Ritchie & Newby, 1989). Thus, many educational
institutions have chosen to use two-way audio/two-way video systems for the
delivery of their distance education programs because these systems most
closely replicate traditional classroom settings (Conniff, 1992). Several
states, including Iowa, Minnesota, Kentucky, and Utah, have implemented, or
are implementing state wide networks, most of which are capable of

**Compressed video**

Compressed video can use existing telephone lines to transmit two-way
audio and video to and from both origination/receive sites. The technique
involves the compression of the video image by a CODEC. A CODEC is a
computer device that codes and decodes the analog signals produced by video
cameras and microphones into digital signals that can be sent over telephone
lines. Another CODEC is required at each receive site to convert the digital
signals to analog signals for display on video monitors. For some systems,
only 10 images each second instead of the 30 images per second that are
provided by regular television are transmitted between locations. The video
signal that appears at the receiving end sometimes looks a little jerky,
similar to watching a video in slow motion. People and objects moving at
normal speeds transmit very well, however, rapid motion sometimes looks
jerky or blurred (Schamber, 1988). In this paper the term compressed video
will be used to refer to the transmission of signals between sites using the
system described above.

Compressed video technology has been used in the business world for
years to conduct meetings and training sessions (McFadden, 1986). It offers a
simple to use, viable, and money saving alternative to transporting people to
and from meeting sites. The technology is also readily available and once
purchased, can usually be delivered and installed within 30 days. Schools
have also started to view compressed video technology as a possible method for delivering distance education courses; however, some administrators have expressed concerns about the effects of the compression techniques on student learning and achievement (Sweeney, 1992).

**Statement of the Problem**

Educators need to have options available to them when they choose a technology to deliver courses to distant learners. To help them make these choices they must know, among other things: (a) what their educational needs are, (b) what they want to accomplish, (c) which technologies can help them meet their needs, and (d) how effective the technology has been in prior educational situations. Because compressed video technology has only recently started to be widely used by educators, insufficient research has been conducted on its effectiveness as a delivery method.

The literature contains primarily descriptive papers explaining how institutions and groups use compressed video, rather than empirical studies on the effectiveness of this technique. Because student (and faculty) support is essential for the success of any technology (Johnson, 1988) further research is necessary to determine the attitudes and perceptions of students and instructors toward the use of compressed video technology.

**Purpose of the Study**

This study was designed to describe attitudes and perceptions of students and instructors who had used compressed video technology. A
secondary purpose was to determine if there were differences in the achievement of students enrolled at the different sites. Students' and instructors' scores on attitude measures were also compared.

Limitations of the Study

Several limitations are apparent. First, there was no random assignment of students to experimental or control groups. Second, there was no control group established for the study. Third, students chose to enroll in the courses, and chose which site to attend class themselves. Finally, there was a very low number of faculty members involved in the courses, and these faculty members volunteered to teach their course on the compressed video system.

These limitations limit the ability to generalize the results of this study to other groups. Also the lack of a control group makes it difficult to determine if student attitudes were related to the content of the courses, or to the use of the compressed video technology.

Research Questions

Items about the 10 research questions of this study were incorporated into the survey instruments that were used. The research questions were:

1) To what degree do students support compressed video instruction?
2) To what degree do instructors support compressed video instruction?
3) What were the students' perceptions of the technology?
4) What were the instructors' perceptions of the technology?
5) What were the students' perceptions of the strengths and weaknesses of compressed video instruction?

6) What were the instructors' perceptions of the strengths and weaknesses of compressed video instruction?

7) What were the students' perceptions of the interaction the system provided?

8) What were the instructors' perceptions of the interaction the system provided?

9) In the students' opinion, did compressed video instruction offer any other benefits beyond course content?

10) What were the instructors' attitudes about the teaching process using the compressed video system?

**Definition of Terms**

**CODEC** - a digital coding and decoding device that converts the analog signals produced by video cameras and microphones into digital signals which can be sent over telephone lines to another CODEC (TTVN, 1991).

**Compressed video** - video that is converted to digital data and modified by eliminating repetitive picture information to allow more efficient and economical transmission to a distant location (TTVN, 1991).

**Delivery Method** - the technology and media used in distance education.

**Distance Education** - the practice of teaching and learning over a distance.

**Facsimile machine (fax)** - a telecopying device that electronically transmits written or graphic material over telephone lines to produce a "hard copy" at a remote location (OTA, 1989).
Fiber Optics - hair thin, flexible glass rods that use light signals to transmit audio, video, and data signals in either analog or digital format (OTA, 1989).

Instructional Television Fixed Service (ITFS) - a point-to-multipoint transmission system that provides audio and video to the receive site with audio only on the return channel. With proper equipment, receive locations can be located up to 20 miles from the origination site (Chinn, 1990).

Satellite - point-to-multipoint transmission system that provides audio and video to many users over wide areas simultaneously. Audio response from a viewer normally is by telephone (Chinn, 1990).

T-1 - a specialized telephone line which transmits the amount of information normally carried on twenty-four telephone lines (TTVN, 1991) which is used for compressed video systems.

DS-1 - a type of T-1 line used to connect the CODECs used in compressed video systems. It is a digital line running at 1.54 megabits, using standard copper lines.

Summary

In this chapter a brief overview of distance education was provided. Information was also included about two-way audio/two-way video instruction and compressed video technology. The main purpose of this study was to identify the attitudes of students and instructors toward using compressed video technology to deliver graduate courses simultaneously to
local and distant students. Chapter Two will discuss: (a) theories relating to distance education, (b) research on distance education, (c) information on compressed video and leased telephone lines, and (d) research and uses of compressed video technology in distance education.
CHAPTER II. LITERATURE REVIEW

Introduction

Distance education, the practice of teaching and learning over a distance, is not a new concept. The movement has its roots in correspondence study (Gray, 1988). Holmberg (1989) found that forms of distance education were in place as long ago as the seventeenth and eighteenth centuries. In the United States distance education was probably first practiced by the University of Chicago and the University of Wisconsin near the beginning of the twentieth century (Feasley, 1982). Today's distance education has been greatly influenced by the establishment of the British Open University in 1971, the first exclusive distance education university (Garrison, 1989).

Hundreds of studies on distance education have been conducted and reported. Most of those studies fall into two major areas, instruction and administration (McIsaac, Murphy, Gamas, & Igoe, 1989). Using a meta-analysis approach, McIsaac et al. (1989) also identified sub-categories under each of these two major areas of research. Instructional sub-categories included evaluations of learning, attitudes, and attrition. Administrative sub-categories were courseware design and cost-effectiveness.

Most distance education courses are offered for adult or high school students. Adults tend to choose distance education courses for reasons such as time, convenience, and self-improvement (Garrison, 1985). High school students say distance education classes are often the only way they can take
more advanced classes such as calculus or a foreign language, especially in remote rural school districts (Johnson, 1988).

In today's rapidly changing information society it is important that everyone remain up-to-date on the development of new forms of technology and information. Keeping up with changing information is often necessary for retaining or advancing in a job, or for admission to college. However, many people have schedules that make it impossible for them to attend conventionally scheduled and delivered courses. Distance education courses offer a way for many students to continue their education.

The review of the literature presents information and previous research concerning key variables examined in this study. The information in this chapter is organized as follows: (a) theories relating to distance education; (b) research on distance education; (c) information about compressed video and leased telephone lines; (d) research and uses of compressed video; and (e) a summary.

**Theories Relating to Distance Education**

There are so many views of distance education that it is nearly impossible to make global or general statements about its characteristics. Distance has different implications, and is not necessarily restricted by geographical distance (Rumble, 1986b). In many definitions distance also refers to cultural, economic and psychological separations (Burge, Snow & Howard, 1989). The field of distance education has been shaped by a society's needs and resources. Politicians have viewed distance systems as ways to promote certain values or to accomplish social, economic, and political
Distance education: A distinct field

There are two main schools of thought in distance education today. The first considers distance education as an educational form based on individualized study, separate and distinct from traditional education. There are many independent universities in the European community that teach only by distance, and believe, in theory, that distance education is an alternative way of teaching (Moore, 1988; Peters, 1988).

Significant efforts have been made to formalize a specific distance education theory with theoretical approaches aimed at distinguishing its essential characteristics and elements. Keegan (1988) classified the theories as: (a) theories of autonomy and independence: Wedemeyer (1981) and Moore (1988); (b) the theory of industrialization: Peters (1988); and (c) theories of interaction and communication: Holmberg (1977, 1981, 1988b); Bååth (1980); and Sewart (1988).

Keegan (1980; 1986) examined the theories presented by Moore, Peters, and Holmberg, and proposed a descriptive definition. These characteristics are widely used today to define distance education:

- quasi-permanent separation of teacher and learner
- influence of an educational organization
- use of technical media
- provision of two-way communication
- quasi-permanent absence of group learning
- presence of industrialized features

Rumble (1989) and Garrison (1989) suggested Keegan's characteristics were too restrictive. The characteristics used by Keegan excluded certain objectives (Daniel, 1988; Foks, 1988; Giltrow, 1989; Rumble & Harry, 1982; Zigerell, 1984).
methods and some audiences. Rumble's definition included teleconferencing capabilities and excluded industrialization as factors critical to a definition of distance education. Garrison believed that a definition of distance education should not be precise. Vagueness was necessary in order not to restrict the activities of the distance education systems.

Keegan (1988) stated "a theory base is still needed." He declared that the lack of theory had weakened distance education. Holmberg (1977) suggested distance education had been characterized by a trial and error approach with little thought given to a theoretical framework. Holmberg (1989) stated that the "emergence (of theories) is almost always due to personal observations, intuition and creative thinking" (p 19). Therefore, he believed a theory of distance education would be developed only after years of practical practice and research.

Distance education: A corresponding field

A second school of thought considers distance education as analogous to traditional education. Garrison (1989) contends that distance education is not a unique form of education. The techniques appropriate for traditional educational goals and for distance education goals are generally the same. Garrison concluded that the most significant task for all educators was the pursuit of effectiveness. Effectiveness is associated with the suitable form and nature of the communication process. Foks (1988) asserted that technology has blurred the distinctions that are used to identify distance education as a separate mode of learning. Perraton (1987) even presented hypotheses that the systems of teaching, administration, and assessment are interrelated.
The majority of educators in the United States have adopted the philosophy that distance education does not differ from conventional education in any real structural sense, but is different only in the delivery system (Zigerell, 1984). Most U.S. educators view distance education as a technique to promote the process of learning (National Governor's Association, 1986).

Holmberg (1988a) contended that both distinctive and corresponding applications of distance education occur, and that both have been successful. However, he believed distance education as a separate mode of education provides the fullest potential for the field. Outside the organizational and administrative framework of traditional education, distance education's potential as a new paradigm becomes more obvious. Distance education offers students opportunities for complete independence—to study individually what, where, and when it suits them. Distance education within the framework of traditional education is more limiting. This is due to restrictions in scheduling of classes and the placement of remote sites to facilitate instruction.

Diffusion of innovations

In the distance education field "compressed video" is a relatively new technology. As with all new technologies and processes, an adoption/diffusion cycle occurs as potential users become aware of the innovation, judge its relative value, make a decision based on that judgment, implement or reject the innovation, and seek confirmation of the adoption/rejection decision. Dede (1990) stated that in order for an
innovation to be seen as valuable by its target audience it must be perceived as being 10 times better than the idea it superseded.

Using compressed video technology as a means of delivering distance education courses is a relatively new use of this technology, and, as such, it is just beginning its diffusion process throughout the educational system. The success or failure of compressed video technology will be highly dependent on its acceptance as a viable instructional tool by educators and administrators. If prices of compressed video systems continue to decline and research indicates no loss of learning by students who learn from instruction delivered using compressed video, the technology is likely to gain acceptance.

Research on compressed video technology has indicated that the most prevalent uses of this technology have been in the business sector, specifically, as an inexpensive way to conduct meetings between people in different offices and cities. Teleconferencing, as it is called, has saved business and government institutions valuable time, and money in transportation costs. As compressed video technology finds its way into the education field, the diffusion of innovations theory (Rogers, 1983) provides a framework in which research can be conducted.

**Definition of the Diffusion of Innovations Theory**

"Diffusion is the process by which innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication, in that the messages are concerned with new ideas" (Rogers, 1983, p. 5). The four main components contained in
this definition of diffusion are the innovation, communication channels, time, and the social system.

According to Rogers (1983), "An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11). Rogers claimed that an innovation would diffuse more rapidly through a user group if it was believed to have the following characteristics: (a) an advantage over what it is replacing; (b) compatibility with the user's values, past experiences, and current needs; (c) ease of use; (d) ability to be considered on a trial basis; and (e) easily observable results.

A communication channel is the way in which messages are exchanged between individuals. People create and share ideas with one another through some form of communication channel. There are two types of communications channels, mass media channels and interpersonal channels. The types of mass communication channels include radio, television, and newspapers, all of which are fast and useful ways to familiarize a large group of potential adopters with an innovation. Interpersonal channels are usually face-to-face communication between two or more people, and are often more effective than mass media for persuading individuals to adopt or reject a new idea.

Time influences the diffusion process in three ways. First, there is a period of time from when an individual first becomes aware of an innovation until the individual adopts or rejects the innovation. Second, time refers to how fast an individual adopts the innovation compared to others within the social system. And third, time is associated with the rate of adoption, or the speed at which an innovation is adopted by members of a social system. This rate is measured by the span of time that is needed for a certain percentage
of the members of a system to adopt an innovation. Different social systems adopt innovations at different rates.

Rogers defines the social system as "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems" (1983, p. 24). The system being observed in a diffusion study may be a college course in Iowa, an elementary school in Minnesota, or a business with offices in several states.

Three of the four elements contained in Rogers' definition of diffusion were important to the present study. The innovation, in this case, was the idea and practice of using compressed video to deliver courses at a distance. Time was involved in the relative earliness or lateness of the participants' acceptance of the innovation's use as compared to the other members of the social system (Rogers, 1983). The social system consisted of the students and instructors involved in the four courses using the compressed video technology.

**Individuals and the diffusion of innovations**

There are several types of people involved in a social system. Individuals are grouped according to their role in the diffusion process. Rogers (1983) discusses the roles of the change agent, the opinion leader, and the clients.

Change agents are professionals who serve the interests of a social system. An example of a change agent would be a sales representative of a communications company seeking to promote the adoption of compressed video equipment for use in delivering distance education at the college and
high school levels. The level of professional or technical training and social status of change agents, however, often means that they have little in common with their typical clients, and have difficulty communicating with them directly. Because change agents have little immediate influence inside a social system, they often use local opinion leaders to help promote diffusion.

Opinion leaders are individuals with influence and respect in a social system. Their interpersonal communication networks allow them to diffuse innovative ideas, and their innovative behavior serves as a model for other members of the community. Faculty members at colleges are often considered to be opinion leaders. A faculty member who saw value in the use of compressed video equipment to deliver education at a distance could help the efforts of the sales representative by diffusing information about the innovation and influencing the opinions and actions of others.

Clients are usually the largest group within a social system and are the individuals who have the most influence on whether or not an innovation is adopted or rejected. Clients might be the administrators, instructors, and students who would be involved in distance education courses and the decisions surrounding those courses. In order for compressed video equipment to be adopted and diffused into the education system the change agent and opinion leaders must be able to show the clients that using compressed video to deliver distance education courses creates options not currently available to them.

Innovations do not directly diffuse by themselves. Within a social system, individuals play different roles in the diffusion process.
Diffusion is the process by which innovative ideas are communicated over time among members of a social system (Rogers, 1983). In the present study, information was sought regarding: (a) the innovation--the delivery of instruction via compressed video, (b) the social system--instructors and students using the system, and (c) the communication channels--the means by which the information regarding this innovation was spread. The application of compressed video-delivered instruction in a University setting is an example of the "adoption and diffusion of innovations" process.

Research on Distance Education

Several definitions of distance education have been developed over the years and although the term has become widely accepted, it is not always used in the same way by different researchers (Garrison, 1989). There is one commonality to most definitions. They all include reference to a separation between teacher and student (Ely, 1981; Garrison, 1989; Keegan, 1986).

Because of the development of new communications technologies for delivering distance education programs, professionals decided in 1982 that the term correspondence study was no longer comprehensive enough to encompass this rapidly growing field. The term distance education was proposed because it was considered to be broad enough to encompass what was happening in the field (Garrison, 1989). The term did not gain full acceptance until the International Council for Correspondence Education changed its name to the International Council for Distance Education in 1982 (Garrison, 1989).
Several different forms of communications technologies have been used in distance education situations. Traditional correspondence study used books. Now, full motion video transmissions are used. As Garrison (1989) said in *Understanding Distance Education*, "the Open University's adoption of educational technology with respect to both hardware and design processes greatly enhanced the credibility and reputation of distance education" (pg. 2). Other technologies that have been used include radio, two-way audio, video tape, and compressed video systems (Schamber, 1988).

Research in distance education has often focused on the effectiveness of distance courses as compared to conventional face-to-face instruction. These studies have generally reported distance classes as being just as effective as conventional classes. Results were usually based on course grades, achievement measures, and student and instructor attitudes (Blanchard, 1989).

