The attitudes of K-12 interactive TV teachers toward their ability and training for teaching at a distance

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The attitudes of K-12 interactive TV teachers
toward their ability and training for teaching at a distance

by

Eleanor Jane Chinn

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

Department. Professional Studies in Education
Major: Education (Curriculum and Instructional Technology)

Signatures have been redacted for privacy

Iowa State University
Ames, Iowa
1990
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CHAPTER I. INTRODUCTION

The traditional idea of a K-12 learning environment has included a classroom in which face to face interactions between teacher, and students take place. In the past twenty years this has changed: technology has become a part of teaching. When the ideal teaching/learning environment was not possible, the use of these technologies was intended to simulate, approximate, or at least in some ways supplement aspects of a traditional classroom environment. In the previous two decades, educational communications technologies have represented a variety of formats including broadcast and cable television, videotext, videodiscs, low power television, microwave technology, fiber optics, microcomputer networks, satellite technology, as well as combinations of these.

In the first part of this chapter an overview of the use of television in education in the past 20 years will be presented. The following information will be included: The advent of noncommercial educational television of the mid-'60s; developments in Public Television (PTV) programming and trends in the decade between 1969-79; a study carried out by the National Center for Educational Statistics which looked at trends in educational PTV between 1982-83; the Federal Communication Commission's (FCC) reserving of broadcasting frequencies for Instructional Television Fixed Service (ITFS) to be used for educational purposes; the National Institute of Education's Educational Satellite Communications Demonstration (ESCD); the Star Schools Program and its associated legislation and affiliations. Following individual discussions of each of the above, a comment will be made on specific shortcomings and possible
lessons learned by educators as a result of these initial uses of educational television and associated technologies.

The second part of this chapter will include a definition of distance education as described by Keegan (1986). In the context of this definition, the implications of interactivity as an instructional technique used with distance education at the K-12 level will be examined.

In the third part of this chapter, some generalizations and research findings with regard to television instruction in public schools at the K-12 level will be presented. The fourth part of the chapter will examine the problem to be addressed by this research. Last, the purpose of this study will be explained. A summary will conclude this chapter.

Developments in Instructional Television

Noncommercial educational television began to be used as a technological support for the classroom during the mid-1960s and was made possible when the Corporation of Public Broadcasting was created in 1967 by the Public Broadcasting Act. The creation of this agency included the allocation of television frequencies to be used specifically for local public broadcasting and educational television. The goals of these two components of the act were similar; however, audiences differed. During the mid-sixties the introduction of television in the classroom resulted in great expectations for innovative educational possibilities. A specific direction was not identified, but there seemed to be a notion that once introduced this technology would somehow flourish of its own accord. Unfortunately many difficult lessons concerning the
educational uses of television were forthcoming. According to Albright (1988, p. 4), "In the absence of innovative and dynamic teachers, ITV turned out to be pretty boring once the novelty effect disappeared." This statement pointed out only one area of inadequacy in the planning required to integrate the use of a specific technology in an educational context. Albright went on to conclude that it was not until the 1970s that quality control methodology for Instructional Television (ITV) was employed to contribute to sound educational design (1988).

While the realization existed that extensive planning and instructional design was necessary to take advantage of television's technical capabilities, the actual implementation of these strategies was not necessarily carried out. Video is a visual medium holding great potential for conveying realism and events in time that can be conveyed with motion; however, these unique aspects of the medium were seldom realized or utilized by producers of early educational programming. According to Albright (1988):

"For many years, instructional television (ITV) featured the 'talking head' instructor whose classroom happened to be the TV studio. The burden of instruction was placed on the video component, with the textbook (if any) and other readings playing a supplemental role. The format, for the most part was lecture and demonstration, as if the viewer at home had a seat in the front row of the lecture hall" (p. 9)

While a great deal of research showed that televised courses were successful in producing learning (Chu & Schramm, 1967), the motivation to continue its use as a classroom support tool has not always been apparent. A study conducted for the Corporation for Public Broadcasting by Katzman and Katzman (1979) indicated that nation-wide, local production of ITV accounted for 15.4% of all programs, and that local ITV production had been declining since before
1968. The incidence of local productions was significant because it related to the degree to which state and district level public education employed and collaborated with agencies offering these services. An interesting finding reported in this study was a description of local ITV programming formats. The treatments represented different instructional techniques used most frequently at the local level. Lecture represented the highest at 51.5%; demonstration 32.2%; dramatization 20.7%; documentary 13.4%; discussion 10.1%; interview 7.7%; narrated graphic symbols 7.7%; representations of actual events in real time 2.5%; and animation 1.1% (Katzman and Katzman, 1979). These percentages revealed an overall lack of utilization of the unique attributes of the medium.

In 1984, the Corporation of Public Broadcasting through the National Center for Educational Statistics (CPB, 1984) conducted a study similar to the one conducted in 1979. The study was intended to monitor the educational services provided by Public TV licensees to elementary, secondary and postsecondary educational institutions throughout the United States. The study indicated that 120 out of 160 licensees provided both K-12 and postsecondary programming or programming services to the educational sector. Twenty-two licensees provided only elementary and secondary programming or programming services. Forty-five licensees (33%) delivered K-12 ITV series in the following nonbroadcast formats: videotape/cassette, cable and Instructional Television Fixed Service (ITFS) (CPB, 1984).

In addition, the licensees and or related agencies made available more than 1.1 million curriculum guides to accompany K-12 programing during 1982-83 (CPB, 1984). The distribution of prepublished instructional materials may have
indicated a degree of concern for instructional development associated with producing educational programming.

The following three concerns were cited in the PBS study as factors most impacting the future of educational services provided by ITV: 1) It was indicated by 103 licensees that funding was the greatest need or problem to be dealt with in the next 2 years; 2) eighty-four or half of the licensees were cited as wanting to become involved with the use of computers in the next 2 years; 3) nearly three quarters (120) of all licensees anticipated an increase in demand for television series with interactive components. At the time of the study only 11 respondents or 8% had K-12 instructional series that were interactive; however, 7 (5%) indicated that they provided K-12 series that were adaptable to interactive technologies. The interactive technologies referred to included computers (6) and audio/radio(4) (CPB, 1984).

One purpose of the 1984 PBS study was to gain information about factors that the 168 licensees felt caused teachers at the K-12 level to use or not to use instructional television. The responses were all in relation to what prevented teachers from using ITV and included the following: lack of equipment was indicated by 58 licensees as the greatest obstacle, followed by scheduling conflicts (47 licensees), lack of access to equipment (26 licensees) and negative attitudes toward the use of ITV in general on the part of teachers (26 licensees) and administrators (20 licensees) (CPB, 1984). One important aspect of the effectiveness of ITV was linked to its capabilities for interactivity.

An additional factor that has often been thought to contribute to teacher's unfavorable attitudes toward ITV in the classroom involved the inconvenience of broadcast scheduling. In reference to this concern, the 1984 Department of
Health, Education and Welfare (DHEW) study found that scheduling decisions were determined by ITV licensees by surveying teachers as to their preferences for programming. One might surmise that the consultation of teachers about scheduling was a result of taking into account the findings of earlier evaluations that revealed unfavorable attitudes toward lack of flexibility in this regard.

In spite of possible technological limitations, and misuses of ITV, the medium in general has considerable value and potential for instructional purposes. Bond (1987) suggested that ITV should be used to its greatest potential before investing in other distance education technologies. The following are some solutions to problems as recommended by Bond (1987): 1) ITV, while not an interactive technology, can be used with active viewing/teaching strategies to achieve more effective results in the classroom; 2) Fixed broadcast schedules can be made less limiting by taping programs at the time they are aired for later viewing at the teacher’s convenience.

A retrospective view of the problems with using ITV yields the following “lessons learned”: Learning is more likely to take place when teaching strategies actively involve the student; utilization of the maximum benefits of the technology can only occur when appropriate training for effective use is available; instructional design and programming will ensure success because educational technology is only as effective as the instruction it delivers (Bond, 1987).

While ITV may be broadcast (over the air), additional means of distributing video signals are available. The National Center for Educational Statistics (CPB, 1984) disclosed that 45 out of 168 ITV providers reported delivering K-12 ITV series in the nonbroadcast delivery formats of videotape/cassette and
Instructional Television Fixed Service (ITFS). Although videocassette was the most frequently reported nonbroadcast distribution mode, a smaller number of licensees indicated a greater average number of series transmitted by both cable and ITFS (CPB, 1984). ITFS refers to fixed transmission of radio frequencies over specific channels reserved by the FCC for instructional and cultural material. The transmission range of this low power TV signal is about 15 to 20 miles from point to point. A variety of advantages are inherent in the use of this vehicle of transmitting ITV: Audio response channels allows 2 way audio interaction during live instruction; two way video (full motion) or freeze frame video interaction are both possible. ITFS offers flexibility as a result of the FCC allocation of channels in blocks of 4 each. More varied choices for programming can be accommodated because several programs can be offered at the same time. Because ITFS is broadcast via low power TV signal transmission, distances are limited; however, courses are designed to address the unique needs of the schools that have access to the channels available. Schools involved in the use of ITFS programming can expand the pool of resources by taking part in the system (Bond, 1987).

The Educational Satellite Communications Demonstration

Not all instructional television is broadcast by way of land. In May 1974, the Applied Technology Satellite 6 (ATS-6) was launched by National Aeronautics Space Administration (NASA). To take advantage of the nation's space program, the National Institute of Education invested 17 million dollars to implement the Educational Satellite Communications Demonstration.
The ESCD's projects lasted only one year and were intended to demonstrate what could be done educationally with satellite technology (Porter, 1976). The use of satellites allowed television signals to be disseminated over a wide area which made it feasible for rural schools to receive instruction that was otherwise not available. Reception of satellite signals by schools was limited to those with access to the necessary receiving equipment but federal funds made these provisions possible to regions involved in the ESCD. Three educational projects were initiated. They were based in Appalachia, the Rocky Mountain area and Alaska. The 3 projects used uplinked instructional television to the ATS-6 satellite. The signals were then down-linked directly to inexpensive 10-ft. diameter antennas and receivers located near classrooms using ITV (Porter, 1976). The most frequent use of ATS-6 involved broadcasting an uninterrupted program with subsequent short periods of interaction.

Other uses of the technology involved the development of a central tape distribution center, storage of recorded programs for rebroadcast in individual schools or for whole school districts, and programs that were generated on the local level (Porter, 1976). A common and significant complaint associated with this form of instructional television related to the "live broadcasts" in the STD Junior High courses (Beare, 1988). According to Porter (1976), the live aspect of the instruction was found to be much less desirable than local control over the scheduling of the programs during the school day and school week. Local teachers were said to resent the TV's competition and the lack of orientation toward the individual learner. They preferred shorter periods of instruction to allow for more individualized instruction during the school week. Porter (1976), in a description of federal policy implications of satellite instruction,
suggested that schools that were involved in the ESCDs needed to have invested in videocassette recorders; and in so doing, as with a lending library, a network library's users could store and use tapes of broadcast programs for a few days or weeks, later erasing them to record new broadcasts.

"The network library is owned collectively by the network's member schools and functions as a cooperative rental system. It is expected that the full purchase price for a program owned by a whole network would be less than the full sum of the royalty fees charged to the member schools in the network were they to purchase their own copies of the program for private ownership" (p. 8).

According to Porter (1976), the ESCD provided very little information to its users about this way of using the satellite network. The fact that the live aspect of the instruction was found to be much less desirable to teachers than local control over the scheduling of the programs during the school day and school week seemed to confirm Porter's contention that teachers were not aware of the means to solve this dilemma. While the issue of interactivity in relation to satellite instruction was not met with unanimous acceptance during the ESCD projects, today it is a widely recognized as a highly valued, personalizing aspect of television instruction.

The Star Schools Program

The next wave of Federal Funding of telecommunications technologies for education was the Star Schools Program which became a statute of Public Law 100-418, Title IX, on August 23, 1988 (102 Stat. 1487). The Star Schools program was designed by the Federal government to encourage the following:
"... improved instruction in mathematics, science, and foreign languages as well as other subjects such as vocational education through a star schools program under which demonstration grants are made to eligible telecommunications partnerships to enable such eligible telecommunications partnerships to develop, construct, and acquire telecommunications audio and visual facilities and equipment, to develop and acquire instructional programming, and obtain technical assistance for the use of such facilities and instructional programming" (Public Law 100-418, 1988).

Senator R. Kennedy, chairman presiding over the Hearings on Examining the Development of a Regional Educational Telecommunications System before the Senate Committee on Labor and Human Resources (1987), made the following statement:

"By 1995, the National Science Board reports that we will need twice as many teachers in math and science as we have today. But for every qualified math and science teacher 13 are leaving... I am proud to be able to say that again Massachusetts is creating a better future. I call the concept 'Star Schools', and the idea is to harness satellite technology to reduce the shortage of qualified teachers and close the gaps that plague so many of our schools, especially in science and math. By making satellite time available to teachers and students on a regular basis, we can make quality education and instruction far more widely and equally available than it is today. With a satellite dish outside the door, even a one room school house can tap a whole world of knowledge" (p. 6).

Senator Kennedy's statement pointed out a variety needs for applying telecommunications technologies in an educational setting. In 1982, the Center for Statistics, through its Fast Response Survey System (FRSS), conducted a survey for the National Commission on Excellence in Education (Center for Education Statistics, 1986) that identified some of these same needs. The survey provided some of the data on academic requirements in schools that were used by the Commission for its publication, *A Nation At Risk* (National Commission
American education was portrayed to be in a crisis situation academically, and it was recommended that graduation requirements be strengthened at the high school level. In order to meet the more stringent graduation requirements mandated, federal laws governing education were passed that required increased course offerings in math, science, English, social studies and foreign language (Center for Educational Statistics, 1986).

These mandates came about as a result of the realization that the future of the nation from qualitative and competitive perspectives hinged on educating youth effectively. The potential that telecommunications held for fulfilling these needs was acknowledged nationwide. Declining enrollments and shortages of qualified teachers in specific subject areas had caused many schools to drop courses in specialized subjects. Telecommunications was considered a way to provide advanced science, math and foreign language courses that individual schools would not otherwise be able to afford. A variety of telecommunications technologies made learning/teaching at a distance possible.

The Star Schools Project presently includes four cooperative projects. These are the Midlands Consortium, the Satellite Educational Resources Consortium, the TI-IN Network, and the Technical Education Research Center Project. School districts can subscribe to courses or programs offered by these vendors.

TI-IN, a member of the Star Schools Project, is the largest private venture that delivers K-12 instruction via satellite. It represents a cooperative affiliation between private enterprise and public agencies that was established to help small Texas schools fulfill increased graduation requirements in foreign
language and computer science (Jordahl, 1987). Its broadcast facility and uplink are provided by the Region 20 Educational Service Center in San Antonio Texas. In addition to technical contributions, the service center also selects the certified high school teachers, and develops the lesson plans which are submitted to the Texas Education Agency for approval and accreditation. TI-IN also coordinates the installation and maintenance of equipment for subscribers (Batey and Cowell, 1986). TI-In's audience expanded beyond state lines after the first year of broadcasting. In 1987, over 200 schools in over 17 states as far as New York state subscribed to TI-In's services, expending initial sums of about $17,500 each. This included costs of satellite-reception hardware, the classroom A/V unit, installation fees, teacher in-service, and fees for each class of nine students (Johrdahl, 1987). In 1989 TI-IN United Star Network was awarded 4.2 million dollars by the federal government. Students and teachers communicate with automatic talkback systems, electronic writing tablets as well as touchpads (Withrow, 1990).

The Satellite Educational Resource Consortium (SERC), another Star Schools grant recipient, was awarded 4.1 million for 1989. Management resources, including the chief state school officer and the chief public television administrator, are combined in each of the 20 states comprising the partnership. SERC provides full credit courses with high school approval to students through satellite distribution. It offers live interactive direct instruction to students as well as teachers participating in training and staff development programs (Withrow, 1990).

The Technical Education Research Center (TERC) is a collaborative that links eleven education institutions to facilitate a nationwide
telecommunications venture. Seventh and twelfth grade students in every state and the Virgin Islands are able to interact with professional scientists (Withrow, 1990) TERC utilizes audiographic, telecommunications and computer technologies for instruction.

The Midlands Consortium is a partnership consisting of private and public K-12 schools, state departments of education, state school board associations and leading universities in Alabama, Kansas, Mississippi, Missouri and Oklahoma. The fiscal agent and management partner for the consortium is Oklahoma State University Education and Research Foundation in Stillwater, Oklahoma (Withrow, 1990) The Midlands Consortium at this time utilizes university professors for instruction in K-12 level schools.

