CRITICAL FACTORS CONSIDERED IN THE PLANNING FOR THE

ADMINISTRATION AND IMPLEMENTATION OF LONG

DISTANCE INTERACTIVE VIDEO INSTRUCTION

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DEDICATION

This project is dedicated to my family:

Lisa, Christie, Michael, and Cathy

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CHAPTER I

INTRODUCTION

Overview

Technology has been improving and growing at a rapid pace in the last twenty years, and that growth has resulted in demands on educators to use the technology for the enhancement of education and the accessibility of the learner of all ages (Portway, 1988). Administrators in education and experts in technology have predicted the change in educational approaches to reach the remote learner with improved education through technology (Young, 1981). As early as 1979 the Office of Technology Assessment Priorities stated:

> The lessons of experience should be brought
> to bear on the new opportunities presented by
> new technologies such as cable,microwave,
> communications satellites... Education, using
> such technologies, may move from a parochial
> local level to a national, continental, and
> global level... (Telescan, 1979)

Elementary and secondary schools, colleges and universities

were encouraged to incorporate the new technologies into the instructional or administrative processes (Bretz, 1985). Administrators and policy makers were encouraged to consider changing the ways they taught and the people they served (Young, 1981). Dr. Steven Muller, President of Johns Hopkins University, stated in 1979 in the closing speech at a meeting of the American Association for Higher Education that colleges and universities in the very near future are going to be radically changed in four major areas:

> They will serve substantially different
> student clienteles...
> They will deliver educational services in new
> ways...
> Their educational content will be different...
> The style in which they operate will have to
> change...
> ...and if they don't change...our campuses will
> be like old nunneries that have been
> abandoned by the order. (Telescan, 1979).

According to Elizabeth Young "education, then, confronted the dilemma of change" (1981, p.4). Moving toward the incorporation of technology and serving new audiences became a difficult task for schools to accept and utilize:

> We, who introduce technologies are not just
> introducing new hardware or new integrated

systems, we are introducing change. This is
difficult because, we as educators are asked
to adapt to change ourselves at the very time
we must help others who work with us to
accept it. We are both immersed in the new
technologies and trying to guide others
toward rational uses. Nevertheless, this
is the challenge and it must be met (Young,
p. 5).

From the late 1970's to the present there has been a rapid
growth in the use of technology for educational purposes (Portway,
1987). The advances in the telecommunications technologies of
audio, video, and data transmissions via satellite, cable, fiber
optics, microwave, computer and interactive video disc have
resulted in a proliferation of long distance interactive video
programs that are available for students of all ages (Wilson, 1987).

There are successful educational networks for public schools
in elementary and secondary instruction, as well as credit and non-
credit courses for adults who may want to pursue a degree program,
continuing education and training, or staff development as teachers
(Gardner, 1987). According to the literature (Gardner, 1987;
Baldwin, 1988; Pease, 1988; Portway, 1988; Walters, 1988;) these
success stories are accommodating the non-traditional, remote
learner and using the technologies for the enhancement of learning

(Pease, 1988). Networks such as the National Technological University, the National University Teleconference Network, Arts and Sciences Teleconferencing Service, the Missouri Educational Satellite Network, and the Texas Instructional Interactive Network are running successful, long distance interactive video programs for students from kindergarten through higher education (Baldwin, 1988; Gardner, 1988; Grantham,1987; Pease, 1988; Walters, 1988).

However, the proliferation of technologies and its uses by education still remains a small portion of the population. Gregory Benson, Director of the New York State Center for Learning Technologies Policy, Research and Development commented on the state of technology and education:

> There's a general knee-jerk reaction with the professsion, I think, to technology. That's not to say there aren't a whole lot of people out there who understand what needs to be done, what can be done and are willing to do it, but that group is really at the forefront; it certainly doesn't represent the masses (Bruder, 1989, p. 31).

In its assessment of the prospects for the development of education, the International Panel on the Future Development of Education found that:

> The ongoing transformation of society, due in
> large part to scientific and technological
> progress, has important consequences and
> implications... as an agent of social change.
> Since scientific and technological progress is
> not linear, simple extrapolation of trends is
> an unreliable forecasting tool and the less
> foreseeable side-effects of a new technology
> often prove more significant for education
> than the technology itself (1984, p. 6).

Moreover, the General Conference of Unesco, which at its

twentieth session recognized the need for a reflection on the future

development of education, summarized the problems between

education and technology:

> The techniques of mass communication, or
> media are playing an increasingly significant
> part in contemporary society, and this gives
> great importance to their interaction with
> education, both as an educational support and
> as a "parallel school" -- a school based on
> principles different to those upon which
> traditional education rests.   However,
> although there are many cases in which the
> media have been used successfully for
> educational purposes, generally speaking the
> two institutions of education and media
> develop and function   in such a way that the
> cooperation between them that might have
> been expected has rarely been achieved
> (1984, p. 157).

The future of the relationship between education and

technology needs a re-examination and re-definition of roles.   This

assessment, according to Schaeffer (1984) should include a view of the judgments of administrators about the ability of the technology to be useful as well as the cooperation between the technology delivery and the user institution.

Statement of the Problem

Despite the telecommunications capabilities available for education, and the current groups and networks that are delivering programming, there is no validated process for planning prior to, during, and following implementation of successful distance education programs. In fact, relationships between the technology and education could be said to be indifferent and even competitive (Souchon, 1985). Moreover, Souchon cites the consensus of the Unesco Panel recommendations to re-examine the relationship between education and communication technology, and to re-evaluate the reasons for lack of role definition and lack of cooperative use (1985). According to the Unesco Panel, "it was thought theoretically possible to use the tools of information to facilitate the acquisition, transmission and dissemination of knowledge" (p. 157). However, the panel continued to postulate whether education and technology remain, in fact, irreconcilable (1985).

Recent studies have indicated barriers to education's use of technology (Barron, 1987; Evans, 1982; Rockhill, 1980) and studies have indicated the advantages of implementing the technology in education (Seidman, 1986; Wilson, 1987; Lewis, 1985; and Wagner, 1984). However, no studies have indicated a valid process for the positive planning for implementing a successful distance education program.

Purpose

The purpose of this study was to identify the critical factors considered by administrators when they chose to implement, administer, or produce programming or courses by long distance, interactive video.

Research Questions

The following questions were developed to provide direction to the study:

1. What critical factors did administrators in education, program providers, and distance education specialists identify when they considered implementing, administering, or producing programming or courses by long distance, interactive video?

2. According to these experts, what relative rank or value does each of these critical factors have?

3. Do administrators in education, distance education experts, and program providers rank the critical factors differentially?

Limitations of the Study

The following limitations applied to the study:

1. Only people recognized as key leaders and experts in the field of delivery of long distance education and representing organizations who are successful users or providers were nominated to generate and rank critical factors through participation in this study. Those categories were: administrators in education, distance education specialists and program providers. The experts represented higher education, adult and continuing education, elementary/secondary education, national educational or programming organizations and state departments of education.

2. Only people nominated by their peers, and by a random sample of distance education conference attendees were considered as key leaders or experts in the field of long distance delivery of programming.

3. Thirty of the 32 people invited to participate agreed to be a part of the study. Of those, ten were identified in each of the three categories of educational administrator, distance education specialists, and distance education program provider.

Definition of Terms

For the purposes of this study, the definition of distance education is one offered by the U.S. Department of Education's Office of Educational Research and Improvement: "Distance education is the application of telecomunications and electronic devices which enable students and learners to receive instruction that originates from some distance location. Typically, the learner is given the capacity to interact with the instructor or program directly, and given the opportunity to meet with the instructor on a periodic basis" (Bruder, 1989).

The focus of this study was given to the long distance, interactive video instruction program delivered by a single technology or combination of technologies to include computer, microwave, satellite, fiber optics, instructional television fixed service (ITFS), cable, or very small aperture terminals (VSAT).

Organization of the Study

Chapter I provided an introduction and rationale for the study. It included a statement of the problem, purpose of the study, research questions and limitations, assumptions and definitions of terms used in the study.

Chapter II provided a review of the literature related to distance education technologies, current long distance video instruction, decision making and diffusion of innovations, and perceptions of use of telecommunications. It also noted the current research on barriers to use and noted the need for more research in the area of planning for implementation for use.

Chapter III examined the procedures used in the study. It defined the population and explained the sampling procedures used in compiling the panel of experts in long distance delivery of programming. It explained the Delphi Technique and its history, how the instruments were designed and how the information was analyzed.

Chapter IV contained the findings of the study and Chapter V contained the conclusions, implications, recommendations and a

summary of the study.

CHAPTER II

REVIEW OF THE LITERATURE

Overview

The review of the literature for the purposes of this study was conducted to provide a background in (1) the current technologies that are being used in education, as well as definition of the term "distance education", (2) the current successful long distance programs that are being delivered across the United States and Canada, (3) the processes of diffusion of innovation that are reported in the adoption of technology, and (4) the current reported perceptions by users of the barriers to successful implementation of distance education programs.

The purpose of the review was to provide a background and understanding in the technologies, programs, adoption process and perceived barriers by organizations as they made decisions and planned for the implementation and administration of long distance

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education. The review explored the studies of the most current uses of technology in education, the applications that were considered successful by experts in the medium, and studies citing the reasons potential users list for their inability to implement and administer long distance education programs.

Definitions of Distance Education Technologies

Distance learning applications have been emerging across the world as telecommunications technology has provided broader learning opportunities (Portway, 1988). The use of telecommunications technology for educational purposes by long distance has been termed "distance education" (Bruder, 1989). According to the United States Department of Education's Office of Educational Research and Improvement, distance education is:

> ...the application of telecommunications and
> electronic devices which enable students and
> learners to receive instruction that
> originates from some distance location.
> Typically, the learner is given the capacity to
> interact with the instructor or program
> directly, and given the opportunity to meet
> with the instructor on a periodic basis
> (1988).

According to Benson and Hirschen (1987) distance learning

refers to "instruction that occurs at a point distant from the location of the learner(s) with an interactive audio and/or visual component" (p. 63).   According to the literature (Bruder, 1989; Benson et al., 1987; Gardner, 1988; Whisler, 1987; Hawkridge, 1983) "distance education" provides ways that advanced technology can be used to meet the needs of remote learners.

Certain formats and telecommunications technologies are used in distance education. According to Wilson (1987) these "range from the simple to the complex and provide an electronic link for any number of applications..." (p. 234).   Often many different formats and technologies are used and integrated into one process for delivering a message (Whisler, 1987).   The new telecommunications technologies are recommended for evaluation in the following format (Wilson, 1987):

    I. Video Communications

    2. Audiographic Technologies

    3. Telephone Systems

    4. Computer Communications

Bruder, (1989), Benson et al., (1987), Whisler (1987), Parker (1981), Wilson (1987), and Wedemeyer (1986), defined the

telecommunications technologies that are applicable to distance education and summarized the delivery mediums that are currently being used. Those delivery mediums include broadcast, cable, fiber optics, ITFS, and satellite used in combination or alone. Broadcast video provides transmission over the air using radio frequencies received by common equipment at home. Coaxial cable is another delivery method for types of broadcast and interactive communications. An antenna or headend receives the signal and distributes the signal through a coaxial cable wire to locations connected on the cable line. Both allow the reception of programs designed for a broad audience to be brought into the home, office or school (Wilson, 1987).

Satellite technology is a means of providing information and programming by transmitting information up to a domestic satellite and "downlinking" the program through the use of earth stations or receive stations. These satellites are placed in geostationary orbit above the equator, and move at the speed of the earth's rotation. Transponder time or channel time can be leased for an hourly fee from a satellite broker or organization. Satellite delivery can be used for full motion or compressed video, and two way audio or

video interaction. Satellite delivery is less expensive if many sites are included in the downlink. The satellite program has the capability of reaching a large audience with only a one time channel cost (Wilson, 1987).

