Distance education, innovativeness, and teacher education: status in Iowa independent, four-year colleges and universities

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Distance education, innovativeness, and teacher education: Status in Iowa independent, four-year colleges and universities

by

Nancy Jean Pollock Maushak

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education (Curriculum and Instructional Technology)
Major Professor: Michael R. Simonson

Iowa State University
Ames, Iowa
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This is to certify that the Doctoral dissertation of

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For the Graduate College
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CHAPTER I. INTRODUCTION

New technologies alter the structure of our interests: the things we think about. They alter the character of our symbols: the things we think with. And they alter the nature of community: the arena in which thoughts develop. (Postman, 1992, p. 20)

During the last five years, new technologies have altered the "nature of community" in Iowa. With the construction of the Iowa Communications Network (ICN), a fiber optic network connecting all of Iowa's 99 counties, the technologies for changing the nature of education are in place. Educational communities across the state now have the capability of expanding the learning community beyond school district lines to include other districts within the state and even go beyond state and national boundaries to provide a worldwide community of learners. The range of educational possibilities expands the traditional definitions of distance education.

In order to employ this broad range of educational possibilities, "teachers must be trained if they are to use distance learning technologies effectively" (Linking for Learning, 1989, p.88). Both pre-service and in-service teachers need training beyond merely operating the technology. They need the skills and knowledge to not only use the technology but to integrate technologies into the curriculum effectively to provide broader learning experiences as well as new learning opportunities.

This chapter begins with an explanation of the background for this study including the evolution of distance education, distance education in Iowa and the integration of technology into teacher education. It concludes with identification of the purpose of the study including research questions and significance of the study.

Background for the study

Technological evolution of distance education

Distance education has existed in some form for over 150 years. The European origins of correspondence education using mail service may be found in an 1833 advertisement offering learners the opportunity to study "Composition through the medium of the Post" (Holmberg, 1986). While this occurred in Sweden, other instances of early correspondence education include a school formed in 1856 in Germany to teach languages by correspondence, and the British extension movement occurring out of Oxford and Cambridge in the late 1850s (Watkins, 1991).
In 1873, with the creation of a Boston-based program offering correspondence instruction to women of all classes, distance education began in the United States. Eastern universities, adapting the English model of extension, began offering "home-study" or correspondence courses aimed toward individuals whose work or financial situations prevented them from regular attendance (Watkins, 1991). At the turn of the century, education expansion led to the development of correspondence study programs at several midwestern universities. Perhaps the best examples of these programs can be found at the Universities of Chicago, Wisconsin, and Kansas (Watkins, 1991).

With each advent of a new communication technology advancement, the prevalent medium of distance education changed. In the 1920s, radio stations were established at many educational institutions. Land grant institutions continued offering independent study using this medium for several decades (Buckland & Dye, 1991). Though there was evidence of televised teaching programs existing in the early 1930s, it was not until the early 1950s that the first offerings of college credit courses via broadcast television occurred (Buckland & Dye, 1991).

Over the last twenty years, rapid advancements in communication technology have greatly changed the delivery of distance education. Microwave, satellite distribution, compressed video, fiber optic delivery, and web-based instruction employing the Internet allow distance education possibilities only dreamed about previously.

Minnesota used microwave technology to expand course offerings in underpopulated areas of the state. The Minnesota network had its beginnings in 1980 when three districts used two-way televised instruction to share teachers. During the next decade, the network expanded to serve 149 of 433 school districts allowing isolated communities to meet the minimum state requirements and promoting communication among districts (Descy, 1991).

In the early 1980s Learn/Alaska, the first state educational satellite system, began delivering courses to isolated communities (Johnson, 1988). Since 1985, TI-IN, a privately operated network out of San Antonio, has used satellite technology to deliver one-way video, two-way audio courses to high schools across the United States.

Fiber optics communication systems, developed in the late 1980s and early 1990s allowed expanded capabilities including two-way audio, two-way video and data transmission. Though use of fiber optics has a high initial cost, it is considered by many to be the least expensive alternative for delivering the high quality, two-way audio and video necessary for synchronous, interactive distance education (Thompkins, 1993).

Because it wanted to best duplicate the traditional classroom setting, the Panhandle Share-Ed Video Network in Oklahoma used a fiber based system that allowed digital, two-
way, full-motion, interactive video. This network connected 13 rural Oklahoma schools and Panhandle State University and provided expanded educational opportunities to a distinctly rural, underserved population (Currer, 1991).

Though the use of fiber optics technology is found, to some extent, in other states, the most extensive use of fiber optics for distance education is found in Iowa with the use of the Iowa Communications Network (ICN). The next section presents a summary of the history of distance education in Iowa.

**Distance education in Iowa**

Iowa has led the nation in recognizing various telecommunications technologies as a viable means of delivering instruction. In the 1970s, several rural southeast Iowa high schools utilized microwave technology to link their school districts providing a two-way audio and video network. Soon after, Kirkwood Community College began serving learners in a large service area of over 4,300 square miles employing a variety of telecommunications technologies. Other community colleges as well as universities and four-year colleges in Iowa soon followed (Iowa Distance Education Alliance, 1992).

The history of the Iowa Communications Network (ICN) began in 1986 when legislators, recognizing the desirability of statewide coordination of telecommunications, allocated $200,000 to develop a long range telecommunications plan. The final report detailing the concept of a statewide telecommunications network to enhance education, the Iowa Communications Network, was presented to the General Assembly in 1987.

Construction of a fiber optic network allowing transmission of two-way audio, two-way, full motion video, and data began in 1991. This system best replicates the student/teacher interaction found in the traditional face-to-face classroom. Parts 1 and 2 were completed in Fall 1993 and connected all 99 counties in Iowa and included 103 interactive classrooms. Part 3 will expand the system to all K-12 school districts in Iowa and bring the classroom total to over 600 by the year 2000.

In 1992, a collaborative alliance of educational organizations received funding from the United States Department of Education’s Star Schools Program. From its beginnings in 1987, the Star Schools Program’s intent had been to reach underserved populations through the use of telecommunications. Several content areas were targeted for improved instruction including mathematics, science, foreign languages, literacy, and vocational education (IDEA, 1992).

The Iowa Distance Education Alliance (IDEA), Iowa’s Star Schools Project, brought together teachers and administrators from local school districts, area education agencies, the
The Iowa Department of Education, community colleges, and private and public universities and colleges. This partnership had a common purpose: "the appropriate infusion of live, two-way interactive telecommunications into the educational systems of the state of Iowa (IDEA, 1992, p. iv)." To this end, the project was organized into four interconnected components: project management, regional partnerships, an information clearinghouse (Communication and Resources Clearinghouse), and the Teacher Education Alliance or TEA (IDEA, 1992).

The 1992 IDEA proposal included three subcategories of preservice and inservice activities for which the TEA was responsible.

1) Curriculum plans for preservice teachers will be developed that will present relevant information about distance education and teaching using the ICN. p. 20

2) Curriculum plans for inservice education and staff development for classroom teachers will be developed and made available to the teachers of the state through the area education agencies. p. 20

3) Preservice and inservice activities that deal with the curriculum reform efforts in mathematics, science, foreign languages, literacy skills and vocational education will be developed and made available to the teacher education faculty and through the area education agencies to the teachers of the state. p. 21

Over 1500 educators attended the inservice workshops and curriculum institutes held by the TEA during the first two years of the project. An additional 3000 teachers received inservice courses using the ICN as a delivery system. Responses of participants were favorable and individuals indicated they felt positive about the effectiveness interactive television for teaching (IDEA, 1994).

While many activities were held to address the issue of integrating distance education into the preservice teacher education programs of Iowa's colleges and universities, involvement was limited. Out of 28 teacher education institutions in Iowa, only 15 reported participating in the activities sponsored by the TEA and only the largest institutions in the state, the three regent's institutions and a large private university reported integrating distance education into the teacher education program at more than an awareness level (IDEA, 1994).

The goals of the TEA did not change for the 1995-96 funding year. However, activities designed to achieve these goals took a different focus. Instead of asking faculty to attend workshops and colloquia, it was decided to take the workshops to the faculty. In spring, 1996, the TEA visit the campus of 17 independent, 4-year colleges in Iowa. It was this activity through evaluation and data collection provided the base for this study.
Technology and teacher education

Linking for Learning (1989), a publication by the Office of Technology Assessment of the United States Congress, stated:

Teachers must be trained if they are to use distance learning technologies effectively. Few preservice and inservice programs focus on how to incorporate technology into instruction, create new opportunities for interactively, or develop materials and use media effectively. (p.88)

Research has indicated few teachers have received even limited training and experience in educational technology. At least half of all teachers had little or no classroom experience with technology (McKinsey and Co., 1995) had only 14% had more than eight hours of training in educational technology during the 93-94 school year (U.S. Department of Education, 1996). In addition, only 18 states required technology training as part of certification requirements (U.S. Department of Education, 1996).

Colleges and universities with teacher education programs play an essential role in providing the training and experience teachers need to use technology effectively. Requirements for graduation should include “a working knowledge of technology...(and should focus) on teaching with technology, not merely teaching about it” (U.S. Department of Education, 1996, p. 48).

According to Zenor (1996), distance education “is squarely on course to become a dominant instructional strategy in education and training (p.2)”. If so, it can not be ignored in the training of teachers with the skills and knowledge to use technology, including distance education. Based on the 1994 IDEA Final Evaluation Report, limited integration of distance education was occurring in Iowa’s colleges and universities with teacher education programs. This study hopes to identify the characteristics of these institutions that contribute to the decision to integrate distance education or not to integrate distance education in the teacher education program.

Theoretical Perspective

In forming a theoretical perspective for studying the integration of distance education throughout the teacher education programs of institutions of higher education in Iowa, Roger’s (1995) diffusion of innovations theory provided a useful framework. This theory attempts to explain the process underlying the decision to adopt an innovation from an individual viewpoint as well as an organizational viewpoint and “to explain how individuals” or organizations “change their overt behavior as a result of communication with another individual” or organization (Rogers, 1995, p. 305).
Roger's (1995) identified the innovation decision process as "the process through which an individual...passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (p. 161). This was conceptualized in a five stage model of the innovation decision process: knowledge, persuasion, decision, implementation, confirmation.

Rogers (1995) presented a similar five stage model detailing the innovation decision process within an organization. The five stages comprising this model differ slightly from the individual model and include agenda setting, matching, redefining, clarifying and routinizing. The five stages are divided into two phases, initiation and implementation.

How and when an individual or an organization moves through the decision making stages is affected by individual and organizational characteristics. Innovation theory (Rogers, 1995) identified three categories of variables related to organizational innovativeness. These include individual characteristics, and internal and external characteristics of the organization. This study focused on organizational characteristics, and individual and organizational innovativeness.

**Purpose**

The purpose of this study was to determine the relationship between organizational characteristics and the organizational intent of teacher education programs in institutions of higher education in the state of Iowa to integrate the innovation, distance education. Organizational characteristics were divided into background information, individual innovativeness, and perceived organizational innovativeness. The study of organizational characteristics was important to this study to identify characteristics that related significantly to the adoption of the innovation, distance education.