In spite of the fact that many states have not qualified for Star Schools grants, after legislation for increased graduation requirements was introduced, many states have begun to implement statewide telecommunications plans A variety of states have set up telecommunications partnerships between educational and business factions (telephone companies, utility companies, and cable TV), which was what the Star Schools project set out to do. These partnerships offer mutual benefits for each participant

The first fiber optic telecommunications partnership was formed between a rural telephone cooperative with about 400 customers and a group of seven Minnesota school districts. The Mid-State Educational Telecommunications Cooperative (MSET) and the Upsala Telephone Cooperative pooled their resources and networked these school districts by using a 78-mile fiber optics cable. The network was intended to provide an interactive television system for educational purposes and to upgrade Upsala’s cooperative telephone system In
1987, the MSET system was delivering 16 high school classes, preschool and parenting classes, community education programming and college classes (Senate Committee on Labor and Human Resources, 1987).

In 1986, a telecommunications project was begun for the purpose of enhancing education in Iowa. One of the goals of the project was to provide the capacity to communicate on a local, regional, national and international basis. Plans are underway to install multiple technologies including microwave, ITFS, fiber optics and satellite that will connect all schools in the state of Iowa.

In addition to logistical concerns for the implementation of a statewide plan in Iowa, as in many other states, there exist legal concerns for teacher certification and training for teaching at a distance. Iowa code subsection 256 7(9) specifies that “prior to being assigned initially to deliver instruction via telecommunications a teacher shall receive training regarding effective practices which enhance learning by telecommunications” (Iowa Department of Economic Development, 1990).

A Definition of Distance Education

The term distance education is a broad one, representing uses of a variety of technologies, and in a variety of teaching situations. Keegan (1986) formulated a definition of distance education that stemmed from an international perspective that focused mainly on the adult learner. The purpose of describing Keegan’s definition will be to point out aspects that can be applied to K-12 distance education in the U.S. Keegan’s definition is composed of five interdependent elements which briefly described are as follows: 1) the separation
of the teacher and the learner, 2) the contribution of an educational organization toward planning and provision of educational materials and student support materials, 3) the employment of media such as print, audio, video, or computer for the purposes of bringing together teacher and learner, 4) the prearrangement of two-way communication to allow the student to initiate and benefit from dialogue, 5) the teaching of students as individuals rather than in a group situation. In addition, Keegan included two "socio-cultural elements" that were preconditions for distance education. These were 1) the existence of industrialized features not present in the usual educational environment, and 2) "the privatization of institutional learning" (Keegan, 1986, p. 50).

Keegan, in an attempt to eliminate ambiguity and vagueness, limited the definition of distance education to exclude "the use of educational technology as a support to the classroom" (1986, p. 51). Therefore, "the use of broadcasting in schools does not fall within the definition of distance education .." as presented by Keegan (1986, p. 51). According to Keegan,

"Neither do flexi-study, multi-mode or mixed mode programmes form part of distance education as defined in this book. They represent the use of distance education materials for conventional students, with a reduced attendance rate at classes. The reason for this is purely heuristic and does not imply any judgment for or against the mixing of distance education with conventional forms" (1986, p. 52).

With respect to Keegan's definition of distance education, the use of telecommunications technologies in the K-12 curriculum to fulfill non-conventional educational needs can not be described as "distance education". According to Keegan, the presence of students in a group assembled in a
classroom did not allow the use of the term “distance education”. In addition, the necessity of interactivity as a component of “distance education” disallowed the use of this term to describe much of the teaching/learning situations that utilized educational technology to support classrooms. Generally speaking, the distinctions made by Keegan are often not observed by those describing learning at a distance at the K-12 level in the United States.

Keegan’s definition provides for the individual learner who is physically separated from other students and the teacher. In the U. S., our system of education operates at the state level under laws concerning attendance that may be difficult to apply to telecommunications-based distance learning systems (Goldstein, 1984). According to Batey and Cowell (1986):

“State funding and other benefits are determined by the number of students attending courses and attendance records are kept on a daily basis. But in distance education, what does “attendance” mean? Which district gets credit for the students who attend a television course used in several districts or delivered to nonschool sites? Will school districts receive the same state payments for students learning via distance technologies as they do for students who are attending class with a regular instructor?” (p. 21).

The consideration of interactivity and the presence of learners in a group in a classroom are relevant when describing what might occur in K-12 distance learning situations unique to the United States. Research has pointed out that students learning at a distance prefer opportunities to communicate with peers and the teacher (Johnson, 1988). Previous discussions of the use of educational telecommunications technologies in this chapter have discussed broadcast and cable television, low power television, microwave technology, fiber optics, satellite technology as well as combinations of these. Only some of these
technologies allow for interactive exchanges between teacher and student, and some of these are restricted to two-way audio, and one-way video. The survey used in this study (Appendix B) presents a list of delivery technologies and the technological capacities they offer for interactivity.

Regardless of the technology employed, each interactive system allows a teacher in one location in the presence or absence of students to be seen or heard simultaneously by students in one or more remote sites. An important factor in the use of interactivity is that the employment of these systems is often more an outcome of community resources, long-range planning, and the existence of outside assistance rather than of the values or shortcomings of a specific technology (Senate Committee on Labor and Human Resources, 1987, p. 83).

Interactivity as a component of distance education is valuable but not always necessary for learning to take place. Utah's Spanish Project, when it first began, used a modified conference call format. After some initial experimentation, however, project officials in Salt Lake City indicated that the benefits of such a format were gained only by the schools "on-line" with the teacher (Jordahl, 1987). Apparently, this type of system was implemented in a manner similar to the ESCD projects of the mid-seventies; that is, with one interactive classroom having access to interactive two-way audio while other participating schools observed these verbal exchanges on ITV live via satellite. Preliminary performance data gathered to evaluate this project indicated that while students enjoyed the social interaction of the telephone link, interaction was not necessary for significant learning gains to occur. At the time that the article was written (Johrdahl, 1984), the Utah project no longer emphasized live broadcast and prerecorded its Spanish lessons for distribution over satellite.
"According to Utah officials, this approach allows more control over the broadcasts and greater scheduling flexibility for participating schools, since the classes can be taped and shown later" (Jordahl, 1987, p. 40). This rationale was also put forth by participants in the ESCD projects of the mid-seventies.

The idea that interactivity may influence achievement was also found in a study conducted from 1983 to 1986 by the Minnesota State Department of Education:

"No systematic, statistically significant difference in achievement was found between students taking courses traditionally and those in interactive television sections. The medium does not appear to influence achievement" (p. 79)

According to Barker (1988), a large body of research has indicated that the key factor in an effective classroom is the teacher. Barker (1988) suggested that the effectiveness of the educational process was contingent upon the teacher, whether in a traditional setting or in a distance education setting. Based upon this assumption, Barker sought to determine the effectiveness of satellite delivered instruction by documenting the characteristics of the instructors involved in teaching via this medium (Barker, 1988). Among the most significant teacher behaviors found to contribute to effective instruction were the provision for effective praise, allowance of sufficient wait time during questioning, posing suitable questions at the student’s cognitive level, use of advanced organizers, and frequent content reviews. Barker used a content analysis design to determine the frequency of predetermined effective teaching practices of a group of teachers employed by the TI-IN network. The positive characteristics of instruction carried out by the TI-IN teachers were noted in
The evaluation of the quality of instruction was based upon the performance of the TI-IN teachers. The issue of quality teaching in distance education is repeatedly emphasized in the literature. While it is important to focus on the needs of the learner, the fulfillment of these needs is partly contingent skilled teachers.

Statement of the Problem

Once a need for implementing interactive televised instruction has been identified, effective training and inservice programs can be organized, implemented, and evaluated. The problem addressed in this study concerns providing quality teaching in distance education at the K-12 level. Positive attitudes, a high degree of motivation, enthusiasm and charisma are important qualities of teachers who teach on television. It is not realistic to assume school systems need only choose individuals with these qualities already intact. In order for these characteristics to be present teachers need adequate training, preparation and on-going support so they can be successful at their task. Determining the attitudes of TV teachers with regard to the training they received for teaching at a distance will give insight into improving the these programs and in turn, the quality of the classes that these teachers undertake to teach.

The impact of teacher's attitudes

Unless there is a relative advantage perceived by the teacher, educational methods that involve a substantial commitment of time by them quickly fall to
neglect and disuse once the zeal of novelty wears off. According to Sparks (1984), "...a further factor in education is the problem of ensuring that teachers feel that their time is well spent using educational technology, and that good quality materials and effective teaching is achievable" (p. 218).

The process of adoption and diffusion of distance education technologies and the role of teacher's attitudes in this process must be addressed. Research has revealed that teacher involvement in instructional planning and participation in the decision making process facilitates successful educational change and implementation of innovative programs (Kozma, 1978).

Descriptive research in the form of surveys, questionnaires, and case studies, have generally revealed that adoption of innovations in education is slow (Rogers, 1983); that teachers are influenced by peers and subjective opinions offered through an informal network (Rogers, 1983); that motivation toward planning and inservice training is essential for success, and that evaluation of instructional innovations ensures endurance and credibility for opinion leaders and teachers alike (Hall, 1987).

It is difficult to determine attitudes of teachers toward an innovation or new teaching technique when they do not understand fully the value or purpose behind it. Staff development concerns are important in changing attitudes and increasing knowledge about innovations. This is because people generally are more cooperative if they feel that there is a supportive effort that provides training, and where fear of failure and loss of jobs are not perceived as factors. Pelton and Filep (1984) suggested that tele-education projects would not be successful if in part they "do not involve teachers in the creation and the revision of educational program materials."
There is a delicate balance that exists between an innovation and the perceived value that it will have for individuals in a social system (i.e., a school system). The success of exemplary programs and curriculum change is determined by the adoption and diffusion of innovations by administrators, teachers and students. The attitudes of each of these categories of "key players" in an educational setting will continue to play a role in the acceptance and implementation of technological innovations (Hall, 1987).

For adoption and diffusion to take place there is a need for an increase in effective interpersonal communication between change facilitators and those who are potential adopters of distance education. Rogers (1983, p. 246) identified five categories of adopters of innovations. These include innovators, early adopters, early majority, later majority and laggards. According to Rogers (1983) these categories are based upon ideal types that have been conceptualized from observations of reality in order to guide research efforts. Based upon Roger's classification, the proposed research will concern itself with the role of "early adopter" of distance education at the secondary level of public education.

When applying the diffusion model and adoptor category classification model it can be concluded that programs such as the Star Schools Project were "spearheaded" by innovators: those who launch a new idea in the social system by importing the innovation from outside the system's boundaries (Rogers, 1983). The category of innovator in the scheme of adoption and diffusion has been said to include those who are able to control substantial financial resources (Rogers, 1983). In addition to the ability to control finances, the innovator has the ability to absorb possible losses due to an innovation that has proven unprofitable; the ability to understand and apply complex technical knowledge;
and the need to be able to cope with uncertainty associated with an innovation at the time of adoption (Rogers, 1983)

While satellite course subscription services are currently being utilized by rural schools, many superintendents and teacher leaders would prefer to use distance courses that originate in their own states (Neuberger, 1989). For this to happen a faction of “early adopters” must be found in each state to carry out this role in the diffusion process. According to Rogers (1983), “the role of the early adopter is to decrease uncertainty about a new idea by adopting it, and then convey a subjective evaluation of the innovation to near peers, by means of interpersonal networks.”

Teachers’ positive attitudes toward their ability to use an innovation are dependent upon effective training. A teacher who has not been adequately trained may lack the confidence needed to carry out a particular task. There may be a relationship between teachers’ perceived self-efficacy for performing a task and the effectiveness of the training they have had. In addition, a teacher’s sense of effectiveness may influence the continued use of a particular technology. If a teacher perceives him/herself to be ineffective at a task, avoidance of involvement and negative attitudes toward the technology may occur. The resulting negative attitudes toward involvement will influence the quality of teaching and may influence the successful adoption and diffusion of the innovation.
Purpose of the Study

Once a need for implementing an innovation is identified, effective training and inservice programs about it can be organized, implemented, and evaluated. Determining the opinions of TV teachers with regard to the training they received in preparation for teaching at a distance will give insight into improving these training programs. A variety of factors may influence a teacher's perception of the training they have undergone. Training can increase the belief that one has acquired skills and raise self-efficacy. The effectiveness of a training program may be indicated by teachers' perceptions of self-efficacy with regard to the skills learned. The purpose of this study was to determine teachers' attitudes toward interactive televised instruction, the type of training received, and personal perceptions of self-efficacy with regard to being an interactive TV teacher.

Research Questions

The proposed research will attempt to explore and find answers to the following questions:

1. Who chooses to become an interactive television teacher and what constitutes programs that are available to train these teachers?

2. What are interactive television teacher's perceptions of the strengths and weaknesses of interactive TV technologies for instruction?

3. To what degree are teachers of interactive TV instruction involved in the creation and revision of educational program materials?
4. Do distance education teachers feel that the training they have had fully addresses the needs they have to be successful in this type of teaching/learning environment?

5. How do interactive TV teachers rate their personal effectiveness?

Terminology

**Teaching Demeanor:** The appropriate teaching demeanor for teaching on television includes concerns for appearance, poise, natural, positive projection of personality, attitude and enthusiasm. Teaching demeanor can be effected by voice quality, enunciation, and emphasis on words, as well as body language and pronunciation.

**Questioning Strategies for TV Teaching:** Questioning strategies for TV teaching lead the student to the appropriate cognitive level as expressed in course objectives and as measured in test items. Categories of question types include, trivia questions, study questions, provocative questions, linking questions, probing questions, hierarchical questions, and value questions.

**Interactive Study Guides:** An Interactive Study Guide is a highly organized set of student notes, graphics pictures, graphs, charts and activities that are used in conjunction with a videotape or live lecture. Key notes, phrases, or visual materials are printed in logical, numbered segments called displays. The student is required to respond in writing to questions posed by the instructor during the lecture in many displays. Key concepts and ideas are filled in within the display (Cyrs, 1988).
**Fiber Optics**: Light transmissions over glass cable. Digital transmissions provide large capacities for multiple channel activity and can be simplex (one-way) or duplex (two-way) voice, data and video service.

**Microwave**: Point-to-point transmission system and provides program audio and video plus capacity for additional voice and data material. It can be simplex or duplex.

**Narrowcast**: Transmission of programs to a specifically defined audience normally using the newer technology delivery systems, it is sometimes referred to as a target audience, a limited audience, or a "narrow" audience, hence the name "narrowcast".

**Interactive**: Identifies live communications with either two-way audio and video, or two-way audio and one-way video. This provides for question-and-answer interactivity.

**ITFS**: Instructional Television Fixed Service is a point-to-multipoint transmission system and provides program audio and video to the receive location with audio only on the return channel. With proper equipment, receive locations can be almost anywhere within the 20 miles of an ITFS transmitter.

**Satellite**: Point-to-multipoint transmission system, and provides program audio and video to many users over wide areas simultaneously. For response from viewer, telephone is utilized.
Summary

In the past twenty years, a variety of uses of television in education have been attempted. In the mid-'60s the use of noncommercial educational television was introduced; developments in Public Television programming occurred between 1969-79; the mid-seventies included the National Institute of Education’s Educational Satellite Communications Demonstration (ESCD); and the Star School Program was initiated through federal legislation in the mid-'80s.

Distance education has come to represent the use of a broad category of teaching and learning technologies. Some important issues relating to the use of distance technologies at the elementary and secondary level include curriculum development, teacher training, certification and accreditation, scheduling and management, costs, funding, and evaluation.

The use of distance technologies at the K-12 level was not born out of mere fascination with the idea of applying novel technologies in an educational setting, but out of specific needs. These needs include critical problems such as declining enrollments, teacher shortages in specific subject areas, and increased graduation requirements.

A variety of issues have led school administrators to consider developing education telecommunications programs that originate within their own states as opposed to using nation-wide subscription services (i.e., TI-IN). Along with this consideration are concerns relating to the training of teachers certified to teach in their home state. This study evaluated the attitudes and experiences of
teachers who can communicate advantages of the medium, influence future adoption, and make recommendations for improvement
CHAPTER II. LITERATURE REVIEW

The review of the literature presents information concerning key variables of this study and previous research addressing these variables. The information in this chapter is organized in the following categories: 1) theories and generalizations relating to teacher training and teacher effectiveness in the context of distance education; 2) teachers’ attitudes toward interactive televised instruction; 3) perceived self-efficacy and teacher effectiveness; 4) Adoption and Diffusion Theory, the early adopter and self-efficacy.