Fiber optics is another medium to use for distribution of programs. It is currently the fastest growing means of delivery of information (Wilson, 1987). Fiber optics is a laser-beam broadband analog or digital signal which travels through glass-like fiber bundles of filaments in small tube cables. This fiber delivery system is capable of delivery compressed, audio, video or data over the fiber optic lines at a much reduced cost.

Instructional television fixed service (ITFS) is a closed circuit telecommunications broadcast system that allows the transmission of video and audio signals via low-powered transmission equipment. The signal is microwaved between the transmitter and receivers (Benson et al., 1987).

All of the technologies available for telecommunications delivery of instruction provide the capability for educators to reach the learner by long distance (Gardner, 1988). According to Benson et al., (1987), more than ever before, education has the opportunity to

reach individuals, communities and institutions in all parts of the world. Wedemeyer (1986) related the importance of integrating the telecommunications technologies and using them as a tool for delivery of instruction to a wider student public.

> At this moment, sophisticated and increasingly integrated telecommunciations systems and services are being used by governments, high schools, universities, corporations, and individuals. Soon, those of us unable to effectively and efficiently use these additional tools and processes of expression, interaction, and learning will be as functionally illiterate as the person in the past who could neither read nor write. As educational professionals we have a responsibility to anticipate the new skill requirements and develop new literacies (p. 10).

According to Bruder (1989), Gardner (1988) and Whisler (1987) the choice of the technology depends upon the program that is being delivered, the accessibility of the technology, the costs that are involved and the perceived usability and understandability of the technology itself. The technology is available. According to those educators, there are organizations who are using the technology successfully in education, but they represent a small minority of educators (Bruder, 1989; Gardner, 1988; Whisler, 1987). The

following three sections in the review of the literature will focus

on the reports of those groups who are considered successful in

their delivery of distance education programs by interactive video

and the studies of diffusion of innovation and the barriers that

educators are citing for not using the technology.

Successful Long Distance Video Instruction

Institutions of higher education, and secondary/elementary

schools, are utilizing long distance interactive video instruction to

serve large student enrollments. Baldwin, (1989), Grantham (1988),

Portway (1988), Pease (1988), Benson et al. (1987) and Lawry

(1986) report successful networks available to deliver programs to

students by satellite, fiber optics, microwave or ITFS. These

programs, according to the reported studies, accomplished the

application of technology to education and developed programs to

serve the remote student successfully (Portway, 1988). They are

reviewed for background in the study as documented successfully

implemented and administered long distance interactive video

programs.

In satellite instruction, the Texas Instructional Interactive

Network (TI-IN) delivers high school credit courses to more than 2000 students across the United States. Oklahoma State University's Arts and Sciences Teleconferencing Service (ASTS) and the National University Teleconference Network (NUTN) provide credit and non-credit programs by satellite across the nation for secondary students, teachers and administrators and colleges and universities (Whisler, 1987; Walters, 1988; Grantham, 1988). In Washington, Satellite Telecommunications Educational Programming (STEP) provides high school credit courses by satellite to students around the United States (Whisler, 1987; Cooper, 1988). The Missouri Educational Satellite Network (MESN) provides programs for secondary students and teachers through the auspices of the Missouri School Boards Association and the Missouri State Department of Elementary and Secondary Education (Gardner, 1988). Faculty at Iowa State University are sharing information on teaching techniques through the "Teacher on TV" Program (Hoy, 1988). The states of New York (SUNYSAT) and North Carolina are using satellite delivery of instruction to high schools, college campuses and communities (Snyder, 1988). Kentucky's educational network (KET) provides instruction by satellite across the state (Hobson, 1988).

States from coast to coast are involved in consortium activities organized and funded by the Star Schools Project to deliver long distant instruction to remote sites (Grantham,1989). The National Technological University (NTU) provides coursework in engineering for Master of Science degrees by satellite to corporate sites around the United States (Baldwin, 1989). The Community College Network (CCN) networks adult and continuing education programming by satellite to community colleges across the United States. Organizations like PBS's Adult Learning Service, PSSC's AMA by Satellite, ManagemenTVision, the Computer Channel Network (CCI) and The Learning Channel (TLC) provide courses by satellite to a variety of audiences (Portway, 1989).

In fiber optics, microwave and cable, campuses and school districts are combining efforts to tie campuses and schools together for delivery of instruction. The Missouri Video Network shares programming from the four University of Missouri campuses in St. Louis, Rolla, Kansas City and Columbia with industry and the community (Sarchet, 1986). In Pennsylvania, Lehigh University cooperates with York University to provide courses to Bell Laboratories and remote students (Brichta, 1989). In Iowa,

community colleges, the public television station, the public schools and the institutions of higher education are sharing a network developed for the state's educational programs (Patten,1988). At California State University-Chico, credit and non-credit programs are being offered to business and industry over a fiber optic network and ITFS network, as well as sharing courses among the state campuses (Meuter, 1988). The BOCES Project in Norwich, New York and the Westchester County school district in New York utilize a cable network in the community for delivery of course instruction (Walters, 1988).

These documented successful distance education programs represent the activity that the experts in distance education indicate are the leaders in the forefront of the distance education industry (Bruder, 1989). Yet, as studies in the literature also indicate, other educators and educational institutions refrain from involvement in distance education projects because of the perception of barriers they confront. The following two sections of this review of the literature report the theories of the diffusion of innovation and the barriers to the use of technology in education.

Decision Making and Diffusion of Innovations

As early as the 1950's, Rogers began his analysis of the

process used by mankind to accept those things that are new and

different for him. He identified those stages of acceptance or

adoption as: (1) awareness, (2) interest, (3) evaluation, (4) trial and

(5) adoption (Rogers, 1962, p. 5). Its applicability to the 1990's and

to education's acceptance and adoption of educational technology has

been discussed by educational researchers and telecommunications

providers (Pease, 1988; Lang, 1987; Svenning, 1987; Acker, 1985;

Bell and Weady, 1984; Olgren and Parker, 1983). Those educational

researchers have compared the adoption process to the process of

educators' acceptance of technology.

Acker (1985) discussed Roger's Diffusion of Innovations

Theory in terms of its applicability to the use of educational

technology. He discussed the stages of adoption related to the

characteristic of the innovation, and listed them according to (1)

perceived and actual relative advantage, (2) complexity, (3)

observability, (4) trialability, and (5) compatibility (p. 211). Issues

in diffusion were centered around cost, type of equipment, quality,

difficulty to use, other uses, evaluations, comfortability and

culture.

Pease and Tinsley (1986) evaluated the TI-IN Network and drew comparisons to Roger's Diffusion of Innovation. Their conclusions were that successful implementation of the programs from TI-IN were met based on the criteria listed in the innovation attributes. Similarly, Svenning and Ruchinskas (1986) conducted studies in decisions for use of teleconferencing and concluded that the decision factors were predisposed by the attributes of the diffusion of innovation. Those were (1) relative advantage, (2) comparability, (3) convenience and (4) graphic requirements.

Olgren et al., (1983) commented on user acceptance in a review of technology and its applications. They concluded that "user acceptance and sustained applications are two of the most important human factors...and they require as much, or even more planning than the technical design" (p. 238). Parker (1984) discussed the "hurdle effect" within an organization prior to its use of telecommunications technology. In his 1983 survey of teleconferencing users, he reported the key ingredient of an influential person to introduce the technology in the organization.

Teleconferencing users must 'clear a hurdle'

to get from their first teleconferencing
experience to familiarity and acceptance of
current teleconferencing technology. That is
you must lose the mystique and fear they feel
for teleconferencing...Those users who don't
get across the hurdle tend to drop their
teleconferencing commitment and become
poor ambassadors to others contemplating
adoption of the technology (p.102).

Bell et al., (1984) cited the importance of human factors in the
adoption and successful implementation of teleconferencing in an
organization. According to those authors, human factors need to be
considered as systems are developed:

People are not going to use a technology
simply because we think it is a good idea, or
because we think it will save them time and
money. If we want people to accept and adopt
teleconferencing we must design the
technical structure and human interface to be
both initially and lastingly rewarding (p.
299).

According to the research, educators have had difficulty in the
decision process to use technology effectively and successfully
(Lawry, 1986; Souchon, 1986; Kaye et al., 1981). Lawry (1986)
stated that decision making for the educator reflected similar
processes to those for business and industry, and to the innovation
decision process of Rogers. Souchon (1986) stated that "Much
remains to be done before education defines its objectives and the

world of communicators, in turn, opens its mind to the problems of education" (p. 159).

Boles cited Irvine (1983) in his discussion of the decision making process for education and its future:

> Imaginative planning and vigorous action are necessary to maintain a viable educational system. The educational system of the future will be shaped by men in purposive fashion, or it will by default, be shaped by accident, tradition and the senseless forces of environment (p. 383).

Similarly, Kaye and Rumble (1981) cited the problems in decision making for educational institutions as they made decisions in proceeding with distance learning systems. Like Armsey and Dahl (1973) they concluded that problems in decision making and acceptance of the technology needed certain conditions for success. Among those were the (1) recognized existence of a need, (2) articulation of a purpose and guide, (3) identification of a structure, (4) leadership of the innovation, (5) teacher participation and support, (6) appropriate technology, (7) evaluation mechanism, and (8) adequate resources for the beginning and duration of the project (p. 101-103).

Researchers have studied the decision making process and the

adoption of technology by educators. They have concluded that the

adoption process for the educator in implementing technology

follows closely the adoption process and diffusion of innovation

presented by Rogers. The following section addresses those studies

that have been conducted concerning the perceptions of the educator

for the use and/or non-use of telecommunications technology in

education.

Perceptions of Use of Telecommunications

Technology

In the 1980's educators and technologists researched the

perceptions for use and non-use of telecommunications technology

in education (Evans, 1982; Wagner, 1984; Seidman, 1986; Barron,

1987). Studies conducted in the 1970's reflected similar results to

the later studies (Baer, 1978; Lucas, 1978; Benne, 1975). Each of

the studies indicated a listing of factors that were perceived as

barriers to the implementation of the partnership of education and

technology. Those factors were related to cost, time, faculty

support, staffing, equipment use, compatibility, and comfort.

Baer (1978) discussed the advantages of use of the

telecommunications technologies and cited reduced costs as the major reason. Barriers indicated were lack of information about the technology and length of time for widespread use. Lucas (1978) cited the frequent inappropriate match between technology and service as a major barrier. Barron (1987) reviewed the literature on the study of barriers to implementation of technology in education and concluded that, while little research had been conducted, the acceptance of teleconferencing in higher education had become widespread, but televised delivery of classes, especially in graduate education, was "considered with more hesitation and suspicion by some educators" (p. 3). Barron cited Dirr's major barriers to the implementation of courses as (1) lack of money to support the effort, (2) lack of faculty commitment and (3) lack of trained support staff (p. 4). Barron (1987) found that faculty had concerns for the students, the size of the classes, discussion and face-to-face involvement, and lack of support for themselves from peers and instructors. In a second study Barron (1987) asked faculty to rank the technologies in terms of use and then secured data on the perceived barriers to that use. He, furthermore, reiterated the need for additional studies of delivery media and modes of instruction,

including all aspects of distance education.

Evans (1982) studied faculty responses to the use of television as a delivery method. He addressed the decision-making process and the psychological barriers to using the technology. Like Barron (1987), he indicated in his study that barriers to implementation of distance education programs at institutions included finance, compatibility, and comfort.

Additionally, Wilson (1987), Seidman (1986), Lewis (1985) and Wagner (1984) studied the cited advantages of implementing distance education technology. Similarly, Roark (1985), Lamp (1985) and Hassan (1984) studied the adoption and satisfaction of telecommunications technology by teachers and institutions. They found that cost efficiency, access to programming, and enrichment were reasons for use cited by teachers.