Studies by Barker (1987) and Johnson (1988) indicated that high school students involved in satellite delivered courses expressed positive attitudes toward instruction. Although the students gave suggestions for improvement in most of the areas studied, they still indicated positive attitudes toward the amount of interaction between teacher and student, and toward the strengths of satellite instruction.

Several studies have been conducted concerning interactive distance education. These studies have lead researchers to propose the following conclusions: (a) student achievement in interactive distance education classes is as good or better than with tradition teaching (Batey & Cowell, 1986; Hobbs, 1990; Johnson, 1988; Kabet & Friedel, 1990; Minnesota State, Dept. of Education, 1990; Pirrong & Lathen, 1990; Randall & Valdez, 1988; U.S. Congress,
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1989); (b) students involved in interactive classes have positive feelings about their experiences (Barker, 1989; Kitchen & Kitchen, 1988; Nelson, 1985; Nelson, Cvancara & Peters, 1989; Pirrong & Lathen, 1990; U.S. Congress, 1989). Because two-way interactive systems more closely replicate the traditional classroom environment, schools have been inclined to choose two-way systems over one-way systems when implementing distance education programs.

Both quantitative and qualitative studies have been published. However, many can not be generalized beyond their sample, would be impossible to replicate, and most lack a theoretical background. This type of research has been referred to as "relatively advanced statistical analysis combined with a complete lack of theory" (Holmberg, 1988, p. 151).

Compressed Video and Leased Telephone Lines

Compression technology uses a device called a CODEC and DS1 telephone lines to deliver audio and video signals to and from a distant site. The analog video and audio signals from cameras and microphones are converted to digital data by the CODEC, a coding and decoding device, and sent over the telephone lines to another CODEC which converts them back to analog signals to be displayed on the video monitors. It is also necessary to compress the video signals because video bandwidths are too large to be carried over telephone lines as regular signals. In simple terms, the compression technology makes it possible for a picture that is recognizable by the human eye to be sent over telephone lines as a signal that only represents a fraction of the original picture. In other words, only the important information is
continually updated. Stationary items such as a wall or desk do not change and are updated less frequently. Although almost all video signals are compressed somewhat when they are transmitted, the difference with compression technology is that the compression is "significant".

The Applied Research Institute conducted a study and found: (a) compression technology has improved a great deal since its introduction; (b) picture quality has remained good, while the ability to compress signals has increased and the costs of equipment has dropped; (c) compression devices now encode, decode, and blend (multiplex) signals so multiple signals can be sent simultaneously; (d) hardware and software prices have decreased; (e) standards for compatibility among vendors' products are emerging; (f) T-1 lines are readily available (cited in Keller, Staab & Stowe, 1989).

**Compressed Video**

**Uses**

Compressed video systems have been successfully used in both education and industry. The past 10 years have seen tremendous increases in the number of systems being used. Improvements in the technology have led to higher quality video and audio transmissions, and costs have dropped dramatically (McFadden, 1986). The ease of operation and the potential for future applications has also contributed to the expanded use of compressed video. An experiment in Japan using compressed video supported the conclusion that compressed video had practical uses for teaching at a distance in an interactive environment (Wakamatsu & Obi, 1990).
Successful programs using compressed video have been reported by the following groups: (a) V.E.I.N. Video Education Interactive Network, Wyoming Center for Teaching and Learning at Laramie (Edwin, Owens & Rezabek, 1991); (b) IVN Interactive Video Network, North Dakota (Tykwinski & Poulin, 1991); (c) University of Minnesota (Kolomeychuk & Peltz, 1991); (d) TTVN Trans-Texas Videoconference Network, Texas A & M University System (T. Hockenberry, personal communication, December 11, 1991); (e) Penn State (Phillips, 1987); (f) California State University Campus, Bakersfield (Ward, 1990). Compressed video technology plays an important role in the distance education programs used by these groups. The main uses of the technology are for meetings, graduate and undergraduate courses, guest speakers, and special programs.

Some of the major factors associated with the success of these and other programs include the savings of time and money used to travel to meetings and to classes, the structured learning environment compressed video technology provides, the opportunity for almost instantaneous feedback in the more familiar traditional classroom manner, the opportunity for instructor and student to send and receive both audio and visual cues (e.g., establish rapport, puzzlement and comprehension, emphasize a point, etc.), and the capability to use visual demonstrations and graphics (Conniff, 1992).

Research

A review of the literature revealed a limited amount of research on interactive compressed video instruction in education. Whittington (1987) noted that experiences with ITFS and two-way TV can be generalized to other
forms of interactive technologies. Denton, Clark, Rossing, and O'Connor (1984) conducted a comparison study of two-way TV and conventional classroom instruction for medical students. They reported that attitudes toward two-way television were mixed, yet many qualities of television were well-received. Denton et al. found these data consistent with studies of student attitudes, indicating that this medium was perceived favorably. However, most students preferred instruction in the traditional setting.

Sanborn, Miller, and Naitove (1976) administered an attitude inventory to 30 medical students. It was designed to measure students' attitudes toward instructional television. It was found that students had a significantly positive shift in attitudes toward two-way TV after taking an interactive TV course.

Similarly, Oakes (1986) reported positive opinions were expressed by university students involved in the Washington Higher Education Telecommunication System (WHETS). Washington State University and the University of Washington were linked by WHETS, and delivered four engineering and computer science courses to off-campus sites. Student opinions included comments that: (a) the system was generally effective, (b) the audio and video signals were clear, (c) the feeling of being part of a class was mixed, (d) the lack of feeling at ease when asking a question was a problem, and (e) the video capabilities were an advantage.

The Oklahoma State Department of Education surveyed 30 schools that participated in German by Satellite (Barker & Beckner, 1986). The total enrollment in the program was 244 students; the average enrollment per school was eight students. Principals responded that the program's greatest strengths were: (a) the opportunity to study a foreign language not offered
by the school, (b) the cultural experience provided, (c) the exposure to technology, (d) the promotion of independent study and motivation, and (e) the high quality of the instruction and materials. The weaknesses identified were: (a) the lack of synchronization with the school schedule; (b) the need to increase the number of broadcasts per week in order to maintain student interest, provide subject background, and increase interaction; (c) the need to shorten the time between testing and reporting grades; and (d) the absence of a real teacher in the classroom.

Barker and Beckner (1986) conducted an informal evaluation of the Accelerated Learning Spanish project in Utah and Nevada. They contacted principals by telephone and received survey data from 40 students enrolled in the project. Students felt the class was "fun, interesting, and a quality learning experience" (p. 9). Students indicated a need for more classes to be offered and for more interactive opportunities between the students and teacher. Positive comments were reported about the quality of the teaching, value of student/computer interaction, and the opportunity to take the course. Hartz (1983) found Wisconsin high school students who participated in CURCUIT, (Curriculum Improvement Resulting from Creative Utilization of Instructional Two-Way Television), were comfortable with the media and did not regard their instruction as lacking anything as compared to traditional classroom instruction.

Research on instructors' attitudes toward two-way interactive television teaching has generally produced positive results. Instructors cite reductions in travel time, the availability of instantaneous feedback, and the ease of operation as major advantages to such systems (Conniff, 1992). Other advantages of interactive distance education systems as perceived by
teachers included: (a) increasing course options and programs for students, (b) providing opportunities for challenge and growth of teachers, (c) providing opportunities for motivation and self-discipline among students, and (d) smaller class sizes. Instructors generally believed that students learned as much as in traditional classes, and that students displayed more motivation and responsiveness in interactive situations (Senate Committee on Labor and Human Resources, 1987).

Some of the disadvantages cited included: (a) lack of teacher training (Chinn, 1990), (b) a lack of control resulting from lack of personal contact with students, (c) technical problems, (d) delays in material transfer, (e) logistical problems concerning make-up work, and (f) conflicting school schedules (Senate Committee on Labor and Human Resources, 1987).

Instructors indicated that interactive teaching required more preparation time and required them to adapt their method or style of teaching as both a problem and an opportunity. According to Kitchen (Senate Committee on Labor and Human Resources, 1987),

Better advance preparation, more preparation time, more or different visual materials and more work to keep all students involved and attentive are clearly required of teachers. Moreover, it is the observation of the evaluators that these systems tend to magnify both good and bad teaching and do require a degree of 'presence' on camera (p. 87).

Evaluations have indicated that teaching using interactive TV requires the effective use of interaction and a variety of teaching techniques, some of which need to be practiced before use (Senate Committee on Labor and Human Resources, 1987). Teachers have also indicated that to achieve competence as a TV teacher more practice time and support is needed (Chinn, 1990). The increase in preparation time has resulted in many instructors re-
evaluating their approaches to teaching, which some believe made them better teachers (Conniff, 1992; Chinn, 1990).

Summary

This chapter provided a review of the literature relating to distance education, particularly, two-way interactive television and compressed video. The main topics covered were: (a) theories relating to distance education, (b) research on distance education, (c) compressed video and leased telephone lines, and (d) uses of and research about compressed video.

There is a lack of an accepted theory in distance education and most distance education studies have given little thought to theory (Keegan, 1988; Holberg 1977). Literature relating to the development of a theory of distance education falls into two distinctive views: First, distance education is a mode of the traditional educational pedagogy; or second, distance education is a separate discipline. In the United States most educators view distance education as a tool or resource to promote the learning process within the traditional educational perspective.

The review of the literature also revealed that Rogers' (1983) theory of the diffusion of innovations can provide a framework in which research can be conducted about a relatively new technology, compressed video, used in distance education situations. As this technology finds its way into education, this theory could be used to identify its level of acceptance by people involved with distance education.

Four features of distance education were consistently found in the literature. They include: (a) most literature exists in the form of occasional
papers or as conference presentations; (b) most distance education literature tends to be conceptual, providing direction rather than theory base; (c) distance education research tends to be descriptive and presents results of observational data, case studies or survey research; and (d) distance education literature is far more international than national (Wagner, 1989).

The literature also revealed that distance education is gaining popularity in the United States and that interactive systems are the most popular. Research studies relating to distance education have indicated that both students and instructors report positive attitudes toward interactive distance education systems and classes are effective and successful.

Compressed video systems began being implemented into education in the mid 1980's. The review of the literature indicated that few research studies have been undertaken about compressed video technology. Studies that have been undertaken indicate the same positive results and attitudes as have been reported in research studies involving other interactive distance education technologies.

This study attempted to determine students' and instructors' attitudes toward the use of compressed video technology. The information presented in Chapter III will explain the methodology used to examine the attitudes and perceptions of students and instructors toward the use of compressed video technology to deliver courses at a distance.
CHAPTER III. METHODOLOGY

Introduction

A limited amount of research pertaining to instructors' and students' attitudes/perceptions toward interactive compressed video technology is available. Most previous research has been in the form of case studies and position papers.

This research study involves an assessment of instructors' and students' perceptions of the effectiveness of compressed video technology when used to deliver college classes. This study evaluated whether compressed video technology could be used to deliver distance education courses effectively, whether instructors and students would have positive attitudes toward the technology, and whether there was a difference in the learning of students at either the origination site or the receive site.

Chapter III will include information about the research situation, the subjects, and the instrument design. This chapter concludes with a section that discusses the treatment of the data.

The Research Situation

Background

In the fall of 1990, an ad-hoc committee on distance education was formed by interested faculty and staff of Iowa State University and representatives of US West Communications. Working together, this group developed a proposal to bring compressed video equipment to Iowa State
University for the purpose of teaching classes and evaluating the effectiveness of the technology. Representatives of US West Communications arranged for compressed video equipment to be available for classes during the Fall Semester of 1991.

**Classroom set-up**

The compressed video equipment was delivered to the receive site in Des Moines and to the origination site in Ames on August 13, 1991. US West employees assisted in the set-up and installation of the equipment at both sites. The equipment was tested and connection was made between the Ames (origination) and Des Moines (remote) sites.

**Users of the Compressed Video System**

**The graduate courses**

Four graduate level courses were offered using the compressed video system. Registration of the remote site students was handled by the Continuing Education Office at Iowa State University. Origination site students registered for classes using normal Iowa State University, on-campus registration procedures.

**Curriculum and Instructional Technology 501, Principles and Practices of Instructional Technology** met every Monday night from 6:00 to 9:00 p.m. It was a three credit course that provided instruction in the utilization and analysis of instructional technology in school and corporate settings. The course stressed the application of research findings,
preparation of teaching materials, and methods of teaching with technology (ISU, 1991).

Research and Evaluation 550, Educational Research, met every Tuesday evening from 5:30 to 7:00 p.m. This two credit introductory class provided students with a basic understanding of the nature of research and the opportunity to develop the essential skills for writing a research proposal (ISU, 1991).

Basic Educational Statistics, Research and Evaluation 552, met Wednesday nights, 6:00 to 9:00 p.m. A two credit course, 552 covered basic statistical concepts and procedures used in analyzing educational data (ISU, 1991).

Curriculum and Instructional Technology 615 was a one credit seminar that met on Thursday afternoons from 4:10 to 5:00 p.m. The results of research studies and other selected topics in curriculum and instructional technology were presented weekly (ISU, 1991).

The high school course

A course titled "Advanced Computer Technology" at Central Campus in Des Moines offered high school students the opportunity to work with computer applications and technology to produce projects. The class members met with their regular high school instructor every day. As a supplement to their instruction they also met with an Iowa State University professor 10 times during the semester using the compressed video system.
Occasional users

The system was also used during the semester by a variety of occasional users. An occasional user was defined as some one who used the system less than once every two weeks during the semester.

The most frequent occasional use of the system was for meetings. A summary of those meetings is listed as follows: (a) major professors meeting with graduate students about their programs, (b) professors conducting group meetings with students in both Ames and Des Moines, (c) meetings of the Ad-hoc Committee for Distance Education, and (d) meetings of the Ames Laboratory educational program called Improving Success in Calculus.

Subjects

The subjects for this study were the instructors and students enrolled in courses taught using the compressed video system during the fall semester of 1991. Data were collected from four groups for this study. Group one included the graduate students enrolled in the four courses being offered by Iowa State University. The group consisted of both on and off campus students. The second group included the instructors that taught using the compressed video system. Group three consisted of the high school students enrolled in the Advanced Computer Technology course. The final group was made-up of the occasional users (i.e., meetings, inservice) of the system.

Enrollment in the graduate classes at the beginning of the semester was 93 students. Final enrollment was 81 students. This drop in enrollment was not considered unusual.
Most of the students (57%) were masters candidates in graduate programs at Iowa State University. Seventy two percent of the students were enrolled at the origination site in Ames. Only nine percent of the students said they had been involved in a distance education class before. The gender makeup of group one was 67% females and 33% males.

Students were told that participation in the study was optional and that they could drop out at any time. Because the surveys were distributed and completed during class time, participation was quite high.

Four instructors taught using the system on a regular basis (at least once a week). The four instructors had an average of 25 years of teaching experience. Three of the four instructors were males. Two of the instructors had never taught a distance education course and had no previous formal training in distance education. Instructor participation in the study was optional.

The third group that participated in the study was composed of 15 high school students enrolled in a technology course at the Central Campus of the Des Moines Public Schools. Students were asked to evaluate the instruction they received via the compressed video system as part of a class evaluation. Thirteen students completed the evaluation instrument, two were absent on the day the researcher visited the class.

The students enrolled in this class were juniors and seniors in high school. There were eleven males and two females in the class. Sixty two percent considered themselves to be B students. None of the students had been involved in a distance learning experience before.

Occasional users of the system made up the fourth group who participated in the study. Primary users (persons in charge of meetings or
classes) were personally interviewed by the researcher. There were five occasional users. Two occasional users also taught one of the classes using the system and were not interviewed.

All of the occasional users indicated they had a knowledge of distance education. All users also indicated they had some form of previous experience (as a teacher or a student/viewer) with distance education systems.

Instrument Design

The questionnaire was selected as the type of instrument used in this study. The questionnaire/attitude rating scales were identified as the most direct and appropriate data gathering instruments for a large group of subjects (Henson, Morris, & Fitz-Simmons, 1978). Questionnaires and attitude rating scales have been described as research instruments that: (a) permit anonymity, (b) provide time for the subjects to think about answers, (c) pose uniform questions, and (d) allow for a variety of questions. Two existing measures, Johnson's Study of Satellite Instruction Questionnaire (1988) and Brown's Distance Learning Evaluation Questionnaire (1988), were used as guides and modified for this study following the procedures described by Henerson et al. (1978).

The Study of Compressed Video Instruction (SCVI) and the High School Students Evaluation of Instruction (HSSEI) questionnaires were adapted from Johnson's Study of Satellite Instruction Questionnaire (1988). These questionnaires were used to gather descriptive information about the graduate students and the high school students. They were also used to
gather attitudinal information regarding student attitudes toward compressed video used for instruction. Two other questionnaires were developed and modified using Brown's Distance Learning Evaluation Questionnaire (1988). The Student Evaluation of Compressed Video and Distance Learning (SECVDL) and the Faculty Evaluation of Compressed Video and Distance Learning (FECVDL) were used to gain further insight into students' and instructors' attitudes toward specific aspects of the compressed video system. The processes for the design and modification of the four questionnaires used in this study are listed below. The survey instruments are included in Appendices A, B, C, & D. The four survey instruments were reviewed and met the approval of the Iowa State University Human Subject Review Committee (Appendix F).