Theories Relating to Teacher Training and Teacher Effectiveness

In a summary of evaluations and research compiled by Seamons (1987), a study called “Factors which Impact Learning at a Distance” was cited. According to Fellenz (1987), the perceptions of students indicated that the instructor was credited as having the greatest effect on learning. An additional study showed a similar finding. In a study conducted by Barker 1988, the following question was asked: “Does satellite delivery of high school instruction which provides one-way video, two-way audio interaction with all of its advanced technological delivery resources, effectively provide participating students with a quality learning experience?” (p 6)

In order to answer this question, Barker conducted a review of literature on effective schools and effective classrooms. Barker (1988) reported on the results of 2700 studies conducted during the decade between 1969 and 1979 related to the topic of effectiveness of schools and classrooms. It was reported that little of the
current research deals with classrooms utilizing interactive TV technologies (Barker, 1988).

Barker's review of the literature in this area lead to the conclusion that a primary factor in an effective classroom is the teacher. A variety of teacher behaviors were noted in the research that contributed to effective teaching/learning. The most significant of these behaviors included the providing of effective praise (Brophy, 1979), allowing of sufficient wait time during questioning, posing of suitable questions at the students' cognitive level, using of advanced organizers, and using of frequent content review (Cruickshank, 1986). Barker's premise for the study was that "a way to help determine the effectiveness of satellite delivered instruction was to document the characteristics of instructors teaching via a satellite system" (Barker, 1988, p. 6).

The teachers in Barker's study were employed by TI-IN interactive satellite system described in Chapter One of this thesis. Researchers observed 15 hours of 3 courses on the TI-IN network. The frequency of the following pedagogical techniques was calculated using a content analysis design: 1) instructor initiated interaction, 2) student initiated interaction, 3) wait time, 4) level of questioning, 5) advanced organizers, 6) statements of expectations for students, 7) review, 8) praise, and 9) corrective feedback. It was concluded that each one of these teacher behaviors was exhibited and that quality instruction can and does occur via satellite TV instruction (Barker, 1988).

In response to the conclusion of this study, the following question can be asked: What discreetly different behaviors are required of the interactive TV teacher compared to a traditional classroom teacher? Approaching this
question, Barker (1988) noted several unique aspects of teaching in the electronic classroom. These included 1) the importance of the use of visual aids, props, art works, written materials, and guest speakers, 2) the tendency of students to "hide" from the teachers 3) the need to call on specific students and encourage even participation, 4) the limitation imposed by teachers being unable to see the students. The problem was thought to limit the sensitivity of the teacher to non-verbal cues and behavior of students. A solution to this limitation would involve the teacher taking a consistent moderate pace that would be easy to follow.

Additional information addressing the question of teaching behaviors unique to the "electronic classroom" was found in a publication called, "Distance Education: An Overview" (Batey and Cowell, 1986). According to Batey and Cowell (1986),

"...many types of distance education imply, or in some cases demand changes in teacher competencies and behavior. Whenever teachers are expected to adapt their teaching techniques, use new equipment and technologies, or relate to learners in different ways there are important implications for both preservice and in service teacher training" (p. 16).

Batey and Cowell (1986) suggested that teachers with the responsibility of delivering educational material at a distance needed training and preparation for the following:

* Teaching lesson plans partly or completely developed by others
* Preparing very detailed lessons well in advance of delivery
* Teaching without a group of responsive students in attendance
* Teaching with new types of feedback (or sometimes with no feedback at all from learners)
* Organizing and structuring materials in new ways
* Systematically pre-testing materials and explanations for appropriateness, clarity and comprehensibility
* Pacing and delivering lessons in a different manner
* Presenting lessons according to strict inflexible time schedule
* Balancing multiple materials and inputs to students
* Planning differently for the provision of social and emotional needs of students groups
* Projecting style and personality in new ways
* Operating new technology (pp. 16, 17)

According to Dede (1990), a variety of factors exist that account for reasons why the interchange of ideas in distance learning require discreetly different methods of communication than would exist in a conventional classroom. These factors include: 1) the fact that the visual nature of the medium predicts a specific teaching approach, 2) the fact that the affective content of video based instruction is “muted” as compared to teacher/student interaction that is face-to-face, and 3) that multiple ways of presenting complex cognitive content are possible in electronic form (including animations, text, verbal descriptions and visual images) “allowing learners many ways of understanding the fundamental concept” (Dede, 1990, p. 14). Dede goes on to state:

“Good teachers in distance learning use different pedagogical approaches than they would in face-to-face interactions for the same reasons that a skilled actor would portray a role differently for a movie camera than for a stage audience” (1990, p. 14).
A variety of faculty handbooks are available that serve as guides to teaching
telecourses as well as teaching live via interactive television. Most of these
guides address the unique needs of adult learners in reference to
audience/student considerations; however, much of the information in these
guides is applicable to secondary education as well. One such guide suggests that
teachers need personal characteristics such as:

* a positive attitude toward television courses
* excellent interpersonal skills
* excellent writing skills
* good telephone communication
* adaptability and versatility
* excellent organizational skills
* an interest in trying new forms of communication with students

(Levinson, 1984)

In addition to the latter teacher characteristics, use of interactive study
guides, and interactive strategies such as questioning and feedback, preparation
of overheads, etc., are important training consideration (Cyrs, 1988).

Teachers' Attitudes toward Interactive Televised Instruction

Preliminary to determining what makes a training program for interactive
satellite instruction effective, the consideration of teachers' attitudes toward the
technology should be considered. Previous research dealing with teacher's
perceptions/attitudes toward interactive TV have mainly involved those
teachers without prior experiences and or training in this area. A review of the
literature revealed limited research with regard to teacher's attitudes concerning interactive TV at the secondary level. In a study conducted by Neuberger (1989), a survey was used to determine the attitudes of teacher leaders and school administrators toward interactive satellite delivery of instruction. The following research questions were asked in the study:

1. What is the appropriateness of using satellites to deliver courses for credit to high school students?

2. What is the effect on the teaching profession if satellite course delivery becomes widespread?

3. What will be the effect on the school curriculum in order to accommodate satellite courses?

4. What are the teacher leaders' and school administrators' perceptions of the controls that will be needed when satellite courses are planned and delivered in order to maintain quality of content?

5. What problems do teacher leaders and school administrators perceive if satellite delivery of instruction is used?

The results of data analyses indicated that teacher leaders and school administrators held generally positive attitudes toward the appropriateness of satellite instruction. In reference to the effect of satellite delivery of instruction on teachers' job opportunities an analysis of subtests' items showed that teachers believed that job opportunities would probably not be reduced. Also, positive attitudes were indicated towards the effect that satellite instruction had on the school curriculum (Neuberger, 1989).
In 1983 the Minnesota Legislature enacted a Technology Demonstration program to promote greater and more effective use of technology in Minnesota schools. An evaluation of the program required by statute, conducted over a three-year period, revealed in part, information concerning teachers' attitudes toward interactive television (Senate Committee on Labor and Human Resources, 1987). The report indicated that teachers who participated in the use of Technology Demonstration Site (TDS) interactive systems were generally favorable toward the use of this technology. Only half teaching on TDS funded interactive systems felt they were doing so voluntarily while 75% indicated they would choose to teach again on the system.

Advantages of the system were perceived by teachers to include: increasing course options and programs for students, providing opportunities for challenge and growth for teachers, providing opportunities for motivation and self-discipline among students, and typically smaller class sizes consisting usually of 18 students or less. Teachers generally believed that students learned as much as in traditional classes, like the TV classes, and display more motivation and responsiveness in interactive situations.

Teachers sometimes felt that disadvantages included a lack of control resulting from lack of personal contact with students, technical problem, delays in material transfer, logistical problems concerning make-up work, and conflicting school schedules (e.g., announcement interruptions daily or weekly schedule difference) (Senate Committee on Labor and Human Resources, 1987). Teachers described as both a problem and an opportunity the fact that TDS interactive projects required them to adapt their method or style of teaching. According to Kitchen (Senate Committee on Labor and Human Relations, 1987),
“Better advance preparation, more preparation time, more or different visual materials and more work to keep all students involved and attentive are clearly required of teachers. Moreover, it is the observation of the evaluators that these systems tend to magnify both good and bad teaching and do require a degree of ‘presence’ on camera” (p. 87).

The TDS evaluation revealed that teachers felt interactive systems required practice, time and support to achieve competence as a TV teacher. The evaluation also indicated that ITV (interactive TV) required the use of a variety of interaction and teaching techniques, some of which needed to be practiced. (Senate Committee on Labor and Human Resources, 1987)

A variety of factors may influence a teachers perception of the training they have received to carry out the use of a specific technology or task. The relationship between a teacher’s ability to perform a task and the effectiveness of the training they have had may be influenced by both internal (self-efficacy) and external factors (the training).

A teacher’s initial perception or attitude toward the technology may effect their view of the value of the training. If negative, teachers’ perceptions may predispose them to non-receptive attitudes toward training. It is assumed that positive attitudes toward a specific technology can be fostered by the provision for effective training. Training can increase the belief that one has acquired skills and raise self-efficacy. The effectiveness of a training program may be indicated by increased measures of perceptions of self-efficacy with regard to the skills taught. A discussion of the construct of self-efficacy and research that addresses it will provide information with which to associate it to this study.
Perceived Self-Efficacy and Teacher Effectiveness

Research concerning self-efficacy is extensively represented in the literature. According to Bandura (1982) psychological theories and research have tended to focus on issues relating to the acquisition of knowledge/skill or the enactment of the knowledge/skill. Research concerning self-efficacy postulates that the effective performance of a skill is more than simply knowing what to do. According to Bandura (1982),

“A capability is only as good as its execution Operative competencies require orchestration and continuous improvisation of multiple subskills to manage ever-changing circumstances. Initiation and regulation of transactions with the environment are therefore, partly governed by judgements of operative capabilities. Perceived self-efficacy is concerned with judgements of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122).

Generally, it can be stated with regard to task performance and self-efficacy, that people successfully carry out tasks that they feel capable of and shun or do not succeed at those that are beyond their perceived coping capabilities.

Some of studies relating to self-efficacy involved performance attainments in controlled situations by people with phobias, addictions (Bandura et al., 1980, Marlatt & Gordon, 1980). In addition, research has been done in this area regarding athletic performance (Weinberg et al., 1980), career pursuits (Hackett & Betz, 1981) and despondency to failure experiences (Seligman, 1975).

In an experimental study with phobic subjects (Bandura, 1982) concerning the cognitive processing of “inactive experiences” (those tested by their being acted out), subjects displayed increases in self-efficacy when their experiences
contradicted misbeliefs concerning what they feared and when they achieved new abilities to deal with activities they found threatening. Bandura (1982) noted that other factors than enactive experiences can influence self-efficacy.

"People do not rely on enactive experience as the sole source of information about their capabilities. Efficacy appraisals are partly influenced by 'vicarious experiences'. Seeing similar others perform successfully can raise efficacy expectations in observers who then judge that they too possess the capabilities to master comparable activities...modelling displays convey information about the nature and predictability of environmental events. Competent models also teach observers effective strategies for dealing with challenging or threatening situations" (p. 127).

The previous explanation of modeling can be applied to the idea of perceived self-efficacy of teachers who have undergone training for the use of interactive TV. It has been demonstrated that the modelling of a teaching/training technique can have a positive effect upon perceived self-efficacy.

Other than "enactive attainments", or performance attainments, and vicarious experiences (modelling) self-efficacy was said to be influenced by verbal persuasion, and physiological states. Verbal persuasion is used extensively to encourage people that they had capabilities that would allow them to make achievement gains (Bandura, 1982). Physiological states were said to be what occur when a person experienced fear or stress. According to Bandura (1982), "People rely partly on information from their physiological state in judging their capabilities. They read their visceral arousal in stressful and taxing situations as an ominous sign of vulnerability to dysfunction" (p. 127).

Results of a variety of studies showed that a number of influences can increase and fortify self-efficacy. This theory was given credence by a series of
experiments in which severe snake phobics received treatments relying on enactive, vicarious, emotive and cognitive types of treatments (Bandura, Adams, Hardy and Howells, 1980). Subjects undergoing enactive mastery were assisted by aids inducing performance in dealing with what they feared. Eventually the aids were withdrawn and self-directed mastery situations were planned to verify personal efficacy. The vicarious (modelling) mode of treatment consisted of phobics who observed a model carry out increasingly more threatening activities without negative effects. The third treatment employed cognitive modality in which phobics described threatening cognitive situations that a variety of models of different characteristics coped with and gained competence in dealing with (Kazdin, 1973). The fourth test consisted of a treatment in which subjects visualized threatening scenes while in a deep state of relaxation, until anxiety arousal was diminished. It is interesting to note that results of Bandura’s (1980) experiments indicated that enactive mastery (performance) produced the strongest and most generalized increases in improved self-efficacy.

There is much in the literature to support the premise that perceived efficacy of teachers may be attributable to effective training. The effectiveness of the training may depend on the degree that the attitudes, opinions and reactions of teachers were considered in the design of the training. According to Locke (1985),

"'Ownership' is the operative word in educational jargon today. If teachers are to 'buy into' an innovation, they must have a vested interest. How can that feeling of 'ownership' be developed? Research suggests that input through a 'needs assessment' program and also through participation in the actual planning of the
inservice program is fundamental in developing a sense of 'ownership' and acceptance" (p. 5).

The relationship of personal perceptions of efficacy and participation in the planning of a training program by teachers was investigated in a study conducted by VonEschenbach (1980). The purpose of the study was to determine the effects of a collaborative in-service model on the perceptions of middle school teachers' personal competence.

The plans for the in-service were presented to the faculty for evaluation before implementation and were based on the faculty's perceived professional needs. A survey instrument was developed that evaluated 24 teaching functions. Teachers were asked to rate themselves on the 24 teaching functions in terms of their current competence for carrying out each of the tasks. The survey was used to determine the perceptions of teachers' professional competence before and after the in-service training period. The results of the study indicated that the teachers perceived a "small" to "moderate" degree of competence for the 24 teaching functions prior to their involvement in the collaborative in-service. Following the collaborative inservice-training the teachers felt that they had a "moderate to "considerable" amount of competence for the 24 teaching functions. The post-rating means of professional competence were higher than the pre-rating means for all of the 24 teaching functions (VonEschenbach, 1980). VonEschenbach cautioned that one should not infer that there was a significant change in the behavior of the teachers in terms of competence; but that the results only indicate changes in teachers' perceptions of their personal competence (1980).
If we apply Bandura’s theory to the idea of teachers’ perceived self-efficacy, the perceived professional competence resulting from training may positively affect teacher behaviors. Bandura (1982) proposed that one’s behavior is determined by the perception that behavior will lead to desirable outcomes as well as a sense of self-efficacy (the perception that one has the necessary skills to influence an outcome). The implication of VonEschenbach’s study was that contributing to the increased self-efficacy of the teachers was their collaborative involvement in the design of the in-service model.

Adoption and Diffusion Theory, the Early Adopter and Self-efficacy

Teacher’s perceptions of their self-efficacy are important when considering an innovation’s diffusion and rate of adoption. In order to discuss the relationship between teacher’s perceived self-efficacy and the adoption and diffusion of an innovation, first, specific information on which Roger’s (1983) theory is based must be explained.

Four main elements in the diffusion were described by Rogers (1983) as the innovation, communication channels, time and the social system. Initially, a definition of innovation given by Rogers will clarify characteristics of a broadly applied term. According to Rogers, “an innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption” (p. 23). In Rogers’ book the terms innovation and technology were often used as synonyms; however, he offered the following definition of technology: “A technology is a design for instrumental action that reduces the uncertainty in
the cause-effect relationships involved in achieving a desired outcome" (Rogers, 1983).

Diffusion is the process by which information is exchanged between individuals within a group. The process of diffusion includes 3 components: 1) the innovation, 2) an individual or other unit of adoption who knows about or has experience with the innovation 3) a means of communicating between the parties which is the communications channel. These include 2 types: 1) mass media channels 2) interpersonal channels.

Rogers has described 5 categories of people who adopt innovations. These include 1) innovators, 2) early adopters, 3) early majority, 4) late majority, 5) laggards. The innovators are the first to adopt an innovation and are characterized as having a high degree of mass media exposure with interpersonal networks that are extensive and which reach beyond their local system. The other categories of adoption reflect the amount of time that will pass before the individual accepts the innovation.