Summary

While the technologies and term distance education were clearly defined in the literature, and those technologies and programs are available and being used, the majority of educators remain hesitant to use the technology for educational purposes

(Bruder, 1989).   Studies in both innovation and decision making theory, as well as research in the use/non-use of the technologies indicated that more research needs to be conducted to bring together the educator and the appropriate technology for adoption (Barron, 1987; Bruder, 1989).   While there is evidence of the barriers related to cost, compatibility, comfortability, communication, and support, research also indicated that the presence of those same factors acts as a motivator for use (Wagner, 1984; Svenning, 1986).   The literature does not contain studies of the critical factors that need to be considered prior to, during and following the implementation of distance education programs.

CHAPTER III

METHODOLOGY

The purpose of this study was to identify and rank the critical factors considered by leaders in the field of distance education when they made decisions to implement, administer, or produce programs or courses by long distance. Those critical factors identified and ranked were developed from a consensus of experts representing administrators in education, distance education and program production. This chapter is devoted to the method of data collection and its analysis, and is divided into the following sections: (1) Type of Research, (2) Population, (3) Instrumentation, (4) Data Collection, and (5) Analysis of the Data.

Type of Research

This descriptive study consisted of the acquisition of information using the Delphi Technique designed by Delbecq, Van de Ven and Gustafson (1975). The purpose of the Delphi Technique was

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to "obtain a consensus of opinion from a group of respondents" (Salancik, Wenger, and Helfer, 1971, p. 65). It used written responses rather than bringing together individuals for brainstorming and consensus (Delbecq, et al., 1975). The Delphi members chosen for this study were composed of 30 members from the following groups: Administrators in education, long distance program production providers, and experts in distance education. These experts were asked to identify the critical factors considered when they decided to administer, implement, or produce programs or courses by long distance. The study then polled those experts asking them to make value judgements about those criteria. The study used three mailed questionnaires and telephone interviews.

The research design was an important tool in making the evaluation of data effective and productive. Descriptive research was a method of collection of data for describing conditions as they exist. This study used a method of descriptive research at the ordinal level of statistical measurement to interpret group suggestions and opinions into a collection of descriptive information for decision making (Dalkey, 1972).

Population

The respondent population was elected by two methods: peer election and expert election. Random selection was not considered because the Delphi relies on expert opinion. The participants who were elected were considered leading authorities in their field by their constituents. Because the questions asked were directed to leaders in the field of distance education, it was imperative to elect those leaders who well represented the industry. Therefore, the Delphi members were elected not only by other leaders in the industry, but by those people who were users and knowledgeable of their programs. The criteria for their election as experts in the field of distance education was that they each were responsible for the successful administration, implementation, or production of long distance, interactive video programming. Voters were asked to elect the members based on their leadership in the categories of Educational Administration, Distance Education, or Program Provider/Producer.

In the spring of 1987 and 1988, the College of Arts and Sciences at Oklahoma State University held its annual conference entitled "Learning by Satellite." For both years, presenters and

keynote speakers were invited to attend from Public Broadcasting Service (PBS), Texas Instructional Interactive Network (TI-IN), the National University Teleconferencing Network (NUTN), Applied Business teleCommunications, C-Span, and the National Technological University (NTU). More than 200 participants attended both conferences, and had the opportunity to hear and interact with the representatives from those organizations and institutions. Following the close of the spring, 1988 conference, fifty participants were randomly sampled and asked to elect one person in three areas representing expert opinion and capability. Those three areas, were: educational administrator, programming provider and distance education expert.

Additionally, the administrators of ten major telecommunications organizations were asked to nominate experts who represented the same three areas. Those administrators represented technology and telecommunications providers, program providers in education, education divisions in industry and major long distance networks in education and industry.

Telephone calls were made to the 32 experts identified in the panel selection process. Of those 32, 30 agreed to participate in the

study. The list of experts can be found in Appendix A. The calls explaining the purpose and objectives of the study were followed by a letter confirming their participation and explaining the study further (see Appendix C).

Instrumentation

Information for the study was obtained using the Delphi Technique designed by Dalkey and Helmer (1963) and revised by Delbecq, Van de Ven and Gustafson (1975). The review of the literature indicated five studies (Ayers, 1985; Marino, 1986; Bretz, 1983; Baker, 1988; Dean, 1986) that used the Delphi Technique to acquire information to identify criteria for use in education.

The Delphi was first developed by Dalkey and Helmer (1963) at the Rand Corporation to obtain information for forecasting Soviet Bomb damage for the United States Air Force. In addition to forecasting, the Delphi has been used for consensus building, generation of information, and opinion gathering. According to Dalkey, the old truism that "two heads are better than one turns out to be well founded" in the Delphi Technique.

He stated:

> When faced with an issue where the best
> information obtainable is the judgment of
> knowledgeable individuals, and where the
> most knowledgeable group reports a wide
> diversity of answers, the old rule that two
> heads are better than one, turns out to be
> well founded (p.4).

That simple truism is at the heart of the Delphi Technique. It is more than "opinion technology," but a way of "merging the diverse set of perspectives into one aggregated group point of view" (Dalkey, 1963, p. 9). According to Dean (1986), the Delphi uses the factual judgement for policy formulation and decision making and it is also applicable for use with value judgment information as well. This study, like Dean (1986) and Baker (1988), concerned itself with value judgments and decision making criteria which are both internal and external to the organization and the decision maker. Dalkey said:

> One of the plain facts of life is that
> practically all important decisions, whether
> at the national level, or at the level of
> everyday life, involve issues which cannot be
> decided on the basis of hard data or well
> validated theories (p.3).

In addition, the Delphi Technique is an approach intended to refine the opinions of the experts without bringing them face to

face. Similar in design to the Nominal Group Technique of brainstorming ideas among groups of experts who are together in a face to face environment, the Delphi uses a minimum of three rounds to elaborate and then refine the ideas of one another.

According to Key (1974) the Delphi Technique has several distinct advantages, among which are the generation of ideas quickly from experts who are not able to get together, the avoidance of conflict in person, and savings in time and money. Dalkey (1969) indicated three features as advantages: (1) anonymity, which reduces dominant individuals' influences, (2) a controlled feedback, which uses rounds in a sequence to communicate feedback of issues for clarification by Delphi members, and (3) statistical group response, which indicates that the group is defined as a single body of final consensus of ideas. It is a way, said Dalkey, "of merging the diverse set of perspectives into one aggregated group point of view" (p.8).

This study utilized the three probe Delphi technique to conduct the research. Three separate questionnaires were mailed to the panel members who represented their expertise in the fields of administration in education, distance education, and long distant

program providers. All were involved in the implementation or administration of successful long distance, interactive video instruction programs.

The first probe or Questionnaire One asked the open ended question: "What were the critical factors that were considered when your organization began planning to implement or administer long distant, interactive video instruction? " The panel members were asked to list ten or more critical factors, in any order, and return them in the mail for evaluation and analysis (See Appendix C). From the Delphi One Probe, the panelists generated 286 factors which were analyzed by a work group and combined into 55 factors. The second mailing contained Questionnaire Two which asked the panelists to 1. identify the twenty most important critical factors from the 55 factors, 2. rank the 20 factors in order of importance in planning, and 3. add any additional factors that may have been omitted. The purpose of the second round was to prioritize the factors that were generated in the first round (See Appendix D). The third round, Questionnaire Three, asked the panelists to comment on the 26 factors that received the highest ranking, plus an additional 27th factor that was suggested by a panelists, make any changes and

rank the top twenty factors in order of importance. They were also asked to vote on the appropriateness of combining factors that had been suggested by panel members. The purpose of the third probe was to refine the consensus and bring to agreement a final listing of the top twenty critical factors considered to be important by successful administrators in long distance video instruction (See Appendix E). The sample size of 30 was within the range of 15-30 recommended by Delbecq et al. (1975).

Collection of Data

Each questionnaire, along with a cover letter explaining the round, was mailed to each of the 30 panel members. The panelists were each asked to respond on the questionnaire in writing and return the questionnaire within two weeks. Those who did not respond within that time frame were contacted by phone as a reminder. The names and identity of the expert panel members were kept anonymous. Panelists were sent a self-addressed, stamped envelope for return of the response, and were called and thanked for the mailing when it was received.

The first questionnaire asked the panelist to list beside the

factor number on the page, the critical factors considered when they began planning to implement or administer long distance, interactive video instruction. Panelists were asked to be brief and concise, and not to limit themselves only to those ten factor items. This first questionnaire served as the generation of information to be ranked and refined in the later two probes (See Appendix C).

The second questionnaire was developed from the information obtained from the first probe. The 286 factors generated were categorized into 55 critical factors by a work group not involved in the Delphi probes (See Appendix B). Those 55 factors were listed in random order on the questionnaire for the members to rank from one to twenty, with "1" being the highest and "20" being the lowest. Space was provided in the column to clarify, make additional comments, or add additional factors that may have been omitted (See Appendix D).

The third questionnaire's purpose was to refine the second probe. The top 26 factors were ranked for the panelists to see and comment upon. An additional 27th factor, offered by one of the panelists, was also listed for ranking. Ranking points and votes were listed beside the ranked factors, along with summarized

earlier comment by panelists. Additional space was provided for comments, justification or refinement. Nine factors were requested by panelists to combine with other factors. Panelists were also given the opportunity to vote on the appropriateness of the combination of factors and to give them a rank order (See Appendix E).

Analysis of Data

Delphi I

The analysis of the data from the first questionnaire required the use of a review panel or work group to identify the descriptors that were key from the generated 286 responses. Those 55 key descriptors were entered into the computer to sort the responses in similar categories. Responses were written on index cards and sorted by the review panel, and the key descriptors and duplicates were eliminated. Each member of the review panel examined each descriptor and the sort, and reached consensus before entering them into the computer. Finally, the consensus of 55 factors was listed randomly on the questionnaire that would constitute the second probe.

Delphi II

The second probe asked the panelists to rank the 55 factors with "1" being the highest and "20" being the lowest. The purpose was to find the relative rank of the factors generated in Delphi I. Rank was determined by the number of points each factor received. A ranking of "1" was given 20 points, a "2" was given 19 points, and a "20" was given one point. This followed similar procedures conducted by Dean (1986) and Baker (1988).

Delphi III

The third probe had the purpose of reaching final consensus on the top 20 critical factors. Panel members were asked to re-evaluate and rank the top 27 criteria for refinement. They were also asked to vote and then rank the suggested combined factors.

Statistical analysis was conducted in two ways. Ordinal level statistics were used to calculate the mean, deviation, and standard deviation of the factors from the final Delphi round. A descriptive table was drawn to show the deviations that occured between the three expert categories, as they ranked the key factors. The purpose was to determine which of the group or groups deviated the most

from the panel as a whole, as well as the level of agreement each group had for each of the key factors.

The Kendall Coefficient of Concordance (W) was calculated to describe the degree of association which existed among the experts in Delphi III. This type of correlational test was useful in determining the extent of agreement among the panelists on a number of issues. The Kendall W was calculated by finding the sum rank of all experts on each factor expressed as a deviation. Then the mean was calculated and the deviations were squared. The null hypothesis, then for the Kendall W was that the ranking by the panelists were unrelated.

Summary

The identification of 20 key factors in implementing long distance interactive video instruction was completed using a Delphi Technique. Thirty experts representing distance education, educational administration, and television program providers across the United States and Canada participated in the study. The Delphi used three questionnaires adapted from Delbecq, et al., to obtain key factors and then to vote on their importance. In this study the

Delphi produced value judgements from the experts. The study was limited in its statistical validation because the true value of jdugement, even a consensus judgment, cannot be validated statistically. To determine the mean of the experts' rank on each key factor, descriptive statistics were used. Deviation scores and standard deviations of each category of expert were calculated to compare ranking by the groups. A Kendall coefficient of concordance (W) test was calculated to determine the extent of agreement by all the experts on the most important criteria.

The product of the Delphi Technique is consensus of opinions. Because the source of the information is from a representative sample of experts in distance education, administration and programming from across the nation and Canada, their consensus of opinion has value and fulfills the purpose of this study in compiling a list of key factors, according to Delbecq, et al. (1975).