**Study of Compressed Video Instruction (SCVI)**

**Design of Part One**

The questionnaire/attitude rating scale for this instrument was divided into two parts (Appendix A). The purpose of Part One of the SCVI was to obtain descriptive information about the graduate students enrolled in courses using the compressed video system. Items requested information about:

1. gender,
2. academic status,
3. student's view of own ability,
4. number of compressed video courses enrolled in,
5. specific course (courses) enrolled in, and
6. site.
Design of Part Two

The purpose of Part Two of the SCVI was to determine the attitudes of the graduate students toward compressed video. The items in this section were adapted from Johnson's Study of Satellite Instruction Questionnaire (1988) following the procedures described by Henerson et al. (1978, pp. 86-88). The items measured one of five constructs: (a) "To what degree do students support compressed video instruction," (b) "What were the students' perceptions of the interaction the system provided," (c) "What were the students' perceptions of the strengths and weaknesses of compressed video instruction," (d) "What were the students' perceptions of the technology," and (e) "In the students' perceptions, did compressed video instruction offer any other benefits beyond course content?"

One of the courses using the system was asked to pilot test the items using the following Likert-like agreement scale:

SA = Strongly Agree
A = Agree
U = Undecided
D = Disagree
SD = Strongly Disagree.

Each item on the pilot test represented an attitude construct which related to one of five of the research questions. The responses were assigned one point for the most favorable to five points for the least favorable choice. Because some of the items were stated in a negative manner, six of the items were reverse scored (items 4, 6, 9, 13, 17, and 20). A score was computed for each respondent for each of the five attitude constructs. Each statement was
also analyzed. Items that provided good discrimination between high and low scorers were retained. Henerson et al. (1978) stated, "The purpose for doing an item analysis is to select from a pool of items the ones that most effectively obtain the information you want, and to eliminate the less effective items from your instrument" (p. 87). A 23-item questionnaire was constructed from the items in the pilot test. A list of the research questions this questionnaire addressed and the related questionnaire items included:

Research Question 1 To what degree do students support compressed video instruction? (Support; Items 7, 14, 19, 20, 22, and 23.)

Research Question 3 What were the students' perceptions of the technology? (Perceptions; Items 4, 9, and 17.)

Research Question 5 What were the students' perceptions of the strengths and weaknesses of compressed video instruction? (Strengths; Items 3, 10, 11, 12, 15, and 16.)

Research Question 7 What were the students' perceptions of the interaction the system provided? (Interaction; Items 2, 5, 6, 8, and 13.)

Research Question 9 In the students' perceptions, did compressed video instruction offer any other benefits beyond course content? (Benefits; Items 1, 18, and 21.)

Student Evaluation of Compressed Video and Distance Learning (SECVDL)

The graduate students were also given a second survey instrument. The SECVDL questionnaire was designed to determine students' perceptions of
the effectiveness of compressed video to deliver instruction with reference to specific aspects of the compressed video system. It was emphasized that this questionnaire was not evaluating the content of the course(s), but rather the effectiveness of the delivery system (compressed video).

The questionnaire consisted of 12 questions (Appendix B). Three of the questions had several subsections. Four open-response format questions were also included in the survey (Appendix G). These questions provided students with an opportunity to express their opinions about the topic more thoroughly. Henerson et al. (1978) stated that open-ended items are valuable "to permit some ventilation of feelings, to uncover unanticipated outcomes, and to obtain some unprompted responses" (p. 61).

Faculty Evaluation of Compressed Video and Distance Learning (FECVDL)

The faculty questionnaire contained many of the same questions as the student questionnaire (SECVDL). It was designed to reveal the instructors' perceptions of the effectiveness of compressed video to deliver instruction. It was emphasized that the questionnaire was not evaluating the content of the course, but rather the effectiveness of the delivery system.

This questionnaire contained 12 questions, many with multiple parts (Appendix C). Four open-response format questions were also included in the FECVDL (Appendix H). These questions were provided to give instructors an opportunity to express their opinions about the topic more thoroughly. The items of this questionnaire were analyzed separately, however, they did relate to the following research questions:

Research Question 2 To what degree do instructors support compressed video instruction?
Research Question 4 Were the instructors satisfied with the technical aspects of the compressed video system?

Research Question 6 What were the instructors' perceptions of the strengths and weaknesses of compressed video instruction?

Research Question 8 What were the instructors' perceptions of the interaction the system provided?

Research Question 10 What were the instructors' attitudes about the teaching process using the compressed video system?

High School Students Evaluation of Instruction (HSSEI)

Design of Part One

The questionnaire/attitude rating scale for this instrument was divided into two parts (Appendix D). The purpose of Part One was to obtain descriptive information about the high school students enrolled in the Advanced Computer Technology course. Items requested information about:

1. gender,
2. academic status,
3. student's view of own ability,
4. previous involvement with distance education.

Design of Part Two

The purpose of Part Two of the HSSEI was to determine the attitudes of the high school students toward the instruction they received via compressed video. Data were collected as part of the general course evaluation. The items
were adapted from the SCVI questionnaire given to the graduate students and modified to fit the learning situation of the high school course. Because all of the students were at the remote site, items 11 & 12 were eliminated from this survey instrument. Also, because the students only received part of their instruction via the compressed video system item number 22 was added to determine if the students would like to take a course that was taught totally using compressed video instruction. The remaining 22 items of the questionnaire were used to gain insight into the high school students' attitudes regarding the attitude constructs of: (a) "To what degree do students support compressed video instruction," (b) "What were the students' perceptions of the interaction the system provided," (c) "What were the students' perceptions of strengths and weaknesses of compressed video instruction," (d) "What were the students' perceptions of the technology," and (e) "In the students' perceptions, did compressed video instruction offer any other benefits beyond course content?"

A list of the research questions this questionnaire addressed and the related questionnaire items included:

**Research Question 1**  
To what degree do students support compressed video instruction? (Support; Items 7, 12 17, 18, 20, 21, and 22.)

**Research Question 3**  
What were the students' perceptions of the technology? (Perceptions; Items 4, 9, and 15.)

**Research Question 5**  
What were the students' perceptions of the strengths and weaknesses of compressed video instruction? (Strengths; Items 3, 10, 11, 13, and 14.)
Research Question 7  What were the students' perceptions of the interaction the system provided? (Interaction; Items 2, 5, 6, and 8.)

Research Question 9  In the students' perceptions, did compressed video instruction offer any other benefits beyond course content? (Benefits; Items 1, 16, and 19.)

At the end of the questionnaire students were given the opportunity to make any additional comments regarding their experience with the compressed video system.

**Administration of the Instruments**

Arrangements were made with each instructor to have a period of time set aside during one (for the high school students) or two (for the graduate students) class periods to have students complete the survey instruments. The surveys had been designed to require approximately 15 to 20 minutes to complete.

The students enrolled in the college courses completed the SCVI and the SECVDL questionnaires described above. The researcher introduced the purpose of the study to the students during the week of November 4, 1991. The SCVI questionnaire and a cover letter were distributed by the researcher at the same time. The cover letter described the purpose and nature of the research (Appendix E). It also informed students that their participation in the study was optional and they could withdraw from the study at any time. This survey was completed by the students during class time (approximately 15 minutes).
The second survey, SECVDL, was distributed during the week of December 9, 1991. In order to ensure adequate time to complete this survey students were encouraged to take the form with them to fill out the open-ended questions. The surveys were returned to the researcher the following week (December 16, 1991).

The FECVDL was distributed the same week as the SECVDL (December 9, 1991). The surveys were returned to the researcher during the week of December 16, 1991.

Evaluation of the high school students occurred in mid January. The researcher made arrangements with the classroom teacher to explain the evaluation to the students. The cover letter and the HSSEI questionnaire was distributed and completed at this time.

Treatment of the Data

The data collected were used to describe the attitudes of the students and instructors toward compressed video instruction. The SCVI questionnaire measured the graduate students' attitudes using five subtests. These subtests were related to the five research questions (listed in Chapter 1) regarding student attitudes. The following is a description of how each research question was examined and the statistical tests that were used:

**SCVI questionnaire**

Research Question 1  (To what degree do students support compressed video instruction?) The mean of this subtest was compared among the means of the other subtests
and with the mean scores of students at the two sites.

Research Question 3 (What were the students' perceptions of the technology?) The mean of this subtest was compared among the means of the other subtests and with the mean scores of students at the two sites.

Research Question 5 (What were the students' perceptions of the strengths and weaknesses of compressed video instruction?) The mean of this subtest was compared among the means of the other subtests and with the mean scores of students at the two sites.

Research Question 7 (What were the students' perceptions of the interaction the system provided?) The mean of this subtest was compared among the means of the other subtests and with the mean scores of students at the two sites.

Research Question 9 (In the students' perceptions, did compressed video instruction offer any other benefits beyond course content?) The mean of this subtest was compared among the means of the other subtests and with the mean scores of students at the two sites.
SECYDL, FECYDL, & HSSEI questionnaires

To provide further information about the research questions 1, 3, 5, 7, & 9 the remaining student instruments (SECYDL and HSSEI) were analyzed by comparing the average scores of individual questions (SECYDL) and subtests (HSSEI), with the average scores of students based on gender, site, and students' views of their own ability. The faculty questionnaire (FECYDL) was analyzed to provide information about research questions 2, 4, 6, 8, & 10.

Occasional users

Information gathered from occasional users was based on informal interview questions asked by the researcher. These questions included: (a) what was the system used for, (b) how easy or difficult it was to learn to operate the technology, (c) how the technology worked for them, (d) what was their distance education background, (e) how many people were involved in the use of the system, (f) how the participants involved in the use of the system appeared to feel about the use of the technology, and (g) would they use the system again? The responses to these questions are included in Appendix I.

Summary

The primary focus of this study was to determine the attitudes of students and instructors involved in the use of compressed video technology to deliver college courses. This chapter described the research situation, the sample, the methods used to develop the survey instruments, and the methods
used to gather and analyze the data collected. The information presented in Chapter IV will explain the results of the responses to the survey instruments.
CHAPTER IV. RESULTS

The questionnaires, the Study of Compressed Video Instruction (SCVI), the Student Evaluation of Compressed Video and Distance Learning (SECVDL), the Faculty Evaluation of Compressed Video and Distance Learning (FEVDL), and the High School Students Evaluation of Instruction (HSSEI) were used to collect descriptive information about the characteristics and attitudes of students and instructors toward compressed video technology. These data summarized in this chapter were gathered from the surveys. Statistical analyses were performed to: (a) present a profile of the respondents, (b) present a summary of the respondents' attitudes relating to their experience with compressed video technology, (c) to determine the differences and relationships between variables described in the study, and (d) present a summary of opinions and suggested improvements. This chapter also summarizes the responses of occasional users to informal interview questions that were asked before and after their sessions using the compressed video system.

Description of the Sample

The results reported in this chapter were obtained from data gathered from questionnaires returned by students and instructors. The subjects were graduate students enrolled in four College of Education courses, the instructors of those courses, and high school students enrolled in an advanced computer technology course.
The sample included 78 graduate students, four instructors, and 15 high school students. The graduate students were each given a letter and two questionnaires (the SCVI and the SECVDL). The instructors received a letter and one questionnaire (the FECVDL). The high school students were given a letter and one questionnaire (HSSEI). Of the 78 graduate students sampled, 70 (90%) completed the SCVI questionnaire and 54 (69%) completed the SECVDL questionnaire. All of the four instructors (100%) completed the FECVDL questionnaire. Thirteen (87%) of the high school students sampled completed the HSSEI questionnaire.

Profile of the Respondents

The purpose of Part One of the SCVI and the HSSEI, and the descriptive items of the SECVDL and the FECVDL was to obtain a profile of the respondents. This section lists the descriptive information gathered from each survey.

Demographics from the SCVI questionnaire

Seventy of 78 SCVI questionnaires were returned. This represents a return rate of 90%. Nine of these 70 surveys were not analyzed because they were incomplete. The following descriptive information about the respondents was gathered from Part One of the SCVI.

(1) gender,
(2) academic status,
(3) student's opinion of own ability,
(4) number of compressed video courses enrolled in,
(5) specific course (courses) enrolled in, and
(6) site where class was attended.

Frequency distributions based on the 61 completed surveys (the 70 that were returned minus the 9 that were incomplete) were computed for all items in Part One of the SCVI questionnaire in order to report information about the characteristics of the sample. These data are illustrated in Table 1. The characteristics of the sample were reported in terms of percent of the total number responding (61) and include the following frequencies:

1. The percentage of female respondents was 67% (N = 41), and males, 33% (N = 20) (TABLE 1).

2. The academic status of the respondents was 57% (N = 35) master's students, 30% (N = 18) Ph. D. students, eight percent (N = 5) were graduate students not enrolled in a program, and five percent (N = 3) responded as other (TABLE 1).

3. Sixty seven percent (N = 41) of the students thought of themselves as 'A' students, and 33% (N = 20) thought of themselves as 'B' students (TABLE 1).

4. Ninty two percent (N = 56) of the students were enrolled in only one compressed video course. Five percent (N = 3) were enrolled in two courses, and three percent (N = 2) were enrolled in three courses (TABLE 1).

5. The number of students indicating enrollment in Curriculum 501 was 27, in Curriculum 615 was 12, in Research and Evaluation 550 was 22, and in Research and Evaluation 552 was 17 (TABLE 1). Five students indicated they were enrolled in more than one of the courses using the system.

6. Sixty nine percent (N = 54) of the respondents were enrolled as students at the Ames site, and 31% (N = 24) were enrolled at the Des Moines
site (TABLE 1). (Enrollment figures in (5) and (6) were based on the number of students receiving grades at the end of the semester.)

Demographics from the SECVDL questionnaire

Fifty-four of 78 SECVDL questionnaires were returned. This represents a return rate of 69%. One survey was incomplete and not analyzed. The following descriptive information about the respondents was gathered from items 1 and 2 of the SECVDL.

1. previous experience with distance education, and
2. would students take another compressed video class.

Frequency distributions based on 53 complete surveys (the 54 that were returned minus the one that was incomplete) were computed for items 1 and 2 of the SECVDL. These data are illustrated in Table 2. The characteristics of the respondents were reported in terms of percent of the total number responding (53) and include the following frequencies:

1. Ninety one percent (N = 48) of the students indicated they had no previous experience with distance learning, nine percent (N = 5) stated they had been involved in previous distance learning situation(s) (TABLE 2).

2. Students were asked if they would take another class taught using compressed video. Eighty five percent (N = 45) said yes, 11% (N = 6) said no, and two students (4%) reported "maybe" (TABLE 2).

Demographics from the FECVDL questionnaire

This survey produced the following descriptive information about the instructors who taught using the compressed video system.

1. years of teaching experience,
(2) gender, and
(3) experience with distance education.

Frequency distributions based on 100% of the returned surveys were computed in order to report information about the characteristics of the sample. These data are illustrated in Table 3.

(1) The instructors had an average of 25 years teaching experience (TABLE 3).
(2) Three of the four instructors were males (TABLE 3).
(3) Two of the instructors had never taught a distance education course and had no formal training or background in distance education (TABLE 3).

Demographics from the HSSEI questionnaire

Part One of the HSSEI was used to gather the following information about the respondents of this questionnaire.

(1) gender,
(2) academic status,
(3) student's view of their own ability,
(4) previous experience with distance education classes.

Frequency distributions were computed for all items in Part One of the HSSEI questionnaire in order to report information about the characteristics of the sample. These data are illustrated in Table 4 and were computed using 13 as the total number of questionnaires.

(1) The percentage of female respondents was 16% (N = 2), and males, 84% (N = 11) (TABLE 4).
2) The academic status of the respondents was 54% (N = 7) juniors, and 46% (N = 6) seniors (TABLE 4).

3) Two (15.4%) of the students viewed themselves as 'A' students, nine (69.2%) viewed themselves as 'B' students, and two (15.4%) viewed themselves as 'C' students (TABLE 4).

4) All of the respondents (N = 13) indicated they had no previous experience with distance education (TABLE 4).

Attitudes of the Participants

The purpose of this study was to identify student and instructor attitudes toward compressed video instruction. The agreement scale format was used for all four surveys, which were designed to yield information about respondents' attitudes, as stated in the purpose of this study. The SCVI and HSSEI questionnaires included statements that were designed to identify positive or negative attitudes on the part of the respondents with regard to the five subtests of the SCVI and HSSEI. The subtests were: (a) support for compressed video, (b) perception of interaction, (c) perceptions of strengths and weaknesses, (d) view of the technology, and (e) benefits beyond course content. The SECVDL and FECVDL questionnaires included statements that were designed to identify positive or negative attitudes on the part of the respondents with regard to specific elements of the compressed video system.