One cannot talk about the elements of diffusion without discussing the social system which is the target group of potential adopters. The social system is defined by Rogers as “a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.... The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems” (Rogers, 1983, p. 24). Some examples of systems that may be involved in the diffusion process are high schools in Iowa, teachers in a school system, peasants in an Asian village or consumers in the U.S. These groups are comprised of people bound together by a common goal. In the context of this
study the social system consists of teachers who have had some experience teaching with interactive television technologies.

Among the members of a social system, there exists a structure of communication. Communication is more apt to occur among individuals who have had common experiences. It was determined from previous adoption and diffusion research that individuals evaluate an innovation on the basis of subjective information (from peers) rather than on the basis of scientific studies (Rogers, 1983). It is possible, however, that the very first individuals (innovators) who adopt an innovation have taken into consideration objective evaluations of innovations, such as research studies. Finally innovativeness of an individual within a social system will depend on their unique characteristics as well as by the nature of the social system to which the individual belongs (Rogers, 1983). Within the social system are several categories of people. These include the opinion leader, the change agent, the aid, and the clients.

The opinion leader exerts a positive degree of influence which is earned and maintained by the person’s technical know-how, “social accessibility and the degree to which he/she conforms to social norms” (Rogers, 1983). Change agents outside the social system have the power to influence opinion leaders. An aide is a less professional go-between and contacts clients in a social system intensely to influence an innovative decision. The aid has credibility for the clients because he/she has more in common with them and is therefore less threatening (Rogers, 1983).

Rogers describes five attributes of an innovation that will influence adoption. The five attributes are described as follows:
1. Relative Advantage, the first attribute is defined by Rogers as "the degree to which an innovation is perceived as being better than the idea it supersedes". The perceptions can be from the standpoint of economic or social gain.

2. Compatibility; a second attribute of innovations is "the degree to which an innovation is perceived as consistent with existing values, past experiences and needs of potential adopters."

3. Complexity; a third criterion is "the degree to which an innovation is perceived as relatively difficult to understand and use." Unlike the first two attributes, complexity is negatively related to the ratio of adoption.

4. Trialability, a fourth attribute, is "the degree to which an innovation may be experimented with on a limited basis." This attribute relates to the degree of commitment (time and money) to an innovation that is necessary to determine whether its alleged qualities are genuine.

5. Observability, the last criterion, is "the degree to which the results of an innovation are visible to others." In the case of satellite instruction a prime attribute of this medium is that it is a visual, observable medium which can convey imagery and sound live, all over the world.

The previous attributes of an innovation have a relationship with the way that potential adopters perceive the innovation. The construct of self-efficacy in this study has significance relating to the early adopters (early practitioners) of interactive televised instruction. The early adopter has been placed in a situation where the enactive mastery of skill is expected following a period of training. The degree of success they experience in coping with being a TV
teacher may hinge upon perceived self-efficacy, the complexity of the
innovation and whether the training has reduced the perceived complexity
The idea that people will continue to undertake and perform activities that they
believe themselves to be capable of managing (trialability), will influence the
adoption and diffusion of an innovation. Modelling of competent skills
required to be an effective interactive TV teacher (observability) will in turn
have a positive impact in influencing involvement of potential adopters in a
given social system.

Bandura (1982) described the phenomenon of collective efficacy which has
many similarities to the social implications inherent in Roger’s theory of
adoption and diffusion:

"The strength of groups, organizations, and even nations lies partly
in people’s sense of collective efficacy that they can solve their prob-
lems and improve their lives through concerted effort. Perceived
collective efficacy will influence what people choose to do as a group,
how much effort they put into it, and their staying power when
group efforts fail to produce results. It should be noted that knowl-
edge of personal efficacy is not unrelated to perceived group efficacy.
Inveterate self-doubters are not easily forged into a collectively effica-
cious force" (p. 143).

The relevance of Bandura’s references to group efforts and collective
efficacy can be related to Roger’s references to diffusion of innovations within a
social system. The collective efforts of interactive TV teachers and factions of a
mutual social system including students, teachers, administrators all come to
play in the adoption and diffusion of the technology of the "electronic
classroom"
Summary and Conclusion

Research studies relating to education have indicated that teacher behaviors exert a major influence upon learning outcomes. Barker's study indicated that teachers employed by TI-IN interactive satellite system exhibited appropriate and effective teaching behaviors and that quality instruction can and does occur via satellite TV instruction. Teaching behaviors that may be emphasized for the "electronic classroom" were described sometimes directly and indirectly in the literature. These discreetly different behaviors/characteristics required of the interactive TV teacher were diverse and included "projecting style and personality in new ways, operating new technology" (Batey and Cowell, 1986) and the need for "excellent organizational skills" (Levinson, 1988). A variety of handbooks have been published that focus on teaching interactive television classes. The majority were geared toward higher education, although some related to teaching at the secondary level. Some of the topics typically included in these guides were "technical orientation" and "designing an interactive study guide" (Cyrs, 1988).

Research dealing with teachers attitudes toward interactive televised instruction included studies whose samples consisted of those with and without experience teaching on television with interactive technologies. Overall, positive attitudes toward the technology were found to prevail with regard to the teachers surveyed.

A variety of studies relating to the construct of self-efficacy were described and related to teacher effectiveness. Factors influencing self-efficacy were characterized as belonging to the following modes: enactive (performance),
vicarious (modelling), cognitive (verbal persuasion), and visceral (physiological states) (Bandura, 1982). A study addressing the relationship of personal perceptions of efficacy and participation in the planning of an in-service training program was described (VonEschenbach, 1980).

The components of Rogers’ theory of the Adoption and Diffusion of Innovations were presented. The relationship between perceived teacher effectiveness, group efficacy and adoption/diffusion theory was explored. The information presented in Chapter III attempted to determine relationships between the perceived self-efficacy of interactive TV teachers and their attitudes toward the training they underwent in preparation for teaching at a distance. Perceived professional competence on the part of interactive TV teachers resulting from training may positively affect teacher participation and thereby influence future adoption and diffusion of interactive televised instruction.
CHAPTER III. METHODOLOGY

Previous research pertaining to teacher’s attitudes/perceptions toward interactive TV has mainly involved those teachers without prior experiences and or training in this area. A review of the literature disclosed a limited amount of research relating to teacher’s attitudes toward their training in preparation for interactive TV teaching at the K-12 education level.

This research study views the K-12 interactive TV teacher as an “early adopter” (Rogers, 1983) of this form of instructional technology. It is believed that the TV teacher as early adopter can convey valuable information derived from first-hand experience teaching on television. The perceptions of TV teachers can suggest ways to design, and improve interactive TV teacher training programs as well as teaching methodologies for teaching on television.

An additional aspect of this research study involves an assessment of TV teachers’ sense of personal effectiveness in the context of interactive TV teaching. This study proposed that effective training can increase a belief that one has acquired skills and positively influence perceptions of personal ability. The effectiveness of a training program may influence a teacher’s perceptions of personal ability with regard to the skills taught, the quality of instruction, continued involvement of TV teachers, and the future adoption and diffusion of this form of instructional technology.

Chapter III will include information about the sample chosen, the design of the instrument and methods used in determining its reliability and validity. Information about the techniques for analysis of data derived from the survey instrument will conclude this chapter.
Sample

The goal for identification of the sample was to obtain the names of 200 interactive K-12 TV teachers in as many of the 50 states in the U.S. as possible. Two hundred and forty-one interactive TV teachers at the K-12 level were identified. While a comprehensive identification of the numbers of interactive TV teachers in all 50 states was not possible in this study, an attempt to identify a balanced distribution was made by the researcher. The state departments of education were contacted in most of the 50 states. The Technology Coordinator (or someone of similar title) employed at the various State Departments of Education was contacted by phone. In most cases they referrals were made to superintendents or telecommunication partners (such as cable TV networks) who worked more closely with the TV teachers and could identify them by name.

Names of TV teachers in some states were not pursued as strongly as a review of the literature suggested that utilization of one or more of the Star School affiliates as a means of providing interactive TV instruction existed in the state in question. Many states indicated that no use of interactive televised instruction was taking place at the time of contact. Some of these states had conducted pilot projects and were planning future use of interactive televised instruction. Due to time constraints, lack of cooperation, and difficulties in correspondence, existence of the use of home state interactive TV teachers may have been overlooked in a variety of states.

There existed varying degrees of willingness to release the names of interactive TV teachers on the part of those in a position to do so. In a minority
of cases the State Department of Education person who was contacted requested a formal letter describing the research and a copy of the survey instrument. Compliance with this type of request was made for the states of Virginia and Kansas. Additional follow-up phone calls were attempted and messages were left. No further reply was received from Virginia after faxing a copy of the survey to the person in charge of instructional technology at the State Department of Education. An additional phone call was made and the State Department official contacted referred the researcher to a superintendent who after seeing the survey and cover letter gave the names of interactive TV teachers. The names were not included on the mailing list because the time had past for this stage of the study. Kansas forwarded the request for interactive TV teachers’ names to local K-12 administrators but no further information was received.

The survey was disseminated using two mailing lists. Initially names of interactive TV teachers were identified in mainly the western and midwestern regions. A subsequent mailing was sent to teachers in mostly eastern states. The following is a list of states where TV teachers were found, and the number of teachers found from each of these, making up a total of 241 teachers.

- Arizona - 7
- Idaho - 3
- Massachusetts - 29
- Minnesota - 116
- South Carolina - 2
- Washington - 6

- Connecticut - 8
- Indiana - 2
- Maryland - 8
- Nebraska - 1
- Texas - 14
- Wisconsin - 7

- Iowa - 10
- Kansas - 2
- Michigan - 9
- North Dakota - 10
- Utah - 7
An attempt to identify interactive TV teachers teaching with the Star Schools Affiliates, including the Midlands Consortium, Technical Education Research Centers (TERC), TI-IN Network, Inc., and Satellite Educational Resources Consortium (SERC) was carried out. It was determined that teachers employed by the Midlands Consortium were Oklahoma State University professors. Due to criteria that the sample for this study consist of certified K-12 teachers, the names of the professors were not included on the list of respondents. TI-IN was contacted to obtain the names of interactive TV teachers in their employment. The director, Dr. Pamela Pease, requested a formal letter describing the study and a copy of the survey. These materials were sent by the researcher but no immediate response was received by mail or by telephone. Two weeks following this initial contact, an in-person meeting with TI-IN executives in San Antonio, Texas, was arranged by Dr. Michael Simonson, the researcher's major professor. Dr. Pease indicated to Dr. Simonson that TI-IN would be willing to participate. The researcher then made a follow-up phone call to Pease to obtain the names of the TI-IN teachers. Pease requested that she be allowed to obtain the approval of the teachers at which point she would personally disseminate copies of the survey. The researcher complied with the request and surveys were returned by 14 of TI-IN's interactive TV teachers.

After notifying Robert F. Tinker, managing partner at TERC, it was determined that TERC utilized audiographics and computer technologies for distance teaching as opposed to video formats. Further attempts to identify interactive TV teachers in their employment were abandoned. SERC was also
contacted and the names of the K-12 interactive TV teachers employed by them were given to the researcher.

Instrument Design

This study was conducted in conformance with the guidelines for survey research specified by Henerson, Morris, and Fitz-Simmons, 1978. Questionnaire/attitude rating scales were identified as appropriate data gathering instruments for this study for the following reasons (Henerson et al., 1978): The questionnaire and attitude rating scale were research tools that 1) permitted anonymity, 2) provided time for the subjects to think about answers, 3) posed uniform questions, 4) allowed mailings that simultaneously contacted respondents over a large geographical area.

Existing measures of the constructs to be investigated in this study were not available to the researcher. As a result, an instrument was designed following the procedures described by Henerson et al. (1978) (see Appendices B and E).

Design of Part One

The questionnaire/attitude rating scale was divided into three parts (Appendix B). The purpose of Part One was to obtain descriptive information about the interactive TV teachers. Items requested information about:

1. school district name and location,
2. gender,
3. education,
4. years employed in education/TV teaching,
(5) teaching endorsements,
(6) membership in professional organizations,
(7) subscriptions to distance education literature,
(8) length of TV teacher training,
(9) use of and training to use TV technologies for teaching

Design of Part Two

The second part of the survey consisted of questions relating to background information about the distance course(s) taught by the respondents. Questions relating to whether training was received for, the degree of knowledge and degree of use of the following interactive TV teaching skills/tools were asked.

- interactive study guides
- visual material for teaching on television
- correct teaching demeanor for TV teaching
- questioning techniques for interactive TV teaching
- use of instructional design models

In addition, the subjects were asked to respond to the degree of satisfaction they felt concerning the exchanges they had with students teaching on television; whether they received additional financial incentives/rewards for their involvement with distance education; and whether as interactive TV teachers, the respondents were involved in the planning and design of instruction.
Design of Part Three

The purpose of Part Three was to determine the attitudes of K-12 interactive TV teachers toward three constructs: involvement in distance teaching, training in TV teaching (if any), personal perceptions of ability as interactive TV teachers. The items in Part Three were written in agreement scale format following the procedures described by Henerson et al. (1978, pp. 86-88).

In accordance with the methodology described by Henerson, a group of 8 graduate students were asked to generate statements (about 60) relating to the 3 attitude constructs previously referred to. A pilot group of teachers who had undergone a course in interactive TV teaching was asked to respond to the statements. The responses were scored for each respondent by the researcher and high scorers and low scorers were identified for each of the three attitude tests (see Appendices D & E). An item analysis was conducted for the three attitude tests and items that clearly discriminated between high and low scorers were identified. These items were retained for inclusion in Part Three of the questionnaire. According to Henerson et al. (1978), “The purpose for doing an item analysis is to select from a pool of items the ones that most effectively obtain the information you want” (p. 87).

The items included in Section A of Part Three of the survey were designed to relate to the following research question: How do interactive TV teachers rate their personal effectiveness as TV teachers? The items in Section B of Part Three were derived from the research question: What are interactive television teachers’ perceptions of the strengths and weaknesses of interactive TV technologies for instruction? The items in Section C of Part Three were
designed to answer the research question, do distance education teachers feel that the training they have had fully addresses the needs they have to be successful in this type of teaching/learning environment?

**Reliability and validity of the questionnaire**

Reliability and validity for the attitudinal parts of the survey were determined following procedures in Hennerson (1978). The reliability for the three attitude subtests were calculated to be (1) $r = .52$, (2) $r = .59$, (3) $r = .53$

Construct validity for the questionnaire was determined by the opinion of judges. The attitude statements were submitted to 10 teachers who had undergone training for interactive teaching on television. They were asked to respond as to whether they believed the statements measured the three constructs in question. Based upon their responses the construct validity for the three attitude tests was determined to be acceptable.

The instrument, K-12 Level Interactive TV Teacher Survey, was reviewed and met the approval of the Iowa State University Human Subjects Review Committee (see Appendix C).

**Distribution of the questionnaire**

Two hundred and twenty-seven K-12 interactive TV teachers identified in as many regions in the U.S. as possible were sent the questionnaire along with a cover letter and a postage-paid, return envelope (see Appendix B). The letter described the purpose of the research and participants were told it was their option to abstain from taking part in the study. Each questionnaire was assigned a number for the purpose of monitoring rate of return. To ensure a high rate of
return, two weeks after the initial mailing, individuals who had not returned their questionnaire were sent another copy of the survey, a second cover letter, and a second addressed, postage-paid, return envelope.

Treatment of the Data

The data collected were used to determine descriptive information about the respondents, as well as to determine their attitudes toward three constructs concerning involvement, training and personal ability in relation to interactive distance teaching. The data were analyzed to include these descriptive statistics: (1) frequency of each response, (2) percentage of each response, (3) number of responses for each item, (4) mean scores, and (5) standard deviation of scores. The data also were analyzed using comparison tests: (1) relationship between means, and (2) difference between means.
CHAPTER IV RESULTS

The responses from the questionnaire, K-12 Level Interactive TV Teacher survey (ITVTS), were used to calculate descriptive information about the characteristics and attitudes of K-12 interactive TV teachers in the United States. The data summarized in this chapter were gathered from the survey and statistical analyses were performed to: (1) present a description of the sample, (2) provide information concerning professional background and experience of the subjects, (3) present a summary of the respondents' attitudes relating to their involvements in distance teaching, toward training received, and toward personal abilities as interactive TV teachers, and (4) to determine the differences and relationships between variables described in the study.