A second purpose was to determine the relationship between organizational characteristics and identified barriers to the integration of distance education throughout teacher education programs in institutions of higher education in the state of Iowa.

**Research Questions**

1) What is the level of individual innovativeness of education college faculty?
2) Are education college faculty integrating or do they plan to integrate distance education throughout the teacher education program?
3) What is the perception of education college faculty of the innovativeness of their teacher education program?
4) What relationship exists between the organizational characteristics individual innovativeness and perceived organizational innovativeness and the organizational intent to integrate the innovation, distance education, throughout teacher education programs in institutions of higher education in the state of Iowa?

5) What are the reported barriers to the integration of the innovation, distance education, throughout teacher education programs in institutions of higher education in the state of Iowa?

6) What differences exist between institutions with a high level of innovativeness and those with a low level of innovativeness?

Significance of the study

A study of the innovation of teacher education faculty and programs and the diffusion of the innovation distance education is important for several reasons. First, understanding the relationships among organizational characteristics, innovation levels, and integrating distance education can assist change agents in designing appropriate strategies to further encourage the integration of technology in the training of teachers. Second, as part of the broader evaluation of the IDEA, this study not only documents the activities of the Teacher Education Alliance but presents evidence to support the effectiveness and impact of those activities.

Summary

This chapter provided an introduction to this study. Distance education in Iowa and technology and teacher education were discussed. The importance of preparing teachers to use technology to enhance learning was identified. The purpose of this study was to determine the relationship between organizational characteristics and the organizational intent of teacher education programs in institutions of higher education in the state of Iowa to integrate the innovation, distance education. Chapter two will review the literature related to this study including distance education research, diffusion of innovations research and research related to change in teacher education programs.
CHAPTER II. LITERATURE REVIEW

Introduction

This chapter presents a review of previous research and key information related to three areas of importance to this study. The information is organized into distance education including emerging definitions and research findings, research pertaining to the adoption of innovations within organizations, and studies related to change in teacher education programs.

Distance Education

Defining Distance Education

The term distance education is important to this study because it encompasses both distance teaching and distance learning. It includes the activities and roles of both the teacher and the learner and brings together both sides of the educational process. Distance teaching only addresses management and instructional design activities, while distance learning only describes the activities of the learner which occur at a distance from both the teacher and the institution (Suave, 1993). Distance education includes both the teaching and learning process.

Reaching a single, all encompassing definition of distance education is not easy. Definitions of distance education, by necessity, reflect existing technologies. As new technologies have emerged, definitions of distance education have changed to reflect the capabilities of the technology. Early definitions have their base in correspondence study which was limiting in interaction capabilities. More recent technological innovations have influenced a different interpretation of distance education including a stronger focus on the interaction of students and teacher (Suave, 1993). Both early definitions and emerging definitions are discussed below.

Though distance education has existed in both English and German-speaking countries for over 150 years, it was not until the mid-60s that distance education began to be the topic of “scientific research or scholarly work ...It was, as it were, unexplored ground” (Peters, 1994, p. 1). Definitions of distance education provided by Peters, Moore, Rumble, and Holmberg are characteristic of this time. All are based on an analysis of correspondence study which was mostly one-way delivery with limited interaction.

Peters' definition stressed three concepts: mass education, industrialization, and the use of a technical medium (Keegan, 1986). The industrialization of teaching and the use of technology allowed materials to be reproduced and distributed to a large audience. Many
students could receive instruction at the same time regardless of where they lived in reference to the institution.

The use of a technical medium was also noted in Moore’s early definition of distance education as referenced in Keegan (1986). While Peters’ definition included technology as merely a reproduction medium, Moore’s definition expanded the use of technology to include the facilitation of communication between teacher and learner. While the separation of teacher and learner can be inferred from Peters’ definition, it is central to Moore’s definition of distance education (Keegan, 1986).

Rumble’s (1989) four part definition included a contractual agreement between the student and the teacher or institution, student/teacher separation, student/institution separation and two-way communication. While the learner may be learning alone or in a group, this definition repeatedly stresses that learning takes place in the absence of the teacher.

This separation of teacher and learner is stressed again by Holmberg (1986). Also stressed by Holmberg is the involvement of an educational organization/institution.

Distance education thus includes the various forms of study at all levels which are not under the continuous, immediate supervision of tutors present with their students in lecture rooms or on the same premises, but which, nevertheless, benefit from the planning, guidance and tuition of a tutorial organization. (p. 2)

These early definitions, as well as other similar definitions, were perhaps best synthesized in the work of Keegan (1986). After analyzing definitions of distance education for key components, Keegan provided a comprehensive definition of distance education which included five elements:

1. The separation of teacher and learner.
2. The role of the educational organization
3. The place of the technological medium.
4. Two-way communication.
5. The separation of learner and the learning group. (pp. 43-45)

A closer look at these elements shows most to still be applicable to distance education today. The fact that the teacher and learner do not share the same space or even the same time is what distinguishes distance education from traditional, face-to-face instruction. The influence of an educational organization separates distance education from private study (reading, watching television, talking with friends, etc.). The technological medium is what allows two-way communication (Keegan 1986). The technology available today is far more advanced than the mediums available when Keegan proposed this definition.
The preceding definitions define the traditional view of distance education. These traditional definitions are being challenged by rapid changes in society and technology. Over the last twenty years, distance education technologies have advanced rapidly. The traditional definitions, as well as Keegan's synthesis of the definitions, were too restrictive and did not take into account either existing technologies or future possibilities (Garrison and Shale, 1987). Garrison and Shale (1987) focused on the characteristics of the distance education process when they offered the following three defining characteristics:

1. Distance education implies that the majority of educational communication between (among) teacher and student(s) occurs noncontiguously.
2. Distance education must involve two-way communication between (among) teacher and student(s) for the purpose of facilitating and supporting the educational process.
3. Distance education uses technology to mediate the necessary two-way communication. (p. 11)

Barker, Frisbie, and Patrick (1989) suggested that the definition of distance education needed to be restructured to take into account the introduction and advances in telecommunication technologies.

A broadening of the definition of "distance education" is needed in order to clarify the inherent strengths that new technologies bring to the field, to recruit new audiences to the benefits of distance learning, and to guide further study and research in this aspect of outreach education. (Barker et al., 1989, p. 10)

To assist in "broadening the definition" Barker et al. (1989) proposed a taxonomy of distance education approaches based on the level of teacher/student interaction. Category 1 looked at the more traditional view of distance education - correspondence-based distance education. Category 2 took into account the growing field of telecommunications with the low end of interaction being two-way voice only link and the high end of interaction consisting of a two-way audio, two-way full motion video link.

Simonson (1996) states that "Traditional approaches to distance education based on the delivery of print and linear media technologies are no longer as relevant to the field as it is practiced in the United States" (p. 5). Based on the concept of virtual electronic classrooms he suggests the following redefinition of distance education:

Distance education implies formal institutionally-based educational activities where the teacher and learner are normally separated from each other in location but not normally
separated in time, and where two-way interactive telecommunication systems are used for sharing video, data, and voice instruction. (Simonson & Schlosser, 1995, p. 13)

This redefinition based on maturing technologies suggests a time when "the concept of distance will become relatively unimportant" (Simonson, 1995b, p. 12). Perhaps instead of looking at definitions that differentiate distance education from the rest of education, it is time to look at the ways in which the two converge (Hoffman, 1996).

Research in Distance Education

As presented in the last section, emerging technologies forced a redefinition of distance education. The distance education research agenda also evolved. The focus shifted to a more learner-centered approach. Researchers were not merely looking at achievement but were examining learner attributes and perceptions as well as interaction patterns and how these contribute to the overall learning environment. While there was continued interest in the technology, the focus was not on which medium is best, but on which attributes of the medium can contribute to a positive learning experience. Both Holmberg (1987) and Moore (1995) provided guidance in the structuring of a review of distance education literature.

In his 1987 article, "The Development of Distance Education Research," Holmberg, a leading distance education theorist and researcher, suggested the structure of distance education research include:

- philosophy and theory of distance education
- distance students, their milieu, conditions and study motivations
- subject-matter presentation
- communication and interaction between students and their supporting organization (tutors, counselors, administrators, other students)
- administration and organization
- economics
- systems (comparative distance education, typologies, evaluation, etc.)
- history of distance education. (Holmberg, 1987, p. 20)

Leading researchers attending the Third Distance Education Research Symposium-Conference organized discussions around the four areas of course design, instruction, policy and administration, and learners and learning (Moore, 1995). In the area of course design, the need for evaluation of learner affective reactions, learning, transfer of knowledge to other
settings, and impact on the organization was stressed. "Research to support our intuitive sense that interaction is important and necessary" (Moore, 1995, p. 3) was needed under research on instruction.

A blending of these two research agendas provided organization for this section. Five categories will be discussed: learning outcomes, learners' perceptions, learner attributes, interaction and distance education technology. Moore’s category of course design and Holmberg's distance students category provided the basis for both learning outcomes and learners' perceptions. Holmberg's distance students and system categories were combined with Moore's learners and learning category to provide structure for the next two areas: learner attributes and distance education technology. The framework for interaction came from Moore's instruction area and Holmberg's communication and interaction area. History, philosophy and theory, all categories identified by Holmberg, were covered in the previous section.

**Learning Outcomes**

It is likely that when different media treatments of the same informational content to the same students yield similar learning results, the cause of the results can be found in a method which the two treatments share in common...give up your enthusiasm for the belief that media attributes cause learning. (Clark, 1994, p. 28)

Hundreds of media comparison studies indicating, unequivocally, there is no inherent significant difference in the educational effectiveness of media support Clark's position. The specific medium used does not matter. The focus of future research should be the truly critical factor in determining student achievement: instruction itself (Whittington, 1987).

Unfortunately, much of the research in distance education was still of the media comparison type. Perhaps this was to be expected given the rapid development of distance education technology, especially in the area of two-way interactive television systems. With each technological advance there was the temptation to conduct media comparison research on the offhand chance that the use of the new technology might truly result in higher student achievement.

Cheng, Lehman and Armstrong (1991) compared performance of graduate-level students enrolled in traditional and computer conferencing classrooms. The on-campus class had 25 graduate students and the off-campus group included 28 in-service teachers. The groups differed significantly only on age with the average age of the off-campus students being
older. A pre-test/post-test format was used measuring attitude and knowledge. Results indicated no significant difference in overall course performance or in attitudes.

Learning outcomes of an interactive telecourse in introductory High School Japanese were compared to that in a traditional class by Bruning, Landis, Hoffman, and Grosskopf (1993). The course originated in Nebraska and was transmitted to 170 schools (911 students) the first year, 255 schools (1,157 students) the second year, and 259 schools (1,330) students the third year. The achievement test had two parts and measured listening and writing.

An evaluation of the first year showed the achievement of the telecourse schools was significantly higher than the comparison schools in both listening and writing. The results for the second year were similar. Several explanations should be considered including motivation and differences in student characteristics.