The surveys related to the research questions listed in Chapter I of this thesis. The items in SCVI, SECVDL, and HSSEI were relevant to research questions 1, 3, 5, 7, 9 listed in Chapter I. The items contained in FECVDL were
relevant to research questions 2, 4, 6, 8, 10 listed in Chapter I. The items in HSSEI were relevant to research questions 1, 3, 5, 7, 9 listed in Chapter I.

The relationship of each instrument to the research questions was described in Chapter III. An analysis of the subtests of the SCVI and the HSSEI, and the individual items of the SECVDL and the FECVDL was conducted to determine if any differences existed in the attitudes of the respondents within each research group (graduate students, SCVI & SECVDL; instructors, FECVDL; and high school students, HSSEI). Each subtest of the SCVI and HSSEI was considered an individual measure of an attitude construct and was examined separately. Individual items of the SECVDL and the FECVDL were examined separately.

The reliability of the subtests of the SCVI questionnaire were based on reliability estimates from Johnson's SSIT questionnaire (1988) determined using the Cronbach alpha statistic, a statistical measure appropriate for determining the internal consistency of attitude scales (Ary et al., 1985). The reliability coefficient for all subtests of Johnson's SSIT was above .70. Based on Johnson's reliability estimates, it was determined that the subtests of the SCVI survey were acceptable and useful measures of student attitudes toward the use of compressed video technology.

The three remaining survey instruments were used to gather additional data concerning the students' and instructors' attitudes about the use of the compressed video system. The SECVDL and FECVDL were based on a survey, that in its original form, had a reported reliability coefficient of .95 (Brown, 1988). The HSSEI was modified from the SCVI.

To achieve an index of positive or negative attitudes, the following statistical procedures were carried out:
1) The average, SD, and range for each subtest of the SCVI, and the HSSEI were computed. A favorable attitude was determined if the score was at or below the midpoint of total possible points for each subtest. An unfavorable attitude was determined if the score was above the midpoint of the total possible points (TABLES 5 & 8).

2) The average score (mean) of all students, and instructors, was found for each item on the SECVDL, and the FECVDL, to allow the researcher to examine each item separately. A favorable attitude was determined if the score was at or below the midpoint for each question. An unfavorable attitude was determined if the score was above the midpoint for each question (TABLES 6 & 7).

Results of the subtests of the SCVI questionnaire

Research Question 1. To what degree do students support compressed video instruction? (Subtest: Support for Use of Compressed Video)

The average of the subtest "Support for Use of Compressed Video" was 14.12 (TABLE 5). The test had a possible range of scores from 6-30. The average for students in Ames was 15.84. The average for the Des Moines group was 9.65. Lower scores indicated a more positive attitude.

Research Question 3. How did students view the technology used to deliver classes? (Subtest: Students View of the Technology)

Table 5 shows the subtest "Students' View of the Technology" had a possible range of scores of 3-15. The average was 7.05. Students in Ames had an
average of 7.21. The average of the students in Des Moines was 6.65. Lower scores indicated a more positive attitude.

Research Question 5. "What were the students' perceptions of the strengths and weaknesses of compressed video instruction? (Subtest: Perceptions of Strengths and Weaknesses)

The average of the subtest "Perceptions of Strengths and Weaknesses" was 15.13 (TABLE 5). The possible range of scores was 6-30. Des Moines students had an average of 13.16. An average of 15.71 was calculated for the Ames group. Lower scores indicated a more positive attitude.

Research Question 7. What were the students' perceptions of the interaction the system provided? (Subtest: Adequacy of Interaction Level)

The subtest, "Adequacy of Interaction Level" had an average of 12.31. The possible range of scores was 5-25. The average for the students in Ames was reported as 12.64. The average for the Des Moines group was 11.47. Lower scores indicated a more positive attitude.

Research Question 9. In the students' perceptions, did compressed video instruction offer any other benefits beyond course content? (Subtest: Benefits Beyond Course Content)

Table 5 shows the subtest "Benefits Beyond Course Content" had a possible range of scores from 4-20. An average of 9.71 was calculated for the whole group. The Ames group had an average of 10.07. An average of 8.77 was
reported for the Des Moines group. Lower scores indicated a more positive attitude.

Results of SECVDL questionnaire

The items of this questionnaire were used to further determine the graduate student's attitudes toward the technical aspects of the compressed video system that was used to deliver instruction. Items were analyzed separately and the results are listed below. In all cases a lower score indicated a more positive attitude.

Question 5a. How effective was this compressed video class compared to traditional classes.
The average score of respondents for this question was 3.62. The Ames group had an average of 3.85. The average for the Des Moines group was 3.21. There was a possible range of scores from 1-7.

Question 5b. How effective was this compressed video class compared to other distance education classes.
The average score of respondents for this question was 3.24. The Ames group had an average of 3.4. The average for the Des Moines group was 2. There was a possible range of scores from 1-7.

Question 5c. How effective was this compressed video class for you overall.
The average score of respondents for this question was 3.66. The Ames group had an average of 3.88. The average for the Des Moines group was 3.26. There was a possible range of scores from 1-7.

Question 6a. How do you rate this compressed video class compared to traditionally taught courses in terms of maintaining your attention. The average score of respondents for this question was 3.04. The Ames group had an average of 2.97. The average for the Des Moines group was 3.16. There was a possible range of scores from 1-7.

Question 6b. How do you rate this compressed video class compared to traditionally taught courses in terms of interacting with the teacher. The average score of respondents for this question was 3.38. The Ames group had an average of 3.38. The average for the Des Moines group was 3.37. There was a possible range of scores from 1-7.

Question 6c. How do you rate this compressed video class compared to traditionally taught courses in terms of interacting with other students. The average score of respondents for this question was 3.70. The Ames group had an average of 3.77. The average for the Des Moines group was 3.58. There was a possible range of scores from 1-7.

Question 6d. How do you rate this compressed video class compared to traditionally taught courses in terms of overall behavior of students.
The average score of respondents for this question was 3.08. The Ames group had an average of 3.18. The average for the Des Moines group was 2.90. There was a possible range of scores from 1-7.

Question 6e. How do you rate this compressed video class compared to traditionally taught courses in terms of your opinion of other students' overall satisfaction.

The average score of respondents for this question was 3.40. The Ames group had an average of 3.56. The average for the Des Moines group was 3.11. There was a possible range of scores from 1-7.

Question 6f. How do you rate this compressed video class compared to traditionally taught courses in terms of your overall satisfaction.

The average score of respondents for this question was 2.96. The Ames group had an average of 3.06. The average for the Des Moines group was 2.79. There was a possible range of scores from 1-7.

Question 6g. How do you rate this compressed video class compared to traditionally taught courses in terms of amount of coursework.

The average score of respondents for this question was 3.51. The Ames group had an average of 3.47. The average for the Des Moines group was 3.58. There was a possible range of scores from 1-7.

Question 6h. How do you rate this compressed video class compared to traditionally taught courses in terms of absenteeism of students.
The average score of respondents for this question was 4.72. The Ames group had an average of 4.53. The average for the Des Moines group was 5.05. There was a possible range of scores from 1-7.

Question 7a. How do you rate the technical aspects of the compressed video system in terms of quality of the TV picture.

The average score of respondents for this question was 3.42. The Ames group had an average of 3.47. The average for the Des Moines group was 3.32. There was a possible range of scores from 1-7.

Question 7b. How do you rate the technical aspects of the compressed video system in terms of quality of the audio.

The average score of respondents for this question was 3.76. The Ames group had an average of 3.88. The average for the Des Moines group was 3.53. There was a possible range of scores from 1-7.

Question 7c. How do you rate the technical aspects of the compressed video system in terms of distribution of print materials.

The average score of respondents for this question was 2.47. The Ames group had an average of 2.24. The average for the Des Moines group was 2.90. There was a possible range of scores from 1-7.

Question 7d. How do you rate the technical aspects of the compressed video system in terms of the classroom environment.
The average score of respondents for this question was 2.96. The Ames group had an average of 2.88. The average for the Des Moines group was 3.11. There was a possible range of scores from 1-7.

**Question 7e.** How do you rate the technical aspects of the compressed video system in terms of the functioning of the equipment.

The average score of respondents for this question was 2.94. The Ames group had an average of 3.00. The average for the Des Moines group was 2.84. There was a possible range of scores from 1-7.

**Question 7f.** How do you rate the technical aspects of the compressed video system in terms of your overall satisfaction with the technical aspects.

The average score of respondents for this question was 3.13. The Ames group had an average of 3.18. The average for the Des Moines group was 3.05. There was a possible range of scores from 1-7.

**Results of FECVDL questionnaire**

The items of this questionnaire were used to further determine the instructors' attitudes toward the technical aspects of the compressed video system that was used to deliver instruction. It was also used to provide guidance in answering the following research questions:

- **Research Question 2** To what degree do instructors support compressed video instruction?
- **Research Question 4** What were the instructors' perceptions of the technology?
Research Question 6: What were the instructors' perceptions of the strengths and weaknesses of compressed video instruction?

Research Question 8: What were the instructors' perceptions of the interaction the system provided?

Research Question 10: What were the instructors' attitudes about the teaching process using the compressed video system?

The items were analyzed separately and the results are listed below. In all cases a lower score indicated a more positive attitude.

Question 4a. How effective was this compressed video class compared to traditional classes.

The average score was 1.25. There was a possible range of 1-7 (TABLE 7).

Question 4b. How effective was this compressed video class compared to other distance education classes.

The average score was 1.00. There was a possible range of 1-7 (TABLE 7).

Question 4c. How effective was this compressed video class for you overall.

The average score was 2.00. There was a possible range of 1-7 (TABLE 7).

Question 5a. How do you rate this compressed video class compared to traditionally taught courses in terms of maintaining students' attention.
The average score was 3.00. There was a possible range of 1-7 (TABLE 7).

Question 5b. How do you rate this compressed video class compared to traditionally taught courses in terms of interactions with students.
The average score was 2.50. There was a possible range of 1-7 (TABLE 7).

Question 5c. How do you rate this compressed video class compared to traditionally taught courses in terms of maintaining interactions with students.
The average score was 3.00. There was a possible range of 1-7 (TABLE 7).

Question 5d. How do you rate this compressed video class compared to traditionally taught courses in terms of the overall behavior of students.
The average score was 2.75. There was a possible range of 1-7 (TABLE 7).

Question 5e. How do you rate this compressed video class compared to traditionally taught courses in terms of student performance.
The average score was 2.50. There was a possible range of 1-7 (TABLE 7).

Question 5f. How do you rate this compressed video class compared to traditionally taught courses in terms of your opinion of students' overall satisfaction.
The average score was 1.50. There was a possible range of 1-7 (TABLE 7).
Question 5g. How do you rate this compressed video class compared to traditionally taught courses in terms of your overall satisfaction.
   The average score was 1.00. There was a possible range of 1-7 (TABLE 7).

Question 5h. How do you rate this compressed video class compared to traditionally taught courses in terms of amount of coursework.
   The average score was 2.50. There was a possible range of 1-7 (TABLE 7).

Question 5i. How do you rate this compressed video class compared to traditionally taught courses in terms of absenteeism of students.
   The average score was 4.00. There was a possible range of 1-7 (TABLE 7).

Question 6a. How do you rate this experience using compressed video with respect to course preparation compared to traditionally taught courses?
   The average score was 1.50. There was a possible range of 1-7 (TABLE 7).

Question 6b. How do you rate this experience using compressed video with respect to your ability to adapt the course to distance education.
   The average score was 5.25. There was a possible range of 1-7 (TABLE 7).

Question 6c. How do you rate this experience using compressed video with respect to appropriateness of course for distance education.
   The average score was 2.25. There was a possible range of 1-7 (TABLE 7).
Question 6d. How do you rate this experience using compressed video with respect to your overall satisfaction with this class compared to traditional classes.

The average score was 1.75. There was a possible range of 1-7 (TABLE 7).

Question 6e. How do you rate this experience using compressed video with respect to your overall satisfaction with this course.

The average score was 1.50. There was a possible range of 1-7 (TABLE 7).

Question 7a. How do you rate the technical aspects of the compressed video system in terms of quality of the TV picture.

The average score was 3.50. There was a possible range of 1-7 (TABLE 7).

Question 7b. How do you rate the technical aspects of the compressed video system in terms of quality of the audio.

The average score was 3.72. There was a possible range of 1-7 (TABLE 7).

Question 7c. How do you rate the technical aspects of the compressed video system in terms of distribution of print materials.

The average score was 2.00. There was a possible range of 1-7 (TABLE 7).

Question 7d. How do you rate the technical aspects of the compressed video system in terms of the classroom environment.

The average score was 2.25. There was a possible range of 1-7 (TABLE 7).
Question 7e. How do you rate the technical aspects of the compressed video system in terms of the functioning of the equipment. The average score was 2.00. There was a possible range of 1-7 (TABLE 7).

Question 7f. How do you rate the technical aspects of the compressed video system in terms of your overall satisfaction with the technical aspects. The average score was 2.00. There was a possible range of 1-7 (TABLE 7).

Results of the subtests of the HSSEI questionnaire

Research Question 1. To what degree do students support compressed video instruction? (Subtest: Support for Use of Compressed Video)

Based on the results of Part Two of the HSSEI the average of the subtest "Support for Use of Compressed Video" was 7.8. The test had a possible score of 6-30 (TABLE 8).

Research Question 3. How did students view the technology used to deliver classes? (Subtest: Students View of the Technology)

Table 8 shows the subtest "Students View of the Technology" had a possible score of 3-15. The average was computed to be 10.7

Research Question 5. What were the students' perceptions of the strengths and weaknesses of compressed video instruction? (Subtest: Perceptions of Strengths and Weaknesses)

The average of the subtest "Perceptions of Strengths and Weaknesses" was 3.6. Table 8 shows the possible range of scores was 2-10.
Research Question 7. What were the students' perceptions of the interaction the system provided? (Subtest: Adequacy of Interaction Level)

Table 8 shows an average of 7.8 on the subtest regarding the level of interaction between students and instructors. The subtest "Adequacy of Interaction Level" had a possible range of scores from 4-20.

Research Question 9. In the students' perceptions, did compressed video instruction offer any other benefits beyond course content? (Subtest: Benefits Beyond Course Content)

Table 8 shows the subtest "Benefits Beyond Course Content" had a possible range of scores from 3-15. An average of 5.3 was computed.

Additional Analyses

An analysis of the descriptive statistics about student and instructor characteristics, and subtest scores (SCVI and HSSEI) and individual items (SECVDL and FECVDL) were examined to determine if further analyses were appropriate. The analysis indicated that the Pearson product moment correlation, and the t-test statistic would be appropriate to explore interrelationships and differences between variables.
Correlation for the SCVI questionnaire

The Pearson product moment correlation technique was used to determine the strength of the relationships between the scores of each subtest relating to the attitudes of the respondents of the SCVI questionnaire.

Table 10 shows a strong, positive degree of relationship between all of the subtest scores of the SCVI questionnaire. The strongest positive relationships existed between the subtest scores of "Perceptions of Interaction" and the subtests of "Perceptions of Strengths and Weaknesses" ($r = .72$) and "Benefits Beyond Course Content" ($r = .71$). Strong positive relationships also existed between the subtest scores of "Support for Use of Compressed Video" and the other subtests, "Perception of Interaction" ($r = .58$), "Perception of Strengths and Weaknesses" ($r = .68$), "View of the Technology" ($r = .63$), and "Benefits Beyond Course Content" ($r = .55$). A high correlation was also found between the subtest "Perception of Strengths and Weaknesses" and the two subtests of "View of the Technology" ($r = .67$) and "Benefits Beyond Course Content" ($r = .64$).

t-test for the SCVI questionnaire

The t-test was used to determine whether a significant difference existed between the students enrolled from different sites. The descriptive statistics in Table 5 showed that students enrolled in Des Moines scored slightly lower on each of the subtests than students taking the courses from Ames. Lower scores indicated more positive attitudes. The t-test statistic showed there was a significant difference between the average scores of students in Ames ($x = 2.67$) and the students in Des Moines ($x = 1.61$) on the
subtest of "Support for Use of Compressed Video Instruction." No other significant differences were found between the groups of students.

Comparison of grades in graduate classes

Instructors of the graduate classes were asked to report the grades of the students in their class and to identify at what site students attended class. Grades were reported for Curriculum 501, Research and Evaluation 550, and Research and Evaluation 552. No grades were available for Curriculum 615 because the class is graded on a Satisfactory-Fail basis.

The t-test statistic was used to determine if there were any differences in the grades of students enrolled at the two sites. There were no significant differences in the means of the two groups. Table 9 shows the Ames student mean ($x = 285.87$) for Curriculum 501 was slightly higher than the mean for the students in Des Moines ($x = 284.19$). In Research and Evaluation 550 and 552 the Des Moines students' mean was higher than the mean of the students attending class in Ames (TABLE 9).

Strengths, Weaknesses, and Suggested Improvements

This study also sought to identify participants' thoughts about the strengths and weaknesses of compressed video and distance education, and to identify by using participants' opinions, recommendations for improvements to a compressed video system. This purpose was the basis for the open-ended questions in the SECVDL, and FECVDL surveys.