Description of the Sample

The results reported in this chapter were obtained from data gathered from 157 questionnaires returned by K-12 interactive TV teachers. The subjects consisted of a sample of K-12 interactive TV teachers whose names and addresses were given to the researcher by contacts found in distance education literature, and by the State Departments of Education from throughout the United States. The overall number of K-12 interactive TV teachers existing in the U.S. is unknown; but, based upon a rigorous search conducted by the researcher, it is estimated that approximately two thirds of the teachers were identified.
The sample included 241 interactive TV teachers who were each sent questionnaires, cover letters and self-addressed stamped envelopes. Of the 241 teachers sampled, 165 returned the questionnaire. Two weeks after sending the initial mailing of surveys, a follow-up mailing was conducted. After the second mailing, the rate of response increased 22%. The overall return rate for those responding to the survey was 68% and was calculated using 241 as the number of K-12 interactive TV teachers sampled and 165 as the number of respondents. Eight respondents returned the questionnaire but did not choose to fill it out. Three of those declining to fill out the survey indicated that they were not using interactive technologies or that they were teaching at a level other than K-12. Nine respondents partially completed the survey. The partial responses of these respondents were used as data for the study.

Profile of the Respondents

The purpose of Part One and Part Two of the ITTVS was to obtain a descriptive profile of the respondents and to gather information about their training, degree of use, and degree of knowledge about interactive TV technologies. The characteristics of the subjects studied are reported and described in the order that the questions appeared in Parts I and II of the survey.

Frequency distributions were computed for all items in Part One and Part Two of the questionnaire in order to report information about the characteristics of the sample. These data are illustrated in Figures 1-13.
The characteristics of the sample were reported in terms of percent of the total number responding and include the following frequencies:

1. The percentage of female respondents was 59.62%, and males, 40.38% (Figure 1).

2. The K-12 interactive TV teachers were predominantly in the 40-50 years of age range. Approximately six percent (5.96%) was between 20 and 30, thirty-four percent (34.44%) was between 30 and 40, 47.02% were between 40 and 50, eleven percent (11.26%) was between 50 and 60 and one percent (1.32%) was between 60 and 65 years of age (Figure 2).

3. Seventeen percent (17.31%) had earned undergraduate college degrees, and thirty-one percent (31.41%) with credits toward a master’s degree. The greatest number of respondents (39.10%) reported having earned master’s degrees, while approximately nine percent (8.97%) had credits toward a doctorate and three percent (3.21%) had earned a doctorate degree (Figure 3).

4. Twenty-nine percent (29.68%) of the respondents had between 1 and 10 years of experience as teachers, forty-one percent (41.94%) had 10-20 years. Those with twenty to thirty years of experience made up twenty-five percent (25.18%) of those responding, a small percentage (2.58%) reported having 30-39 years of experience in teaching (Figure 4).

5. The results indicated that seven percent (7.05%) were endorsed to teach at the elementary level. The majority of the sample, seventy-
Figure 1. Gender of respondents

- Male: 40.38%
- Female: 59.62%
Figure 2. Age of respondents
Figure 3. Degree types earned

<table>
<thead>
<tr>
<th>Percent Responding</th>
<th>Bachelor's Credits toward Master's</th>
<th>Master's Credits toward Doctorate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>50%</td>
<td>39.10%</td>
<td>8.97%</td>
</tr>
<tr>
<td>10%</td>
<td>31.41%</td>
<td>3.21%</td>
</tr>
<tr>
<td>20%</td>
<td>17.31%</td>
<td></td>
</tr>
<tr>
<td>30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 4. Years in education

Percent Responding

1-10 20-30 30-40

41.94% 25.81% 2.58%

29.68%
Figure 5. Teaching endorsements held by respondents
two percent (72.44%), were endorsed to teach at the secondary level, and approximately fifteen percent (15.38%) were certified to teach both at the elementary and secondary levels. Of those responding, five percent (5.13%) indicated they had some other form of teaching endorsement. Of the respondents indicating "other", some wrote in additional descriptors that included "vocational", and "college" (Figure 5).

(6) The majority of the respondents (91.67%) were employed as K-12 interactive TV teachers at the time the survey was completed. Only eight percent (8.33%) indicated that they were no longer distance teachers (Figure 5).

(7) Item 7 of Part I requested that respondents list professional organizations in which they had membership. Many of the organizations listed by the respondents were local ones. The majority of respondents reporting membership in a national organization listed the National Education Association (31.2%). Specific subject area organizations at the national level included the National Council for Teachers of Math (2.5%), the National Council for Teachers of English (2.5%), The American Council for Teachers of Foreign Languages (3.83%) and the National Science Teachers Association (2.5%) (Figure 6).

(8) The periodical literature read by respondents varied widely and most indicated they subscribed to journals that did not relate to or give information about teaching at a distance.
Figure 6. Predominant national membership organizations listed by respondents

- NEA = National Education Association
- NCTM = National Council for Teachers of Math
- NCTE = National Council for Teachers of English
- ACTFL = American Council for Teachers of Foreign Language
- NSTA = National Science Teachers Association
Figure 7. Years as TV teachers
Figure 8. Hours of training
Figure 9. Broadcast formats used by respondents for interactive televised instruction.
Figure 10. Other delivery formats used by respondents for interactive TV teaching
In reference to the question asking the number of years that the respondents had been K-12 interactive TV teachers, a majority, ninety-six percent (96.15%), reported 1-5 years. Approximately four percent (3.85%) indicated teaching at a distance for 5-10 years (Figure 6).

Ninety-three of the 157 respondents indicated having undergone the following increments in terms of hours of training, 28.89% had 1-10 hours of training, 20% listed 10-20 hours, 26.67% reported 20-30 hours, 14.44% indicated 30-40 hours, 6.67% reported having had over 40-50 hours of training, and 3.33% listed having 50-60 hours of training. The remaining 64 respondents indicated that they had had no training (Figure 8).

Item 11 of Part I of the ITVTS requested information pertaining to current use of and training in the use of various technologies. The most widely used or significant types of technologies were listed. In the category of print based media, 63.7% of the 157 respondents indicated use of textbooks and 15.3% indicated that they had been trained to use textbooks. In the category of audioconferencing 23.6% of the respondents reported they used this medium, while 11.5% received training in it. The form of broadcast media most commonly used by the respondents (42%) was fiber optics. Training for the use of fibre optics was indicated by 28% of the sample. Cable TV was the second most widely used format for which 33.8% reported use and 12.7% reported having received training. Satellite
technology for interactive TV teaching was used by 21% of those responding and 57% received training to use this medium. Last, in the category of broadcast delivery technology 19.7% of the teachers reported use of microwave TV, while only 8.3% had received training in how to use it (Figure 9). Other technologies listed included the following percentages for use and training, respectively (Figure 10).

- videotape - 73.9%, and 31.2%
- computers - 32.5% and 24.8%
- telephones - 48.4% and 18.5%
- electronic mail - 39.5% and 21.7%
- computer conferencing 11.5% and 7%

(12) Part II of the questionnaire asked respondents to indicate whether they had received training in specific aspects of distance teaching, their depth of knowledge in these areas and how often they used each technique (see Tables 1-2). The categories for these aspects of TV teaching techniques included: instructional study guides, visual material for teaching on television, correct teaching demeanor, questioning techniques for teaching on television, and instructional design models. The category which respondents most frequently indicated for having had training was “correct teaching demeanor” (54.14%). The categories for which respondents had the least training were use of interactive study guides (88.5%) and use of instructional design models (71.15%)
Figure 11. Degree of satisfaction with interactions with students

A = not at all satisfied
B = less than satisfied
C = moderately satisfied
D = very satisfied
E = greatly satisfied
Figure 12. Percentage of respondents involved in planning instruction.
Figure 13. Percentage of teachers who received financial incentives/rewards.
Table 1. Techniques for teaching on television

<table>
<thead>
<tr>
<th>Received Training</th>
<th>Degree of Knowledge</th>
<th>Degree of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive Study Guides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 156</td>
<td>N = 151</td>
<td>N = 151</td>
</tr>
<tr>
<td>Yes 11.4%</td>
<td>A = 62.0%</td>
<td>A = 74.83%</td>
</tr>
<tr>
<td>No 88.5%</td>
<td>B = 18.6%</td>
<td>B = 10.20%</td>
</tr>
<tr>
<td></td>
<td>C = 13.3%</td>
<td>C = 8.16%</td>
</tr>
<tr>
<td></td>
<td>D = 5.3%</td>
<td>D = 4.76%</td>
</tr>
<tr>
<td></td>
<td>E = .67%</td>
<td>E = 2.04%</td>
</tr>
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</table>

Visual Material for Teaching on TV

<table>
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<th>N = 152</th>
<th>N = 151</th>
</tr>
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<tbody>
<tr>
<td>Yes 48.41%</td>
<td>A = 27.63%</td>
<td>A = 26.49%</td>
<td></td>
</tr>
<tr>
<td>No 51.59%</td>
<td>B = 20.39%</td>
<td>B = 19.87%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C = 32.24%</td>
<td>C = 20.53%</td>
<td></td>
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<tr>
<td></td>
<td>D = 13.16%</td>
<td>D = 19.87%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E = 6.58%</td>
<td>E = 13.25%</td>
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</table>

Correct Teaching Demeanor

<table>
<thead>
<tr>
<th></th>
<th>N = 157</th>
<th>N = 152</th>
<th>N = 151</th>
</tr>
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<tbody>
<tr>
<td>Yes 54.14%</td>
<td>A = 22.37</td>
<td>A = 19.87%</td>
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<tr>
<td>No 45.86%</td>
<td>B = 17.76%</td>
<td>B = 10.60%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C = 28.95%</td>
<td>C = 19.87%</td>
<td></td>
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<tr>
<td></td>
<td>D = 20.39%</td>
<td>D = 29.14%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E = 10.53%</td>
<td>E = 20.53%</td>
<td></td>
</tr>
</tbody>
</table>

Note. Possible Responses:
A = None.
B = A little.
C = A moderate amount.
D = Quite a bit.
E = A great deal.
Table 1. continued

<table>
<thead>
<tr>
<th>Received Training</th>
<th>Degree of Knowledge</th>
<th>Degree of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Questioning Techniques for Teaching on TV</strong></td>
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<tr>
<td>N = 150</td>
<td>N = 151</td>
<td>N = 151</td>
</tr>
<tr>
<td>Yes</td>
<td>38.67%</td>
<td>A = 23.84%</td>
</tr>
<tr>
<td>No</td>
<td>61.33%</td>
<td>B = 19.21%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C = 32.45%</td>
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<tr>
<td></td>
<td></td>
<td>D = 19.85%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E = 4.64%</td>
</tr>
</tbody>
</table>

| **Instructional Design Models** | | |
| N = 156 | N = 147 | N = 141 |
| Yes | 28.85% | A = 48.30% | A = 48.94% |
| No | 71.15% | B = 19.73% | B = 18.44% |
|     |       | C = 19.05% | C = 17.73% |
|     |       | D = 12.25% | D = 12.77% |
|     |       | E = .68% | E = 2.13% |
The sixth item in Part II requested that respondents rate the degree of satisfaction they felt concerning the quality of interaction between themselves and their students. Of 155 teachers responding to this item, 1.29% reported to be “not at all satisfied”, 10.97% reported to be “less than satisfied”, 43.23% responded as “moderately satisfied”, 35.48% indicated “very satisfied”, and 9.03% felt “greatly satisfied”.

Respondents were asked whether or not as interactive TV teachers they were involved in the planning and design of instruction. Of 151 answering this question, 97.87% responded positively and 2.13% responded negatively.

The last question in Part II of the survey determined how many respondents received some additional form of financial incentive or reward for their involvement in teaching at a distance. The greatest percentage of respondents (72.90%) indicated that they received no additional financial incentive/reward for interactive TV teaching, while approximately one-fourth of the teachers (27.10%) reported that they had received additional compensation.

Attitudes of K-12 Interactive TV Teachers

Part III, K-12 interactive TV teacher survey

The purpose of this study was to identify a relationships between K-12 interactive TV teachers' attitudes toward interactive televised instruction, the type of training they had, and their personal perceptions of ability with regard to being an interactive TV teacher. The agreement scale format was
used in Part III of the survey and the items in Sections A, B, and C were
designed to yield information about respondents' attitudes as stated in the
purpose of this study. The subtest making up Part III, Section A, was called
Attitudes toward Ability as a TV Teacher (ATAbTVT). ATAbTVT included
statements that indicated the respondents' attitudes toward their personal
ability as interactive TV teachers. Statements in Part III, Section B, were a
subtest called Attitudes Toward Being a TV Teacher (ATBeTVT). ATBeTVT
was designed to report positive or negative attitudes on the part of the
respondents with regard to interactive TV teaching. The third subtest found
under Part III, Section C of the survey was called Attitudes toward Training
for TV Teaching (ATrTVT). This subtest contained statements expected to
indicate whether the respondent held positive or negative attitudes toward
their training in preparation for teaching at a distance.

Each of the subtests in Part III of the survey were designed to obtain
answers to research questions listed in Chapter I of this thesis. The items in
ATAbTVT were relevant to answering research question 5 listed in Chapter
I. In order to answer question 2, listed in Chapter I, ATBeTVT was
developed. The items contained in the subtest, ATrTVT, of the survey
were meant to answer research question 4 listed in Chapter I.

The reliability of each subtest was computed using the Cronbach alpha, a
statistical measure appropriate for determining the reliability of attitude
scales (Ary et al., 1985). The reliability score for the subtest, ATAbTVT, was
.52, for ATBeTVT it was .59, and for ATrTVT it was .53.

To achieve an index of favorable or positive attitudes or unfavorable or
negative attitudes, the following statistical procedures were carried out: The
Table 2. Attitudes of K-12 Interactive TV Teachers: Subtests\(^a\)

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Number responding</th>
<th>Items</th>
<th>Range of scores</th>
<th>Mean score</th>
<th>SD</th>
<th>Highest Possible score</th>
<th>Reliability of subtest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward ability as TV Teacher</td>
<td>153</td>
<td>12</td>
<td>12-60</td>
<td>25.20</td>
<td>4.52</td>
<td>60</td>
<td>.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2.10)(^b)</td>
<td></td>
<td>(.32)(^c)</td>
<td></td>
</tr>
<tr>
<td>Attitude toward being a TV teacher</td>
<td>153</td>
<td>10</td>
<td>10-50</td>
<td>26.60</td>
<td>5.08</td>
<td>50</td>
<td>.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2.66)</td>
<td></td>
<td>(.50)</td>
<td></td>
</tr>
<tr>
<td>Attitude toward training to be a TV teacher</td>
<td>145</td>
<td>9</td>
<td>9-45</td>
<td>21.48</td>
<td>4.10</td>
<td>45</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2.3)</td>
<td></td>
<td>(.45)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Lower scores = more positive attitude.

\(^b\)Mean score divided by number of subtest items.

\(^c\)SD divided by number of subtest items.
Table 3. Correlation matrix: Degree of relationship between characteristics of interactive TV teachers and scores on subtests of attitudes

<table>
<thead>
<tr>
<th></th>
<th>Age of Respondent</th>
<th>Years in Education</th>
<th>Years as a TV Teacher</th>
<th>Training Hours Teacher</th>
<th>Attitude A&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Attitude B&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Attitude C&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Respondent</td>
<td>.64*</td>
<td>.08</td>
<td>.24</td>
<td>-.07</td>
<td>-.14</td>
<td>-.04</td>
<td></td>
</tr>
<tr>
<td>Years in Education</td>
<td></td>
<td>.11</td>
<td>.22</td>
<td>-.03</td>
<td>-.10</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>Years as a TV Teacher</td>
<td></td>
<td></td>
<td>-.05</td>
<td>-.06</td>
<td>.15</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>Hours of Training</td>
<td></td>
<td></td>
<td>.03</td>
<td>-.02</td>
<td>-22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude A&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.22</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Attitude B&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.32</td>
<td></td>
</tr>
<tr>
<td>Attitude C&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Attitude of respondent toward ability as a K-12 interactive TV teacher.

<sup>b</sup>Attitude of respondent toward being a K-12 interactive TV teacher.

<sup>c</sup>Attitude of respondents toward training to be an interactive TV teacher.

*Significant at .05 level.
means of the three subtests were computed. A favorable attitude was determined if the score was at or below the midpoint of total possible points. An unfavorable attitude was determined if the score was above midpoint of the total possible points (Table 2).