Additional data were collected in the third year to investigate possible effects of motivation (measured by self-efficacy rating) and differences in student characteristics of self-reported grades in school and prior language learning experience. The mean achievement test scores for the telecourse schools continued to be significantly higher than the comparison schools even when the variables of self-efficacy, self-reported ability, or prior language experience were controlled. This indicated that the achievement differences between the telecourse students and the comparison group were not related to motivational, self-reported ability, or prior experience factors (Bruning et al., 1993).

A study by Martin and Rainey (1993) supported the findings of Bruning et al. (1993). Researchers investigated the effectiveness of interactive satellite delivery with that of traditional instruction. There was no significant difference between the two groups on the pre-test. "However, the mean post-test score for the experimental group . . . was significantly higher than that of the control group" (Martin & Rainey, 1993, p. 57).

The effectiveness of teletraining in the military was investigated by Bramble and Martin (1995). Participants were 275 individuals enrolled in five different teletraining project courses. Standard multiple-proficiency, criterion-based tests were used where available and achievement tests were developed for the other courses. In all but one course, both pre- and post-tests were administered.

Students were allowed a second chance at taking the proficiency tests and when these retakes were taken into account all students reached acceptable performance level. No comparison data were available from schools offering these courses in traditional settings but "knowledgeable training personnel indicated that this performance is as high or higher than one
would normally expect" (Bramble & Martin, 1995, p. 16). In all courses where pre and post-course performance was measured, the gain was statistically significant.

Students in all five courses were asked if they felt the teletraining was as effective as live instruction. In all but one of the courses, 75% or over responded in the affirmative. The course that had only a 54% affirmative rate was the first course offered and adjustments may have been made prior to delivery of the other courses. This pattern was repeated when students were asked if they felt that the instructor was in the same room. For the first class only 78% responded yes, while for subsequent classes 84% and over responded in the affirmative.

In summary, while comparative research studies on achievement tended to show no significant difference between different delivery systems and between distance education and traditional education, several recent studies indicated a significant higher achievement level in those learning at a distance. As the accepted position is that the delivery system affects no inherent difference on achievement (Clark, 1994), then future research needs to examine which factors do indeed contribute to this difference in achievement.

**Learner Perceptions**

Ross, Morrison, Smith and Cleveland (1991) evaluated two programs for tutoring at-risk elementary school children at a distance: one using a local electronic bulletin board system, and a second using Applelink, a national network system featuring both electronic mail and teleconferencing. For both studies, both tutor and tutee attitudes were assessed.

In the first program, 10 graduate education majors were matched with two or three sixth grade students in an inner-city elementary school. Primary communication was with email. Tutors were to assist tutees in expanding their reading and writing vocabulary. Tutee reactions were mixed to negative. More than half of the students did not understand corrections made by their tutors, received little help with their writing skills, received insufficient time with their tutors, found the assignments difficult, and said they did not learn much from their tutors. On the positive side, slightly more than half the students felt they had enough on-line time to complete messages.

Most tutors felt they possessed the computer skills and content knowledge to do the work. They also felt they related well to their tutees and had the materials necessary. A need for more intensive training was expressed and a majority (67%) said they would have liked more personal contact with their students.

More positive results were found in the second study. Participants were 10 education majors and 27 sixth grade students from the same school as the first study. Activities were
more structured than in the first study. Time was allowed at the beginning of the study for tutors and tutees to get acquainted face-to-face as results of the first study seemed to indicate this need. After the initial meetings, primary communication was, once again, email.

Tutees felt they had a positive relationship with their tutors and preferred communicating with email to their tutors instead of their friends. They liked getting to know someone from a college and learning new things. They regretted the limited amount of time for on-line communication.

The tutors, similar to those in the first study, felt they possessed the necessary computer and academic skills. Many (60%) expressed indecision on whether they had found the experience enjoyable or not. Tutors indicated the most positive aspect of the program was the face-to-face meeting. They cited lack of coordination among teachers, tutors and tutees as the most negative aspect.

Distance learner satisfaction is an important dimension in understanding the success of interactive telecourses. Biner, Dean and Mellinger (1994) conducted two studies to identify the major dimensions of learner satisfaction. In the first study, the telecourse evaluation questionnaire (TEQ), developed by Biner, was administered to 201 students enrolled in live, interactive televised courses at the beginning of the last class meeting. Using factor analysis, seven factors were identified. The factors were satisfaction with:

- instructor/instruction
- technology
- course management
- at-site personnel
- promptness of material delivery
- support services
- out of class communication with instructor

The second study, conducted the following year, confirmed the results of the preliminary study. The researchers concluded with emphasizing the importance of assessing learner satisfaction. Assessment results should be used as part of an ongoing formative evaluation that contributes to program modification. Maintaining high levels of learner satisfaction can contribute to the success of the program with higher motivation, stronger student support, lower attrition and higher achievement (Biner, et al., 1994).
The anxiety level of distance education students and the factors contributing to anxiety were investigated by Jegede and Kirkwood (1994). Two instruments, an anxiety checklist and an opinionnaire on factors which affect learning at a distance, were administered at the beginning of the semester and at the end of the semester. Complete results were obtained from 222 distance education students enrolled at the University of Southern Queensland.

Analysis of data from the anxiety checklist indicated that participants "have a high anxiety level and were generally more anxious about their studies at the end of the semester than at the beginning" (Jegede & Kirkwood, 1994, p. 286). Results of a t-test showed a statistically significant difference between the pre-semester means and the post-semester means. However, researchers cautioned that this difference may be attributed to the timing of the post-semester administration as this occurred just prior to final examinations.

A factor analysis of the opinionnaire identified eight factors affecting learning at a distance: content, environment, finance, readiness, time, employment, family support and other. A comparison of pre-semester and post-semester showed five factor means to be significantly different at the end of the class then at the beginning. Students' concerns related to content, finance and readiness were higher at the beginning of the class then at the end, while concerns related to time and employment increased towards the end of the class (Jegede & Kirkwood, 1994).

The results of this study indicated that anxiety of distance education learners may play a higher role in attrition than previously considered. The researchers suggested future research on the role of anxiety "probably comparing on-campus with off-campus students with the introduction of other variables like achievement outcomes and a longer period of study" (Jegede & Kirkwood, 1994, p. 289).

As part of a larger study, Sorensen (1995) identified the most important predictors of student satisfaction. Surveys were returned by 64% (210) of the community college students enrolled in two-way interactive televised courses. In general, the students were satisfied with their distance learning experience. Regression analysis revealed the variable instruction, which looks at the learning environment, accounted for 46 percent of the variance. "Adding the variables of membership, course management, and technical aspects increased the variance prediction to 55 percent" (p. 141).

However, if the group is split by location, some differences become apparent. Instruction accounted for only 40 percent of the variance for origination site students while instruction accounted for 49 percent of the variance for remote students. Adding course management, which focuses on logistics and resources, into the equation for remote students
accounted for 57 percent of the variance. For the origination site students, adding the variable of membership, defined as being part of the class or belonging, and the variable of technical aspects, which relates to equipment adequacy, increased the percent accounted for to 53 percent. It would appear that instruction was the most important variable related to satisfaction for all groups. For remote students, course management was a key component of overall satisfaction, while for origination site students, a sense of belonging was more important to overall satisfaction (Sorensen, 1995).

Fast (1995) investigated student motivation toward multi-site instruction of students enrolled in foreign language courses delivered by fiber-optic network allowing multi-site, interactive instruction. Nineteen students participated in the study, 11 at the origination site and eight at the remote site. Post-instruction questionnaires administered to all students provided data on the three variables of student motivation, perceived learning, and involvement.

Remote students had a significantly more favorable attitude toward interactive televised instruction than the origination site students. Responses to open-ended questions asking likes and dislikes of interactive televised classes helped clarify this difference.

Students at both locations cited two reasons for liking the multi-site instruction: "human interest and facilitation of learning" (Fast, 1995, p. 17). Students at the remote site felt the delivery system provided opportunities for learning that would not be available otherwise.

The two groups differed strongly on their dislikes. A high number (over 40%) of the dislikes identified by the origination site were organizational issues. Of special concern was the loss of class time due to the need to transport students to the technology classroom. This was not an issue for the remote site students.

The majority of criticisms (60%) from the remote site students focused on problems with interaction. They disliked the lack of opportunity to interact one-on-one with the instructor. Discussions were difficult as everyone talked at once and posing questions necessitated interrupting class. Origination site students also identified the loss of interaction with the instructor as a problem. "These results would suggest that remote-site students tended to experience difficulty in being accepted as part of the discourse domain, while origination-site students found it more difficult to share their teacher with a remote-site" (Fast, 1995, p. 18).

Analysis of questions related to perceived learning showed no significant differences between remote site students and on-site students. However, a comparison of 1/2 level students and 3/4 level students at the remote site showed a significant difference in their perceptions of how well you can learn at a distance. Lower level students tended to indicate that students learn at least as well in remote site/on-site environment as in a single site environment.
A similar situation was found when data on perceived interaction were analyzed. While there were no significant differences between sites, there was a significant difference between levels. Higher level students at the remote site indicated that having the teacher at a distance could hinder learning.

In summary, research related to learners' perceptions has focused on identifying factors related to satisfaction, attitudes and perceived learning and interaction. Factors affecting satisfaction may be organizational and involve the environment, management and support services (Biner et al., 1994) or they may by individual factors including readiness, time and family support (Jegede & Kirkwood, 1994). It was difficult to separate the factors related to satisfaction from the individual, the specific setting and the influence of time on changes in student perceptions.

Positive attitudes were found in students at the remote site of an interactive television class. In general, they felt they learned as well as if in a regular classroom and that having the teacher at a distance did not hinder their learning (Fast, 1995).

**Learner Attributes**

Coggins (1988), in a study of students associated with the University of Wisconsin System External Degree Program, examined the relationship between "personal variables" (learning style and demographic data) and program completion rate. She found that completers and noncompleters did not differ significantly on variables related to gender, occupation, marital status, presence or absence of children, distance from campus, or age of entry into the baccalaureate program. However, there was a significant difference between the two groups for a number of variables. Completers had entered the program with higher levels of education and they had greater expectations of earning higher grades as well as greater expectations of earning a degree. The two groups of students differed in their preference of course content. Noncompleters tended to be more concrete learners preferring a content that allowed them to work with things instead of people. Completers preferences were for a content that involved interviewing and counseling people (Coggins, 1988).

The relationship between gender and success in distance education courses was the subject of a study by Ross and Powell (1990). Data from the 1987-88 school year at Athabasca University, in Alberta, Canada, indicated that a greater percentage of women passed distance education courses. Further, "this higher completion trend was visible irrespective of the student's general study area, specific course selection, course level, mode of course delivery, student's program status, or the number of courses students had previously taken" (p. 10).
An exploratory analysis of results from surveys conducted by the Centre for Distance Education at Athabasca University assessing demographic, motivational, support and learning style variables indicated some possible reasons for the gender differences in academic achievement. These included differences in marital status, employment, and use of institutional support between the two groups. An important difference was noted in the motivational variable as women felt gaining a university credential was critical and the impact of failing serious (Ross & Powell, 1990).