The questions were stated in the open response format so that respondents could express their opinions and give unprompted responses.
The questions were relevant to research questions 5 and 6 listed in Chapter I. Similar student and instructor responses were grouped into like categories by the researcher and are located in Appendices G & H.

When asked to state the reasons students would take a course using a compressed video system again (question 3), seven students responded "it saved driving time and money," and six students responded "convenience" (Appendix G). The most frequent responses to question 10, "What do you see are the advantages of distance education?" were "it reduced travel time for many" (18) and "increase the number of people a school can service" (16). Ten students reported "audio and technical problems" as disadvantages of distance education (question 11). The most frequent responses to question 12 "Please list any suggestions you may have for improvements or any other comments you may have regarding your experience with this distance education system this semester" were "more microphones for students in Ames" (13), and "offer more courses" (3).

Instructors indicated they would teach using a compressed video system again with responses to question 3 "Please state the reason(s) why you would or would not use this system again" such as "it is easy," "it is effective," and "it permits me to teach students I would normally not be able to teach" (Appendix H). The instructors listed several of the same advantages of distance education (question 10) as the students did. Those comments included the ability to reach more students, and convenience. The disadvantages that instructors listed (question 11) dealt more with teaching and administrative problems than did students' responses. Instructors reported there was extra work involved in preparation, and expressed concerns about support and changes in the extension teaching system
(Appendix H). In their responses to question 12 "Please list any suggestions you may have for improvements or any other comments you may have regarding your experience with this distance education system this semester," instructors did agree with students that more microphones were needed for students. Other suggestions and comments included expressing the need for a permanent facility, and noting that the availability of local and remote site facilitators was a great help.

**Occasional Users**

Occasional users were interviewed by the researcher after using the compressed video system. Questions asked included: (a) what was the system used for, (b) how easy or difficult it was to learn to operate the technology, (c) how the technology worked for them, (d) what was their distance education background, (e) how many people were involved in the use of the system, (f) how the participants involved in the use of the system appeared to feel about the use of the technology, and (g) would they use the system again.

The occasional users were supportive of the use of the technology and all three said they would use the system again, given the opportunity. The three users also stated that the other people involved in the session(s) did not appear to have any negative responses to the compressed video system. One user stated several of her students asked if training was going to be offered on how to teach with such a system. Complete responses to the interview questions are located in Appendix I.
Summary

The four surveys (SCVI, SECVDL, FECVDL, and HSSEI) were distributed to a total of 97 participants using the compressed video system. Two surveys were distributed to a total of 78 graduate student participants, 70 of the SCVI surveys were returned, and 54 of the SECVDL surveys were returned. One survey, the FECVDL, was distributed to the four instructors, four were returned. Fifteen high school students received the HSSEI survey, 13 were returned. The questionnaire results were analyzed using percentage and raw scores.

The data revealed that generally, participants held positive attitudes toward their support of the use of compressed video technology to deliver instruction. The students and instructors surveyed had favorable attitudes overall toward the amount of interaction the system provided.

The Pearson product moment correlations that were computed revealed significant relationships between the subtests of the SCVI questionnaire. Significant relationships were also found between the individual items of the SECVDL questionnaire and can be found in Appendix J.

A t-test indicated a significant difference between the average scores of students in Ames ($x = 2.67$) and the average scores of students in Des Moines ($x = 1.61$) on the subtest of "Support for Use of Compressed Video Instruction" from the SCVI questionnaire. The t-test statistic was also used to compare the grades of students enrolled at the two sites in the courses of Curriculum 501, Research and Evaluation 550, and Research and Evaluation 552. No significant differences were found between the grades of students at the two sites.
A summary of students' and instructors' comments regarding strengths, weaknesses, and suggestions for improvements was compiled and discussed. Finally, the results of interviews with occasional users were discussed.
TABLE 1. Demographic information on respondents of the study of compressed video (CV) instruction questionnaire (SCVI)*

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<td>'A' Student</td>
<td>41</td>
<td>67</td>
</tr>
<tr>
<td>'B' Student</td>
<td>20</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>100</td>
</tr>
<tr>
<td>NUMBER OF CV COURSES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>56</td>
<td>92</td>
</tr>
<tr>
<td>Two</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Three</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>100</td>
</tr>
<tr>
<td>SITE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ames</td>
<td>54</td>
<td>69</td>
</tr>
<tr>
<td>Des Moines</td>
<td>24</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>78</td>
<td>100</td>
</tr>
<tr>
<td>NUMBER ENROLLED IN EACH COMPRESSED VIDEO COURSE*</td>
<td>Ames</td>
<td>Des Moines</td>
</tr>
<tr>
<td>Curriculum 501</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Curriculum 615</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Research and Evaluation 550</td>
<td>15</td>
<td>7</td>
</tr>
<tr>
<td>Research and Evaluation 552</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>24</td>
</tr>
</tbody>
</table>

*Given at the beginning of the semester
*Based on enrollment figures at the end of the semester
TABLE 2.
Demographic information for respondents of the student evaluation of compressed video and distance learning questionnaire (SECVDL)*

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>N</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PREVIOUS EXPERIENCE WITH DISTANCE EDUCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>No</td>
<td>48</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>100</td>
</tr>
<tr>
<td>WILL TAKE ANOTHER COURSE USING COMPRESSED VIDEO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45</td>
<td>85</td>
</tr>
<tr>
<td>Maybe</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>100</td>
</tr>
</tbody>
</table>

*Given at the end of the semester

TABLE 3.
Demographic information for respondents of the faculty evaluation of compressed video and distance learning questionnaire (FECVDL)*

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>N</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PREVIOUS TEACHING EXPERIENCE WITH DISTANCE EDUCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>WILL TEACH ANOTHER COURSE USING COMPRESSED VIDEO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>YEARS OF TEACHING EXPERIENCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>30-35</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>GENDER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>Females</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>

*Given at the end of the semester
TABLE 4. Demographic information for respondents of the high school students evaluation of instruction questionnaire (HSSEI)*

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>N</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENDER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td>85.0</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>100.0</td>
</tr>
<tr>
<td>ACADEMIC STATUS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td>7</td>
<td>54.0</td>
</tr>
<tr>
<td>Senior</td>
<td>6</td>
<td>46.0</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>100.0</td>
</tr>
<tr>
<td>VIEW OF OWN ABILITY (GPA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>'A' Student</td>
<td>2</td>
<td>15.4</td>
</tr>
<tr>
<td>'B' Student</td>
<td>9</td>
<td>69.2</td>
</tr>
<tr>
<td>'C' Student</td>
<td>2</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>100.0</td>
</tr>
<tr>
<td>PREVIOUS EXPERIENCE WITH DISTANCE EDUCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>NO</td>
<td>13</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Given at the end of the semester
TABLE 5. Attitudes of graduate students toward compressed video instruction by subtests

<table>
<thead>
<tr>
<th>Number responding</th>
<th>Total average score</th>
<th>SD</th>
<th>Ames group average</th>
<th>Des Moines group average</th>
<th>Number of items</th>
<th>Possible range of scores</th>
<th>Actual range of scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support for use of compressed video instruction</td>
<td>61</td>
<td>14.12 (2.35)°</td>
<td>5.61</td>
<td>15.84 (2.67)</td>
<td>9.65* (1.61)</td>
<td>6</td>
<td>6-30</td>
</tr>
<tr>
<td>Adequacy of instruction level</td>
<td>61</td>
<td>12.31 (2.46)</td>
<td>2.98</td>
<td>12.64 (2.53)</td>
<td>11.47 (2.29)</td>
<td>5</td>
<td>5-25</td>
</tr>
<tr>
<td>Strengths of compressed video instruction</td>
<td>61</td>
<td>15.13 (2.52)</td>
<td>3.93</td>
<td>15.71 (2.62)</td>
<td>13.65 (2.28)</td>
<td>6</td>
<td>6-30</td>
</tr>
<tr>
<td>Perceptions of the technology</td>
<td>61</td>
<td>7.05 (2.35)</td>
<td>2.31</td>
<td>7.21 (2.40)</td>
<td>6.65 (2.22)</td>
<td>3</td>
<td>3-15</td>
</tr>
<tr>
<td>Benefits beyond course content</td>
<td>61</td>
<td>9.71 (2.43)</td>
<td>2.95</td>
<td>10.07 (2.52)</td>
<td>8.77 (2.19)</td>
<td>4</td>
<td>4-20</td>
</tr>
</tbody>
</table>

*Lower scores = more positive attitude
° = average item score on a 1-5 scale
*Significant at .05 level
TABLE 6. Individual item scores of respondents to the student evaluation of compressed video and distance learning questionnaire (SECVDL)*

<table>
<thead>
<tr>
<th>Number responding</th>
<th>Total average score</th>
<th>SD</th>
<th>Ames group average</th>
<th>Des Moines group average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How effective was this compressed video class:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- compared to traditional classes</td>
<td>53</td>
<td>3.62</td>
<td>1.78</td>
<td>3.85</td>
</tr>
<tr>
<td>- compared to other distance ed. classes</td>
<td>53</td>
<td>3.24</td>
<td>1.52</td>
<td>3.40</td>
</tr>
<tr>
<td>- for you overall</td>
<td>53</td>
<td>3.66</td>
<td>2.02</td>
<td>3.88</td>
</tr>
<tr>
<td><strong>How do you rate this compressed video class compared to traditionally taught courses:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- maintaining your attention</td>
<td>53</td>
<td>3.04</td>
<td>1.49</td>
<td>2.97</td>
</tr>
<tr>
<td>- interacting with the teacher</td>
<td>53</td>
<td>3.38</td>
<td>1.51</td>
<td>3.38</td>
</tr>
<tr>
<td>- interacting with other students</td>
<td>53</td>
<td>3.70</td>
<td>1.54</td>
<td>3.77</td>
</tr>
<tr>
<td>- overall behavior of students</td>
<td>53</td>
<td>3.08</td>
<td>1.50</td>
<td>3.18</td>
</tr>
<tr>
<td>- your opinion of other students' overall satisfaction</td>
<td>53</td>
<td>3.40</td>
<td>1.12</td>
<td>3.56</td>
</tr>
<tr>
<td>- your overall satisfaction</td>
<td>53</td>
<td>2.96</td>
<td>1.41</td>
<td>3.06</td>
</tr>
<tr>
<td>- amount of coursework</td>
<td>53</td>
<td>3.51*</td>
<td>1.10</td>
<td>3.47*</td>
</tr>
<tr>
<td>- absenteeism of students</td>
<td>53</td>
<td>4.72*</td>
<td>1.45</td>
<td>4.53*</td>
</tr>
<tr>
<td><strong>How do you rate the technical aspects of the compressed video system:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- quality of the TV picture</td>
<td>53</td>
<td>3.42</td>
<td>1.38</td>
<td>3.47</td>
</tr>
<tr>
<td>- quality of the audio</td>
<td>53</td>
<td>3.76</td>
<td>1.43</td>
<td>3.88</td>
</tr>
<tr>
<td>- distribution of print materials</td>
<td>53</td>
<td>2.47</td>
<td>1.12</td>
<td>2.24</td>
</tr>
<tr>
<td>- the classroom environment</td>
<td>53</td>
<td>2.96</td>
<td>1.39</td>
<td>2.88</td>
</tr>
<tr>
<td>- the functioning of the equipment</td>
<td>53</td>
<td>2.94</td>
<td>1.13</td>
<td>3.00</td>
</tr>
<tr>
<td>- your overall satisfaction with the technical aspects</td>
<td>53</td>
<td>3.13</td>
<td>1.37</td>
<td>3.18</td>
</tr>
</tbody>
</table>

*Lower scores = more positive attitude
*Significant at .05 level
Possible range of scores 1=Excellent; 7=Poor
*Possible range of scores 1=More; 7=Less
**TABLE 7.** Individual item scores of respondents to the faculty evaluation of compressed video and distance learning questionnaire (FECVDL)*

<table>
<thead>
<tr>
<th>How effective was this compressed video class:</th>
<th>Number responding</th>
<th>Total average score</th>
<th>SD</th>
<th>Possible range of scores</th>
<th>Actual range of scores</th>
<th>Scale used</th>
</tr>
</thead>
<tbody>
<tr>
<td>- compared to traditional classes</td>
<td>4</td>
<td>1.25</td>
<td>0.50</td>
<td>1-7</td>
<td>1-2</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- compared to other distance ed. classes</td>
<td>4</td>
<td>1.00</td>
<td>0.00</td>
<td>1-7</td>
<td>1-1</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- for you overall</td>
<td>4</td>
<td>2.00</td>
<td>0.82</td>
<td>1-7</td>
<td>1-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How do you rate this compressed video class compared to traditionally taught courses:</th>
<th>Number responding</th>
<th>Total average score</th>
<th>SD</th>
<th>Possible range of scores</th>
<th>Actual range of scores</th>
<th>Scale used</th>
</tr>
</thead>
<tbody>
<tr>
<td>- maintaining student attention</td>
<td>4</td>
<td>3.00</td>
<td>0.82</td>
<td>1-7</td>
<td>2-4</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- interactions with students</td>
<td>4</td>
<td>2.50</td>
<td>0.58</td>
<td>1-7</td>
<td>2-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- maintaining interactions with students</td>
<td>4</td>
<td>3.00</td>
<td>0.00</td>
<td>1-7</td>
<td>3-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- overall behavior of students</td>
<td>4</td>
<td>2.75</td>
<td>1.50</td>
<td>1-7</td>
<td>1-4</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- student performance</td>
<td>4</td>
<td>2.50</td>
<td>1.29</td>
<td>1-7</td>
<td>1-4</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- your opinion of students' overall satisfaction</td>
<td>4</td>
<td>1.50</td>
<td>0.58</td>
<td>1-7</td>
<td>1-2</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- your overall satisfaction</td>
<td>4</td>
<td>1.00</td>
<td>0.00</td>
<td>1-7</td>
<td>1-1</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- amount of coursework</td>
<td>4</td>
<td>2.50</td>
<td>1.29</td>
<td>1-7</td>
<td>1-4</td>
<td>1=More; 7=Less</td>
</tr>
<tr>
<td>- absenteeism of students</td>
<td>4</td>
<td>4.00</td>
<td>0.00</td>
<td>1-7</td>
<td>4-4</td>
<td>1=More; 7=Less</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How do you rate this experience using compressed video with respect to:</th>
<th>Number responding</th>
<th>Total average score</th>
<th>SD</th>
<th>Possible range of scores</th>
<th>Actual range of scores</th>
<th>Scale used</th>
</tr>
</thead>
<tbody>
<tr>
<td>- course preparation compared to traditionally taught courses</td>
<td>4</td>
<td>1.50</td>
<td>1.00</td>
<td>1-7</td>
<td>1-3</td>
<td>1=Greater; 7=Less</td>
</tr>
<tr>
<td>- your ability to adapt course to distance education</td>
<td>4</td>
<td>5.25</td>
<td>0.96</td>
<td>1-7</td>
<td>4-6</td>
<td>1=Hard; 7=easy</td>
</tr>
</tbody>
</table>
TABLE 7. continued

<table>
<thead>
<tr>
<th></th>
<th>Number responding</th>
<th>Total average score</th>
<th>SD</th>
<th>Possible range of scores</th>
<th>Actual range of scores</th>
<th>Scale used</th>
</tr>
</thead>
<tbody>
<tr>
<td>- appropriateness of course for distance education</td>
<td>4</td>
<td>2.25</td>
<td>1.50</td>
<td>1-7</td>
<td>1-4</td>
<td>1=VA; 7=NA</td>
</tr>
<tr>
<td>- your overall satisfaction with this class compared to traditional classes</td>
<td>4</td>
<td>1.75</td>
<td>1.50</td>
<td>1-7</td>
<td>1-4</td>
<td>1=High; 7=Low</td>
</tr>
<tr>
<td>- your overall satisfaction with this course</td>
<td>4</td>
<td>1.50</td>
<td>1.00</td>
<td>1-7</td>
<td>1-3</td>
<td>1=High; 7=Low</td>
</tr>
</tbody>
</table>

How do you rate the technical aspects of the compressed video system:

<table>
<thead>
<tr>
<th></th>
<th>Number responding</th>
<th>Total average score</th>
<th>SD</th>
<th>Possible range of scores</th>
<th>Actual range of scores</th>
<th>Scale used</th>
</tr>
</thead>
<tbody>
<tr>
<td>- quality of the TV picture</td>
<td>4</td>
<td>3.50</td>
<td>2.08</td>
<td>1-7</td>
<td>1-6</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- quality of the audio</td>
<td>4</td>
<td>2.75</td>
<td>0.50</td>
<td>1-7</td>
<td>2-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- distribution of print materials</td>
<td>4</td>
<td>2.00</td>
<td>0.82</td>
<td>1-7</td>
<td>1-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- the classroom environment</td>
<td>4</td>
<td>2.25</td>
<td>0.50</td>
<td>1-7</td>
<td>2-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- the functioning of the equipment</td>
<td>4</td>
<td>2.00</td>
<td>0.82</td>
<td>1-7</td>
<td>1-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
<tr>
<td>- your overall satisfaction with the technical aspects</td>
<td>4</td>
<td>2.00</td>
<td>0.82</td>
<td>1-7</td>
<td>1-3</td>
<td>1=Excellent; 7=Poor</td>
</tr>
</tbody>
</table>