Perceptions of ability as K-12 interactive TV teachers

Subtest: What are K-12 interactive TV teachers perceptions of their personal ability as TV teachers (ATAbTVT)?

The results of the subtest, ATAbTVT, indicated a mean score of 25.20 (Table 2). The highest possible score indicating a negative attitude was 60. A favorable attitude score was 30 or below. With regard to the sample as a whole, the mean score reflects a positive attitude in relation to perception of personal ability as an interactive TV teacher.

K-12 interactive TV teachers' attitudes toward TV teaching

Subtest: What are K-12 interactive TV teachers attitudes toward being a TV teacher (ATBeTVT)?

Table 1 indicates respondents to the ATBeTVT had a slightly negative attitude toward interactive TV teaching (x= 26.60). The subtest, ATBeTVT, had a possible total score of 50. A score at 25 or below was considered to reflect a positive attitude.

K-12 interactive TV teachers' attitudes toward their training

Subtest: What are K-12 interactive TV teachers' attitudes toward their training in preparation for teaching on television (ATTTrTVT)?
The mean of the subtest ATTrTVT (21.48) indicated that the TV teachers surveyed had favorable attitudes overall toward the training they underwent in preparation for teaching at a distance. The total possible score for the ATTrTVT was 45. A positive attitude was considered to exist if the score was 22.5 or below.

Additional Analyses

An analysis of the descriptive statistics carried out for K-12 interactive TV teacher characteristics indicated that a Pearson product moment correlation and a t-test would be appropriate to explore interrelationships and differences between variables.

Correlation

The Pearson product moment correlation technique was used to determine the strength of the relationships between the characteristics of K-12 interactive TV teachers and the score of each subtest relating to the attitudes of the respondents. The characteristics analyzed were (1) gender of respondent, (2) the number of years employed in education, and (3) the number of years employed specifically as an interactive TV teacher.

A moderately positive, and obvious, expected relationship (.63) was found between the age of the respondents and the number of years they had been employed in education. This was the highest correlation coefficient appearing in the matrix (Table 3). The remaining results of the Pearson
product moment correlations were not significant or revealing with regard to this research study.

**The t-test**

The t-test was used at the to determine whether there was a significant difference between males’ and females’ scores on the subtests making up Part III of the K-12 Interactive TV Teacher Survey. The average scores for two of the three subtest scores for males and females were nearly identical; however, an analysis of the subtest score for attitude toward ability indicated that males held a more negative attitude in this regard (Table 4). Restated, the t-test (p < .01) revealed that males generally were more negative in their assessments of personal ability as interactive TV teachers than were females. Another t-test was used to determine whether there were significant differences between respondents who had received financial incentives and for those who had not. No significant differences were found between these two group’s attitudes (Table 5).

A third t-test was conducted to evaluate differences between respondents who had training and those who had not. The results indicated no significant differences between the respondents’ scores on two of the attitude subtests. The means for the subtest, attitude toward training were significantly different (p < .01) (see Table 6).
Table 4. T-test: Gender of interactive TV teachers by score of attitude subtests

<table>
<thead>
<tr>
<th>Subtest</th>
<th>N</th>
<th>x</th>
<th>SD</th>
<th>t-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude toward ability as TV teacher</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>26.41</td>
<td>4.38</td>
<td>2.70</td>
<td>.007**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.20)</td>
<td>(.36)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>89</td>
<td>24.42</td>
<td>4.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.03)</td>
<td>(.37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attitude toward being a TV teacher</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>26.43</td>
<td>5.20</td>
<td>-.23</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.64)</td>
<td>(.52)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>89</td>
<td>26.62</td>
<td>5.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.66)</td>
<td>(.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attitude toward training</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>59</td>
<td>21.38</td>
<td>4.27</td>
<td>-.14</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.37)</td>
<td>(.47)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>85</td>
<td>21.49</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.38)</td>
<td>(.44)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a*Lower scores = more positive attitude.

*b*Mean score divided by number of subtest items (range = 1-5).

*c*SD divided by number of subtest items (range = 1-5).

**Significant at .01 level.
Table 5. T-test: Receiving of financial incentive/reward by score of attitude subtests$^a$

<table>
<thead>
<tr>
<th>Subtest</th>
<th>N</th>
<th>x</th>
<th>SD</th>
<th>t-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward ability as TV teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No $$ incentives</td>
<td>111</td>
<td>25.04</td>
<td>4.48</td>
<td>-.54</td>
<td>.59</td>
</tr>
<tr>
<td>(2.08)$^b$</td>
<td></td>
<td>(.37)$^c$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes $$ incentives</td>
<td>40</td>
<td>25.50</td>
<td>4.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2.12)</td>
<td></td>
<td>(.38)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude toward being a TV teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No $$ incentives</td>
<td>111</td>
<td>26.83</td>
<td>5.36</td>
<td>1.04</td>
<td>.29</td>
</tr>
<tr>
<td>(2.68)</td>
<td></td>
<td>(.53)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes $$ incentives</td>
<td>40</td>
<td>25.85</td>
<td>4.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2.58)</td>
<td></td>
<td>(.42)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude toward training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No $$ incentives</td>
<td>106</td>
<td>21.70</td>
<td>4.14</td>
<td>1.108</td>
<td>.26</td>
</tr>
<tr>
<td>(2.41)</td>
<td></td>
<td>(.46)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes $$ incentives</td>
<td>37</td>
<td>20.83</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2.31)</td>
<td></td>
<td>(.44)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a$Lower scores = more positive attitude.

$^b$Mean score divided by number of subtest items (range = 1-5).

$^c$SD divided by number of subtest items (range = 1-5).
Table 6. T-test: Respondents with and without training by score of attitude subtests

<table>
<thead>
<tr>
<th>Subtest</th>
<th>N</th>
<th>x</th>
<th>SD</th>
<th>t-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude toward ability as TV teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No training</td>
<td>48</td>
<td>24.95</td>
<td>4.68</td>
<td>-.450</td>
<td>.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.07)</td>
<td>(.39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With training</td>
<td>105</td>
<td>25.31</td>
<td>4.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.10)</td>
<td>(.37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude toward being a TV teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No training</td>
<td>48</td>
<td>26.08</td>
<td>4.54</td>
<td>-.954</td>
<td>.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.60)</td>
<td>(.45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With training</td>
<td>105</td>
<td>26.86</td>
<td>5.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.68)</td>
<td>(.53)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude toward training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No training</td>
<td>48</td>
<td>22.95</td>
<td>4.72</td>
<td>2.71</td>
<td>.007**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.55)</td>
<td>(.52)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With hours training</td>
<td>105</td>
<td>20.92</td>
<td>3.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.32)</td>
<td>(.41)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aLower scores = more positive attitude.
bMean score divided by number of subtest items (range = 1-5).
cSD divided by number of subtest items (range = 1-5).
**Significant at .01 level.
Summary

The K-12 Interactive TV Teacher Survey was distributed to 241 teachers who had previously or were currently teaching on television. A total of 241 surveys were distributed and 165 were returned. Of the 165 returned 157 had been filled out. The questionnaire results were analyzed using percentage and raw scores.

The data revealed that generally, K-12 interactive TV teachers held positive attitudes toward their ability as interactive TV teachers. A slightly negative attitude toward interactive TV teaching generally was found to exist in the respondents as a whole. The TV teachers surveyed had favorable attitudes overall toward the training they underwent in preparation for teaching at a distance.

The Pearson moment correlations that were computed revealed little in terms of significant relationships. Results of the t-tests indicated a significant difference in the mean scores of the subtest, ATAbTVT for male and female interactive TV teachers. Males held more negative attitudes (p < .01) of their ability as TV teachers. A second t-test was computed to examine the differences among the respondents who had received and who had not received financial incentives. The t-test showed no significant differences between their subtest scores.

A third t-test (Table 6) showed a significant difference between the mean scores for the subtest ATTrTVT among those without training and those with training (p < .01). Respondents without training to be interactive TV teachers
and who responded to the subtest showed negative attitudes toward their training (or lack of training).
CHAPTER V. CONCLUSIONS

Once a need for implementing interactive televised instruction has been identified, effective training and inservice programs can be organized, implemented, and evaluated. The issue of quality teaching in distance education is repeatedly emphasized in the literature. Positive attitudes, a high degree of motivation, enthusiasm and charisma are important qualities of teachers who teach on television. It is not realistic to assume school systems need only choose individuals with these qualities already intact. In order for these characteristics to be present teachers need adequate training, preparation and on-going support so they can be successful at their task. Determining the opinions of TV teachers with regard to the training they received in preparation for teaching at a distance will give insight into improving the training programs and in turn, the quality of the classes that these teachers undertake to teach.

A variety of factors may influence a teacher’s perception of the training they have undergone. Training can increase the belief that one has acquired skills and raise self-efficacy. The effectiveness of a training program may be indicated by teachers’ perceptions of ability with regard to the skills learned. The purpose of this study was to examine teachers’ attitudes toward interactive televised instruction, the type of training they had received, and their perceptions of their ability as interactive TV teachers.

Chapter V reviews Chapters I through III and restates the 7 research questions. The research questions and results are discussed, based on the data collected from the questionnaire and reported in Chapter IV.
Implications and suggestions for further study of teaching at the K-12 level via interactive TV technologies are also included in this chapter.

Review of Chapters I, II, and III

When a traditional teaching/learning environment is not possible, the use of various technologies can simulate, approximate, or at least in some ways supplement aspects of the traditional classroom environment. A distance education program usually begins with a need. Needs for distance education in this country have arisen from teacher shortages, shrinking population bases in rural areas, lack of educational equity in urban and rural schools, and similar problems. Some distance education programs are large and reach many students, and others are small and reach only a few. In the previous two decades educational communications technologies used in distance education have varied and have included broadcast and cable television, videotext, videodiscs, low power television, microwave technology, fibre optics, microcomputer networks, satellite technology, as well as combinations of these.

Research questions

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

1. Who chooses to become an interactive television teacher and what constitutes programs that are available to train these teachers?
2. What are interactive television teachers’ perceptions of the strengths and weaknesses of interactive TV technologies for instruction?

3. To what degree are teachers of interactive TV instruction involved in the creation and revision of educational program materials?

4. Do distance education teachers feel that the training they have had fully addresses the needs they have to be successful in this type of teaching/learning environment?

5. How do interactive TV teachers rate their personal effectiveness.

Review of the literature

The review of the literature addressed three areas of concern in this study: (1) discretely different behaviors/characteristics required of interactive TV teacher teachers, (2) attitudes toward interactive televised instruction, and (3) the relationship between perceived teacher effectiveness, group efficacy and adoption/diffusion theory.

Research studies relating to education have indicated that teacher behaviors exert a major influence upon learning outcomes. Barker’s (1988) study indicated that teachers employed by the TI-IN interactive satellite system exhibited appropriate and effective teaching behaviors and that quality instruction can and does occur via satellite TV instruction. Teaching behaviors that may be important for the “electronic classroom” were described sometimes directly and indirectly in the literature. These discretely different behaviors/characteristics required of the interactive TV teacher were diverse and included “projecting style and personality in new ways, operating new technology” (Batey & Cowell, 1986) and the need for “excellent
organizational skills" (Levinson, 1984). A variety of handbooks have been published that focus on teaching interactive television classes. The majority were geared toward higher education, although some related to teaching at the secondary level. Some of the topics typically included in these guides were "technical orientation" and "designing an interactive study guide" (Cyrs, 1988).

Research dealing with teachers' attitudes toward interactive televised instruction included studies whose samples consisted of those with and without experience teaching on television with interactive technologies. Overall, positive attitudes toward the technology were found to prevail in the teachers surveyed.

A variety of studies relating to the construct of self-efficacy were found and related to teacher effectiveness. A study addressing the relationship of personal perceptions of efficacy and participation in the planning of an in-service training program was described (VonEschenbach, 1980).

The components of Rogers' theory of the Adoption and Diffusion of Innovations were also presented in Chapter II. The relationship between perceived teacher effectiveness, group efficacy and adoption/diffusion theory was explored. Perceived professional competence on the part of interactive TV teachers resulting from training may positively affect teacher participation and thereby influence future adoption and diffusion of interactive televised instruction.
Methodology

A mailed questionnaire, called K-12 Interactive TV Teacher Survey (ITVTS) was developed following the procedure prescribed in Henerson, Morris, and Fitz-Simmons (1978). The items in the survey were directly related to one of the research questions addressed by this study. The questionnaire was divided into three parts. The purpose of Part One was to obtain descriptive information about the interactive TV teachers who made up the sample. Part II of the survey consisted of questions relating to background information about the distance course(s) taught by the respondents. The purpose of Part III was to determine the attitudes of K-12 interactive TV teachers toward three constructs: interactive TV teaching, training in TV teaching (if any) and personal perceptions of ability as interactive TV teachers. The sample was identified mainly by calling the state departments of education in regions throughout the country. Two-hundred and forty-one interactive TV teachers teaching at the K-12 level were sent a copy of the survey.

Discussion of Results

Characteristics of the sample

The purpose of Part One and Part Two of the questionnaire was to obtain a descriptive profile of the respondents and to gather information about their training, degree of use and degree of knowledge with regard to interactive TV technologies. Based on frequency distributions computed for
each question, the K-12 interactive TV teachers could generally be described as follows:

1. The interactive TV teachers were predominantly female (59.62%).
2. K-12 interactive TV teachers that were between 40 and 50 years of age comprised 47.02% of the respondents.
3. Of the K-12 TV teachers responding, 39.10% held a master’s degree.
4. A plurality of the teachers had 10-20 years of teaching experience (41.94%).
5. The interactive TV teachers were mainly certified at the secondary level (72.44%).
6. The majority of respondents were TV teachers at the time they completed the survey (91.67%).
7. National educational organizations most frequently listed by the respondents included the National Education Association, the National Council for Teachers of Math, the National Council for Teachers of English, the American Council for Teachers of Foreign Languages and the National Science Teachers Association.
8. Most periodical literature listed by them as ones they read did not pertain to distance teaching.
9. Most of respondents had been involved with teaching on television from 1-5 years (96.15%).
10. Among those responding, 28.89% indicated having undergone 1-10 hours of training for teaching on television.
11. Technologies included in order of most frequently used in distance education systems they were familiar with were: fibre optics, cable
TV, satellite, and microwave Other technologies listed in order of most frequently used included, videotape, telephone lines, electronic mail, computers, and computer conferencing.

(12) The category which respondents most frequently listed that they had received training in was “correct teaching demeanor” Categories for which the least amount of training had been received included instructional study guides, and instructional design models.

(13) The TV teachers mainly reported moderate satisfaction with the quality of interaction between themselves and their students.

(14) Most of the respondents indicated that they had been involved in the planning and design of instruction in the programs in which they taught (97.87%).

(15) The majority of respondents had not received financial incentives for their involvements in interactive TV teaching at the K-12 level (72.90%).

The questionnaire identified respondents who had no training and those who had varying degrees of training. The majority of respondents indicated that the technical aspects of their training was adequate, however, less than half of respondents indicated having had training in the use of instructional study guides, questioning techniques that might facilitate interaction, use of visual material for TV teaching, and the use of instructional design models Slightly over half the respondents had had training dealing with the “correct demeanor” for teaching on television. The lack of training in these areas leads to the conclusion that the majority of
training programs for TV teaching do not include instruction dealing with most of these skills.

The results also suggest that most interactive televised instruction in elementary/secondary education is being conducted at the secondary level. The results indicated that teachers involved in teaching on television at this level had advanced degrees in education and have a great deal of experience.

Attitudes of K-12 interactive TV teachers

Each of the sub-tests in Part III of the survey were designed to describe the attitudes of K-12 interactive TV teachers. The 31 questions in Part III were placed into 3 subtests designed to measure a difference attitude construct. A low score for each of the three subtests indicated a more positive attitude, and a high score, a more negative one. The subtests were designed to answer specific research questions in this study. The results of the subtests showed positive attitudes overall.

With regard to the sample as a whole, the mean score reflects a positive attitude in relation to perception of personal ability as an interactive TV teacher (x=25.20, highest possible score = 60). The positive attitudes toward personal ability may partly be due to the fact that many teachers surveyed were educated beyond minimum requirements for their professions (70% had credits toward or a master’s degree or held a master’s degree) and that most had 10-20 years of experience as teachers. The length of experience and length of education of the respondents may contribute to increased perception of personal ability and confidence in relation to teaching in general, and in being a TV teacher as well.
The results showed that K-12 interactive TV teacher’s attitudes toward being a TV teacher were slightly negative (x= 26.60 possible score = 50). The results of this study showed that there was no relationship between financial incentives and attitude toward being a TV teacher. TV teachers may feel isolated in the sense that other interactive TV teachers may not be available to relate to in reference to discussion of conflicts and problems encountered while teaching on TV.