CHAPTER IV

PRESENTATION OF FINDINGS

The purpose of this study was to develop a list of critical factors that administrators could use in planning to implement long distance interactive video instruction at their institution. Distance education experts generated a list of 20 factors they considered important to implement long distance video instruction. The experts judged the value of each key factor in relation to the others, and created a priority list of factors.

This chapter presents the findings of the research. The first section identifies the key factors suggested by the experts, and describes how the final consensus of key factors was produced. The second section identifes the key factors which the experts ranked as most important. The third section describes the differentiation of rankings by the three expert groups.

Research Question Number One

What were the critical factors that an administrator should consider when planning to implement, produce or administer programs or courses via long distance, interactive video?

To answer this question, a questionnaire was sent to 30 Delphi panelists in March, 1989. It asked the panelists to recommend critical factors necessary for an administrator to consider in planning to implement, produce or administer courses via long distance, interactive video. In the cover letter panelists were asked to respond based on the definition of distance education as "long distance, interactive, video instruction delivered by satellite, fiber optics, microwave, or ITFS networks. The delivery might be full motion or compressed video." Each member represented either program producers, educational administrators, or distance education specialists from higher education, adult/continuing education, and elementary/secondary education.

Twenty-eight of the 30 experts responded and contributed 286 critical factors. Many of the factors generated by the panelists were duplicates or similar to those suggested by other panelists. The analysis completed by the Delphi work group condensed the

responses by descriptors to a total of 55 key factors. Those factors are listed in Table 1.

In a second questionnaire, panelists were asked to rank the 55 critical factors and were invited to add new factors which had not been suggested before in the first questionnaire. From the second questionnaire, one additional factor was generated and added to the list of factors that panelists could consider in the third questionnaire. That additional factor appears with the original list of factors in Table 1.

Research Question Number Two

What relative rank or value does each of the critical factors have?

The third questionnaire was designed from the results of the second questionnaire. The purpose of the second questionnaire was to prioritize the 55 key factors generated from the first questionnaire, and to generate additional factors. The third questionnaire considered 21 of the top 55 factors. One key factor generated from the second questionnaire was added. The questionnaire asked the panelist to prioritize and place value on the

TABLE I

CRITICAL FACTORS FOR PLANNING THE IMPLEMENTATION,
PRODUCTION, AND ADMINISTRATION OF LONG DISTANCE,
INTERACTIVE VIDEO INSTRUCTION

A SYNOPSIS OF DELPHI RESPONSES (55 factors)

Identified need (perceived or real) for the program.

Funds for capital costs: production equipment and facilities.

Availability of appropriate and specialized equipment to deliver the program properly.

Adequate support staff to produce the program.

Faculty/teachers supportive and available.

Adequate receive sites, facilities and equipment.

Identification of receive sites personnel and coordinators.

Identified or garnered support/partners for the program: industry, corporate, legislative, institutional.

Administrator identified to run the program.

Campus experience with instructional television/production.

Politically advantageous to begin and run program.

Availability of on-going money for operations and expenses.

TABLE I (Continued)

A SYNOPSIS OF DELPHI RESPONSES

Collaboration: Assignment of a project team for joint planning of faculty, producers and students.

Opportunity to experiment: to offer "pilot project" .

Motivation/incentives for faculty to get involved and be supportive.

Identify range of services: examples: continuing education, credit, non-credit, inservice, training, research, alumni, recruitment, etc.

Legislative reform affecting courses offerings.

Ability to accredit courses, offer credit or transfer credit across states or institutions.

Identification of marketing plan for the network, system, or program. Includes PR with the public.

Needs analysis: who needs to be served: Is the actual market/clientel national, international, adult, K-12.

How to determine charges: affordable pricing for the courses.

On-going, meaningful course review and evaluation of program.

Enhancing and ensuring TV production quality.

Sufficient and careful planning time: Research and access to accurate knowledge.

TABLE I (Continued)

A SYNOPSIS OF DELPHI RESPONSES

Enthusiasm and belief in the project and its success.

Ways to distribute supplementary print materials.

Ways to offer student services: orientation, counseling, advising.

Choice of technology to best suit the program being offered.

Cost effectiveness: feasibility and justification for delivery system.

Training faculty to use the technology and teach on TV.

Legal issues: copyrights, licenses, FCC regulations, etc.

Quality of the educational content of the program.

Quality of the auxiliary materials.

Appropriateness of the subject matter.

Student assessment and evaluation.

Instructional design: The interactive components, length, frequency and number.

The international, national trends and challenges that the system can address/solve.

Policy in place to support the institutional change in the way it operates.

TABLE I (Continued)

A SYNOPSIS OF DELPHI RESPONSES

Legislative (state, federal, board, trustees, curators) involvement and approval.

Process to select courses for the network.

Positive or negative impact on campus instruction.

Site facilitator/coordinator training.

Process of selecting sites: who, how many, where, now.

Positive impact of broadening video resources campus-wide.

Save travel and time.

Ensuring equivalent status for remote students: Ex. credit/degree.

Ensuring equivalent learning experience for remote students.

Time for steady, stable program development.

Programmatic needs of the students (high school, rural, schools, university, non-traditional, etc.)

Mechanism for handling grading.

Determine program delivery: tape delay, mailed, live production.

Ensure program/courses are in keeping with the mission, goals, and objectives of the institution/organization.

TABLE I (Continued)

A SYNOPSIS OF DELPHI RESPONSES

Identification of a visible, spirited, key leader at the top initiating program.

Personal interest and desire to demonstrate how well to teach by interactive media.

Ensure continued credibility of the program with the public, faculty, students, supporters.

Plan to actively pursue continued funding, grant, and enrollment support.

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most important 20 key factors listed.

The second questionniare was the longest and most complex of the three surveys. The cover letter to the questionnaire asked the panelists to: (1) review the list of critical factors which were listed randomly, (2) comment beside each item if desired, (3) select the 20 most important items, then (4) rank those 20 items with a score of "1" being highest and "20" the lowest, and (5) add any new factors which may have been omitted. This questionnaire was mailed in May, 1989.

Twenty-five panelists responded to the second questionnaire. Based on a point system in which rankings of "1" received 20 points, rankings of "2", 19 points, and rankings of "20", 1 point, an analysis of the questionnaires resulted in a priorized list of all 55 criteria. The rankings of the 55 criteria are shown in Table II in order of importance and with the number of votes and points each received. One new factor was generated by a panelist.

One panelist did not correctly rank the selection of the top 20 factors. Instead the panelist ranked each of the factors with the equal weight of number "1". The panelist stated that all 20 were of equal importance. The selection of the 20 most important factors

was a correct procedure, though the ranking procedure was incorrect. In the analysis of the panelist's response, all the factors were counted and the factors selected were given 20 points. In the analysis of the factors, there were eight sets of ties. In the case of the ties for 19th, 22nd, 33rd, and 37th place, the factor with the greatest number of votes was given the priority status. Factors 8 and 17 were tied for 19th place. Ten panelists voted for Factor 17 "Ability to accredit courses...", while eight panelists voted for Factor 8 " Identified or garnered support/partners." Factors 7, 9, and 23 were tied for 22nd place. In the case of Factor 7 "Identification of receive sites," 11 panelists voted for it, while 10 voted for Factor 23 "Sufficient and careful planning time," and 8 voted for Factor 9 "Administrator to run the program." In the case of the tie for 33rd place, Factors 20 and 47 were ranked in order of the number of votes each received. Factor 20 "how to determine charges," received 8 votes and Factor #47 "Time for steady program development" received 5 votes. In the case of the tie for 37th place, Factor 26 "Ways to offer student services" received seven votes, while Factor 14 "collaboration assignment of a project team" received five votes.

TABLE II

CRITICAL FACTORS BY RANK IMPORTANCE

VOTES	POINTS	RANK	FACTOR
25	451	1	Identified need (perceived or real) for the program.
19	286	2	Funds for capital costs: production equipment and facilities
19	269	3	Faculty and teachers supportive and available.
20	231	4	Availability of on-going money for operations and expenses.
19	219	5	Adequate support staff to produce the program.
16	193	6	Enthusiasm and belief in the project.
17	192	7	Ensuring equivalent learning experience to remote students.
17	182	8	Adequate receive sites, facilities, equipment.
15	171	9	Availability of appropriate and specialized equipment to deliver the quality programming.
17	167	10	Quality of the educational content of the program.
12	150	11	Ensuring equivalent status for remote students: ie. credit/degree
11	146	12	Needs analysis: who needs to be served: Is the actual market/clientel national, international, adult, K-12.

TABLE II (Continued)

CRITICAL FACTORS BY RANK IMPORTANCE

VOTES	POINTS	RANK	FACTOR
13	138	13	Identification of a marketing plan for the network, system or program. PR with the public.
11	136	14	Identification of a visible, spirited key leader at the top initiating the program.
14	134	15	Instructional design: The interactive components, length, frequency, number.
14	133	16	Motivation/incentives for faculty to get involved.
10	111	17	Identify range of services: ex: continuing ed, credit, non-credit, inservice training, research etc.
15	110	18	Ensure continued credibility of the program with the public, faculty, students, and supporters.
10	109	19	Ability to accredit courses, offer credit or transfer credit across states or institutions.
8	109	20	Identified or garnered support/partners for the program: industry, corporate, legislative, institutional.
13	104	21	Cost effectiveness: feasibility and justification for delivery system.
11	98	22	Identification of receive site personnel and coordinators.

TABLE II (Continued)

CRITICAL FACTORS BY RANK IMPORTANCE

VOTES	POINTS	RANK	FACTOR
10	<u>98</u>	23	Sufficient and careful planning time: Time for research and access to accurate knowledge about needs
8	<u>98</u>	24	Administrator identified to run the program.
11	<u>87</u>	25	Training faculty to teach on TV.
10	<u>85</u>	26	Programmatic needs of students: high school, university, non-traditional.
7	<u>79</u>	27	Campus experience with instructional television.
7	<u>79</u>	28	Legislative involvement and approval.
10	<u>77</u>	29	On-going, meaningful course review and evaluation.
10	<u>77</u>	30	Choice of technology to best suit the program.
10	<u>77</u>	31	Determine program delivery.
8	<u>72</u>	32	Site facilitator, coordinator training.
8	<u>66</u>	33	How to determine charges.
5	<u>66</u>	34	Time for steady, stable program development.
5	<u>63</u>	35	Opportunity to experiment.
8	<u>61</u>	36	Process to select courses for the network.
7	<u>55</u>	37	Ways to offer student services.
5	<u>55</u>	38	Collaboration: Assignment of a project team.
5	<u>51</u>	39	Ensure programs are in keeping with mission, goals, and objectives of the institution, and organization.

TABLE II (Continued)

CRITICAL FACTORS BY RANK IMPORTANCE

VOTES	POINTS	RANK	FACTOR
5	50	40	Legal issues, copyrights, licenses, FCC regulations.
7	45	41	Student assessment and evaluation.
6	43	42	Save travel and time.
9	41	43	Plan to actively pursue funding.
10	37	44	Ways to distribute supplementary materials.
4	31	45	Enhancing and ensuring TV production quality.
4	31	46	Politically advantageous to begin the program.
4	30	47	The international, national trends/challenges that the system can solve, address.
4	30	48	Mechanism for handling grading.
4	28	49	Policy in place to support the institutional change in the way it operates.
3	22	50	Quality of the auxiliary materials.
2	20	51	Approriateness of the subject matter.
2	16	52	Positive or negative impact on campus instruction.
2	12	53	Positive impact of broadening video resource on campus.
1	1	54	Personal interest and desire to demonstrate how well to teach by interactive media.
0	0	55	Process of selecting sites.