Dille and Mezack (1991) studied the use of locus of control and learning style as predictors of high-risk among college distance education students. One hundred fifty-one students enrolled in lower division telecourses completed the instruments which included demographic information, Internal-External Locus of Control Scale (RIELC), and Learning Style Inventory (LSI).

The locus of control measure was a significant predictor of two variables: success, defined as receiving a grade of C or above, and of actual letter grade. Students with a more internal locus of control were more likely to be successful and to obtain a higher grade. Students with an external locus of control "would be less likely to persevere when faced with the perceived tougher challenge of a telecourse" (Dille & Mezack, 1991, p. 29).

An analysis of the data from the learning style inventory indicated that students who were more successful had a lower LSI average score measuring concrete experience. On the abstract conceptualization/concrete experience scale where a lower score indicates a more concrete learner, successful students had a significantly higher score than non-successful students. This supports the idea that "the less concrete one's learning style, the better suited one is to learn in the telecourse format" (Dille & Mezack, 1991, p.31). While examining the abstract/concrete scale may be helpful in predicting success in a distance learning environment, individual learning style was not found to be a significant predictor of success.

Based on Dille and Mezack's (1991) study, the profile of a high-risk telecourse student would be:

- 25 years or older
- divorced
- less than 30 college credit hours completed
- GPA less than 3.0 - 2.9
- Higher than average Locus of Control score indicating internal locus of control
• Lower than average AC-CE score indicating a concrete learner. (p. 34)

Laube (1992) examined the relationship between academic and social integration variables and the persistence of students in a secondary distance education program. Students were divided into two groups based on persistence. Completer/persisters were those who completed or still persisted in course work one year after enrollment while dropout/nonstarters had dropped out during the same time.

One hundred eighty-one surveys were returned out of 351 surveys mailed, 124 in the completer/persister group and 57 in the dropout/nonstarter group. Interestingly, in the non-returned surveys there were 44 completer/persisters and 126 dropout/nonstarters.

Of the three variables included in academic integration, two showed a significant difference between the groups. Completers/persisters were more likely than dropout/nonstarters to have higher educational goals and to study more than 10 hours a week. For the third variable, amount of family assistance, there was no significant difference between the two groups.

The three variables related to social integration were self-initiated contact with the school, student attitudes toward their tutors, and student attitude toward missing peer socialization. The two groups differed significantly only in their attitudes toward their tutors with completer/persisters indicating a more positive attitude. Both groups indicated a positive attitude toward their tutors but a large percentage of dropout/nonstarters selected undecided as a response which contributed to the significant results obtained (Laube, 1992).

Stone (1992) examined the relationship of tutor contact and locus of control with course completion rates for students enrolled in print-based, distance training courses. The treatment group received weekly phone calls from the training staff while the comparison group received only minimal feedback. Results did not show a statistically significant difference between the two groups in course completion rates. However, Stone did find that students "with relatively external loci of control completed their coursework at significantly faster rates when exposed to regular telephone cues from their tutors" (Stone, 1992, p. 9).

How study practices and attitudes of students in a distance learning program related to academic success was examined by Bernt and Bugbee (1993). The sample consisted of approximately 300 students with even representation from achievement categories: high-passers, low-passers, and failers. Demographic data showed the subsamples based on achievement categories to be similar except for educational level. The high-passers were likely to have advanced degrees.
Two types of study strategy dimensions with distance education students were examined: primary strategies "which are used to identify, understand, remember, and apply important subject matter" (Bernt & Bugbee, 1993, p. 97) and secondary or support strategies "which involve the formation and maintenance of attitudes related to learning and academic performance" (p. 98). The researchers concluded from their study that there was evidence that both primary and secondary strategies aided academic performance. Passers differed significantly from failers in their test strategies, concentration, and time management skills, but were not significantly different in active processing, diligence, and positive attitude.

The researchers also found that students with different education levels differed in their study strategies, notably in time management, concentration, and testing strategies. This, they concluded, suggested "that distance learning students who have not completed college are 'at-risk' primarily because they lack metacognitive or executive skills for approaching coursework and examination-taking" (Bernt & Bugbee, 1990, p. 108). Distance education instructors need to be aware that, similar to traditional education students, learners are different and some need more direction and structure than others who may be more self-directed.

Garland (1993) used ethnographic procedures to identify barriers to persistence in distance education. Building on the framework of Rubenson (1986), barriers were classified into four categories: situational, institutional, dispositional, and epistemological. Face-to-face interviews were conducted with 47 students enrolled in primarily print based introductory academic courses. Seventeen withdrawal students, students who did not complete final exam, and 30 persisting students, students who took the final exam regardless of outcome, participated in the study.

Barriers to persistence in all four categories were encountered by both withdrawal students and persisting students. Situational barriers included poor learning environment and lack of time. Students indicated a lack of support from both family and peers contributed to a poor learning environment. They also identified available resources and a quiet place to study as problematic. Students felt the course took more time than anticipated especially as many were juggling the demands of work, home and school (Garland, 1993).

Cost, institutional procedures and course scheduling/pacing were reported as institutional barriers. Tuition was not a problem but add-on costs of texts and labs were seen as barriers to persistence. Students who felt the university did not try to meet their needs identified both institutional procedures and course scheduling/pacing as problems. Limited office hours made reaching staff for assistance difficult (Garland, 1993).
The largest number of barriers to persistence identified related to the psychological and sociological nature of the student (dispositional barriers). These barriers included: 1) uncertainty of an educational or professional goal 2) stress of multiple roles (school, work, home), 3) time management problems, 4) problems associated with learning style differences, and 5) adult pride indicated by over-achievement and/or fear of failure (Garland, 1993).

The last category identified barriers within the student's conceptual framework. "The student's epistemological stance is a screen through which new knowledge must be acquired. The screen can become a barrier when the epistemological stance of a course's content or expectations is incompatible" (Garland, 1993, p. 192).

The study points to the individualness of learning whether at a distance or in a traditional setting. Regardless of the setting, the focus needs to be on creating the optimal learning conditions for each individual.

Pugliese (1994) investigated psychological variables as predictors of persistence in telecourses. Independent variables included loneliness, communication apprehension, communication competence and locus of control. Persistence/withdrawal behavior was the dependent variable with respondents divided into quartiles based on the percentage of courses from which they either withdrew or failed. Three hundred six urban commuter students (39% response rate) enrolled in telecourses responded to a telephone survey.

Though results did not prove significant, the implications drawn were interesting. In a traditional classroom it would be expected that the students possessing greater social interaction skills would be more likely to persist and complete the course. Results not proving significant appeared to indicate that telecourses are the social equalizer. "Telecourses apparently minimize both the assets and liabilities of social skills" (Pugliese, 1994, p. 34).

In this study, the correlation between student-instructor communication apprehension and withdrawal, while nonsignificant, was the strongest correlation indicating one possible area for future research. Because communication between student and instructor as part of the telecourses was almost exclusively by telephone, other possible avenues for future research might include telephone apprehension or "data collection other than telephone survey to eliminate the telephone itself as an intervening variable" (Pugliese, 1994, p. 35).

Fjortoft (1995) similarly investigated predictors of persistence in distance learning programs. Based on the literature of adult education, a model relating adult learners to persistence, including eight variables, was developed. Independent variables included age, gender, GPA at time of college graduation, satisfaction with college experience, intrinsic job
satisfaction, ease of learning on their own, intrinsic benefits of degree completion, and extrinsic benefits of degree completion. Persistence was defined by active enrollment status.

The 395 students surveyed included those actively enrolled in a distance learning program in pharmacy and students who had been admitted but had withdrawn before completion. The response rate was 50% with a sample size of 198. The predictive validity of the model was tested using regression analysis.

Three variables were significant in predicting persistence in distance learning programs. Results indicated a positive relationship between perceived intrinsic benefits and continued enrollment while a negative relationship between both age and ease of learning on their own, and persistence was indicated. "An internal desire for more satisfaction and challenge in one's career more than desires for enhanced salary and career mobility" (Fjortoft, 1995, p. 6) motivated adults to continue their education. The respondents ranged in age from the upper twenties to just over sixty. Results indicated it was more difficult for the older students to persist in the distance learning program than it was for younger students.

Because of the individual orientation of the distance learning program investigated, it was expected that students with a higher level of ease of learning on their own would be more likely to persist. In fact, the opposite was indicated. Fjortoft (1995) discussed two possible reasons for this unanticipated result. Only individuals who recognized that they possessed the skills necessary to learn on their own elected to enter a distance learning program.

"Alternatively, adults may not be able to realistically assess their individual learning styles" (p. 6).

Biner, Bink, Huffman and Dean (1995), building on the work of Dille and Mezack (1991), investigated the role of personality characteristics in predicting achievement in televised courses. The Sixteen Personality Factor Questionnaire was administered to both traditional-course and televised-course students to determine how the two groups differed and also to identify personality factors predictive of success in televised-courses.

The personality profiles of the two groups did differ significantly. "Telecourse students tend to be more intelligent, emotionally stable, trusting, compulsive, passive, and conforming than traditional students" (Biner et al., 1995, p. 56).

Results indicated that several personality characteristics correlated significantly with course achievement. The group-oriented/self-sufficient dimension was positively related to course performance indicating successful telecourse students tend to be self-sufficient. A negative relationship was found between the introvert/extrovert dimension and course performance. This indicated that the more introverted a student was the better they performed in
a distance education setting. This supported what one would expect in a distance learning environment (Biner et al., 1995).

A negative correlation was identified between course achievement and the undisciplined/controlled dimension. This indicated that the more successful telecourse student tends to be more lax or undisciplined. This result may be misleading as the telecourse group as a whole tended to be more persistent or rule-bound in their behaviors (Biner et al., 1995).

Finally, higher levels of expedience were associated with higher grades in the telecourse group. This was in contrast to higher levels of conscientiousness associated with higher grades in the traditional course group. Telecourse students tended to be older and were juggling responsibilities of job and home and "higher levels of expedience aid the telecourse students in terms of functionally adapting to the diversity of their responsibilities" (Biner et al., 1995, p. 57).

In summary, several learner characteristics seemed to have some effect on the success of the learner in a distance education environment. While studies on the effects of gender (Ross & Powell, 1990 & Coggins, 1988) indicated mixed results, students who are younger (Fjorloft, 1995) and have a higher level of education (Coggins, 1988 & Brent & Bugbee, 1993) were more likely to complete a distance education course.

Motivation plays a major role. Intrinsically motivated learners (Fjortoft, 1995) and those with high expectations for grades and completion of a degree (Coggins, 1988; Laube, 1992; Ross & Powell, 1990) tended to have a higher success rate. A positive attitude toward the instructor (Laube, 1992) may have also been a factor contributing to the success of a distance learner.