TV teachers surveyed had favorable attitudes overall toward the training they underwent in preparation for teaching at a distance (21.48, possible score = 45). Positive attitudes toward training may indicate that needs in this area are being fulfilled to some degree. There may be needs that are not being met unknown to the teachers doing the teaching.

The Pearson product moment correlation technique was used to determine the strength of the relationships between the characteristics of K-12 interactive TV teachers and the score of each subtest relating to the attitudes of the respondents. The characteristics analyzed were (1) gender of respondent, (2) the number of years employed in education, and (3) the number of years employed specifically as an interactive TV teacher. The results of the Pearson product moment correlation were not significant or revealing with regard to this research study.

The t-test was used at the to determine whether there was a significant difference between males' and females' scores on the subtests making up Part III of the K-12 Interactive TV Teacher Survey. The means for two of the three subtest scores for males and females were nearly identical; however, an analysis of the subtest score for attitude toward ability indicated that males
held a more negative attitude toward their personal ability as interactive TV teachers than did females.

Another t-test was used to determine whether there were significant differences between respondents who had received financial incentives and for those who had not. No significant differences were found between these two groups in relation to their attitude subtest scores.

A third t-test was conducted to evaluate differences between respondents' scores for the three attitudes tests and training. The two groups included those who had undergone training and those who had not. There were no significant differences in the mean scores for those with and without training for the attitude subtests relating ability as a TV teacher and attitude toward being a TV teacher. There was a difference in the two groups mean scores on the attitude test relating to attitude toward training. This was an obvious and expected difference.

Suggestions for Future Research

There is a need for additional research in the area of K-12 interactive televised instruction and in the area of training for teaching at a distance. Several respondents expressed appreciation that research was being carried out in this area and requested results of this study. One respondent requested more detailed information relating to the definitions of terminology furnished in the survey and any other references relating to teaching on television.
There is further need for exploration relating to what is necessary to train teachers for teaching on television. Additional research might examine the methods of teachers using interactive technologies to determine if the attributes of the medium are being used to the advantage of the teachers themselves and their students.

Additional research should include investigation of the role that directors and trainers for interactive TV programs play in televised instruction. The issue of how decisions are made by trainers with regard to what constitutes a training program for TV teachers should be addressed.

Research dealing with other forms of interactive technologies for instruction should be conducted. For example, some distance education programs at the K-12 level utilize audiographics, a microcomputer-based system that involves the use of graphics tablets. A special modem allows data and voice transmission over phone lines. Students and teacher communicate by writing on the graphics tablets, the output from which is displayed on computer screens. The attitudes of teachers toward the use of other types interactive technologies for instruction should be investigated as well.

An additional investigation that more fully addresses the attitudes of K-12 interactive TV teachers might yield a different set of results. The generalization of the results of this study was limited by the number of subtest items used for each attitude construct examined in this study.
Summary

This study described the characteristics of K-12 interactive TV teachers as well as the technologies and techniques they used while teaching on television. The teachers were characterized as highly educated and experienced teachers. The majority of teachers taught on television at the secondary level. Five research questions were developed to address the purpose of this research and questionnaire was designed to provide answers to these questions.

The data from the survey were analyzed to provide a profile of K-12 TV teachers to determine their attitudes toward their ability as TV teachers, toward being TV teachers and toward their training for teaching at a distance. Generally, this study found that K-12 interactive TV teachers held positive attitudes toward their ability as TV teachers, as well as toward their training for teaching at a distance. A slightly negative attitude was found to exist with regard to the respondents' opinion of the appropriateness of interactive TV teaching. It was also noted that males had more negative attitudes toward their personal ability as K-12 interactive TV teachers than did females.

The issue of quality teaching in distance education is repeatedly emphasized in the literature. While it is important to focus upon the needs of the learner, these needs cannot be met without preparing teachers to teach effectively. Positive attitudes, a high degree of motivation, enthusiasm and charisma are important qualities of teachers who teach on television. For these qualities to be present, teachers need adequate training, preparation and support so they can be successful at their task.
REFERENCES


Iowa Administrative Code, § 281-15 1-6, 1990.


Star Schools Program, Chapter 6, 102, Statute 1487 Public Law 100-418, Title IX, (8-23-88).


ACKNOWLEDGMENTS

I would like to thank my Major Professor, Dr. Michael Simonson, for all the time, effort and encouragement he expended in my behalf. His enthusiasm for the research process was contagious and helped me persist in completing my goal.

I would also like to thank the other members of my Program of Study Committee, Dr. Roger Volker and Dr. Thomas Andre, for their interest, suggestions and support.

A great deal of appreciation goes to the state department officials, interactive television directors, and professors involved with distance education, who were instrumental in helping me locate the sample of TV teachers for this study.

A special thank you is given to my husband, Michael, and daughter Amber, for their continued support, understanding and patience, especially in the last weeks of completing this study.
APPENDIX A. DOCUMENTATION OF SAMPLE REQUESTS
Dear Mr. Reese:

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

My study will in part attempt determine what discreetly different teaching skills may be required of the interactive TV teacher as compared to the traditional classroom teacher. In addition, the focus of my research concerns the perceptions and attitudes of interactive TV teachers toward their involvements with distance teaching in general; and toward what they think training programs for distance teaching should consist of. I believe the perceptions of practicing TV teachers have significant implications for improving future distance education programs in k-12 public education.

As an important aspect of my research I would like to distribute a survey to interactive TV teachers represented in states throughout the country. In order to analyze data for at least 100 respondents, I would like to distribute the survey to a sample of 200 interactive TV teachers. While there seems to be a definite need for distance education and interactive TV teachers in the United States, programs that originate within the home state and that utilize local teachers are rare. It is for this reason that I would like to request permission to obtain the names of teachers employed in South Carolina who are involved with teaching via interactive television technologies at the K-12 level.

Enclosed is a copy of the survey instrument to be sent to the subjects for the study. Also enclosed is a copy of the cover letter to be sent with the survey. I feel my research can make a significant contribution in the area of interactive televised instruction and to improved training programs for teachers teaching on television. I would be pleased to furnish you with additional information at your request. Due to deadlines imposed by graduation guidelines, I am operating under time constraints. Your attention to my request will be greatly appreciated. Thank you for your consideration.

Robert Reese
Office of Instructional Technology
205 Rutledge
1429 Senate
Columbia, South Carolina 29201
March 30, 1990

Robert Hale
Connecticut State Dept. of Ed.
Box 2219
Hartford, CN 06145

Dear Mr. Hale:

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

My study will in part attempt determine what discreetly different teaching skills may be required of the interactive TV teacher as compared to the traditional classroom teacher. In addition, the focus of my research concerns the perceptions and attitudes of interactive TV teachers toward their involvements with distance teaching in general; and toward what they think training programs for distance teaching should consist of. I believe the perceptions of practicing TV teachers have significant implications for improving future distance education programs in k-12 public education.

As an important aspect of my research I would like to distribute a survey to interactive TV teachers represented in states through the country. In order to analyze data for at least 100 respondents, I would like to distribute the survey to a sample of 200 interactive TV teachers. While there seems to be a definite need for distance education and interactive TV teachers in the United States, programs that originate within the home state and that utilize local teachers are rare. It is for this reason that I would like to request permission to obtain the names of teachers employed in Connecticut who are involved with teaching via interactive television technologies at the K-12 level.

Enclosed is a copy of the survey instrument to be sent to the subjects for the study. Also enclosed is a copy of the cover letter to be sent with the survey. I feel my research can make a significant contribution in the area of interactive televised instruction and to improved training programs for teachers teaching on television. I would be pleased to furnish you with additional information at your request. Due to deadlines imposed by graduation guidelines, I am operating under time constraints. Your attention to my request will be greatly appreciated. Thank you for your consideration.

Graduate Student

Michael R. Simonson,
Professor

Enclosures
APPENDIX B. COVER LETTERS AND SAMPLE QUESTIONNAIRE
Dear TV Teacher:

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

My study will in part attempt to determine what discreetly different teaching skills may be required of the interactive TV teacher as compared to the traditional classroom teacher. In addition, the focus of my research concerns the perceptions and attitudes of interactive TV teachers toward their involvements with distance teaching in general; and toward what they think training programs for distance teaching should consist of. I believe the perceptions of practicing TV teachers have significant implications for improving future distance education programs in k-12 public education.

An identification number has been assigned to the survey sent to you. The numbers will allow me to check your name off the mailing list when the questionnaire is returned. The completed survey will not be associated with your name and will be destroyed immediately after the data has been collected. Your responses will be kept in strict confidence and will only be used in group averages.

The survey can conveniently be completed within 10 minutes; however, it is your option to abstain from participating in this research study. Please return the survey in the return postage paid envelope within a week, whether you choose to compete the survey or not. Before you begin the survey you may want to refer to the back two pages where terminology that may need clarification is defined. A postage paid return envelope is included for your convenience.

I feel my research can make a significant contribution in the area of interactive televised instruction and to improved training programs for teachers teaching on television. The responses you express are highly valued and appreciated. I would be pleased to furnish you with additional information at your request.

Respectfully,

E. Jane Chinn,
Graduate Student

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

Enclosure
Dear TV Teacher:

In early May I sent you a survey concerning your involvements in teaching at a distance but have not received it at this time. If you have returned the survey, I would like to express thanks and have you please disregard this letter.

I am attempting to obtain as many responses as possible. The more responses received the better the survey will represent the characteristics and perceptions of K-12 interactive TV teachers. Enclosed is another survey and return postage paid envelope. Unfortunately, deadlines are approaching, so please take 10 minutes to fill out the questionnaire and return it within two days.

Again, I would like to restate my belief that the perceptions of practicing TV teachers can have significant implications for improving future distance education programs in K-12 public education. I would be happy to send you a summary of the survey results if you so indicate. Thank you for your cooperation.

Respectfully,

E. Jane Chinn,
Graduate Student

Michael R. Simonson,
Professor
(515) 294-6840
K-12 LEVEL
INTERACTIVE TV TEACHER
SURVEY

Jane Chinn
N031 Lagomarcino Hall
Iowa State University
Ames, Iowa 50011
515-294-6840
K-12 Interactive TV Teacher Survey

Your responses will be kept confidential and will only be used in group averages. All surveys will be destroyed after the data has been recorded.

I. Background Information
   First, could you tell us a little about yourself. Please circle the letter or fill in the blank that describes you or your situation.

School District Name
City, State

1. I am
   a. Female
   b. Male

2. My age is ______

3. I have successfully completed (circle the most relevant)
   a. an undergraduate college degree
   b. credits toward a master's degree
   c. a master's degree
   d. credits toward a Doctorate
   e. a Doctorate degree

4. How many years have you been employed in education
   ___________

5. My endorsements include
   a. elementary
   b. secondary
   c. both
   d. other

6. Are you currently employed as an interactive TV teacher or have you been employed in this specific capacity in the past 5 years?
   yes ( )   no ( )

7. To what professional organizations do you belong? Please list them below.
   __________________________________________
   __________________________________________
   __________________________________________

8. Please list below any periodical literature that you read or subscribe to that deals in part or wholly with the area of distance education.
   __________________________________________
9. How long have you been an interactive TV teacher? ________________

10. What is the total length of time in terms of hours and or credits that you have spent in training for teaching on television that includes interaction (two way audio, one way video, or two way audio and two way video)?

   hours  credits

11. A list of delivery technologies is organized by its primary presentation form below. What types of presentation forms have you used or are you presently using as an interactive TV teacher? Have you received training for the use of these technologies? Please place a check under the appropriate response.

   A. Print Based Media
      1. interactive study guides  (  )  (  )
      2. textbooks  (  )  (  )

   B. Audio Based Media
      1. audio conferences  (  )  (  )
      2. radio courses  (  )  (  )

   C. Broadcast Media
      1. full Power Broadcast ITFS  (  )  (  )
      2. cable  (  )  (  )
      3. microwave  (  )  (  )
      4. fiber optics  (  )  (  )
      5. satellite  (  )

   D. Other Media
      1. videotapes  (  )  (  )
      2. video disc  (  )  (  )
      3. slow scan tv  (  )  (  )
      4. computers  (  )  (  )
      5. phone lines  (  )  (  )
      6. electronic mail  (  )  (  )
      7. computer conferencing  (  )
      8. audiographic technologies  (  )  (  )
Part II.

The following questions concern your background and experiences relating to teaching at a distance. For the first of the three types of questions place an x in the space which best applies to your situation. For the second and third types of questions please circle the answer that best describes your experience or situation.

Please interpret the three questions below by completing it with the following words in bold.

**Interactive Study Guides (ISG's)**

1. Have you received Training in using ISG's?
   - Yes ( ) No ( )
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

2. How much do you know about ISG's?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

3. How often do you use ISG's?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

**Visual Material for Teaching on Television (VMTV)**

1. Have you received Training in using VMTV?
   - Yes ( ) No ( )
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

2. How much do you know about VMTV?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

3. How often do you use VMTV?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

**The Correct Teaching Demeanor for Teaching on Television (TV Dem)(please see definition of terms on last page)**

1. Have you received Training in using TV Dem?
   - Yes ( ) No ( )
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

2. How much do you know about TV Dem?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

3. How often do you use TV Dem?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal
Please interpret the three questions below by completing them with the following words in bold:

**Questioning Techniques for Teaching on TV (QTIV)**

1. Have you received Training in using QTIV?
   - Yes ( ) No ( )
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

2. How much do you know about QTIV?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

3. How often do you use QTIV?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

**Instructional Design Models (IDM)**

1. Have you received Training in using IDM?
   - Yes ( ) No ( )
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

2. How much do you know about IDM?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

3. How often do you use IDM?
   - a. none
   - b. a little
   - c. a moderate amount
   - d. quite a bit
   - e. a great deal

Please circle the correct response below.

11. How satisfied do you feel with the quality of the exchanges between you and your students when teaching on TV?
   - a. not at all satisfied
   - b. less than satisfied
   - c. moderately satisfied
   - d. very satisfied
   - e. greatly satisfied

14. As an interactive TV teacher, are you involved in the planning and design of the instruction?
   - yes ( ) no ( )

15. Does your school district provide additional financial incentives/rewards for your involvement in distance education?
   - yes ( ) no ( )
Part III, Section A

Please circle the response below that indicates your agreement/disagreement with the items. Please circle only one and do not mark between the letters.

1. As a TV teacher, I make/made assessments of my own TV teaching attitudes and capabilities on an ongoing basis and try to plan for continual professional development.

   SA A U D SD
   I________ I________ I________ I________ I

2. As a TV teacher I select and utilize a variety of distance teaching materials and technologies in an effective manner.

   SA A U D SD
   I________ I________ I________ I________ I

3. As a TV teacher I maintain an appropriate TV teaching demeanor that includes projecting style and personality in new ways.

   SA A U D SD
   I________ I________ I________ I________ I

4. As a TV teacher I design and prepare very detailed lessons well in advance of delivery.

   SA A U D SD
   I________ I________ I________ I________ I

5. As a TV teacher I am proficient at presenting lessons according to strict and inflexible time schedules.

   SA A U D SD
   I________ I________ I________ I________ I

6. I am confident about my abilities as a TV teacher.

   SA A U D SD
   I________ I________ I________ I________ I

7. I feel my style of teaching is appropriate for TV teaching situations.

   SA A U D SD
   I________ I________ I________ I________ I

8. Teaching on TV is just as easy for me as teaching in a regular classroom.

   SA A U D SD
   I________ I________ I________ I________ I
9. I have to think about my method of teaching more when I teach on TV than I do in a regular classroom.

          SA   A   U   D   SD
          I____________I__________I__________I____________I

10. I use different teaching skills when I teach on TV than I would in a regular classroom.

          SA   A   U   D   SD
          I____________I__________I__________I____________I

11. I wish I gave more feedback to my students as a TV teacher.

          SA   A   U   D   SD
          I____________I__________I__________I____________I

12. Planning for the provision of social and emotional needs of students involved in distance learning is much harder for me than I thought it would be.