In the case of the sets of ties for 27th, 29th, 45th and 47th place, each factor received equal number of votes from the panelists. Seven panelists voted equally for Factor 10 and 38, "campus experience with instructional television" and "legislative involvement and approval." Three factors received equal votes of ten each ranking them in a tie for 29th place: Factor 21 "On-going meaningful review", Factor 27 "choice of technology,"and Factor 50 "determine program delivery." Forty-fifth place was tied by equal votes of four panelists each for the two factors #11 "Politically advantageous to run the program," and 22 "Enhancing and ensuring TV production quality." Forty-seventh place was tied by Factors 36 "international/national trends and challenges" and 49 "mechanism for handling grading' with 4 votes each. In the case of all of the factors included in the ties, the same number of panelists gave each factor in the ties the same ranking. Thus, the factors in each set of ties were equal in importance and their rankings were randomly chosen.

An analysis of comments from the panelists from Questionnaire Two was helpful in explaining the results of the rankings. Three of the panelists indicated that they wanted to rank

or comment upon all of the 55 factors that were listed on Questionnaire Two rather than simply choose the top 20. Comments from panelists indicating that the factors "all were equally important" or "all 55 factors have some degree of merit in planning" seemed to indicate that limiting their responses to 20 was a difficult task.

Secondly, panelists postulated that perhaps they were listing the factors in the order of the planning process, rather than the ranking of factor importance. According to one panelist, "Perhaps I have marked the order in which I would do these tasks as much as to rank them." Another panelists commented: "Much of our planning was implied by Board mission and goals long before we began to put it together."

Thirdly, two panelists indicated that they felt limited by the 55 factors that resulted from the 286 factors generated from their responses to Questionnaire One. They indicated that they were appreciative of the request for comments and additions to the generated list so that they could clarify, restate, and suggest new factors for Questionnaire Three.

The comments by more than fifty percent of the panelists

resulted in the opportunity for panelists to vote in Questionnaire

Three to combine factors they suggested in Questionnaire Two.

Panelists indicated that items 3 and 16 in Questionnaire Three could

be offered as a combined factor. "Faculty and teachers supportive

and available" could be combined with "motivation for faculty and

teachers to get involved." Items 6 and 14 "enthusiasm and belief in

the project" and "identification of a visible and spirited leader" was

offered as a possible combination. Items 8 and 22 "adequate receive

sites, facilities, equipment" could be combined with identification

of receive site coordinators. Items 12, 17 and 26: "needs analysis to

determine the market," "range of services" and "programmatic needs

of students," were also offered as a possibility for combined

factors.

The third questionnaire was developed to provide closure and

final consensus for the study on the top 20 critical factors that the

panelists agreed were the most important ones in planning to

implement, produce or administer long distance, interactive video

instruction. It was designed similarly to the second questionnaire.

The Delphi panelists were asked to consider 26 of the key factors

generated from the two previous questionnaires. The first 26

factors were the most important ones voted and ranked by the panelists in the second questionnaire. The remaining one factor had been generated by a panelist in the second questionnaire. Again, the panelists were asked to review each of the factors, select the twenty most important and rank them from "1" to "20" with "1" being the most important. In addition, they were asked to vote for the agreement to combine factors which panelists had suggested had similar characteristics in the second questionnaire. It was mailed in August, 1989. Twenty-three panelists responded to it. The findings of Questionnaire Three are found in Table III.

The third ranking by the panelists changed the order of the top twenty rankings and resulted in a combination of factors suggested by the majority of the panelists. Significant was the vote of the panelists to combine from Questionnaire Two factors 3 and 16, 8 and 22, and 12, 17 and 26. They voted not to combine factors 6 and 14. When panelists voted to combine factors, they were also asked to rank that combined factor with one vote. Other votes that the factors received from panelists who did not vote to combine them were averaged to determine a one factor vote. Panelists voted with 15 votes out of 22 to combine the key factors (3 and 16) of "faculty

and teachers supportive and available with "incentives for faculty to get involved." Panelists voted with 15 votes out of 22 to combine the key factors "adequate receive sites, facilities and equipment" (8) with (22)" identification of receive site personnel and coordinators." Panelists voted with 16 votes out of 22 to combine "needs analysis" who needs to be served "(12) with "range of services" (17) and with "programmatic needs of students" (26). While it was not offered as a direct option, panelists also voted in addition to include factor 23 "sufficient and careful planning time: time for research and access to accurate knowledge about needs" with 12, 17 and 26 and gave that factor a combined rank. With an overall vote of ten out of 12, panelists voted not to combine factors "enthusiasm and belief in the project" (6) with "identification of a visible, spirited key leader at the top initiating the program" (14). Rather they suggested that the "key leader" should be combined with factor 24 "administrator identified to run the program" and factor 6 should refine its definition to encompass and include "enthusiasm and belief by the institution in the overall distance education project." Panelists voted to combine factors 25 and 27 to read "knowledge of administrators and, teachers and staff at educational

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TABLE III

MOST IMPORTANT KEY FACTORS

RANK	VOTES	POINTS	FACTOR
1	22	436	1. Identified need (perceived or real) for the program.
2	21	346	2. Faculty and teachers supportive and given incentives for motivation.
3	21	326	3. Funds for capital costs: production equipment and facilities.
4	21	319	4. Availability of on-going money for operations and expenses.
5	22	293	5. Quality of the educational content of the program: Evaluation to ensure.
6	21	273	6. Adequate support staff to produce the program.
7	20	260	7. Ensuring equivalent learning experience to remote students.
8	16	258	8. Enthusiasm and belief by the institution in the overall distance education project.
9	19	232	9. Identification of a visible, spirited key leader/ administrator initiating the program.
10	21	222	10. Adequate receive sites, facilities, and receive site staff .
11	22	218	11. Availability of appropriate and specialized equipment to deliver the quality programming.

TABLE III (CONTINUED)

MOST IMPORTANT KEY FACTORS

RANK	VOTES	POINTS	FACTOR
12	21	178	12. Sufficient time for careful needs analysis: Identify range of services and program needs of students. Number of people, type of courses, ages served, location.
13	18	162	13. Ensuring equivalent status for remote students: ie. credit/degree
14	20	148	14. Instructional design and TV Production: The interactive components, length, frequency and number.
15	17	141	15. Identification of marketing for the network, system or program. PR with the public.
16	19	116	16. Cost effectiveness: feasibility, justification for delivery system to students and institution.
17	18	115	17. Identified partner/ support for the program: industry, corporate, legislative, institutional.
18	19	110	18. Ensure continued credibility of the program with the public, faculty, students, and supporters.
19	9	91	19. Knowledge of educational administrators, teachers and staff at educational institutions on what distance education is and how to teach and use it effectively.
20	16	75	20. Ability to accredit courses, or transfer credit across states or institutions.

institutions on what distance education is and how to teach and use it effectively."

Panelists maintained a consistent agreement in important factors between Questionnaire Two and Questionnaire Three. They seemed to be saying that they had determined the most important issues and that those issues were unswerving in overall agreement. Rankings for 14 individual factors remained within the range of a variation of three when ranking was compared between Questionnaire Two and Questionnaire Three. Unlike those 14, there was a 5 rank change for Factor 10, "quality of the educational content of the program, "as it moved from a 10th place ranking to 5. By combining factors, panelists were able to include the remaining factors generated from Questionnaire Two. When eleven additional factors were combined and ranked, the placement of the factors in the overall rank did change by more than a range of three. Combined factors 8 and 22 "adequate receive sites, facilities and staff moved to 10th place. Factors 24 and14 "identification of a visible, spirited key leader/administrator initiating the program" ranked 9th. Factors 3 and 16 moved to rank 2. Factors 12, 17, 23, 26 ranked 12th. The newly generated factor 27 from Questionnaire

Two "knowledge of administrators at educational institutions in how to use distance education and what it is "moved into the top twenty with the ranking of 19 and total points of 91 when it was combined with factor 25 "teaching faculty to teach on TV." Panelists commented that it should be combined with factor 25 "training faculty to teach on TV" and re-stated as" "Knowledge of educational administrators, teachers, and staff at educational institutions on what distance education is and how to teach and use it effectively."

Additionally, 5 panelists commented that evaluation and course review were implied in factor 10 "quality of the program" but wanted the statement inserted to ensure that quality was consistently evaluated and courses reviewed. One panelists commented, upon ranking factor 10 below factor 3 "funds for capital costs" that "it's a shame that this is where this factor has ranked, when it is so important." Another panelist commented that ideally "quality was a highly ranked issue, but could not be accomplished without the money for the equipment," therefore the panelists ranked quality lower than capital costs.

Again, as in Questionnaire Two, panelists indicated that perhaps they were considering the factors in <u>sequential order of</u>

<u>planning importance</u> as they began to implement the interactive video instruction program at their institution, rather than the factors overall importance related to other key factors. One panelist commented that all of the 26 factors offered for ranking were equally important, but their rankings were based on the importance of that factor as planning occurred.

When tabulating the total points from the panelists voting, one panelists only ranked eight factors and gave the remaining factors a zero ranking. Because the panelist did not follow the requested procedure in ranking, the votes and total points from his responses were not included in the final data. Therefore, while 23 panelists responded, only 22 panelists' votes and comments were included in the final data.

Research Question Number Three

Do program providers, distance education specialists and educational administrators rank the key factors differentially within groups?

In order to answer this question, the 30 panelists were divided into three categories of experts. The Delphi panelists were

identified as they were nominated for the study representing one of the three expert groups. The panelists consisted of ten experts/administrators of program production by long distant delivery, ten experts/administrators in the distance education field, and ten experts in administration and planning at educational institutions utilizing distance education programming.

The same analysis procedure used for Delphi II was used for Delphi III in order to reach a final consensus on the 20 key factors. Tabulations were performed on each of the three groups of the experts. Statistical analysis consisted of two methods. Ordinal level descriptive statistics were calculated to determine the mean scores and standard deviations of the factors established in the third questionnaire. Raw scores were entered into the Microsoft Works Spreadsheet program to determine the means, standard deviation, minimum and maximum values, and N for each of the criterion. The rank of the means of each of the key factors by the three groups of experts helped to determine the priority rank judged by the panelists to be the most essential. This analysis also helped to determine the amount of agreement each group of experts had for each of the key factors, and to determine which group(s) deviated

TABLE IV

KEY FACTORS RANKED BY VOTERS IN EXPERT CATEGORIES

TOTAL RANK	P RANK	E RANK	D RANK	KEY FACTORS
1	1	1	1	1. Identified need (perceived or real) for the program.
2	6	6	4	2. Faculty and teachers supportive and given incentives for motivation.
3	2	7	8	3. Funds for capital costs: production equipment and facilities
4	4	8	7	4. Availability of on-going money for operations and expenses.
5	9	9	6	5. Quality of the educational content of the program.
6	11	7	8	6. Adequate support staff to produce the program.
7	6	11	10	7. Ensuring equivalent learning experience to remote students.
8	8	8	12	8. Enthusiasm and belief by the institution in the overall distance education project.
9	13	9	10	9. Identification of a visible, spirited key leader/ administrator initiating the program.
10	10	12	10	10. Adequate receive sites, facilities, site staff .
11	12	12	9	11. Availability of appropriate and specialized equipment to produce/ deliver the quality programming.

TABLE IV(continued)

TOTAL RANK	P RANK	E RANK	D RANK	KEY FACTORS
12	12	13	14	12. Sufficient time for careful needs analysis: Identify range of services and program needs of students. Number of students, type of courses, ages served, location.
13	14	12	15	13. Ensuring equivalent status for remote students.
14	13	15	14	14. Instructional design and TV production. The interactive components, length, frequency and number.
15	15	14	15	15. Identification of a marketing plan for the network, system or program. PR with the public.
16	15	16	16	16. Cost effectiveness: feasibility, justification for delivery system to students and institution.
17	16	16	16	17. Identified support/partners for the program: industry, corporate, legislative, institutional.
18	16	15	17	18. Ensure continued credibility of the program with the public, faculty, students, and supporters.
19	0	18	13	19. Knowledge of educational administrators, teachers and staff at educational institutions on distance education and how to teach and use it effectively.