Dille and Mezack (1991) and Stone (1992) both found locus of control to be a significant factor. More abstract learners with internal locus of control (Dille & Mezack, 1991) and skills in learning alone (Fjortoft, 1995) were more successful. Providing students possessing external locus of control with regular contact with the instructor increased their chances of success (Stone, 1992).

Individual learning style did not prove to be a significant predictor of success. Distance education seems adept in providing for the learning needs of students with a variety of learning styles (Dille & Mezack, 1991).

**Interaction**

Beare (1989) compared the effectiveness of six instructional formats which allowed differing levels of interaction: 1) lecture, 2) lecture with videotape back-up, 3) telelecture, 4)
Audio assisted independent study, 5) Video assisted independent study, and 6) Video on
campus. One hundred seventy-five nontraditional teacher education students participated in the
study.

Not surprisingly, given the history of media comparison research, "individual
instructional formats had little effect on student achievement" (Beare, 1989, p. 64). The
amount of interaction also appeared to have had no impact on student achievement.

Course evaluations yielded some interesting results, however. Analysis showed that
"distant learners found the course just as stimulating, were equally interested in the subject
matter, and judged the instructor equally as skilled as did those receiving face-to-face
instruction" (Beare, 1989, p. 65). The on-site students in the telecourse strongly disliked the
medium. "One night, when the electronic equipment failed temporarily, the class spontaneously
cheered" (p. 65).

Bauer and Rezabek (1992) compared verbal interaction under three conditions: 1) two-
way audio and video, 2) two-way audio, 3) traditional instruction. The study included 172
students pursuing teacher certification randomly assigned to one of the three treatment groups.

There was no significant difference in total number of interactions between the
audio/video group and the audio group. There was, however, a statistically significant
difference between the audio/video group and the traditional group as well as between the audio
group and the traditional group. Results indicated that merely the addition of video in the
distance education format did not increase interaction. This may have been a result of the
conditioned passive response of individuals to viewing television. Simply measuring
interaction may not be the answer in discovering variables contributing to increased interaction.

Souder (1993) investigated interaction and achievement of students in traditional
delivery courses compared to students in a distance delivery course. Three groups of students
enrolled in the same course participated in the study with each group in a different setting. One
group was in a traditional classroom; the second group was on-site with the instructor while the
class was broadcast to the third group at a distance. The instructor, the course content, and the
course evaluation requirements were the same for each group.

There was no significant difference between the two traditional delivered courses on
evaluation questionnaire items addressing face-to-face interaction. However, the responses of
the distance group were significantly different from both the on-site group and the traditional
group. The students at a distance "defended their distance learning experiences. They did not
agree that face-to-face instruction with a live instructor was vital, nor did they believe that real
time interactions with other students were vital" (Souder, 1993, p. 44). The students in
traditional settings disagreed and did not feel that a distance class would be the same quality as the more traditional approach to instruction.

The results seemed to indicate that students at a distance tended to bond more with their fellow classmates and the instructor. They appeared supportive of each other and, in general, felt they performed better than the other two groups. In fact, the overall achievement of the distance group was significantly higher than the on-site group.

Souder (1993) concluded

the distance learners in this study were observed to gain much more than a traditional education from their experiences. They gained a broadened network of valuable colleagues, skills in working with others and collaborating across distances, and many social skills beyond those offered by traditional settings. (p. 50)

Using semi-structured personal interviews, May (1993) investigated the contribution of interaction to women's learning experiences in women's studies courses delivered using distance education. Nine women of varied background and experiences were interviewed. Course delivery was mostly one-way technology and content focused on the dissemination of knowledge with little interactivity.

Students did not appear to miss the interaction or to recognize the potential benefits. The general feeling was that increasing student interaction would require arranging face-to-face meetings. Due to travel, and home and work responsibilities, making time for these meetings was not desirable. They questioned the value and desirability of increased collaboration.

"The women in this study did not believe that isolation among distance learners necessitated a negative learning experience" (May, 1993, p. 44). The researcher concluded that "increased learner interaction is not an inherently or self-evidently positive educational goal or strategy" (p. 47).

Fulford and Zhang (1993) examined the relationship of perceived interaction and satisfaction in an in-service training course delivered by the Hawaiian Interactive Television System (HITS). One hundred twenty-three students completed surveys at the beginning, midpoint and end of the 10 week course. Participants responded to questions related to three variables: personal interaction, overall interaction, and satisfaction with the value and quality of instruction.

Perceived level of personal interaction was only a moderate predictor of satisfaction, approximately 15% of the variance. Perceived level of overall interaction accounted for almost three times as much variance in satisfaction. "Learner satisfaction may be attributed more to perceived overall interactivity than to individual participation" (Fulford & Zhang, 1993, p. 18).
Probably instructors using interactive television should focus more on building group interaction rather than individual participation.

This study also examined the variable of time. Learners' perceptions of interaction and satisfaction decreased over the length of the course, however, overall interaction "becomes a more stable predictor of satisfaction as learners become more experienced with the technology" (Fulford & Zhang, 1993, p. 19).

In a follow-up study, Zhang and Fulford (1994) investigated the variable time. Participants were 260 students enrolled in a course delivered by HITS. While this study also looked at perceived interaction and satisfaction, variables were expanded to include attitude towards interaction and actual interaction time determined by analyzing video tapes of each session.

The correlation between perceive interaction and actual interaction time was non-significant. "Reserving a considerable portion of TV time for interaction, a common strategy among TV instructors, does not seem to have quite as much relevance to the psychological reality of interactivity as one's intuition would suggest" (Zhang & Fulford, 1994, p. 61). This supported the work of May (1993) that more interaction is not necessarily better.

While the correlation between actual interaction time and attitude was nonsignificant, the relationship between perceived interaction and attitude was near perfect (df=8, r=0.98, p<0.01). Similar relationships were found when correlating actual interaction and perceived interaction with satisfaction. "Increasing interaction time merely for more time's sake" (Zhang & Fulford, 1994, p. 62) ignores the fact that the role of the student is central in the learning process.

Communication and teaching patterns that contributed to student participation were examined in a study by Schoenfelder (1995). Forty-four students and 11 teachers participating in interactive television courses comprised the sample. A questionnaire was used to measure teachers' and students' perceptions of ways to increase interaction and involvement.

Both teachers and students felt that an enthusiastic teacher with a sense of humor was an important factor in enhancing involvement. They also identified addressing students by name and providing timely feedback as factors that made a positive contribution to interaction. Specific teaching habits were found to help increase student involvement. These included varying the learning activities and using a variety of visual materials (Schoenfelder, 1995).

Using observations, interviews and videotapes, Baker (1995) examined the interactive teaching behaviors of five faculty members teaching courses using distance education.
technology. Seven broad categories of teaching behaviors were identified. These dimension were:

- nonverbal "immediacy" behaviors,
- verbal "immediacy" behaviors,
- behaviors that personalize the class
- technology management strategies,
- methods for acquiring student feedback,
- methods used to manage student participation, and
- active learning strategies. (p. 109)

Three of these behaviors will be discussed here. Nonverbal behaviors that conveyed a feeling of approachability and warmth increased involvement of students at the remote site. Specific behaviors included making eye contact with the camera, using gestures, and using camera angles and shots that allowed students to see facial expressions. Verbal "immediacy" behaviors that were found to contribute to student involvement included using humor, frequent positive encouragement and the frequent sharing of personal examples when relevant. Teachers used a variety of methods for acquiring student feedback that improved student involvement. Most of the teachers relied, at least partially, on the nonverbal cues of the students at the origination site. Some used a variety of questioning techniques, while others used more formal, written formative evaluations (Baker, 1995).

In summary, research regarding interaction and distance education technologies pointed to the fact that different technologies allow differing degrees of interaction (Bauer & Rezabek, 1992). However, similar to comparison studies examining achievement, research comparing differing amounts of interaction showed interaction had little effect on achievement (Beare, 1989 & Souder, 1993). Those students who had little or no interaction as part of the course did not seem to miss it (May, 1993).

While the above seems to point to the unimportance of interaction, a conflicting study indicated a high correlation between perceived interaction and attitude (Zhang & Fulford, 1994). Possibly the emphasis should not be on individual participation but on building group interaction and feeling of community.
**Distance Education Technology**

Numerous studies have described or examined the efficacy of individual forms of distance education, while others have examined aspects or components of those forms. Garrison (1990) used a description of audio teleconferencing to argue for an appropriate concentration on the role of the teacher and the importance of two-way communication in the education process. Along the way, Garrison (1990) argued for the appropriate, conservative use of interactive communication technologies.

The core of Garrison's argument was that:

> education, whether it be at a distance or not, is dependent upon two-way communication. There is an increasing realization in the educational community that simply accessing information is not sufficient. In an educational experience information must be shared, critically analyzed, and applied in order to become knowledge. (Garrison, 1990, p. 13)

A goal of some distance education programs was to make education more student-centered through the prepackaging of instructional materials that students may use when convenient. However, Garrison argued that this approach "ignores the essential nature of an educational learning experience" (Garrison, 1990, p. 14). For Garrison, this "simply risks making learning more private and therefore less likely to transform the views and perspectives of the learner in a positive developmental manner" (p. 14).

Garrison argued that "the quality and integrity of the educational process is dependent upon sustained, two-way communication" (Garrison, 1990, p. 15). Such communication, between student and teacher, and between student and student, was the prime benefit of teleconferencing. When this technology was applied to distance education, "the result is that distance education is no longer necessarily an independent and isolated form of learning but, instead, begins to approach the interactive ideal of an educational experience" (p. 15).

Garrison is a staunch supporter of audio teleconferencing, which he regards as "a distinct generation of distance education capable of providing unique and varied teaching/learning possibilities. Independent and isolated study is no longer the hallmark of distance education" (p. 17).

Egan, Welch, Page, and Sebastian (1992) examined graduate students' perceptions of three instructional delivery systems: 1) conventional delivery, 2) closed-circuit microwave system (EDNET), and 3) videotape recordings (Professor Plus). Near the conclusion of the course, 514 students evaluated the delivery systems using the Media Evaluation Survey. This instrument allowed individuals the opportunity to evaluate instructional media on ten elements:
- amount of material covered,
- level of difficulty,
- degree to which the course content was well organized,
- clarity of the content,
- degree to which the various programs and instructional activities were relevant to the course objectives,
- excellence or lack of excellence of the presenter's delivery,
- extent to which text and weekly assignments were integrated with each week's class,
- value of slides, film, and other visual materials,
- value of text screens to support the presenter's delivery, and
- degree to which the course held the student's interest. (Egan et al., p. 50).

In comparing conventional delivery with EDNET, results showed six of ten variables to be significantly different. The conventional delivery group gave higher ratings to organization, clarity, relevance, integration, value of visuals, and value of text screens. A comparison of conventional delivery with Professor Plus yielded similar results with a significant differences shown on the two additional variables of adequacy of presenter's delivery and student interest which were rated higher by the conventional delivery group.

A comparison of the two television delivery systems, EDNET and Professor Plus, showed a significant difference on only one variable. The mean of the EDNET group's ratings on the value of visuals variable was higher than the mean of the Professor Plus group's ratings. These two types of television delivery systems were seen as virtually equivalent.