* Lower numbers indicate more positive attitudes
VA = very appropriate
NA = not appropriate
<table>
<thead>
<tr>
<th>Subtest</th>
<th>Number responding</th>
<th>Total mean score</th>
<th>SD</th>
<th>Males group mean</th>
<th>Females group mean</th>
<th>Number of items</th>
<th>Possible range of scores</th>
<th>Actual range of scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support for use of compressed video instruction</td>
<td>13</td>
<td>12.31 (1.76)*</td>
<td>2.29</td>
<td>11.82 (1.69)</td>
<td>15.00 (2.14)</td>
<td>7</td>
<td>7-35</td>
<td>9-15</td>
</tr>
<tr>
<td>Adequacy of instruction level</td>
<td>13</td>
<td>10.31 (2.58)</td>
<td>1.89</td>
<td>10.27 (2.57)</td>
<td>10.50 (2.63)</td>
<td>4</td>
<td>4-20</td>
<td>8-13</td>
</tr>
<tr>
<td>Strengths of compressed video instruction</td>
<td>13</td>
<td>9.54 (1.91)</td>
<td>2.07</td>
<td>9.64 (1.93)</td>
<td>9.00 (1.80)</td>
<td>5</td>
<td>5-25</td>
<td>6-14</td>
</tr>
<tr>
<td>Perceptions of the technology</td>
<td>13</td>
<td>5.46 (1.82)</td>
<td>1.90</td>
<td>5.36 (1.79)</td>
<td>6.00 (2.00)</td>
<td>3</td>
<td>3-15</td>
<td>3-9</td>
</tr>
<tr>
<td>Benefits beyond course content</td>
<td>13</td>
<td>7.08 (2.36)</td>
<td>1.75</td>
<td>6.73 (2.24)</td>
<td>9.00 (3.00)</td>
<td>3</td>
<td>3-15</td>
<td>5-11</td>
</tr>
</tbody>
</table>

*Lower scores = more positive attitude
* = average item score on a 1-5 scale
TABLE 9. Average scores and standard deviations of student grades analyzed by site in graduate courses delivered via compressed video

<table>
<thead>
<tr>
<th></th>
<th>Total number of students</th>
<th>Total points</th>
<th>Total average</th>
<th>Total SD</th>
<th>Total number of students in Ames</th>
<th>Ames average</th>
<th>Ames SD</th>
<th>Total number of students in Des Moines</th>
<th>Des Moines average</th>
<th>Des Moines SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum 501</td>
<td>27</td>
<td>320.00</td>
<td>285.37</td>
<td>11.11</td>
<td>19</td>
<td>285.87</td>
<td>11.68</td>
<td>8</td>
<td>284.19</td>
<td>10.28</td>
</tr>
<tr>
<td>Research and Evaluation 550</td>
<td>22</td>
<td>(3.36)*</td>
<td>(0.69)</td>
<td>15</td>
<td>(3.29)*</td>
<td>(0.69)</td>
<td>7</td>
<td>(3.52)*</td>
<td>(0.72)</td>
<td></td>
</tr>
<tr>
<td>Research and Evaluation 552</td>
<td>17</td>
<td>800.00</td>
<td>660.06</td>
<td>104.40</td>
<td>11</td>
<td>652.73</td>
<td>(3.03)*</td>
<td>6</td>
<td>673.50</td>
<td>(3.17)*</td>
</tr>
</tbody>
</table>

*Indicates scores based on letter grades with an 'A' = 4.00, 'B' = 3.00, 'C' = 2.00
All other scores based on total points
### TABLE 10. Correlation matrix: Degree of relationship between the subtest scores of the SCVI questionnaire for graduate students

<table>
<thead>
<tr>
<th></th>
<th>Support for compressed video instruction</th>
<th>Adequacy of interaction</th>
<th>Strengths of compressed video instruction</th>
<th>Perceptions of technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequacy of interaction</td>
<td>.58*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengths of</td>
<td></td>
<td>.68**</td>
<td>.72**</td>
<td></td>
</tr>
<tr>
<td>compressed video</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>video instruction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceptions of</td>
<td>.63*</td>
<td>.53*</td>
<td>.67**</td>
<td></td>
</tr>
<tr>
<td>technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits beyond</td>
<td>.55*</td>
<td>.71**</td>
<td>.64*</td>
<td>.54*</td>
</tr>
<tr>
<td>course content</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significance level $p < .05$

**Significance level $p < .01$
CHAPTER V. CONCLUSIONS

Chapter V reviews Chapters I through III and restates the 10 research questions. The research questions and results are discussed, based on the data collected from the questionnaires and reported in Chapter IV. Implications and suggestions for further study of compressed video technology as a tool for delivering instruction are also included in this chapter.

Review of Chapters I, II and III

Distance education, instruction in which the student and instructor are separated, has been shown to be an appropriate way to deliver instruction to students that for some reason could not otherwise participate in a course or activity. One of the newest methods for delivering instruction, compressed video technology, was the focus of this study. The advantages of compressed video technology, two-way interactive audio and video, and the combination of the ability to use existing telephone lines, offer tremendous potential for distance education.

Research questions

In order to accomplish the purpose of this study, the following research questions were developed:

1) To what degree do students support compressed video instruction?
2) To what degree do instructors support compressed video instruction?
3) What were the students' perceptions of the technology?
4) What were the instructors' perceptions of the technology?
5) What were the students' perceptions of the strengths and weaknesses of compressed video instruction?
6) What were the instructors' perceptions of the strengths and weaknesses of compressed video instruction?
7) What were the students' perceptions of the interaction the system provided?
8) What were the instructors' perceptions of the interaction the system provided?
9) In the students' perceptions, did compressed video instruction offer any other benefits beyond course content?
10) What were the instructors' attitudes about the teaching process using the compressed video system?

Review of the literature

The review of the literature addressed four areas: (a) theories relating to distance education, (b) research on distance education, (c) information about compressed video and leased telephone lines, and (d) research and uses of compressed video.

Although distance education has gained wide support as a way to provide instruction throughout the United States (U.S. Congress, 1989), the lack of an established theory and empirical research within a theoretical frame weakens the effectiveness of distance education (Keegan, 1988; Holmberg, 1977). Four major features about research in distance education were consistently found in the literature. They included: (a) much of the literature exists in the form of occasional papers or as conference presentations; (b) most distance education literature tends to be conceptual
rather than theoretical; (c) distance education research tends to be
descriptive presenting results of observational data, case studies or survey
research; and (d) distance education literature is far more international than
national (Wagner, 1989).

The literature indicates that as distance education has gained favor in
the United States, interactive systems have become the most popular.
Research studies relating to distance education indicate that both students
and instructors report more positive attitudes toward interactive distance
education systems than non-interactive systems, and that classes are
effective and successful (Kitchen & Kitchen, 1988; Nelson, Cvancara & Peters,

Compressed video systems first were used in the mid 1980's. A review
of the literature found few research studies about compressed video
technology. Those that have indicated the same positive results and attitudes
that have been reported in research studies involving other interactive
distance education technologies.

Methodology

Four questionnaires, called Study of Compressed Video Instruction
(SCVI), Student Evaluation of Compressed Video and Distance Learning
(SECVDL), Faculty Evaluation of Compressed Video and Distance Learning
(FECVDL), and High School Students Evaluation of Instruction (HSSEI), were
developed following the procedure described in Henerson, Morris, and Fitz­
Simmons (1978). The items in the surveys were directly related to one of the
research questions addressed by this study. The questionnaires were divided
into two parts. The purpose of part one of each survey was to obtain
descriptive information about the students and instructors who made up the sample. Part two of the surveys consisted of questions relating to the attitudes of students toward five constructs: (a) to what degree do students support compressed video instruction, (b) was the technology perceived differently by local or distant students, (c) what were the students' perceptions of the strengths and weaknesses of compressed video instruction, (d) what were the students' perceptions of the interaction the system provided, and, (e) in the students' perceptions, did compressed video instruction offer any other benefits beyond course content? The faculty questionnaire addressed the following constructs: (a) to what degree do instructors support compressed video instruction, (b) were the instructors satisfied with the technical aspects of the compressed video system, (c) what were the instructors' perceptions of the strengths and weaknesses of compressed video instruction, (d) what were the instructors' perceptions of the interaction the system provided, and, (e) what were the instructors' attitudes about the teaching process using the compressed video system? The sample consisted of 99 students and instructors involved in distance education courses being delivered via compressed video technology.

Review of the Characteristics of the Sample

Based on frequency distributions computed for each question, the students and instructors could generally be described as follows:
The graduate students

1. Students enrolled in these courses were mostly masters students in graduate programs at Iowa State University (57%).
2. Sixty-nine percent of the students were enrolled at the origination site in Ames.
3. Only nine percent of the students said they had been involved in a distance education class before.
4. Sixty-seven percent of the students were female.
5. Most students considered themselves to be 'A' students (67%).
6. A majority of the students (85%) indicated they would take another course taught using compressed video equipment.
7. Five of the students were enrolled in more than one course using the compressed video system.

The faculty

1. The four instructors had an average of 25 years of teaching experience.
2. Three of the four instructors were male.
3. Two of the instructors had never taught a distance education course and had no formal training in distance education.

The high school students

1. The students enrolled in this class were juniors and seniors in high school.
2. There were 11 males and two females.
(3) Nine of the students (69.2%) considered themselves to be 'B' students.

(4) All of the students indicated no previous involvement with distance education.

The occasional users

(1) There were three occasional users of the system.

(2) All of the occasional users indicated they had some form of prior knowledge or experience with distance education.

(3) All of the occasional users indicated they would use the compressed video system again if the opportunity arose.

Discussion of Results

SCVI questionnaire

Each of the subtests in the SCVI survey were designed to describe the attitudes of the graduate students. Each of the statements in the SCVI related to one of the five subtests that measured a different student attitude construct. A low score for each of the subtests indicated a more positive attitude, and a high score a more negative one. The subtests were designed to relate to one of the study's research questions. The results of the subtests showed overall positive attitudes. These results were similar to that found by Johnson (1988).

The graduate students' average score on the subtest "Support for Use of Compressed Video" which was defined as the degree to which students supported the use of compressed video technology to deliver instruction ($x = 14.12$, range of scores = 6-30) reflects a positive attitude in relation to
research question 1, "To what degree do students support compressed video instruction." This data is similar to that found by Johnson (1988). Students in Des Moines ($x = 9.65$), the students learning at a distance, indicated significantly more positive attitudes than students in Ames. The average of the Ames students ($x = 15.84$) indicated more negative attitudes toward support of compressed video. The positive attitudes of the graduate students as a whole toward support of compressed video may partly be due to the fact that most of the students (91%) had never been involved in a distance education course before. Students indicated they would like to take another course taught using compressed video and planned to do so if offered in the future. An explanation for this may be that many of the students had difficulty driving to Ames for courses because of scheduling conflicts.

The results showed that students' attitudes toward the subtest "Adequacy of Interaction Level", which was defined as the students' perceptions of the amount of interaction the system provided, were slightly positive ($x = 12.31$, range of scores = 5-25). This data is similar to that found by Johnson (1988). Des Moines students ($x = 11.47$) showed more positive attitudes on this subtest than students in Ames ($x = 12.64$). The results showed that most students viewed the amount of interaction allowed by the system favorably. The most common weakness and suggestion for improvement was to place more and better microphones around the room to avoid having to pass the microphone around when a student wanted to ask a question or make a comment. The receive site students often reported difficulty in hearing the students at the origination site, but reported no difficulty hearing their instructor. Students in Ames commented that passing the microphone tended to stifle conversation. These comments do differ from comments from
students in Johnson's study (1988). Her results indicated students felt it was
difficult to ask questions and to contact the instructor (Johnson, 1988).

Students had slightly negative attitudes overall toward the perceptions
of strengths and weaknesses of compressed video technology ($x = 15.13$, range
of scores = 6-30). This construct was defined as the students' views of the
strengths and weaknesses that the use of compressed video technology for
instruction provided. Students in Des Moines ($x = 13.16$) indicated stronger
perceptions than students in Ames ($x = 15.71$). Students indicated the
interaction capabilities of the system and the instructors use of interactive
study guides and handouts as strengths. Written comments by students
indicated they felt the handouts made concepts clearer and helped them keep
up with the lecture. They also indicated the pace of the classes seemed a bit
slower than in a traditional classroom which helped give more time for the
information to sink in.

The subtest "Students' View of the Technology", defined as the students' perceptions of compressed video technology, indicated positive attitudes of
the graduate students as a whole ($x = 7.05$; range of scores = 3-15) toward
research question 3, "How did students view the technology used to deliver
classes?". Students in Des Moines ($x = 6.65$) had more positive views of the
technology than students in Ames ($x = 7.21$). An analysis of the questions
that made up this attitude construct indicated students found the compression
of the video slightly distracting ($x = 2.73$ out of a possible score of 5),
however, students rated their overall satisfaction with the technical aspects
of the system very high ($x = 1.11$; scale used 1 = Excellent - 7 = Poor).
Comments from students in Des Moines indicate that although the
compression of the video signal, and the audio was sometimes distracting, the benefits of course far outweighed the distractions.

The average of students' scores related to subtest "Benefits Beyond Course Content" was slightly positive ($x = 9.71$; range of scores = 4-20). This data is similar to that found by Johnson (1988). Students in Ames indicated more negative attitudes on this subtest ($x = 10.07$). Students in Ames indicated that at this level (graduate school), independent study skills should already be developed. Students in Des Moines indicated more positive attitudes on this subtest ($x = 8.77$).

The results of the Pearson product moment correlation showed significant relationships between the subtests (Table 10). The correlations between the subtests showed a moderate to strong positive relationship, ranging from $r = .53$ to $r = .72$, for each of the five subtests. High positive correlations indicated a fairly accurate prediction could be made that as students increased in their positive attitude on one subtest their positive support of the other subtests would also increase.

The t-test indicated a significant difference in student scores for the subtest "Support for the Use of Compressed Video." Students who attended class at the receive site showed significantly more positive support of compressed video to deliver instruction than students at the origination site. This difference was probably to be expected because of the time savings and convenience attending class in Des Moines offered the remote students.

**SECVDL questionnaire**

In general, students' average scores for the SECVDL questionnaire were positive (at or below the midpoint, 3.5). Students in Des Moines
indicated more positive attitudes than students in Ames. Des Moines students ($x = 3.26$) viewed the compressed video classes as more effective for them overall than Ames students ($x = 3.88$) (item 4c). This result corresponds to comments by Des Moines students regarding the external benefits attending class in Des Moines offered them, such as less driving time.

Students at the remote site indicated by their responses to item 6a "How do you rate this compressed video class compared to traditionally taught courses in terms of maintaining your attention" that they had a little more difficulty maintaining attention ($x = 3.16$) than students at the origination site ($x = 2.97$). This indicated that having the instructor present in the room helped students stay focused and maintain their attention. Students also indicated they felt the interaction the system provided between the students and the instructor was adequate ($x = 3.38$), however, they felt that interaction with students at the other site was difficult (3.70). The scores on this item (6c) indicated students in Ames perceived less interaction with other students ($x = 3.77$) than students in Des Moines did ($x = 3.58$). This may be because there were fewer students at the Des Moines site. This allowed them to get to know each other better than did the students in Ames.

**FECVDL questionnaire**

The instructors' average scores on the items of the FECVDL questionnaire were positive (at or below the midpoint, 3.5), indicating instructor satisfaction with compressed video technology as a medium to deliver courses. However, the number of instructors participating in this study was very small, four, and can not be generalized beyond the sample.
HSSEI questionnaire

The high school students expressed generally positive attitudes toward the instruction they received via compressed video technology. However, the number of high school students participating in this study was small.

Comparison of grades

A comparison of student grades in the college classes revealed no significant differences between the average grades received by students at either of the class sites, and in two of the classes, the Des Moines students' average grades were higher than those of students in Ames. This finding is consistent with the research which has indicated receive site students earn grades that are as good as, and often better than, origination site students (Katoaka, 1987; Stone, 1988; Weinand, 1984).

Occasional users

All of the occasional users showed positive support of the use of the compressed video technology by their statements indicating they would use the system again given the opportunity. The three users also stated that the other people involved in the session(s) did not appear to have any negative responses to the compressed video system. This statement was based on users observations and comments made by others involved in the session. One user stated several of her students asked if training was going to be offered on how to teach with such a system.
Suggestions for Future Research

There is a need for additional research in the area of using compressed video technology to deliver instruction. Several respondents and other interested parties expressed appreciation that research was being carried out in this area and requested results of this study.