TABLE IV(continued)

TOTAL RANK	P RANK	E RANK	D RANK	KEY FACTORS
20	17	17	18	20. Ability to accredit courses, or transfer credit across states or institutions.

P = Program Providers

E = Educational Administrators

D = Distance Education Specialists

the most from the panel as a whole. Table IV shows the mean of the individual rankings by the expert category compared to the total rank each key factor.

Table V lists the group deviation scores from the total mean response for each factor. Calculations were rounded to within two decimal places. Table V indicates that the Program Providers group deviated the most from the central tendency rankings in voting on the 20 key factors. The group deviated more than three points on three of the key factors. They deviated from the group on 3 "funds for capital equipment," 7 "ensuring equivalent learning experience for remote students," and 19 "knowledge of educational administrators about distance education." The Educational Administrator group deviated two points on two factors: 7 "ensuring equivalent learning experience" and 10 " adequate receive sites and coordinators." The Distance Education Specialists deviated by two points on the four factors: 3 "funds for capital costs," 5 "quality of the educational content," 8 "enthusiasm in the project," and 11 "availability of equipment." They deviated by more than four points on the factor 19 "knowledge of educational administrators." From the standard deviation scores, the factor

TABLE V

GROUP DEVIATION SCORES

Key Factors	Mean	Sd	P	E	D
1	1.00	0.00	0.00	0.00	0.00
2	5.33	0.94	0.67	0.67	-1.33
3	5.66	2.64	-3.66	1.44	2.34
4	6.33	1.69	-2.33	1.67	0.67
5	8.00	1.41	1.00	1.00	-2.00
6	8.60	1.62	2.40	-1.60	0.60
7	9.00	2.16	-3.00	2.00	1.00
8	9.33	1.88	-1.33	-1.33	2.67
9	10.66	1.69	2.34	-1.66	-0.66
10	10.00	1.15	0.00	2.00	0.00
11	11.00	1.29	1.00	1.00	-2.00
12	13.00	0.57	-1.00	0.00	0.00
13	13.66	0.47	0.34	-0.66	0.34
14	14.00	0.81	-1.00	1.00	0.00
15	14.66	0.47	0 .34	-0.66	0.34

TABLE V (Continued)

GROUP DEVIATION SCORES

Key Factors	Mean	Sd	P	E	D
16	15.66	0.47	-0.66	0.34	0.34
17	16.00	0.00	0.00	0.00	0.00
18	16.00	0.81	0.00	-1.00	1.00
19	17.33	3.29	-3.67	0.67	-4.33
20	17.33	0.47	0.33	0.33	0.67

Sd - Standard Deviation (rounded to nearest hundredth)
P = Deviation Score for Program Producers Group
E = Deviation Score for Educational Administrators Group
D = Deviation Score for Distance Education Specialist Group

with the most diversity was factor 19 followed by 7 and 3. The greatest agreement was on Factor 1 "identified need for the program" and Factor 17 "identified partners". All three groups ranked 1 number one, and ranked 17, seventeen.

The Kendall Coefficient of Concordance (W) was used to show the correlation and extent of agreement of the experts on Delphi III. The Kendall Coefficient of Concordance (W), according to Siegel (1956), is a correlational test used to determine the level of agreement among judges on a number of issues. The formula for its calculation is the rank sum of the panelists' individual factors expressed as a deviation. The rank sums for each of the experts responses to each of the twenty key factors is found in Table VI. The mean was then calculated and the deviations squared. The sum of the squares was then divided by 1/12 times the number of judges (26) squared times N3 - N.

The calculated W of .367 was converted to a Chi Square distribution with a value of 153.406. A Chi Square value equal to or greater than 32.67 is required at the .05 level of significance to reject the null hypothesis that the expert rankings were unrelated. Since the calculated value of W exceeded the critical value, the null

TABLE VI

RANKS OF TOP TWENTY FACTORS BY 22 EXPERTS

TOP 20 KEY FACTORS

EXPERT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(P)																				
A	1	2	3	7	11	5	8	6	14	9	10	4	15	12	13	20	18	17	-	16
B	1	5	2	4	7	18	6	3	9	-	17	-	15	19	8	11	14	12	-	13
C	1	5	2	4	9	7	3	6	-	8	10	12	-	13	16	17	15	14	-	-
D	1	3	2	4	14	10	7	5	11	8	9	12	14	15	13	17	18	-	-	20
E	1	16	2	3	5	-	4	-	-	10	17	12	6	7	11	9	8	13	-	14
F	1	4	2	3	9	5	8	6	12	7	10	18	13	14	11	16	-	20	-	19
(E)																				
G	1	5	2	3	8	7	19	4	12	8	10	6	15	18	11	20	-	14	-	19
H	1	2	-	8	6	3	5	13	-	11	7	18	12	10	17	9	16	15	14	20
I	1	3	2	5	14	6	7	-	12	8	11	-	9	17	13	18	16	15	-	10
J	4	5	3	2	10	7	12	6	15	9	1	6	14	16	13	18	20	-	-	17
K	2	4	3	-	10	5	7	6	13	8	9	6	11	14	12	18	17	15	1	16
L	1	2	5	4	6	7	17	3	8	18	19	3	12	9	-	10	11	16	-	-
M	1	3	2	4	11	7	9	5	14	10	8	6	13	15	16	20	19	17	-	18
N	1	-	17	15	4	13	11	3	-	16	18	6	7	-	14	12	5	9	-	19
(D)																				
O	1	2	17	5	3	18	4	-	-	6	12	11	13	7	-	9	-	15	8	-
P	1	3	2	8	10	5	4	-	13	6	7	-	9	15	13	19	16	11	20	12
Q	1	2	4	5	12	9	7	3	14	6	13	8	10	15	11	20	18	16	19	17
R	1	3	4	6	10	5	7	2	12	8	9	13	16	14	11	-	19	15	17	18
S	1	12	6	7	10	9	-	-	17	13	8	15	-	-	14	4	5	-	20	-
T	1	2	9	10	4	5	-	3	8	12	11	6	-	13	10	16	14	-	20	-
U	1	3	12	6	4	9	5	-	13	18	11	10	-	14	17	-	15	16	-	20
V	1	9	14	7	11	8	10	3	19	12	5	2	13	16	17	-	-	20	4	-

P = PROGRAM PROVIDERS

E = EDUCATIONAL ADMINISTRATORS

D = DISTANCE EDUCATION SPECIALISTS

TABLE VI (CONTINUED)

RANK SUM OF TOP TWENTY FACTORS
BY 22 EXPERTS

TOP 20 KEY FACTORS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
26	95	115	122	190	168	160	79	214	211	232	163	217	273	272	283	264	290	107	283

KENDALL COEFFICIENT OF CONCORDANCE: W=.367

KENDALL W CALCULATED TO CHI SQARE = 153.406

CHI SQARE CRITICAL VALUE AT .05 = 32.67

hypothesis was rejected. This Chi Square value indicates a strong relationship among the individual experts on the ranking of the top 20 factors.

According to Dalkey (1972), because the Delphi Technique deals with value judgements instead of quantitative data, its severe limitation on statistical testing is worthy of note. According to Baker (1988), Dean (1986) and Delbecq et al. (1975) since the information was from a representative sample of experts across the nation and Canada, the consensus of opinions has value. Therefore, the consensus of opinions fulfills the purpose of this study in compiling a list of key factors to be used in planning to implement or produce long distant interactive programming.

According to Siegel (1956) :

> a high or significant value of W may be
> interpreted as meaning that the observers or
> judges are applying essentially the same standard
> in ranking the factors under study. Often
> their pooled ordering may serve as a "standard,"
> especially when there is no relevant external
> criterion for ordering the objects (p. 237).

Summary

This study was conducted to identify through a consensus of

expert opinion the key factors that are important in the administration and implementation of a long distance interactive video program. The 28 panelists representing program providers, educational administration, and distance education generated 55 factors that they said needed to be considered when planning to implement or administer an interactive video program. Through the third round of refinement and combining factors the panelists determined 20 factors to be key in the planning and implementation process. The 20 key factors were identified by the expert panelists through a rank-ordering process. Those results are shown in Tables III and IV.

There was strong agreement among the panelists as well as their groups that these key factors needed to be included in the decision making and planning process. That level of agreement was statistically validated by the calculation of the Kendall W test statistic. Those results, as well as the top factors by experts are shown in Tables V and VI.

There were variations of agreement between the groups, with the strongest disagreement from the Program Providers, who placed "funds for capital costs and ensuring equivalent learning experience"

at a much higher ranking than the other two groups and "knowledge of educational administrators on how to use it effectively" at a much lower ranking.

While the final agreement on the key factors indicated a strong consensus among the group, they also indicated that the generated list of factors represented the planning process as well as the rank importance. They indicated that the importance of the key factors to the planning process could not be overlooked and that the factors were related and necessary to each other as well as valuable individually. Panelists commented that each factor was dependent upon the other for the ultimate success of the implementation of the program.

CHAPTER V

SUMMARY, CONCLUSIONS AND
RECOMMENDATIONS

The purpose of this study was to develop a list of critical factors that could be used for the planning of the implementation and administration of long distance, interactive video instruction. This chapter presents a summary of the research, the conclusions and the recommendations for the data collected.

Summary

Three specific research questions were addressed to provide direction to this study: (1) What critical factors did program providers, educational administrators and distance education experts identify when they planned to implement administer or produce programming by long distance, interactive video? (2) According to the panel of experts, what relative rank or value does each of these critical factors have? (3) Do administrators in

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education, distance education specialists and program providers rank the critical factors differentially?

A Delphi Technique with 30 experts representing administrators in education, distance education and program production was used to generate a listing of critical factors that administrators could use to implement and administer long distance interactive programming. This was accomplished by asking the question, "What were the critical factors that were considered when your organization began planning to implement, produce or administer programs or courses via long distance, interactive video instruction?" The panelists were advised that long distance, interactive video instruction could be delivered by satellite, fiber optics, microwave, or ITFS networks.

The panelists responded with 286 factors. A work group was used to analyze the statements, and sorted similar statements into categories. From those categories, 55 critical factors were produced. To verify that list, the panel of experts was sent a second questionnaire containing the 55 critical factors and asked to identify and rank the 20 most important critical factors from that list. They were also asked to generate any new critical factors

which may have been overlooked in the first questionnaire.

In the response to the second questionnaire, the panelists identified the twenty most important factors and also added one more factor. The third questionnaire was mailed to reach a final consensus on the identification of the most important critical factors.

In the response to the third questionnaire, the panelists showed high agreement on the twenty most important critical factors. According to the panelists, all of the twenty critical factors were important and needed to be included in the planning process. Those twenty critical factors are:

1. Identified need (perceived or real) for the program.

2. Faculty and teachers supportive and given incentives for motivation.

3. Funds for capital costs: production, equipment, facilities.

4. Availability of on-going money for operations and expenses.

5. Quality of the educational content of the program .

6. Adequate support staff to produce the program.

7. Ensuring equivalent learning experience to remote students.

8. Enthusiasm and belief by the institution in the overall

distance education project.

9. Identification of a visible, spirited key leader/administrator initiating the program.

10. Adequate receive sites, facilities, and staff.

11. Availability of appropriate and specialized equipment to deliver the programming.

12. Sufficient time for careful needs analysis: Identify the range of services and programmatic needs of students. Example: Number of people, type of courses, ages served, location.

13. Ensuring equivalent status for remote students: ie. credit, degree.

14. Instructional design and TV production: the interactive components, length, frequency and number.

15. Identification of a marketing plan for the network, system or program. Public relations with the public.

16. Cost effectiveness: feasibility and justification for delivery system to students and institution.

17. Identified or garnered support/partners for the program: industry, corporate, legislative, institutional.

18. Ensure continued credibility of the program with the public, faculty, students, and supporters.

19. Knowledge of educational administrators, teachers and staff at educational institutions on what distance education is and how to teach and use it effectively.