An analysis of the educational attributes of two forms of communication technology was reported by Tuckey (1993). The electronic white board, a form of synchronous audioconferencing, and asynchronous computer conferencing were reviewed. It was not the intent of the analysis to identify one form of communication as better than the other.

Face-to-face interaction was available in the uses of the electronic white board reviewed. Students met in small groups with the aural presence of the instructor. This element "provides opportunities for social interaction, for mutual support, and for collaborative learning...it provides more possibilities for group work than does audioconferencing" (Tuckey, 1993, p. 62).
The computer conferencing permitted only text-based communication. Several negative aspects, including limits in retrieval and display capabilities, contributed to difficulties in collaboration. Group work was also difficult due to the asynchronous nature of this technology.

The researcher concluded that each form of communication had its advantages. There was a need to review the attributes of the technology used for distance education. Visual channels may be more important in "subject areas such as mathematics and the sciences, whereas (computer conferencing) may be more suitable in areas requiring extensive discourse" (Tuckey, 1993, p. 70).

Ahern and Repman (1994) examined two different delivery technologies and the effect on interaction. Interaction was sometimes inhibited in distance education systems. The attributes of different delivery technologies may contribute to both the quantity and the quality of teacher-student and student-student interactions.

In the first study, researchers analyzed video tapes of a class delivered using two-way audio/two-way video technology. Levels of teacher-student interaction were identified. Teachers talked 62% of the time with students talking 38% of the time. The percent of questions asked was divided almost equally between students and teachers.

In the second study, Ahern and Repman (1994) reported on computer mediated communication systems and the impact on interaction. Two versions of software were developed for this study. The first used a graphic-based discussion map while the second was a more traditional text version. "Students in the graphic interface produced significantly . . . more messages . . . than students using the textual interface" (p. 541). While a comparison of time spent using the software was not statistically significant, the students using the graphic version spent approximately 25% more time per visit.

To summarize, it is important to examine the attributes of any instructional medium and how these attributes contribute to the learning outcome. The studies above suggested that different distance education technologies meet different needs. Two-way communication is an essential component of the learning environment (Garrison, 1990). Collaboration with other students and with the instructor is not only possible but easier today than previously due to advancements in technology. Continued research needs to examine the setting, context as well as the media attributes to determine variables contributing learner outcomes.
Summary

The distance education literature has several characteristics that make summarizations difficult. The largely anecdotal nature of distance education literature, reporting results of a specific project, makes it difficult to generalize. Widely criticized comparison studies continue to be popular. Comparing the achievements of distance learners to traditional learners or between distance learners using different technologies continue to show "no significant difference". Subjects tend to be highly motivated, adult learners providing little help in generalizing to other populations.

In spite of these limitations, it is possible to draw the following tentative conclusions from the research literature. While these summary statements should be interpreted skeptically, they are supported by the literature.

- Distance education is just as effective as traditional education in regards to learner outcomes.
- Distance education learners generally have a more favorable attitude toward distance education then traditional learners and distance learners feel they learn as well as if they were in a regular classroom.
- Successful distance education learners tend to be abstract learners who are intrinsically motivated and possess internal locus of control.
- While interaction seems intuitively important to the learning experience, interaction should not be added without real purpose.
- Focusing on building collaboration and group interaction may be more important than focusing on individual participation.
- Each form of distance education technology has it own advantages and disadvantages in contributing to the overall quality of the learning experience.

The research clearly shows that distance education is an effective method for teaching and learning. Future research needs to focus on: different populations, particularly K-12 students; psychological and social attributes of the learner; the impact of distance education on the organization; and the contributions of different media attributes to learning outcomes.

Diffusion of Innovations

Diffusion of innovation research has its roots in the beginnings of Social Science in Europe. Perhaps one of the earliest investigators in this field was a French judge, Gabriel
Tarde. Tarde identified the diffusion of innovations as a basic explanation of how human behavior changes (Rogers, 1995).

The purpose of his scholarly observations, Tarde said, was "to learn why, given one hundred different innovations conceived of at the same time - innovations in the form of words, in mythological ideas, in industrial processes, etc. - ten spread abroad while ninety will be forgotten" (Tarde, 1903, p. 140 in Rogers, 1983, p. 40).

In the United States, diffusion research began in the field of anthropology in the 1920s. While research in anthropology and sociology dominated the diffusion literature until the 1960s, a large number of diffusion studies were completed in the field of education under the guidance of Mort at Columbia University's Teacher College in the first half of the century (Rogers, 1995). The unit of analysis in the majority of Mort's studies was the school system and data was collected from administrators. Two key findings of Mort's research were that per pupil cost was the best predictor of school innovativeness and that the rate of adoption of an educational innovation has a wide ranges but averages about 25 years (Rogers, 1995).

**Rogers and diffusion of innovations within systems**

Rogers (1983) defined diffusion of innovations as a process which included four parts: "the innovation, communication channels, time and the social system" (p. 10). Anything perceived by an individual to be new regardless of when it was discovered would be an innovation. Communication channels identify how information is exchanged between individuals. "A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (Rogers, 1983, p. 24).

A substantial body of diffusion research has focused on the adoption of an innovation by an individual. But a large number of technological innovations are adopted by organizations. Rogers (1995) defines an organization as a "stable system of individuals who work together to achieve common goals through a hierarchy of ranks and a division of labor, p. 348." Five components that contribute to the structure and stability of an organization are:

1. predetermined goals,
2. prescribed role or duties,
3. a hierarchical authority structure,
4. rules and regulations to govern decision making, and
5. informal patterns and relationships. (Rogers, 1995)

Rogers' (1962) original model of the diffusion of an innovation focused on the individual. Based on the review of numerous innovation studies, Rogers' model attempted to
explain why an individual adopts or rejects an innovation. His model identified five stages in the adoption process: awareness, interest, trial, evaluation, and adoption. These have since been modified to knowledge, persuasion, decision, implementation and confirmation (Rogers, 1995).

Early research on organizational innovation attempted to apply the individual model of diffusion of an innovation to organizational innovation. Data were usually collected from only one individual within the organization though the unit of analysis was the organization (Rogers, 1995).

These early organizational innovativeness studies and the transfer of Rogers model of diffusion of innovations among individuals to organizational innovation was criticized by Gross, Giacquina, and Bernstein (1971). While the model was helpful in understanding the adoption of simple technological innovations by individuals it did not readily transfer to the adoption of complex educational innovations (Gross et al., 1971).

In his 1983 book, Rogers acknowledged this problem with the model and identified two shortcomings of the early organizational innovativeness studies. First, the way the dependent variable, innovativeness, was measured tended to obscure the innovation process. Combining measures about several different innovations hid actual differences among the innovations. Second, organizational innovation studies tended to collect data from only one individual, usually the top leader. Information from only the one source can not show the complete picture of organizational innovation (Rogers, 1995).

One solution, proposed by Rogers (1995), to these shortcomings was to use a more in-depth approach. Data should be gathered from many sources about the innovation-decision process within an organization. Though less generalizable than a strictly quantitative approach, a smaller sample, and more in-depth methods would provide greater insight into how and why an organization adopts or rejects an innovation (Rogers, 1995).

Based on his review of innovation literature, Rogers (1995) suggested three classifications of independent variables related to organizational innovativeness: leader characteristics or the leader's attitude toward change in general and the leader's attitude toward the innovation; external organizational characteristics or system openness; and internal organizational characteristics including centralization, complexity, formalization, interconnectedness, organizational slack and size.

Centralization refers to the locus of power and control in an organization. If an organization is highly centralized, decision making resides in the hands of only a few individuals. An emphasis on rules and procedures is characterized in the formalization variable.
Centralization and formalization variables hinder the decision to adopt. However, once a
decision to adopt is made, these two variables provide a structure which encourages the
implementation of an innovation (Rogers, 1995).

Complexity, interconnectedness, organizational slack, and size tend to have the
opposite effect. The degree of expertise and knowledge of organizational members is referred
to as complexity. The interconnectedness variable examines the communication network among
organizational members. The availability of resources is characterized by organizational slack.
These variables contribute positively to the decision to adopt an innovation but may restrict the
actual implementation process (Rogers, 1995).

These internal organizational characteristics tend to have relatively low correlations with
innovativeness. They also seem to have different effects in different stages of the innovation
process. Because of these problems, Rogers (1995) recommends a process approach to
studying innovativeness within organizations and suggests a five stage model of the innovation
process in organizations. Rogers’ model is divided into an initiation phase and an
implementation phase.

The initiation phase has two stages: agenda-setting and matching. Agenda-setting may
occur in one of two ways. In the first, individuals within the organization identify an important
problem within the organization and then seek out innovations to solve the problem. In the
second, organizations continually look for ideas or innovations which may be helpful to the
organization (Rogers, 1995). There is evidence to support the idea that in most cases, the
awareness of the availability of an innovation created a demand for the innovation (Bernas,

Matching is the next stage in the innovation process. In this stage, the organization
examines the innovation to see how well it fits or “matches” the organization. Questions to be
answered during this stage include: How well will it solve the problem? and What additional
problems may occur if the innovation is implemented? Answers to these questions and others
allow the organization to make a decision to adopt or reject the innovation. Rejection leads to a
termination of the innovation process, while adoption leads to the next phase of the innovation
process: implementation (Rogers, 1995).

The implementation phase has three stages: redefining/restructuring, clarifying, and
routinizing. When an innovation is first adopted it undergoes a modification or
“redefining/restructuring” so it more closely fits the organizational needs. Sometimes, not only
is the innovation modified, but the organization itself must be modified to accommodate the
innovation (Rogers, 1995). During the clarifying stage, the innovation is more widely
implemented within the organization and more members develop an understanding of the innovation. Finally, the innovation becomes a routine part of the organization (Rogers, 1995).

In summary, early research on organizational innovation attempted to determine independent variables related to organizational innovation. Data were normally gathered from only one individual, the lead administrator. Because of the low relationships between organizational characteristics and innovativeness, this research was replaced with a more process approach. Rogers (1995) model of the innovation process in organizations provides a structure for examining the innovation process in organizations.

There have been many studies examining the correlations of certain characteristics with innovation. Recent examples of innovation research that examined this relationship include Carr's (1985) study of the relationship of demographic characteristics and attitude toward innovation and a similar study by Rude (1994).

Carr (1985) used survey research to study the attitudes of 400 randomly selected Florida vocational educators toward educational change. A three part survey was used to measure demographics, attitude toward educational innovation, and innovation and flexibility. The nine demographic variables included were:

- gender,
- age,
- teaching/service area,
- type of school,
- degree held,
- inservice hours taken,
- college semester hours earned in past year,
- teaching experience, and
- professional organization membership (Carr, 1985).