There is further need for exploration relating to what causes people to choose to support the technology. Additional research might examine the rates at which people choose to adopt, or not to adopt, the use of compressed video technology to deliver instruction. This research should include information on the administration, instructors, and students who will use the technology.

Additional research should investigate the role interaction plays in students' attitudes. This research should also address ways for improving the interaction between the sites.

An additional study that more fully addresses the attitudes of students and instructors to determine if attitudes change over time, might yield a different set of results and would be worth investigation. The generalization of the results of this study was limited by the number of subtest items used for each attitude construct examined in this study and by the relatively low number of respondents.

Summary

This study described the attitudes of students and instructors toward using compressed video technology to deliver instruction. Four surveys were
developed to provide answers to the 10 research questions that were formulated to address the purpose of the study.

The data from the surveys were analyzed to provide a profile of the respondents and to determine their attitudes toward using compressed video technology to deliver courses at a distance. Generally, this study found that students and instructors held positive attitudes toward the use of compressed video technology to deliver courses. Students felt compressed video instruction offered many positive aspects, there was sufficient interaction between students and their instructor, and the technology offered benefits beyond the course content. This study also resulted in a list of strengths and weaknesses of compressed video and distance education, and a list of suggestions for improvements.

There is a great deal of interest in interactive distance education technologies because interactive systems offer students the opportunity to see and verbally interact with an instructor or speaker in the same manner as they would if they were in a traditional classroom. The issues raised for educators are cost, availability, and effectiveness of the different technologies. Compressed video technology offers educators the opportunity to implement interactive distance education programs quickly, at relatively low costs, with no apparent loss in effectiveness.
REFERENCES


ACKNOWLEDGMENTS

I wish to extend a very special thank you to my family. To my brother Kevin, the "phantom" lives! Thanks for putting up with me during the past year, you're the best! Thank you to my parents, Jerry and Vi, for their unending and unconditional love and support. You have taught me to always strive to do my best. I would not be where I am today if it were not for the two of you, I love you very much.

To my writing buddy Connie, thanks for pushing me on through the difficult times. I never would have made it through all those late nights without your support and humor to keep me sane. I also wish to thank my friends in the IRC, Jane, Denise, Cindy, Jodi, and the other TA's, who helped me to keep laughing. Also, to my friends, Kay and Lisa in my hometown, thanks for understanding when I didn't have the time or energy to talk, even when we hadn't seen each other for a long time.

I would also like to thank the members of my Program of Study Committee, my Major Professor, Dr. Micheal Simonson, Dr. Ann Thompson and Dr. Gary Phye, I greatly appreciate your input, interest, and support.

Finally, a great deal of appreciation also goes to Linda Brown, Mike McQuiston, and the others at U.S. West Communications. Thanks for your support and friendship.
APPENDIX A

SURVEY
STUDY OF COMPRESSED VIDEO INSTRUCTION SURVEY
(SCVI)
A STUDY OF COMPRESSED VIDEO INSTRUCTION

The purpose of this questionnaire is to attempt to identify the attitudes of students toward instruction delivered using compressed video technology. You have been selected as a participant in this research study because you are a member of one of the courses being offered using this technology. All answers will be confidential and will be used only for producing average responses of all participants. Your opinion is important and highly valued, however, if you would prefer not to participate in this research simply leave the questionnaire with the classroom facilitator.

When you have finished the questionnaire, please leave it with the class facilitator.

In order to code this data please give us the last four digits of your Social Security number.

Thank you for your cooperation.

PART ONE

Some basic information about you is needed. Please circle the letter that best describes you or your situation.

1. I am
   a. Male
   b. Female

2. My current academic status is
   a. ISU Graduate Student - Master's Level
   b. ISU Graduate Student - Ph.D. Level
   c. Graduate student not in an ISU program
   d. ISU Undergraduate
   e. Other (Please specify) ________________________

3. I consider myself an
   a. "A" student
   b. "B" student
   c. "C" student
4. The number of compressed video courses I am presently involved with is
   a. One
   b. Two
   c. Three
   d. Four

5. The compressed video course (or courses) I am involved with is
   a. Curr. 501
   b. Curr. 615
   c. Res.Ev. 550
   d. Res.Ev. 552

6. I am enrolled as a student in
   a. Ames
   b. Des Moines

Please continue with Part Two on the next page.
PART TWO

In this part of the questionnaire we would like your opinion about the compressed video course (courses) you are currently taking. If you are taking more than one course please base your answers on the first class you have during the week. There is no "right" or "wrong" answer. Please circle the response that best describes how you feel about the following statements. Choose only one response for each question.

SA  Strongly Agree
A   Agree
U   Undecided
D   Disagree
SD  Strongly Disagree

1. This class makes me think for myself.  
2. I ask as many questions in this class as I do in a traditional class.  
3. Watching TV makes this class interesting.  
4. The slower movement of the video from the other site distracts me from learning.  
5. I am learning as much as I would in a regular class.  
6. The technology makes it difficult to ask questions.  
7. I would like to be involved in another compressed video course.  
8. The instructor makes the assignments clear.  
9. The technology makes the subject matter more difficult to understand.  
10. This class is well organized.  
11. There is enough involvement of the students in Ames.  
12. There is enough involvement of the students in Des Moines.  
13. It is difficult to hear when students at the other site ask questions.
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>I would recommend a course using compressed video to my friends.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>The TV reception from the other site is always good.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>The TV reception from our own site is always good.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>I don't like coming to class because I have to be on TV.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>This class challenges me to do my best.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>I would like to be involved in another course taught this way.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I would never take another compressed video class.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>This class has helped me develop independent study habits.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>If offered I plan to be involved in another compressed video course in the future.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>I look forward to coming to this class.</td>
<td>SA A U D SD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

SURVEY
STUDENT EVALUATION OF COMPRESSED VIDEO AND DISTANCE LEARNING (SECVDL)
STUDENT EVALUATION OF
COMPRESSED VIDEO AND DISTANCE LEARNING

Please respond to the questions below so we may determine what YOU think about the
effectiveness of the compressed video delivery system. We are not evaluating the content of the
course(s), but rather are evaluating how effective the system was for you. If you are taking more
than one course please base your answers on the first class you have during the week. The
usefulness of the survey depends on the frankness with which the questions are answered. Your
answers will be treated with the utmost confidentiality. In order to code this data please give us
the last four digits of your Social Security number:

____  _____  _____  _____

QUESTION 1  Have you taken a course using a distance learning delivery system before this
semester?
Yes  No

QUESTION 2  Would you take another course which used this type of delivery system again?
Yes  No

QUESTION 3  Please state the reason(s) why you would or would not take a course using this
system again. (Please use the back of the page if necessary.)

QUESTION 4  From which site are you taking this class?
Ames  Des Moines

QUESTION 5  Please respond to the following questions by circling the appropriate number
on the scale. The numbers range from Poor (1 on the scale) to Excellent (7 on
the scale) or DA for Doesn't Apply (0 on the scale).

How effective was this telecommunications class for you:

<table>
<thead>
<tr>
<th>How effective was this telecommunications class for you:</th>
<th>DA</th>
<th>Poor</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. as compared with traditional or conventional courses</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6 7</td>
</tr>
<tr>
<td>b. as compared with other courses using telecommunications</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6 7</td>
</tr>
<tr>
<td>c. overall</td>
<td>0</td>
<td>1</td>
<td>2 3 4 5 6 7</td>
</tr>
</tbody>
</table>
QUESTION 6  Please respond to the following questions by circling the appropriate number on the scale.

How do you rate this telecommunications experience as compared to regular or traditionally taught courses with respect to:

a. maintaining your attention
b. interacting with the teacher
c. interacting with other students
d. overall behavior of students
e. your opinion about other students' overall satisfaction
f. your overall satisfaction
g. amount of course work
h. absenteeism of students

How do you rate the following:

a. the quality of the TV picture
b. the quality of the audio
c. distribution of print material
d. the classroom environment
e. the functioning of the equipment
f. your satisfaction with the technical aspects, overall

QUESTION 8  What types of media, if any, have been used in this course? Please circle all that apply.

a. 16mm film
b. Slides
c. Videodisc
d. Computers
e. Overhead projection
f. Commercially produced video tapes
g. Teacher produced video tapes
h. Commercially produced audio tapes
i. Teacher produced audio tapes

QUESTION 9  What is your current academic status? (Please circle the appropriate number.)

ISU Graduate Student - Master's Level
ISU Graduate Student - Ph.D. Level
ISU Undergraduate
Graduate Student - not in an ISU program
Other
QUESTION 10 What do you see are the advantages of distance education?
(Use the back of the sheet if necessary.)

QUESTION 11 What do you see are the disadvantages of distance education?
(Use the back of the sheet if necessary.)

QUESTION 12 Please list any suggestions you may have for improvements or any other comments you may have regarding your experience with this distance education system this semester. (Use the back of the sheet if necessary.)

Thank you very much for taking time to complete this survey!
APPENDIX C

SURVEY
FACULTY EVALUATION OF COMPRESSED VIDEO AND DISTANCE LEARNING (FECVDL)
FACULTY EVALUATION OF
COMPRESSED VIDEO AND DISTANCE LEARNING

Please respond to the questions below so we may determine what YOU think about the effectiveness of the compressed video delivery system. We are not evaluating the content of the course(s), but rather how effective the system was for you. The usefulness of the survey depends on the frankness with which the questions are answered. Your answers will be treated with the utmost confidentiality. In order to code this data please give us the last four digits of your Social Security number:

QUESTION 1    Have you used a distance learning delivery system before this semester?
   Yes          No

QUESTION 2    Would you use this type of delivery system again to teach a course?
   Yes          No

QUESTION 3    Please state the reason(s) why you would or would not use this system again.
   (Please use the back of the page if necessary.)

QUESTION 4    Please respond to the following questions by circling the appropriate number on the scale. The numbers range from Poor (1 on the scale) to Excellent (7 on the scale) or DA for Does not Apply (0 on the scale).

How effective was this telecommunications class:

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>Poor</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. as compared with traditional or conventional courses</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b. as compared with other courses using telecommunications</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c. overall</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

QUESTION 5    Most of the following items are questions about you. Please circle the appropriate word or fill in the blank.

   a. Is teaching your main job?    Yes          No

   b. How many years have you been teaching?    ____________ years

   c. What do you think will be the average grade given in this course as compared to a regular course?
      Higher          Same          Lower
QUESTION 6  Please respond to the following questions by circling the appropriate number on the scale.

How do you rate this telecommunications experience as compared to regular or traditionally taught courses with respect to:

<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. maintaining students attention</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>b. initiating interactions with students</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>c. maintaining interactions with students</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>d. overall behavior of students</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>e. student performance</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>f. your opinion of students' overall satisfaction</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>g. your overall satisfaction</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Less</th>
<th>Same</th>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td>h. amount of course work</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. absenteeism of students</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

QUESTION 7  The following questions are related to your experience using compressed video for distance education.

How do you rate this telecommunications experience for distance education with respect to:

<table>
<thead>
<tr>
<th></th>
<th>Less</th>
<th>Same</th>
<th>Greater</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. amount of course preparation as compared to traditionally taught courses</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. your ability to adapt the course to telecommunications</td>
<td>Easy Hard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. appropriateness of course for telecommunications</td>
<td>Not Appropriate Very Appropriate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. your overall satisfaction as compared to traditionally taught courses</td>
<td>Low High</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. your overall satisfaction with this course</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

QUESTION 8  The following questions are related to the technical aspects of the system. Please circle the appropriate number.

How do you rate the following:

<table>
<thead>
<tr>
<th></th>
<th>Poor</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. the quality of the TV picture</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>b. the quality of the audio</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>c. distribution of print material</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>d. the classroom environment</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>e. the functioning of the equipment</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>f. your satisfaction with the technical aspects, overall</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
QUESTION 9  What types of media, if any, have you used, or will use in this course? Please circle all that apply.

a. 16mm film  
b. Slides  
c. Videodisc  
d. Computers  
e. Overhead projection  
f. Commercially produced video tapes  
g. Teacher produced video tapes  
h. Commercially produced audio tapes  
i. Teacher produced audio tapes

QUESTION 10  What do you see are the advantages of distance education? (Use the back of the sheet if necessary.)

QUESTION 11  What do you see are the disadvantages of distance education? (Use the back of the sheet if necessary.)

QUESTION 12  Please list any suggestions you may have for improvements or any other comments you may have regarding your experience with this distance education system this semester. (Use the back of the sheet if necessary.)

Thank you very much for taking time to complete this survey!
APPENDIX D

SURVEY
HIGH SCHOOL STUDENT EVALUATION OF INSTRUCTION
(HHSEI)
HIGH SCHOOL STUDENTS EVALUATION OF INSTRUCTION
USING COMPRESSED VIDEO TECHNOLOGY

The purpose of this questionnaire is to attempt to identify the way you feel about the type of instruction you received this fall through the use of compressed video technology. Your thoughts and opinions are important and very useful in helping us improve future classes. All answers will be confidential and will be used only for producing average responses of all participants. Your opinion is important and highly valued, however, if you would prefer not to participate in this research simply leave the questionnaire with your teacher.

In order to separate your evaluation from your classmates please give us your student ID number.

When you have finished the questionnaire, please leave it with your teacher.

Thank you for your cooperation.

PART ONE

Some basic information about you is needed. Please circle the letter that best describes you or your situation.

1. I am
   a. Male  
   b. Female

2. My grade level in school is
   a. Freshman  
   b. Sophomore  
   c. Junior  
   d. Senior

3. I consider myself an
   a. "A" student  
   b. "B" student  
   c. "C" student

4. Have you ever been involved in a distance education course before?
   a. yes  
   b. no
PART TWO

In this part of the questionnaire we would like your opinion about the compressed video course you were involved in this fall. Please respond to your feelings about the portion of the class in which you received instruction using the compressed video system. There is no "right" or "wrong" answer. Please circle the response that best describes how you feel about the following statements. Choose only one response for each question.

SA  Strongly Agree
A  Agree
U  Undecided
D  Disagree
SD  Strongly Disagree

1. This class made me think for myself. SA  A  U  D  SD
2. I asked as many questions in this part of class as I did in the traditional part of class. SA  A  U  D  SD
3. Watching TV made this part of class interesting. SA  A  U  D  SD
4. The slower movement of the video from the other site distracted me from learning. SA  A  U  D  SD
5. I learned as much as I would have in a regular class. SA  A  U  D  SD
6. The technology made it difficult to ask questions. SA  A  U  D  SD
7. I would like to be involved in another class using compressed video technology. SA  A  U  D  SD
8. The instructor answered questions clearly. SA  A  U  D  SD
9. The technology made the subject matter more difficult to understand. SA  A  U  D  SD
10. The class time spent using the compressed video technology was well organized. SA  A  U  D  SD
11. We were actively involved in discussions with the instructor in Ames. SA  A  U  D  SD
12. I would encourage friends to take a course using compressed video technology. SA  A  U  D  SD
13. The TV reception from the Ames site was always good. SA  A  U  D  SD
14. The TV reception from our own site was always good. SA  A  U  D  SD
15. I didn't like coming to class because I had to be on TV. SA  A  U  D  SD
16. This class challenged me to do my best.  
17. I would like to be involved in another class taught this way.  
18. I would never take another compressed video class.  
19. This part of class has helped me develop independent study habits.  
20. If offered I plan to be involved in another compressed video course in the future.  
21. I looked forward to coming to this class.  
22. I would like to take a class that was taught entirely on a compressed video system.  

Please make any additional comments about your experiences in this part of class below.
APPENDIX E

COVER LETTER TO PARTICIPANTS
October 28, 1991

Dear Distance Education Participant:

I am a graduate student in the department of Curriculum and Instruction at Iowa State University in Ames, Iowa. To satisfy the requirements for a Master's of Science Degree in Curriculum and Instructional Technology, I am conducting research under the supervision of Dr. Michael R. Simonson.

My study will attempt to determine the effectiveness of the distance education system known as compressed video that is being used in your classes this fall. I am interested in your attitudes and perceptions about this technology.

During the remaining weeks of the semester you will periodically be asked to fill out surveys. The surveys can be completed in approximately 15 minutes and arrangements have been made for you to fill them out during class time. When you are finished, the surveys can be left in an envelope in your classroom. Arrangements have been made to deliver them to me. We want you to know your opinions are of value and are important for gaining needed documentation about using compressed video technology for delivering courses. It is your option to participate in this project and you may withdraw at any time without prejudice.

In order to keep your survey separate from others I am asking you write the last four digits of your Social Security number on your survey. This method of coding was chosen because the number is unique to you and can be easily remembered. Your name will not be associated with the survey. All codes will be removed and surveys will be destroyed after all data have been collected.

We feel this research can make a significant contribution to what is known about compressed video technology for instructional purposes and will help to determine if such a system should continue to be used at Iowa State University. The responses you express are highly valued and appreciated. We thank you for your time and will be happy to furnish you with additional information and the results of this study.