20. Ability to accredit courses, offer credit or transfer credit across states or institutions.

The expert panelists agreed that all of the critical factors were important to the successful implementation of long distance, interactive video instruction at their institution. They postulated that, in ranking the critical factors, they also had listed the factors in order of consideration in the planning process. They also stated that the factors were dependent upon each other in order for the program to be successsful. When one panelist commented upon the fifth placement of" quality of the program, "the panelist stated that, while it was important, that it could not be accomplished without the factors prior to it. Panelists also commented that the timeline for the accomplishment of these critical factors varied among institutions and that many of the factors could be "in the works" simultaneously.

Consequently, administrators may have to consider that, while certain critical factors are extremely important to them personally, or to their institution, certain factors like capital expenses or faculty incentives may need to be accomplished before consideration of the latter factors like accreditation. Additionally, these generated critical factors may align themselves well with different planning models or strategic planning guidelines. However, the panelists generated the critical factors in order of importance, not in the order of execution of planning. Administrators would be well advised to include these critical factors as most important in a planning process individual to the institution when planning to implement long distance interactive video instruction.

Conclusions

1. The expert panelists produced a ranked list of 20 critical factors for the planning of the implementation and administration of long distance interactive video at their institution.

2. Based upon the findings, it can be concluded that after the identification of the need for the program, the most important

factors relate to human and fiscal resources. The experts indicated that the successful implementation depended upon the completion and thorough investigation of each of these 20 critical factors.

3. Based upon the high degree of agreement as indicated by the Kendall's W, it can be concluded that educational administrators distance education specialists, and program providers agree on the most critical factors for the implementation of long distance interactive video instruction. Administrators in all three expert groups agreed in the overall importance of the 20 factors. However, individually the groups had special interests indicating their unique approaches to priority planning. The program providers ranked those critical factors of "funds for equipment, on-going money for operations, and support staff to produce the program" with a higher priority. The need for support for production, and equipment was a priority for the needs of the program provider group. While all the expert groups considered the factors to be equally important, different administrators involved in the planning process had interests related to the operation of their own units at the institution. Similarly, the distance education specialists indicated with their votes, that the "overall belief and enthusiasm in the

distance education project" should be a high priority, while the program providers ranked lower the "knowledge of educational administrators on what distance education is and how to use it effectively."

Recommendations

1.   Additional research should be conducted to further validate the critical factors generated through the Delphi Study.   The 20 critical factors presented by the panel of experts represent a consensus of opinion from a representative sample of administrators from successful programs of long distance interactive video instruction.

2. These critical factors should be used as part of the preparation of a strategic planning document for administrators at educational institutions who are in the initial planning phase for the implementation of long distance interactive video instruction.   In addition, an analysis of those factors from experienced and successful administrators, should indicate to institutional administrators the reality of the grand scope of involvement of teams of people, equipment, facilities, and policy that must be

addressed prior to the implementation of such a program.

3. Planning for the implementation of a long distance, interactive video program requires a major investment in time, people and funding. Serious consideration should be given the number one critical factor generated unanimously with the highest priority in each of the Delphi Rounds. The number one critical factor throughout the entire study was the "identification of the need for the program." All the expert administrators agreed that without this identified need for utilizing the technology for the delivery of instruction an institution should not move ahead to purchase equipment, hire people, or begin planning to deliver a long distance program. Jumping on the technology bandwagon for technology's sake, according to these experts, is not a wise move for an educational institution.

4. Faculty involvement, incentives, motivation and training were ranked as serious issues for these successful institutions involved in the long distance delivery of interactive video instruction. This second place ranking is an indication of the importance of the educator in the delivery of coursework and the teacher-learner "learning process." Institutions need to include the

importance of the teacher/faculty in the planning process and communicate that importance to the teacher/faculty throughout that process. While the fear of teachers being replaced by the technology appears to be an overriding concern as a real barrier to the implementation of distance education programming, it is clear that according to these experts, the faculty are an important priority. This ranking is a statement that the importance of the teacher remains critically high in the electronic classroom, as does the teacher in the traditional classroom.

Implications

The delivery of long distance interactive video instruction is still in its infancy, despite the proliferation of a variety of institutions and networks around the world delivering programming to students of all ages. This study asked 30 experts who are currently administrators of successful institutions or networks providing long distance programs to generate and rank the 20 critical factors they considered important when they began plannning their successful program. The programs they administered are young ones, because the delivery of interactive

video instruction by long distance is a new medium. Yet, these administrators agreed at a high level regarding those important issues, not to be ignored, that must be included in the successful planning of long distance interactive video programs.

No other research to date has been conducted to assimilate these critical factors, nor to gather the consensus of administrators of such successful, cutting edge programming. These critical factors were generated from the administrators of the first long distance programs that were considered successful in the United States and Canada. Yet, even then, their experience has been brief.

This study implies that, despite the relative newness for the administrator of such a program, that a high level of consensus did occur among those who were considered successful in this new arena. They considered the issues the same, despite the differences in technology that they used and audiences they served. This also implies that as technology changes, that the issues can remain similar for the planning of such a program.

This study has served to encourage a model for the strategic planning of administrators of new programs in long distance

interactive video instruction. It has also served as the foundation of the information/awareness stage for those institutions and their people who are considering the adoption of long distance teaching and delivery of interactive video instruction. It should encourage administrators as planners to look at the grand scope of the teams of people, the funding and capital expenditures, the students needs, and the organization of a plan to meet the defined need for the program. And finally, it should serve as enthusiastic hope for new planners of distance education programs from the consensus of opinion of successful people who have said "what we are doing is working successfully and we agree on the reasons why it is working!"

Perspective on a planning project can change the attitude, direction and ultimate success of a new program. Rather than listing the barriers that interfere in the implementation of a new idea or program, these administrators focused on the critical issues that resulted in a successful long distance interactive video program for their institution. This study implies the successful planning for the implementation of such a program, rather than a focus on the barriers to implementation.

New technologies are emerging as options for the delivery of long distance interactive video instruction, and new success stories are appearing on the horizon in the distance education arena. As they do, additional studies need to be continued to consider new critical factors that impact the strategic planning for the implementation and administration of long distance interactive, video instruction. The ultimate continued success of long distance education depends on the continued research of these issues and the successful planning for the positive implementation of these programs.

Technology and education have come together in long distance interactive video instruction. The ultimate success of the relationship will depend on the successful planning of educational administrators, distance education specialists and the program providers. Strategic planning for this effort will increase the possibilities for successful programs and ultimately successful learners.

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APPENDIX A

PARTICIPATING DELPHI STUDY

DISTANCE EDUCATION EXPERTS

DELPHI PANELISTS

Educational Administrators

1
Mr. Coley Burton
Director, Telecommunications
University of Missouri
215 University Hall
Columbia, MO 65203
2
Dr. Shirley Davis
Director, Media Based Services
116 STEWART CENTER
Purdue University
W. Lafayette, IN 48197
3
Dr. Walt Fahey
Retired Dean of Engineering
and Director of Microcampus
Dept of Electrical Engineering
University of Arizona
Tuscon, AZ 85721
4
Sandy Garrett
Secretary of Education
Office of the Governor
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Oklahoma City, OK 73105
5
Mr. J.O. Grantham
Vice President
Academic Affairs and Extension
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Stillwater, OK 74078
6
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7
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DELPHI PANELISTS (Continued)

8
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Teachers on TV Program
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1 0
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2
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3
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 4
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6
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9
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10
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Distance Education Program Providers
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2
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3
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9
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10
Mr. William Snyder
Director
SUNYSÅT Network
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12th Floor
Albany, NY 12225

APPENDIX B

WORK GROUP MEMBERS

Work Group Members

Carle Gustavison
Assistant Director
Video Communications Center
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Rolla, Mo   65401

Roseanne Emmett
Producer/Director
Video Communications Center
University of Missouri
Rolla, Mo   65401

Ross Haselhorst
Engineer
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Marion Smith
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Krista Fester
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University of Missouri
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Patrice Hatcher
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APPENDIX C

QUESTIONNAIRE ONE

AND COVER LETTER

Ginny Pearson
Director
Media Programs
University of Missouri
Rolla, Missouri 65401
314-341-6460

March 30, 1989

Mr. Coley Burton
Director
University Telecommunications
215 University Hall
University of Missouri
Columbia, MO

Dear Mr. Burton:

Thank you for agreeing to participate in the current research I am conducting to complete my doctoral dissertation at Oklahoma State University.

As I indicated by phone, the purpose of the investigation is to determine through group consensus, the key factors that leaders in successful distance education programs considered valuable when they began planning to implement, administer, or produce programs or courses. Distance education is defined as long distant, interactive, video instruction delivered either by satellite, fiber optics, microwave, ITFS networks, or vsat. This delivery may be full motion video or compressed video.

You are a part of a Delphi membership comprised of program producers, educational administrators, and distance education experts. You were elected by your peers from educational institutions, broadcasting and business/industry as a leader in the field of distance education. This thirty member group spans higher education, adult and continuing education and secondary/ elementary education.

Your responsibilities are to serve in three rounds as a Delphi member. The first round is to generate ten critical factors from each member. Please be brief and concise. Feel free to list more than ten factors, if needed.

Please return the questionnaire by the return date indicated. (This will help eliminate additional reminder telephone calls from my office).

Thank you again for your valuable information and time. I personally appreciate your assistance, and look forward to working with you. I have enclosed my card for your reference, should you have any questions.

Sincerely,

Ginny Pearson

CORRESPONDENCE SHEET NO. 1
(To be enclosed in return mail)

_____

Please list ten possible factors, in any order, as you answer the following question:

What were the critical factors that were considered when your organization began planning to implement , produce, or administer programs or courses via long distant, interactive video instruction?

EXAMPLE: A possible answer to the above statement might be:
"Access to the appropriate equipment"

_____

LIST YOUR ANSWERS BELOW

NUMBER ONE:

NUMBER TWO:

NUMBER THREE:

NUMBER FOUR:

NUMBER FIVE:

NUMBER SIX:

NUMBER SEVEN:

NUMBER EIGHT:

NUMBER NINE:

NUMBER TEN:

(PLEASE RETURN YOUR ANSWERS ON THIS FORM IN THE ENCLOSED, PRE -ADDRESSED, POSTAGE PAID ENVELOPE NO LATER THAN **APRIL 14, 1989.**

NAME_____ DATE MAILED _____

ADDRESS CORRECTION _____

TELEPHONE _____

Thank you!

APPENDIX D

QUESTIONNAIRE TWO

AND COVER LETTER

GINNY PEARSON
MEDIA PROGRAMS
UNIVERSITY OF MISSOURI
ROLLA, MO   65401
3 1 4 - 3 4 1 - 6 4 6 0

May 15, 1989

Dear Panelist:

Thank you very much for your participation in my doctoral research.
As you will recall, I mailed the first questionnaire to you on April 1.
The question that I asked you to respond to was: "What were the
critical factors that you considered when making the decision to
implement or produce long distant interactive video programming at
your organization?"

I was very pleased with the responses generated by the participating
experts.   Together you generated 286 factors as critical issues in
implementing long distance programming.   Through a systematic
process and committee review, identical and similar responses were
grouped and condensed, resulting in 55 key factors.

I need your help to further identify and refine those factors.
Specifically, I ask that you: (1.)   review the list of factors, (2.)
comment beside each if you feel that is necessary, (3.) select the 20
most important items, (4.) rank the 20 items you selected, and (5)
add any new criteria you feel have been omitted.

Please return the questionnaire by mail or fax, so that it may be
analyzed by June 15.   Again, thank you for your continued
participation in this study.

Sincerely,

Ginny Pearson

CORRESPONDENCE SHEET NO. 2

(TO BE ENCLOSED IN RETURN MAIL)

Below are the combined factors that you and others suggested were key issues in the decision making process to implement or produce long distant interactive video programming. Please review each of the following 55 items identified. Indicate the 20 most important criteria of the 55 by using a check. Then rank those 20 you have selected (using numerals 1-20). Please regard "1" as most important. Feel free to add new criteria or to make comments.