In examining the relationship between demographic characteristics and attitude toward innovation, only inservice hours taken and professional organization membership were found to be significantly related. Both variables were found to be positively correlated with a favorable attitude toward innovation. Individuals who had taken more inservice hours had a lower or more favorable attitude toward innovation. This was also true for individuals with a greater number of professional memberships (Carr, 1985).
While in general, vocational educators were found to be flexible, results did not indicate a correlation between any of the demographic variables and flexibility. However, professional organization membership was found to be significantly correlated with innovativeness (Carr, 1985).

In summary, the results of Carr’s (1985) study indicated the best predictor of flexibility and attitude toward innovation was professional organization membership. Vocational educators in Florida were found to be flexible and innovative. Results supported the relationship between an individual’s flexibility and a favorable attitude toward innovation.

Rude’s (1994) study used surveys to measure organizational innovation and to collect general community college information. A distance education nomination form was used to identify three individuals knowledgeable about distance education at each community college in Iowa. These individuals were then asked to complete a survey measuring organizational innovation. Data were analyzed to determine the relationship between general community college information (demographics) and organizational innovation determined by average respondents scores for each community college (Rude, 1994).

Only one variable was discovered to be slightly correlated with organizational innovativeness. As the average age of the respondents increased, the organizational innovation score decreased. A low innovation score indicated a higher level of organizational innovativeness. Results indicated that organizational characteristics had little to do with the adoption of the innovation distance education (Rude, 1994).

These two studies support Rogers’ suggestion of the need for a more process approach to studying innovation. In the following section, two studies that use a process approach to study change within teacher education programs are reviewed.

Change in Teacher Education Programs

**Historical foundations of teacher education**

Until the nineteenth century, formal preparation of teachers existed in only a limited fashion, if at all. In general, during the first 200 years of American history, teachers were required to be of high moral character and to have demonstrated the ability to read, write, and cypher. This change with the advent of the common schools in the early 1800s. With the single purpose of preparing individuals to teach in the common schools, the normal schools were founded. The first normal school opened in Lexington, Massachusetts, in 1839 (Urban, 1990).
While the number of normal schools continued to increase, departments of education within the university were being established in the last decades of the nineteenth century. The focus of the university department of education was on the preparation of teachers for the high school leaving the preparation of elementary teachers to the normal school (Urban, 1990). This split continued well into the twentieth century.

As the normal schools evolved into teachers colleges they began to compete with the universities in producing not only elementary teachers but high school teachers. The offering of degree programs increased the diversity in academic subjects unrelated to teacher education. By the 1930s "most normal schools had become teachers colleges and had taken their proper place in the educational hierarchy." (Urban, 1990, p. 65)

In looking at the evolution of teacher preparation in America, societal and governmental factors contributed to the change. Until the 1960s, these factors were mostly of a local nature. Since then, the federal government has served as a change agent for education and teacher preparation. Federal legislation and funding have directed the direction of educational reform in recent years (Freiberg & Waxman, 1990). However, "despite change efforts, it can still be argued that there have been no fundamental or substantive changes in teacher education during the past several decades." (Freiberg & Waxman, 1990, p. 622)

After analyzing the issues of change in teacher education, Freiberg and Waxman (1990) suggest several areas be considered when initiating change in the preparation of teachers. Change strategies should be multidimensional and noncoercive. The professional development of teacher education faculty needs to be addressed. There must be federal, state, and institutional support (Freiberg & Waxman, 1990).

In the final analysis, change must be instituted from within...Teacher educators must take the initiative and provide an agenda for change to policymakers who support and finance these changes. Having both the responsibility and authority over one's profession should be the collaborative goal of teacher educators and other members of the teaching profession. (Freiberg & Waxman, 1990, p. 631)

**Two studies of change in teacher education**

The continual evolution of educational theory and practice suggests the continual need for change in teacher preparation programs. Incorporating these innovations into teacher education programs at universities and colleges is problematic. Wideen and Holborn (1984) studied how changes occurred at 10 teacher preparation institutions in Canada. One objective of
their study was "to identify a set of conditions necessary for effective program development to occur in faculties of education" (Wideen & Holborn, 1984, p. 2).

Wideen and Holborn (1984) looked at changes in teacher preparation programs in Canada over the last 30 years. Following an analysis of documents and interviews at 49 teacher training institutions, three innovations were identified for further analysis: 1) the move from Normal School to University campus, 2) a lengthened practicum, and 3) improving the link between theory and practice. Changes were analyzed from both a human relations perspective using Chinn and Benne's classification of change strategies and from a political systems perspective employing Bryden's policy spirals (Wideen & Holborn, 1984). Results indicated that six factors were necessary for a change to occur: external influence, power within the institution, shelter conditions, structure, key players, and receptive groups (Wideen & Holborn, 1984). Three of these factors are discussed in more detail below.

External factors that contributed to change included governmental legislation, commissioned papers, and teacher and linkage groups. If these factors did not support the innovation then change was not likely to occur. While changes did occur with the support of only some of these factors, the likelihood of the change being incorporated into the teacher education programs was greater if all were present (Wideen & Holborn, 1984).

Shelter conditions were found to be necessary during the early stages of change. "Criticism can destroy a new and emerging idea most effectively. Shelter conditions which may come in many forms are necessary to blunt such criticism" (Wideen & Holborn, 1984, p. 28).

Wideen and Holborn (1984) repeatedly found that key players were an important part of the process of change. Sometimes initiating and implementing a change fell on one individual. However, it was more likely to be the work of several individuals whose efforts overlapped.

Based on their analysis of change, Wideen and Holborn (1984) suggested five factors be considered when planning for change in teacher education programs.

1. In planning for reform in teacher education one must also plan for the change process that will implement such reform.
2. Policy and program development along with its implementation is a very complex process which involves time to effect.
3. For change to occur a constellation of factors must be operating and a variety of change strategies being used.
4. Plans for change in faculties of education must take into account their distinctive character.
5. In terms of understanding the process of change in faculties of education both the human relations and the political relations perspective are useful. (Wideen and Holborn, 1984, pp. 31-32)

As part of a large ethnographic study documenting the process of policy and program development in teacher education, Rainer and Guyton (1994) focused on the policy-decision making process. Objectives of this study included identifying issues that facilitated or constrained change, the steps in the policy making process and responses of faculty members to the process.

Data were collected from 14 education department faculty members over an eight month period. Methods used included participant observations, interviews, surveys and document review. Several events were held to facilitate the policy-decision making process beginning with a meeting to generate interest followed by several retreats and workshops (Rainer and Guyton, 1994). Results identified three categories of tasks associated with policy development. Education tasks included readings, discussions, observations and application. Grappling with issues tasks were at first very general, but as decisions were made more specific issues emerged. Issues the faculty had to "grapple" with related to philosophical issues, teacher control, and program issues. Decision making tasks occurred at the end of each meeting (Rainer and Guyton, 1994).

Rainer and Guyton (1994) identified structural foundations and group characteristics necessary for change to take place. Structural foundations referred to how a group functions and included time, commitment, resources, leadership, and dedicated time. The groups' prior knowledge and experience with change were instrumental in the decision-making process. It was also important that the group was able to assimilate new information with current beliefs. Two other group characteristics that provided a foundation for change were collaboration and a feeling of trust and respect among members (Rainer and Guyton, 1994).

Findings from this study do not suggest the one right way to conduct the policy-making stage of curriculum development. What they do indicate is that the process of getting ready to change is an integral component of curriculum development and change in teacher education. (Rainer and Guyton, 1994, p. 146)

In summary, Rainer and Guyton's (1994) study of the decision-making process identified several factors which contribute to the success of the decision-making process. These included allowing time for process not only product, the importance of collaboration and shared decision-making, strong leadership, time and resources.
The two studies discussed here examined the process of change, specifically the decision making stages. The first study by Wideen and Hoborn (1984) examined the integration of educational innovations looking back at the implementation. In contrast, Rainer and Guyton (1994) were participant observers in the decision-making process.

Summary

This chapter presented a review of previous research and key information related to three areas of importance to this study. First, distance education was defined and then related research was presented. Second, Roger's (1995) model of the diffusion of innovations within organizations was discussed followed by a review of two research studies. The last area presented information related to change in teacher education including a historical look at the foundations of teacher preparation programs and a review of two studies that examined the process of change in teacher education.

Roger's (1995) theory on diffusion of innovations provided the theory base for this study. Rogers (1983) defined the diffusion of an innovation as "the process by which (1) an innovation (2) is communicated through certain channels (3) over time (4) among the members of a social system" (p. 10).

The innovation researched here was distance education. While technically distance education was not "new", technological advances had changed the communication channels by which distance education was distributed. Teacher preparation programs provided the organizations or social systems to complete the definition.
CHAPTER III. METHODOLOGY

Introduction

The methodology used in this study is explained in this chapter. First, participants are described; second, a description of data collection methods is provided; third, data analysis methods are outlined; and fourth, a summary of the chapter is provided.

This study was conducted as part of the Teacher Education Alliance activities and evaluation activities of the Iowa Distance Education Alliance, Iowa's Star Schools Project. The researcher developed the instruments, collected and analyzed the data, and wrote the research report. Support for data collection was provided by the US Department of Education Star Schools grant (#R203 B 5001-95 and #R203 B 5001-96).

Participants

In Spring 1996, letters were sent to the presidents of 25 independent, 4-year institutions with teacher education programs in Iowa requesting the nomination of a representative to the Teacher Education Alliance. These representatives were invited to participate in the Teacher Education Alliance activities including the Iowa Distance Learning Association Annual conference and campus site visits. Representatives who attended the IDLA conference and their colleagues who participated in the Teacher Education Alliance campus visits were asked to respond to the Teacher Education Alliance Participant Survey. These same individuals also participated in group discussions related to the integration of distance education conducted at each of the site visits.

Data Collection

Three methods of data collection were used for this study. Site visits were used to collect qualitative data related to the research questions. The TEAS was developed and administered to provide data related to five constructs, demographic data, and qualitative data to supplement the data collected at the site visits. Documents were reviewed to provide demographic information about the independent, 4-year colleges and universities in Iowa.

Site visits

A primary goal of the Teacher Education Alliance was to promote integration of distance education into the teacher education programs of Iowa's colleges and universities. Representatives from all 28 teacher education programs in Iowa were invited to participate in
series of workshops and discussion groups held in conjunction with the Iowa Distance Learning Association (IDLA) annual conference in February, 1996. Twenty-three individuals representing the three Regent’s institutions and 20 private colleges/universities participated in this event. Activities included a look at distance education in Iowa, past present and future, and presentations by professors who had integrated distance education activities into education methods classes.

Key to building collaboration with Iowa’s colleges and universities were focus groups and individual meetings with college and university representatives held at the IDLA conference. Representatives were given the opportunity to meet with colleagues at other institutions and share ideas and concerns related to the integration of distance education into teacher education programs. TEA members met with each representative on a one-to-one basis to discuss the current status of distance education at their institution. These individual meetings were also used as a method of assessing how the needs of each institution for the integration of distance education could best be met.

Qualitative data collected at the IDLA conference indicated that the needs of universities/colleges in Iowa with teacher education programs were very diverse. Some were already implementing distance education technologies while others were still struggling with computer access. Because of this great diversity, the TEA decided to offer individualized workshops to Iowa’s teacher preparation colleges and universities.