          SA   A   U   D   SD
          I____________I__________I__________I____________I

Part III, Section B

1. I like being a TV teacher.

          SA   A   U   D   SD
          I____________I__________I__________I____________I

2. Only the best teachers should be TV teachers

          SA   A   U   D   SD
          I____________I__________I__________I____________I

3. TV teachers should be paid more than regular teachers teaching the same topic

          SA   A   U   D   SD
          I____________I__________I__________I____________I

4. It is exciting to teach students at a distance using TV.

          SA   A   U   D   SD
          I____________I__________I__________I____________I
5. I didn’t want to teach a TV course initially, but after being more fully involved I found it enjoyable.

       S A   A   U   D   S D
       I________I________I________I________I

6. I volunteered to be a TV teacher.

       S A   A   U   D   S D
       I________I________I________I________I

7. TV teaching is necessary for the future success of rural as well as urban schools.

       S A   A   U   D   S D
       I________I________I________I________I

8. There are more advantages to TV teaching than to traditional classroom teaching.

       S A   A   U   D   S D
       I________I________I________I________I

9. I feel that discipline problems in the TV classroom are partly a result of the teacher not being physically present.

       S A   A   U   D   S D
       I________I________I________I________I

10. It is not possible to have as much control over students while teaching on TV as compared to the regular classroom.

       S A   A   U   D   S D
       I________I________I________I________I

Section III, Part C

1. My training taught me how to make and use interactive study guides, handouts and other learning materials for TV.

       S A   A   U   D   S D
       I________I________I________I________I
2. I feel that my training in TV teaching has improved my ability to interact with students.

   SA   A   U   D   SD
   I_____________________I

3. My training for teaching on television included advice on how to improve my mannerisms and teaching style.

   SA   A   U   D   SD
   I_____________________I

4. There are specific, and unique skills that a TV teacher needs to be taught about.

   SA   A   U   D   SD
   I_____________________I

5. My training for TV teaching helped me to become more organized.

   SA   A   U   D   SD
   I_____________________I

6. The technical aspects of my training fell short of teaching me what I feel I need to know to be effective while teaching on television.

   SA   A   U   D   SD
   I_____________________I

7. My TV teacher training gave me good ideas about student/teacher interaction.

   SA   A   U   D   SD
   I_____________________I

8. I should have had more practice time teaching on television as part of the training I underwent to prepare me as a TV teacher.

   SA   A   U   D   SD
   I_____________________I

9. My TV teacher training did not place enough emphasis upon preplanning of instruction.

   SA   A   U   D   SD
   I_____________________I

===============================================================================================
Thank you for completing this survey. A self addressed, stamped envelope is enclosed for convenient return of the survey.
===============================================================================================

TERMINOLOGY

Teaching Demeanor: The appropriate teaching demeanor for teaching on television includes concerns for appearance, pose, natural, positive projection of personality, attitude and enthusiasm. Teaching demeanor can be effected by voice quality, enunciation, and emphasis on words, as well as body language and pronunciation.

Questioning Strategies for TV Teaching: Questioning strategies for TV teaching lead the student to the appropriate cognitive level as expressed in course objectives and as measured in test items. Categories of question types include, trivia questions, study questions, provocative questions, linking questions, probing questions, hierarchical questions, and value questions.

Interactive Study Guides: An Interactive Study Guide is a highly organized set of student notes, graphics pictures, graphs, charts and activities that are used in conjunction with a videotape or live lecture. Key notes, phrases, or visual materials are printed in logical, numbered segments called displays. The student is required to respond in writing to questions posed by the instructor during the lecture in many displays. Key concepts and ideas are filled in within the display. (Cyrs 1989)

Fiber Optics: Light transmissions over glass cable. Digital transmissions provide large capacities for multiple channel activity. Can be simplex (one-way) or duplex (two-way) voice, data and video service.

Microwave: Point-to-point transmission system. Provides program audio and video plus capacity for additional voice and data material. Can be simplex or duplex.

Narrowcast: Transmission of programs to a specifically defined audience normally using the newer technology delivery systems. Sometimes referred to as a target audience, a limited audience, or a "narrow" audience, hence the name "narrowcast".

Interactive: Identifies live communications with either two-way audio and video, or two-way audio and one-way video. This provides for question-and-answer interactivity.

ITFS: Instructional Television Fixed Service is a point-to-multipoint transmission system. Provides program audio and video to the receive location with audio only on the return channel. With proper equipment, receive locations can be almost anywhere within the 20 miles of an ITFS transmitter.

Satellite: Point-to-multipoint transmission system. Provides program audio and video to many users over wide areas simultaneously. For response from viewer, telephone is utilized.

Distance Education: Keegan's (1986) definition is composed of five interdependent elements of which four can be applied to the unique characteristics of distance education at the K-12 level: 1) the separation of the teacher and the learner, 2) the contribution of an educational organization toward planning and provision of educational materials and student support materials, 3) the employment of media such as print, audio, video, or computer for the purposes of bringing together teacher and learner, 4) the prearrangement of two-way communication to allow the student to initiate and benefit from dialogue. The 5th element refers to the teaching of students as individuals rather than in a group situation which is not always applicable to k-12 distance education in the United States.
APPENDIX C. DOCUMENTATION OF HUMAN SUBJECTS APPROVAL
Information for Review of Research Involving Human Subjects
Iowa State University
(Please type and use the attached Instructions for completing this form)

1. Title of Project Teachers' Perceptions of their Ability as TV Teachers and their Attitudes toward their Training in Preparation for Teaching at a Distance

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the committee. Additions to or changes in research procedures after the project has been approved will be submitted to the committee for review. I agree to request renewal of approval for any project continuing more than one year.

E. Jane Chinn 3-25-90
Typed Name of Principal Investigator Date

31 North Lagomarcino Hall 294-6840
Department Campus Address Campus Telephone

3. Signature of ADV Date Relationship to Principal Investigator

Major Professor

4. Principal Investigator(s) (check all that apply)

☐ Faculty ☐ Staff ☑ Graduate Student ☐ Undergraduate Student

5. Project (check all that apply)

☐ Research ☑ Thesis or dissertation ☐ Class project ☐ Independent Study (490, 590, Honors project)

6. Number of subjects (complete all that apply)

100 # Adults, non-students # ISU student # minors under 14 # minors 14 - 17

7. Brief description of proposed research involving human subjects: (See instructions, Item 7. Use an additional page if needed.) A) The problem addressed by this study concerns determining what is required for the provision of quality interactive TV teacher training programs for K-12 level teachers. A survey will be sent to approximately 100 interactive TV teachers who are or who have taught on television at the k-12 level. The survey will consist of 3 parts that will attempt to gain descriptive information about the respondents; information concerning the professional characteristics of the respondents; and information relating to the attitudes of the respondents toward 3 constructs. The constructs include 1) attitudes toward involvement in teaching on television, 2) personal perceptions of ability as a TV teacher, 3) perceptions of the quality of the training undergone to be a TV teacher. B) The method for selection of the subjects involved contacting the (continued, see attached)

(Please do not send research, thesis, or dissertation proposals.)

8. Informed Consent:

☐ Signed informed consent will be obtained. (Attach a copy of your form.)
☒ Modified informed consent will be obtained (See instructions, item 8.)
☐ Not applicable to this project.
9. Confidentiality of Data: Describe below the methods to be used to ensure the confidentiality of data obtained. (See instructions, item 9.) Each of the surveys will have an identification number that will correspond to a number assigned to each respondent. The subjects will be informed that the numbers are simply to allow the researcher to check the respondents' names off the mailing list when the questionnaires are returned. The respondents will be assured that their names will never be put on the surveys themselves. In this way there will be no method of associating specific responses with any individuals. The respondents will be informed that the surveys will be destroyed immediately after the data has been rostered.

10. What risks or discomfort will be part of the study? Will subjects in the research be placed at risk or incur discomfort? Describe any risks to the subjects and precautions that will be taken to minimize them. (The concept of risk goes beyond physical risk and includes risks to subjects' dignity and self-respect as well as psychological or emotional risk. See instructions, item 10.)

There will be no involvement of risk or discomfort on the part of the respondents. The survey will take approximately 10 minutes to complete.

11. CHECK ALL of the following that apply to your research:
   - A. Medical clearance necessary before subjects can participate
   - B. Samples (Blood, tissue, etc.) from subjects
   - C. Administration of substances (foods, drugs, etc.) to subjects
   - D. Physical exercise or conditioning for subjects
   - E. Deception of subjects
   - F. Subjects under 14 years of age and/or Subjects 14 - 17 years of age
   - G. Subjects in institutions (nursing homes, prisons, etc)
   - H. Research must be approved by another institution or agency (Attach letters of approval)

If you checked any of the items in 11, please complete the following in the space below (include any attachments):

Items A - D Describe the procedures and note the safety precautions being taken.

Item E Describe how subjects will be deceived; justify the deception; indicate the debriefing procedure, including the timing and information to be presented to subjects.

Item F For subjects under the age of 14, indicate how informed consent from parents or legally authorized representatives as well as from subjects will be obtained.

Items G & H Specify the agency or institution that must approve the project. If subjects in any outside agency or institution are involved, approval must be obtained prior to beginning the research, and the letter of approval should be filed.
Checklist for Attachments and Time Schedule

The following are attached (please check):

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

13 [☐] Consent form (if applicable)

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

15. [X] Data-gathering instruments

16 Anticipated dates for contact with subjects:
   First Contact
   
   4-11-90
   
   Last Contact
   
   5-20-90

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

   5/18/90

18 Signature of Departmental Executive Officer  Date  Department or Administrative Unit

3/19/90  Prof. Studies

19. Decision of the University Human Subjects Review Committee:

[X] Project Approved   [☐] Project Not Approved   [☐] No Action Required

Patricia M. Keith  4-3-90
Name of Committee Chairperson  Date  Signature of Committee Chairperson
APPENDIX D. STEPS FOR CONSTRUCTING ATTITUDE TESTS
Steps for Constructing Attitude Tests

In order to develop the attitude tests for the final survey for this study I went through the following steps:

1) A group of graduate students were asked to assist in writing clearly favorable or clearly unfavorable statements related to the following attitude constructs: attitude toward being a TV teacher, attitude toward ability as a TV teacher, and attitude toward training to be a TV teacher. Before the group wrote the statements, I explained the purpose of the study and the relationship of the each attitude construct to the study.

2) From a list of 80 statements 64 of those written by the graduate students were selected to be included in the presurvey. Twenty-six statements made up the attitude construct, Attitude Toward Personal Ability as a TV Teacher; twenty-one statements made up the attitude construct, Attitudes Toward Being a TV Teacher; and seventeen statements were included for the attitude construct, Attitudes Toward Training to be a TV Teacher.

3) The statements were arranged in agreement scale format and mailed to a group of 15 graduate students who had taken a distance teaching workshop (see examples, Appendix E). The graduate students were sent a cover letter (see Appendix E) explaining the purpose of the pilot attitude survey and were asked to respond to the statements. In addition, the respondents were asked to indicate whether they thought the statements measured the appropriate attitude construct (see Appendix E).

4) Of the 15 people sent the pilot survey, 8 completed and returned it. Responses of the group of workshop participants were scored and identified as being high, indicating a positive attitude, or low, indicating a negative attitude. Of the eight students who returned the survey, 2 students' overall scores were considered in between the high or low score categories. These students' responses were not included in the item analysis.
5) For the 6 remaining presurveys I then carried out an analysis that determined the frequencies of each response (strongly agree, agree, undecided, disagree, strongly disagree) per item for high and low scorers. Strongly agree was counted as 5 points; agree, 4 points; undecided, 3 points; disagree, 2 points; and strongly disagree was counted as 1 point.

6) Those items that tended to be scored in the same way by high scorers and items scored similarly for low scorers were included in the attitude test for the final questionnaire. Below, Item A, shows a statement for which there was no consistently different response between people in either the low or high scoring groups. Item B, below, is shown as a statement that was included in the final survey because the responses for high scorers tended to be high and for low scorers, low. Items that clearly discriminated between high and low scorers were included in the attitude tests for the final questionnaire (see Appendix B, Part III).

**Item A (not included in final survey)**
Written for construct: Attitude toward personal ability as a TV teacher.

A. I am a good TV teacher because I am a good traditional classroom teacher

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**Item B (included in final survey)**
Written for construct: Attitude toward personal ability as a TV teacher.

B. As a TV teacher I maintain an appropriate TV teaching demeanor that includes projecting style and personality in new ways.

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APPENDIX E. EXAMPLES FROM PILOT SURVEY OF ATTITUDE CONSTRUCTS AND COVER LETTER
Note: The following are excerpts from the pilot survey for determining items to be included in the part of the final survey that measured attitudes.

ATTITUDE TOWARD ABILITY AS A TV TEACHER: Construct #1

1. As a TV teacher, I make/made assessments of my own TV teaching attitudes and capabilities on an ongoing basis and try to plan for continual professional development.

   SA  A  U  D  SD
   I_________I_________I_________I_________

Construct #1 Item 1: ______  ______  ______  ______  ______  
YES  NO  UNDECIDED

2. As a TV teacher I select and utilize a variety of distance teaching materials and technologies in an effective manner.

   SA  A  U  D  SD
   I_________I_________I_________I_________

Construct #1 Item 2: ______  ______  ______  ______  ______  
YES  NO  UNDECIDED

ATTITUDES TOWARD BEING A TV TEACHER: Construct #2

6. I feel more anxious as a TV teacher than when I teach in a traditional classroom environment.

   SA  A  U  D  SD
   I_________I_________I_________I_________

Construct #2 Item 6: ______  ______  ______  ______  ______  
YES  NO  UNDECIDED

7. Teaching on TV predisposes one to interact less with students than when teaching in a traditional classroom.

   SA  A  U  D  SD
   I_________I_________I_________I_________

Construct #2 Item 7: ______  ______  ______  ______  ______  
YES  NO  UNDECIDED
ATTITUDES TOWARD TRAINING TO BE A TV TEACHER: Construct #3

7. Some people are born with TV teaching skills and they should be TV teachers

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Construct #3, Item 7

YES  NO  UNDECIDED

8. Training for TV teachers must be very practical with many opportunities to teach on TV

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Construct #3, Item 8

YES  NO  UNDECIDED
Dear

I am preparing a survey to fulfill the requirements for a Master’s Degree in Curriculum and Instructional Technology. In part the survey will determine the perceptions of TV teacher’s toward their personal ability in relation to interactive teaching on television. In addition, information about TV teacher’s attitudes toward the training they underwent to prepare them to teach on television will be obtained.

Enclosed is a set of statements relating to 3 attitude constructs. The constructs are as follows: 1) attitudes toward television teaching, 2) attitudes toward the quality of the training for preparation to teach on TV and, 3) perceptions of personal ability for teaching on television. My major professor, Dr. Michael Simonson, and I feel that an evaluation of these statements by individuals such as yourself, who have undergone training for teaching at a distance, will provide us with invaluable information. Please indicate your agreement/disagreement with the statements. Included with the statements are evaluation items. Please read the statements and respond in the blanks provided whether you believe they relate to the corresponding attitude construct.

Please take the time to fill out the form and return it within one week. The timely evaluation of these attitude statements by someone like yourself is critical to the validity, and reliability of the final survey. The more responses we receive the better I will be able to develop a quality survey with statements that reflect the attitude constructs in question.

If you are interested in, or have any questions about the development of this survey, please send in the name and current address section on the last page. We will respond by sending you a final copy of the survey as well as a summary of the results if you so indicate. Thank you for your cooperation and support.

Sincerely,

E. Jane Chinn,
Graduate Student

Michael Simonson,
Professor

Enclosures
APPENDIX F. REVERSED ITEMS FOR SCORING OF ATTITUDE RATING SCALES
Reversed Items for Scoring of Attitude Rating Scales

Part III, Section A: Attitude Toward Ability as a TV Teacher

None

Part III, Section B: Attitude Toward Being a TV Teacher

3. TV teachers should be paid more than regular teachers teaching the same topic.

   SA  A  U  D  SD
   5___ 4___ 3___ 2___ 1

9. I feel that discipline problems in the TV classroom are partly a result of the teacher not being physically present.

   SA  A  U  D  SD
   5___ 4___ 3___ 2___ 1

10. It is not possible to have as much control over students while teaching on TV as compared to the regular classroom.

    SA  A  U  D  SD
    5___ 4___ 3___ 2___ 1

Part III, Section C: Attitude toward training to be a TV teacher

6. The technical aspects of my training fell short of teaching me what I feel I need to know to be effective while teaching on television.

   SA  A  U  D  SD
   5___ 4___ 3___ 2___ 1

9. My TV teacher training did not place enough emphasis upon preplanning of instruction.

   SA  A  U  D  SD
   5___ 4___ 3___ 2___ 1