Criticial issues for implementing long distant interactive programming:	Best Item	Rank of Selected Items	Comments
1. Identified need (perceived or real) for the program.	___	_____	
2. Funds for capital costs: production equipment and facilities.	___	_____	
3. Availability of appropriate and specialized equipment to deliver the program properly.	___	_____	
4. Adequate support staff to produce the program.	___	_____	
5. Faculty/ teachers supportive and available.	___	_____	
6. Adequate receive sites facilities and equipment.	___	_____	
7. Identification of receive site personnel and coordinators.	___	_____	
8. Identified or garnered support/partners for the program: industry, corporate, legislative, institutional.	___	_____	
9. Administrator identified to run the program.	___	_____	

10. Campus experience with instructional ___ _____
    television/production.

11. Politically advantageous to begin ___ _____
    and run program.

12. Availability of on-going money for ___ _____
    operations and expenses.

13. Opportunity to experiment: to offer ___ _____
    "pilot"project with satellites,
    equipment, delivery, courses.

14. Collaboration: Assignment of a project ___ _____
    team for joint planning of faculty,
    producers and students.

15. Motivation /Incentives for faculty to ___ _____
    get involved and be supportive.

16. Identify range of services: examples: ___ _____
    continuing education,credit,non-credit,
    inservice, training ,research, alumni,
    recruitment, etc.

16. Legislative reform affecting course ___ _____
    offerings.

17. Ability to accredit courses offer credit ___ _____
    or transfer credit across states or
    institutions.

18. Identification of marketing plan for the ___ _____
    network, system, or program. Includes
    PR with the public.

19. Needs analysis: who needs to be served: ___ _____
    Is the actual market/ clientel
    national, international, adult, K-12.

20. How to determine charges: affordable ___ _____
    pricing for the courses.

21. On-going, meaningful course review ___ _____
    and evaluation of program.

22. Enhancing and ensuring TV production ___ _____
    quality.

23. Sufficient and careful planning time: ___   _____
    Research and access to accurate
    knowledge.

24. Enthusiasm and belief in the project   ___   _____
    and its success.

25. Ways to distribute supplementary   ___   _____
    print materials.

26. Ways to offer student services: ___   _____
    orientation, counseling, advising.

27. Choice of technology to best suit the ___   _____
    program being offered.

28. Cost effectiveness: feasiblity and   ___   _____
    justification for delivery system.

29. Training faculty to use the technology ___   _____
    and teach on TV.

30. Legal issues: copyrights, licenses,   ___   _____
    FCC regulations, etc.

31. Quality of the educational content   ___   _____
    of the program.

32. Quality of the auxiliary materials.   ___   _____

33. Appropriateness of the subject matter. ___   _____

34. Student assessment and evaluation.   ___   _____

35. Instructional design: The interactive ___   _____
    components , length, frequency and
    number.

36. The international, national trends   ___   _____
    and challenges that the system
    can address/ solve.

37. Policy in place to support the   ___   _____
    institutional change in the way
    it operates.

38. Legislative (state, federal,board,   ___   _____
    trustees ,curators) involvement and
    approval.

39. Process to select courses for the   ___   _____
network.

40. Positive or negative impact on   ___   _____
campus instruction.

41. Site facilitator/ coordinator   ___   _____
training.

42. Process of selecting sites: who,   ___   _____
how many, where, how.

43. Positive impact of broadening video   ___   _____
resources campus- wide.

44. Save travel and time.   ___   _____

45. Ensuring equivalent status for
remote students: ex. credit/ degree.   ___   _____

46. Ensuring equivalent learning   ___   _____
experience for remote students.

47. Time for steady, stable program   ___   _____
development.

48. Programmatic needs of the students   ___   _____
(high school, rural schools,
university, non-traditional, etc.)

49. Mechanism for handling grading.   ___   _____

50. Determine program delivery: ___   _____
tape delay, mailed, live production.

51. Ensure program/ courses are   ___   _____
in keeping with the mission, goals,
and objectives of the institution/
organization.

52. Identification of a visible, spirited,   ___   _____
key leader at the top initiating program.

53. Personal interest and desire to   ___   _____
demonstrate how well to teach by
interactive media.

54. Ensure continued credibility of the   ___   _____
    program with the public, faculty,
    students, supporters.

55. Plan to actively pursue continued   ___   _____
    funding, grant, and enrollment
    support.

PLEASE ADD ANY ADDITIONAL KEY FACTORS THAT YOU THINK SHOULD BE CONSIDERED
WHEN IMPLEMENTING OR PRODUCING LONG DISTANT INTERACTIVE VIDEO
PROGRAMMING :

NAME_____

DATE MAILED_____

APPENDIX E

QUESTIONNAIRE THREE

AND COVER LETTER

GINNY PEARSON
MEDIA PROGRAMS
UNIVERSITY OF MISSOURI
ROLLA, MISSOURI   65401
314-341-6460

August 18, 1989

Dear Delphi Panelist:

Thank you very much for your continued participation in my doctoral research. I am very pleased with the responses from the second questionnaire that you returned to me the last of June. In the second questionnaire, I asked you to rank the twenty most important key factors from those that were identified in the first questionnaire.

Delphi panelists chose 27 factors as most important. There were two ties for 19th and three ties for 21st place. A point system (20 points for a ranking of "1", 19 points for a ranking of "2" etc.) was used to calculate the rankings. In the ties the factor with the most panelists voting for it was ranked highest. Nine factors were suggested to be combined with others.

In this third and final questionnaire please examine the twenty six factors plus the new factor added by a panelist. Notice that the twenty six factors are listed in order of their ranking alongside the number of ranking points that they received. **Once again, please rank them, using "1" as most important, "2" as second most important, etc. You may also rank the factor added by a panelist. Please comment on the appropriateness of combining the nine factors and include them, if combined, in your rankings.**

Please return the final questionnaire to me by mail or fax so that analysis may begin by September 1, 1989.

Within a few months you will receive a copy of a summary report of this Delphi study. It will contain a listing of all key factors in the order of their importance along with study conclusions.

Once again, thank you for your participation.

Sincerely,

Ginny Pearson

CORRESPONDENCE SHEET NO. 3
(TO BE ENCLOSED IN RETURN MAIL)

_____

Instructions: Rank the twenty most important key factors that are considered when implementing or producing long distant interactive video programming. Use "1" as most important, etc. The key factors that appear were ranked by voting in the second questionnaire. They appear in order of their ranking. The number of points accumulated in that voting appear beside each key factor.

_____

YOUR FINAL FACTORS VOTE	FIRST VOTE RESULTS	ITEM (BY RANK)	SUMMARY OF COMMENTS TO BE INCORPORATED INTO
_____	451	1. Identified need (perceived or real) for the program.	This is what it's all about!
_____	286	2. Funds for capital costs: production equipment and facilities	Expensive investment.
_____	269	3. Faculty and teachers supportive and available.	Goes along with incentives Combine with #16
_____	231	4. Availability of on-going money for operations and expenses.	Can identify grant sources or income generation from students.
_____	219	5. Adequate support staff to produce the program.	
_____	193	6. Enthusiasm and belief in the project.	Why do it if you are not? This is a given; Combine with #14.
_____	192	7. Ensuring equivalent learning experience to remote students.	This is the reason for the existence of DL.
_____	182	8. Adequate receive sites, facilities, equipment.	Add receive site staff: Coordinators can make or break a program. See #22
_____	171	9. Availability of appropriate and specialized equipment to deliver the quality programming.	Reception/Production quality important. Need balance of TV production and educational content.

_167_	10. Quality of the educational content of the program.	Must continue to evaluate.
_150_	11. Ensuring equivalent status for remote students: ie. credit/degree	This is not important if no credit is offered.
_146_	12. Needs analysis: who needs to be served: Is the actual market/clientel national, international, adult, K-12.	Clients need to determine programming See #17 and #26
_138_	13. Identification of a marketing plan for the network, system or program. PR with the public.	Ties in closely with Needs Analysis.
_136_	14. Identification of a visible, spirited key leader at the top initiating the program.	Same as belief in the Someone has to get it going. Combine with enthusiasm for the project. #6
_134_	15. Instructional design: The interactive components, length, frequency and number.	More important than TV production quality
_133_	16. Motivation/incentives for faculty to get involved.	Same as Faculty support: #3.
_111_	17. Identify range of services: ex: continuing ed, credit, non-credit, inservice training, research etc.	Compare with needs analysis #12 & # 26
_110_	18. Ensure continued credibility of the program with the public, faculty, students, and supporters.	Need evaluation.
_109_	19. Ability to accredit courses, offer credit or transfer credit across states or institutions.	A goal to be achieved for the future.
_109_	20. Identified or garnered support/ partners for the program: industry, corporate, legislative, institutional.	Distance learning is dependent on multiple players.
_104_	21. Cost effectiveness: feasibility and justification for delivery system. for institution is high.	Cost effective for student. Initial expense

____	98	22. Identification of receive site personnel and coordinators.	Combine with #8.
____	98	23. Sufficient and careful planning time: Time for research and access to accurate knowledge about needs.	Planning time for programming and needs.
____	98	24. Administrator identified to run the program.	
____	87	25. Training faculty to teach on TV.	
____	85	26. Programmatic needs of students: high school, university, non-tradi-tional.	Same as/combine with #12 & #17

_____

FACTOR ADDED BY YOUR COMMENTS :

RANK

____   27. KNOWLEDGE OF ADMINISTRATORS AT EDUCATIONAL INSTITUTIONS IN HOW TO USE DISTANCE EDUCATION AND WHAT IT IS.

PLEASE COMMENT IF FACTORS SHOULD BE COMBINED:

YES   NO   IF YES, RANK

____   ____   _____   FACTORS # 3 AND # 16

____   ____   _____   FACTORS # 8 AND # 22

____   ____   _____   FACTORS # 12 AND #17 AND # 26

____   ____   _____   FACTORS # 6 AND # 14

ADDITIONAL FACTORS TO BE COMBINED

ADDITIONAL COMMENTS (USE REVERSE SIDE, IF NEEDED):

NAME:_____DATE_____

VITA

Virginia Wooten Pearson

Candidate for the Degree of

Doctor of Education

Thesis: CRITICAL FACTORS CONSIDERED IN THE PLANNING FOR THE ADMINISTRATION AND IMPLEMENTATION OF LONG DISTANCE INTERACTIVE VIDEO INSTRUCTION.

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Atlanta, Georgia; November 13, 1946; the daughter of Sidney J. and Alice Ross Wooten.

Education: Graduated from Tucker High School; Tucker, Georgia, in June,1964. Received the Bachelor of Arts Degree in English/Education from Georgia State University, Atlanta, Georgia, in June, 1968. Received the Master of Arts in Communications from Purdue University in West Lafayette, Indiana; June, 1970. Completed the requirements for the Doctor of Education at Oklahoma State University in December, 1989.

Professional Experience: Director of Media Based Programs, University of Missouri-Rolla, January, 1988- Present. Manager of Extension Programs, College of Arts and Sciences, Oklahoma State University, Stillwater, Oklahoma1986-88. Teleconference Coordinator, Educational Television Services, Oklahoma State

University, Stillwater, Oklahoma,1983-1986. Technical Writer, Burroughs Wellcome Corporation, Research Triangle Park, North Carolina, 1981-82. Graduate Teaching Assistant, Department of English, Oklahoma State University, Stillwater, Oklahoma, 1976. English teacher, Marion Junior High School, 1972, Marion, Arkansas. English teacher, Medina Junior High School, 1971, Medina, New York. Graduate Teaching Assistant, Department of Communications, Purdue University, West Lafayette, Indiana, 1968-70.

Membership in Professional Organizations: The American Society for Training and Development; National University Continuing Education Association; United States - Distance Learning Association; Association for Educational Communications and Technology.