Respectfully,

Karen A. Jurasek,  
Graduate Student

Michael R. Simonson,  
Professor  
(515) 294-6840

Enclosure
APPENDIX F

HUMAN SUBJECTS APPROVAL
Checklist for Attachments and Time Schedule

The following are attached (please check):

12. ☑ Letter or written statement to subjects indicating clearly:
   a) purpose of the research
   b) the use of any identifier codes (names, #s), how they will be used, and when they will be removed (see Item 17)
   c) an estimate of time needed for participation in the research and the place
   d) if applicable, location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, note when and how you will contact subjects later
   g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13. ☐ Consent form (if applicable)

14. ☐ Letter of approval for research from cooperating organizations or institutions (if applicable)

15. ☑ Data-gathering instruments

16. Anticipated dates for contact with subjects:

   First Contact          Last Contact
   Month/Day/Year         Month/Day/Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

   January 31, 1992
   Month/Day/Year

18. Signature of Departmental Executive Officer Date Department or Administrative Unit

   Signature redacted for privacy
   ___________  /  _____________________________
   Date
   _____________________________
   Department or Administrative Unit

19. Decision of the University Human Subjects Review Committee:

   □ Project Approved       □ Project Not Approved       □ No Action Required

   Patricia M. Keith        Patricia M. Keith
   Name of Committee Chairperson     Date

Signature of Committee Chairperson

Signature redacted for privacy

GC: 1/90
APPENDIX G

STUDENT RESPONSES TO THE OPEN-ENDED ITEMS IN THE SECVDL QUESTIONNAIRE
Question 3  Please state the reason(s) why you would or would not take a course using this system again.

Would:
- It saved driving time and money (7)
- Convenience (6)
- Delivery end only (4)
- I would take it if it was impossible for me to do it in any other way (2)
- Takes a little more time so can sink in more material (2)
- It did not adversely affect my ability to learn the material.
- Find the Technology fascinating.
- Time constraints of full time job, family and courses leave me little time to drive to Ames.
- It has been a lot more convenient for me since I live in Des Moines. I feel I get just as much out of class and I don't have to drive.
- The people in DM make class more interesting.
- I feel that the system is here to stay in some form. As educators we need to learn how to use the capability and as learners we need to learn how to learn from it.
- I like the idea behind this system, and more practice would help to work out any kinks. So, I hope to see it continue in the future.
- Better than correspondence! Classmate interactions personalized. Real instructor available.
- I have no reason not to do so and it was interesting.
- I like the teleconference system.
- Convenient location. Class interaction is good. Depends on the subject - for statistics I would want personal contact.
- I would because it has been a positive experience. I would like to have the experience of the Des Moines site sometime.
- I would like a class using this system definitely if I was in the area the course was telecast to. I would not necessarily seek out a distance Ed. class at ISU, but I would not avoid a distance Ed. class either.
- I want to introduce this system to my country, so I want to know more about it.
- Takes 2 hours less drive time per week.
- Since I am taking the class from Ames, the Technology hasn't affected my learning as the instructor is in Ames, so I wouldn't have a reason to not take another course like this.
- Because the learning experience is easier, than traditional courses, and I can improve my knowledge about how to use technologies in education.
- Like to be involved in leading edge technology. Would like to try a distance site before I make a final evaluation of whether this is good delivery method.
- Interesting technology.
- I will be teaching a course using ITV next fall or spring.
- Don't have to drive to Ames. Professor includes us very well in class. I like the small groups working together in Des Moines.

Would not:
- Because fiddling with cameras and figuring out the system takes too much time. Cohesiveness did not develop between the two groups.
- It is difficult not being able to have the one on one interaction with the instructor.
- The constant monitoring of the system by the instructor, plus the inconvenience of passing a microphone to ask questions constantly disrupts the continuity of the class and stifles open discussion.
- It takes time sometimes for teachers to take care of two classes at the same time.
- Hard to hear - audio pickup in Ames poor. No lab instructor in D.M.
- The procedure isn't smooth.
- Class went slow; a lot time spent on technical duties for sound, cameras etc.
- Sound through a phone line is not very clear. Handout from TV screen is hard to read.

Question 10 What do you see are the advantages of distance education?

- Reduced travel time for many (18)
- Increase the number of people a school can service (16)
- This is a wonderful way to reach a lot of students and to make their classes more easily available (6)
- Convenience (5)
- It's economic, as one teacher can teach several classes at the same time (2)
- Handouts have been a great help.
- Due to reduced travel, larger class, so you have a more varied class (wider range of opinions).
- Lectures are slower paced, with my style of learning this helps information sink in before we move on.
- Distance education is something different that by itself grabs people attention.
- Smaller class size even though many students are attending at the same time.
- This 4:10 class, I would not have been able to take because of work conflicts if I would have had to drive to Ames.
- The time advantage this offers me because of not having to travel in invaluable. I am really pleased to be able to take the class in Des Moines.
- I feel the D.M. group, though they know few of the Ames group, feel close and do a lot of talking and interacting.
- It is nice to not have the teacher in the room. It reduced stress and we had less pressure to participate. It saved a lot of time, money & gas!
- The technology available in the classroom. It's fun to talk to DM people. Things presented are more visual.
- Able to maintain course and instructor integrity (by not sending a less-qualified instructor to a distant location)
- Don't have to cancel classes because of weather.
- Able to offer a wider variety of classes to other locations.
- Ability of student to view tapes for review or classes missed.
- If there is an 'expert', or guest speaker, you can make these presentations to a wider variety of audiences (classes)
- School districts need to hire only one person to teach.
- Include those with busy schedules.
- Allows students access to on-campus level instructors, no matter the geographic location of the student.
- Increase distance of information.
- Classroom is convenient, within 20 minutes of my home as opposed to a 45 minute drive. All other instructional elements are equal. The student must be more creative in getting access to equipment for homework. But the student has a larger window in which to complete homework.
- Actually this class has greater number of audiovisuals, but that is also part of class.
- Interaction of students at distance site.
- It exposes you, as a student, to different techniques of teaching.
- It uses the latest in technology to connect students in two different places.
- Available to a small group in a remote location.
- The main advantage I see is in sharing people & equipment resources in instructional settings.
- Experience for future use.
- Offers class to more than one site at a time which makes better use of the instructor's time. It was fun to see what will be a "wave of the future" in education.

**Question 11** What do you see are the disadvantages of distance education?

- Audio and technical problems (10)
- For the Des Moines people they often are delayed in receiving papers, assigns etc. They didn't always receive them at the same time the students in Ames received theirs (3)
- I really can't see any harm other than the people in Des Moines can't have access to the professor as we have here.
- Really not much communication between students in Ames and Des Moines. Instructors communicated with both classrooms, but we were treated as if we were in two different classes, not one class.
- I only hope we don't try to replace the teachers in the classroom by Distance Education, as we need to have the contact time to stimulate with the teacher or at least I do & not everyone's learning patterns are such that we can rely on just the lecture, it's worked well with this class & with the small number in Des Moines has helped.
- There is no use of a blackboard that sometimes is very important.
- I have the feeling that students feel less confident when there two classes receiving the same course. In other words, students' participation decreases.
- Distance. Their physical absence.
- Less interaction between teacher/student would cause less involvement.
- It is difficult to talk with instructor. Use of the EEE (Electronic Education Exchange) system helps with this.
- The teacher running the equipment wasted a lot of class time.
- I thought the attempts to have us get to know students in the distant classroom were silly.
- You don't have the interaction with the instructor or other students. The feeling of having someone there to help you is nonexistent.
- Lack of ability for instructor to use a variety of instructional strategies because of equipment.
- Higher incidence of off-talk (inattention) behavior from all locations.
- Impersonal atmosphere.
- You're at the mercy of the equipment.
- Paper shuffle.
- Lack of the 'personal' element. (Eye contact with teacher, presenter, no physical response.) Easier to space off.
- Teachers or presenters need to be trained how to properly use this system.
- Materials, activities need to be properly adopted for this type of system.
- Lack of interaction between off-campus and teacher.
- Not available state wide. Limited skill/comfort level of various instructors.
- It takes time to organize teaching. For instance, when students answer questions, they must deliver microphone. It's my feeling that the instructor seems busier compared with using the conventional teaching method.
- Use of the microphone, interaction with all students, instructor has to continually switch cameras & be thinking about the technology.
- Not as personal. Individual help could be tough to get.
- Some extra time is used passing microphones, switching cameras, etc. & I'm concerned we're missing something.
- Conversation with whole class more difficult.
- Class in Des Moines often seem distracted, talking among themselves.
- At times it is hard to see the overhead (not always on screen etc.)
- I feel the class out of the instructors room would have a little problem with following at times.
- In D.M. Sat/Sun help sessions; most of the time there is not a good plan to enter the building.
- Poor communication with the D.M. people.
- Sometimes, especially for foreigners as me, it is difficult to understand the English due to technical problems.
- I see none from my point of view.
- Locating equipment to do the homework. But I do have several options, one of which is to drive to Ames on Sunday to use the I.R.C.
- Contact with instructor - BIG DISADVANTAGE.
- Not as appropriate for some subjects such as detail math.
- The lack of connection between sites. The imbalance of site participation.
- The people on TV - there is a slight lag from speaking & viewing. Seems the audio travels faster than the video.
- I feel like I don't really know the people in Des Moines.
- The picture doesn't always come through very clear.
- I feel like sometimes Des Moines is being left out of things.
- When live demonstrations occur Des Moines has a difficult time experiencing them. I.e., Video editing.
- Felt missed a lot of presentation due to lack of time (taken by making sure equipment ran & all could transmit). Ames crowded classroom - felt like in a dungeon.
- No disadvantages.
- I do feel detached from the Des Moines group, but the instructor does an excellent job of tying them in with the rest of the group.
- Students attention can be distracted. It's hard to get immediate feed back.
- Not having all the resources available that are in Ames.
- Communication is more difficult, you do not meet all your classmate.
- I believe that the remote classroom may be too removed from the lecture. I don't feel that distance education is appropriate for "how-to" type classes.
- Personal contact.
- Availability of local resources.
- None in Ames. I wouldn't have done this from Des Moines.
- None
- Lack of interaction with individual in the class at all sites.
- Eye contact not as good as in person.
- Cost.
- This class could have made better use of the resource center and had more "hands on" experiences, but because of the distance education factor, this was not possible.

Question 12 Please list any suggestions you may have for improvements or any other comments you may have regarding your experience with this distance education system this semester.

Improvements:
- More microphones for students in Ames (13)
- Have someone else run the equipment so that the teacher can teach and not have to run equipment(2)
- Can the speakers be moved? The times I sat near the speakers there was a lot of feedback from Des Moines. I would hear this professor's voice in Des Moines seconds after I heard it in Ames. This was distracting.
- The professor has done a very nice job switching back and forth with us & Des Moines.
- I think a blackboard should be available even though it is not used for every classroom.
- The instructor must be allowed freedom of movement, not tied to console.
- Presenters/teachers need to be prepared with materials that can be easily read from the Elmo (letters large enough).
- A responsible, reliable person to be at the door for weekend help sessions - with a key!!
- Make sure if something is shown or allowed to be passed around then the students in Des Moines have it, too.
- Teacher may spend more time at distance site.
- The quality of TV picture, and the quality of the audio.

Comments:
- Offer more courses (3)
- Students from all sites need to meet each other in person at some point in time (2)
- Examples of research work would be helpful. Individual help would be great.
- The handouts are helpful. Class discussion is difficult. Pictures of classes were helpful. The professor did do a good job of including & pulling Des Moines in to the conversation.
- It's a new experience for me. I enjoy it!
I can't stress enough how much I hope this continues, allowing me to stay in Des Moines is very beneficial.

In general I like the system, especially because the instructor always encouraged us to ask questions about the subject.

Make sure you have duplicate samples of object that are being viewed.

Include variety of ages - Merge H.S-GED-Drop-Senior citizens.

Offer parenting classes - supported by fees & local moneys.

Teach the technology to every participant.

To solve live demonstration problems, maybe have someone demonstrate it there, if it is feasible.

I think distance education has a lot of potential. There are still a few kinks in the system that need to be dealt with. All of the above disadvantages need to be addressed in some way.

Won't take another class if at the center, may be different if in Des Moines.

It has been a slice of Heaven! Thanks for the distance learning opportunity!

I would enroll in distance education again!

I felt the class was well prepared & executed.

Would liked to have had more instruction with the system and been shown (& worked) the control panel at the start of the class. This would have given us a better preparation on the capabilities of the system.
APPENDIX H

FACULTY RESPONSES TO THE OPEN-ENDED ITEMS IN THE FECVDL QUESTIONNAIRE
Question 3  Please state the reason(s) why you would or would not use this system again.

Would:
- It is easy.
- It is effective.
- It permits me to teach students I would normally not be able to teach.
- It was fun!
- It is convenient for students at a distance.
- It challenged me to vary my teaching methods.
- The technology caused us all to make an effort to interact as a group.
- I felt proud of myself that I could respond to this challenge and create a positive learning environment.
- I felt satisfied to see the distance learners eventually interact freely and spontaneously in class.
- It has a way of promoting more carefully planned instruction.

Question 10 What do you see are the advantages of distance education?

- Reach distant students easier and more cost effectively.
- Because of distance courses, it is possible to include distant student in an on-campus environment. They are more like on-campus students than traditional off-campus students.
- Convenience for students and professors
- Save driving time.
- Make possible for some people to attend at other end who couldn't drive to Ames.
- Makes me plan more effectively.

Question 11 What do you see are the disadvantages of distance education?

- Access to hardware.
- Traditional extension approach does not work well, distance education changes off-campus teaching, so the system needs to change.
- Additional effort needed from professor.
- IRC support has helped this semester. Would such support always be in place?
- Perhaps takes a little getting used to - by both teachers and students, but that evaporates soon.
- Biggest problem is to use extensive set-ups of gear - and to then break for hands-on practice. Instructor can't
supervise practice at remote end, & sometimes there is no lab there for hands-on work anyway.

Question 12 Please list any suggestions you may have for improvements or any other comments you may have regarding your experience with this distance education system this semester.

- A permanent facility is needed, one with equipment designed for use in the distance education classroom.
- Local & remote site facilitators are a great help.
- More microphones for students.
- No suggestions - I think it's working beautifully.
APPENDIX 1
RESPONSES OF OCCASIONAL USERS TO INTERVIEW QUESTIONS
USER 1

1) What was the system used for.

   To bring a speaker to my class that would not have been able to come to Ames to speak with us in person because of a very tight schedule.

2) How easy or difficult it was to learn to operate the technology.

   Very easy, took about ten minutes to get comfortable with the technology.

3) How the technology worked for them.

   The technology worked very well.

4) What was their distance education background.

   I have worked with satellite delivered instruction.

5) How many people were involved in the use of the system.

   My reading methods class and two other classes viewed the session. It was a very tight squeeze, but approximately forty-five students and faculty members viewed the session.

6) How the participants involved in the use of the system appeared to feel about the use of the technology.

   The speaker was nervous at first but worked very well with the technology. The students were fascinated that the speaker was in Des Moines and they could talk to her as if she was in the room in Ames. Some of the students mentioned the jerkiness of the video, but said they had stopped noticing it by the end of the session. Many of the students have asked if classes will be developed to teach them how to teach with such a system.

7) Would they use the system again.

   Definitely would use the system again.
USER 2

1) What was the system used for.

   It was used for meetings of the Ames Lab educational program 'Improving Success in Calculus'.

2) How easy or difficult it was to learn to operate the technology.

   It was very easy to learn. I was controlling the equipment after about fifteen minutes of practice.

3) How the technology worked for them.

   This worked very well for us. Made scheduling meetings easier.

4) What was their distance education background.

   I have viewed satellite seminars, but have never taught with a distance education system.

5) How many people were involved in the use of the system.

   Five to seven people depending on the meeting.

6) How the participants involved in the use of the system appeared to feel about the use of the technology.

   Those in Des Moines were very happy they didn't have to rearrange their schedule to drive to Ames. The technology didn't appear to bother the Ames participants and some mentioned how nice it was for those from the Des Moines area not to have to drive.

7) Would they use the system again.

   Yes, we had two meetings using the system and would have scheduled more if the system would have stayed in place after the fall semester.
USER 3

1) What was the system used for.

I was a guest speaker for the high school technology class.

2) How easy or difficult it was to learn to operate the technology.

The system was fairly easy to learn. I was shown how to work with the cameras and practiced for ten to fifteen minutes.

3) How the technology worked for them.

It worked very well.

4) What was their distance education background.

I have read a few articles about distance education.

5) How many people were involved in the use of the system.

Including myself there were seventeen people.

6) How the participants involved in the use of the system appeared to feel about the use of the technology.

The high school students had been using the system during the semester so it wasn't new to them. I found the system to be highly interactive and was impressed with its ease of use.

7) Would they use the system again.

Yes I would use the system again if given the opportunity.
APPENDIX J
OTHER TABLES
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Correlation matrix: Degree of relationship between individual items of the FECVDL questionnaire for instructors

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*Significance level p < .05  
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coursework | Absenteeism
of students | Amount of course
preparation | Your ability to adapt course to telecommunications | Appropriateness of course for telecommunications | Your overall satisfaction compared to traditional courses |
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* Significance level p < .05