A basic workshop agenda was developed, but was adjusted to meet the needs of each individual college/university. The primary focus was on sharing information. Monographs about distance education history and research, interactive distance education teaching, and distance education research studies in Iowa were discussed and distributed. The award winning video “Room with a View” was shown and copies of this video and a video series on the foundations and applications of distance education were given to the education department of each college/university visited.

Site visits were made to 18 private colleges/universities in Iowa. One hundred sixty-one individuals participated in these site visits. One site had only two participants, the entire education department at that institution. The largest number of participants at one site was 21.

Participants included:

- education department faculty (43%);
- teacher education students (25%);
- faculty from departments other than education (16%);
• administrators (11%); and
• media/technology specialists (5%).

Five workshops were conducted using ICN distance education classrooms. These workshops allowed participants to actually use the technology and see for themselves how the system worked. It also allowed the TEA to involve distance education experts from other institutions who could not travel to the participating institution. For many participants, this was their first experience with the distance education technology available in Iowa. These ICN sessions involved an extra commitment from the participating institutions as many did not have an ICN classroom on their own campus.

Observations and focus groups were used to collect data at each site visit. The focus groups were planned discussions to obtain participants' perceptions about distance education. Three open-ended questions were used to allow participants the opportunity to comment, explain, and to share experiences and attitudes. Questions focused on the level of current integration of distance education, concerns about the integration of distance education, and suggestions on how to integrate distance education into teacher education programs in Iowa.

At the beginning of each focus group certain procedures were established. Participants were insured of confidentiality. Participants were encouraged to interact with and respond to others in the group. The acceptance of differing viewpoints and both positive and negative comments was stressed. In particular, four ground rules were communicated to aid in the participation of all. These four ground rules were:

• only one person speaks at a time,
• no side conversations,
• everyone participates with no one dominating, and
• all responses are equally valued.

Notes were taken by this researcher and by the other presenter. Immediately following each site visit, the researcher and presenter debriefed in an effort to capture impressions and as well as contrast findings with previous focus groups. This reinforced and clarified observations and recorded responses.

**Teacher Education Alliance Survey (TEAS)**

The instrument used for this study is shown in Appendix A. Literature and previous evaluation instruments used as part of the Iowa Distance Education Alliance (IDEA) evaluation were reviewed. Based on this review and discussions with the IDEA evaluation team, five
constructs were identified for inclusion on the instrument used for this study. These constructs were individual innovativeness, perceived organizational innovativeness, level of concerns about distance education, attitude toward distance education, and level of distance education coverage. Table 1 summarizes the working definition developed for each construct, the measurement, and identifies the survey items related to each construct.

The final version of the Teacher Education Alliance Survey (TEAS) developed for this study and as part of the IDEA evaluation consisted of 53 items requesting demographic information, ratings on a series of Likert-scale items, and three open-ended questions. It was based on evaluation instruments used previously as part of the IDEA evaluation and an instrument used by Maushak and Wright (1996) to evaluate the project VISION 2020. The instrument was pilot tested with education faculty members at the IDLA annual conference to check readability and reliability.

The Likert-items on the survey were grouped to form 5 constructs: PORGI* (perceived organizational innovativeness), IS* (individual innovativeness), level of concerns toward distance education, attitude toward distance education, and current level of distance education coverage. Cronbach alpha coefficients were determined for each of the constructs. Table 2 shows the Standardized Cronbach alpha reliability estimate for each construct. The reliability estimates indicated that the constructs were reliable, with coefficients ranging from .63 to .94.

The construct PORGI*, defined as perceived organizational innovativeness, was measured by using an abbreviated form of an instrument created in 1977 by Hurt and Tiegen to measure perceived organizational innovativeness. From a pool of 37 items, Hurt and Tiegen (1977) used factor analysis to select 25 items for the PORGI scale. These 25 items are shown in Table 3. The original instrument had a split-half (odd-even) reliability estimate of .96. Evidence indicated that this instrument had both construct and predictive validity.

Based on Hurt and Tiegen's recommendation, the 10 items with an absolute value factor loading greater than or equal to .73 were selected for the abbreviated form or PORGI*. The PORGI* items, identified with an * in Table 3, had a response set where 1=strongly disagree, 2=disagree, 3=moderately disagree, 4=undecided, 5=moderately agree, 6=agree, and 7=strongly agree. *). The standardized Cronbach coefficient alpha obtained for the PORGI* was .94.

The construct IS*, defined as individual innovativeness scale, was adapted from an instrument created by Hurt, Joseph and Cook (1977). Factor analysis of responses to the original pool of 53 items identified 20 items that comprised the IS scale (see Table 4). The split-
**Table 1: Research constructs, working definitions, and measurement.**

<table>
<thead>
<tr>
<th>Construct name</th>
<th>Working definition</th>
<th>Measurement</th>
<th>Survey number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual innovativeness</td>
<td>Individual innovativeness is a normally distributed characteristic interpreted as a willingness to change.</td>
<td>Ten items were identified to measure this construct based on the innovativeness scale (IS), the work of Hurt, et. al. (1977). As recommended, the 10 items with the highest item correlation were selected as a short form of the IS. <strong>Response Format</strong> Items were assessed on a 7-point disagree/agree scale.</td>
<td>Items # 1 to #10</td>
</tr>
<tr>
<td>Perceived organizational</td>
<td>Perceived organizational innovativeness is defined as employees' perceptions of their organization's willingness to change. It is assumed that this construct is normally distributed.</td>
<td>This construct was measured by adapting the 25 item PORGI developed by Hurt and Teigen. The ten items with the highest item correlation were selected for inclusion here. <strong>Response Format</strong> Items were assessed on a 7-point disagree/agree scale.</td>
<td>Items #11 to #20</td>
</tr>
<tr>
<td>innovativeness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of concerns about</td>
<td>Level of concerns refers to an individuals' perceptions about how change related to distance education relates to them on a personal level. Three levels were identified for this study: awareness, informational, and self.</td>
<td>The six items used to measure this construct were modified from Hall's level of concerns questionnaire and were used on previous IDEA instruments. <strong>Response Format</strong> Items were assessed on a 7-point disagree/agree scale.</td>
<td>Items #21 to #26</td>
</tr>
<tr>
<td>distance education</td>
<td></td>
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</tr>
<tr>
<td>Attitude toward distance</td>
<td>Attitude toward distance education refers to an individual's beliefs about distance education.</td>
<td>This construct was measured using eight items from previous IDEA instruments. The items were modified to reflect a teacher education perspective. <strong>Response Format</strong> Items were assessed on a 7-point disagree/agree scale.</td>
<td>Items #27 to #34</td>
</tr>
<tr>
<td>education</td>
<td></td>
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<tr>
<td>Level of distance coverage</td>
<td>Level of coverage identifies the extent to which distance education is covered in both method and media classes.</td>
<td>Four two-part items were used to measure this construct. Questions progressed from a relatively low end of coverage to actual hands-on applications. <strong>Response Format</strong> Items were assessed on a 5-point none/extensive scale.</td>
<td>Items #47 to #50</td>
</tr>
</tbody>
</table>
Table 2: Reliability estimates of TEAS constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Reliability estimate (Cronbach alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORGI*</td>
<td>.94</td>
</tr>
<tr>
<td>IS*</td>
<td>.89</td>
</tr>
<tr>
<td>Level of concerns toward distance education</td>
<td>.64</td>
</tr>
<tr>
<td>Attitude toward distance education</td>
<td>.89</td>
</tr>
<tr>
<td>Current level of coverage</td>
<td>.94</td>
</tr>
</tbody>
</table>

Table 3: PORGI scale items with factor loadings (unrotated matrix)

<table>
<thead>
<tr>
<th>The organization I work for (is):</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. cautious about accepting new ideas</td>
<td>.67</td>
</tr>
<tr>
<td>*2. a leader among other organizations</td>
<td>-.74</td>
</tr>
<tr>
<td>3. suspicious of new ways of thinking</td>
<td>.72</td>
</tr>
<tr>
<td>*4. very inventive</td>
<td>-.76</td>
</tr>
<tr>
<td>5. often consulted by other organizations for advice and information</td>
<td>-.65</td>
</tr>
<tr>
<td>6. skeptical of new ideas</td>
<td>.70</td>
</tr>
<tr>
<td>*7. creative in its method of operation</td>
<td>-.74</td>
</tr>
<tr>
<td>8. usually one of the last of its kind to change to a new method of operation</td>
<td>.73</td>
</tr>
<tr>
<td>9. considered one of the leaders of its type</td>
<td>-.74</td>
</tr>
<tr>
<td>*10. receptive to new ideas</td>
<td>-.80</td>
</tr>
<tr>
<td>11. challenged by unsolved problems</td>
<td>-.60</td>
</tr>
<tr>
<td>*12. follows the belief that “the old way of doing thins is the best”</td>
<td>.73</td>
</tr>
<tr>
<td>13. very original in its operational procedures</td>
<td>-.73</td>
</tr>
<tr>
<td>*14. does not respond quickly enough to necessary changes</td>
<td>.75</td>
</tr>
<tr>
<td>15. reluctant to adopt new ways of doing things until other organizations have uded them successfully</td>
<td>.71</td>
</tr>
<tr>
<td>16. frequently initiates new methods of operation</td>
<td>-.70</td>
</tr>
<tr>
<td>*17. slow to change</td>
<td>.83</td>
</tr>
<tr>
<td>18. rarely involves employees in the decision making process</td>
<td>.66</td>
</tr>
<tr>
<td>19. maintains good communication between supervisors and employees</td>
<td>-.65</td>
</tr>
<tr>
<td>20. influential with other organizations</td>
<td>-.60</td>
</tr>
<tr>
<td>*21. seeks out new ways to do things</td>
<td>-.79</td>
</tr>
<tr>
<td>*22. rarely trusts new ideas and ways of functioning</td>
<td>.74</td>
</tr>
<tr>
<td>23. never satisfactorily explains to employees the reasons for procedural changes</td>
<td>.62</td>
</tr>
<tr>
<td>*24. frequently tries out new ideas</td>
<td>-.77</td>
</tr>
<tr>
<td>25. willing and ready to accept outside help when necessary</td>
<td>-.66</td>
</tr>
</tbody>
</table>

* All items preceded by an asterisk comprise the 10 item abbreviated PORGI scale. (PORGI*) (Hurt & Tiegen, 1977, p. 381)
Table 4: IS scale items with factor loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1. My peers often ask me for advice or information.</td>
<td>.58</td>
</tr>
<tr>
<td>Item 2. I enjoy trying out new ideas.</td>
<td>.57</td>
</tr>
<tr>
<td>Item 3. I seek new ways to do things.</td>
<td>.60</td>
</tr>
<tr>
<td>Item 4. I am generally cautious about accepting new ideas.</td>
<td>.67</td>
</tr>
<tr>
<td>Item 5. I frequently improvise methods for solving problems when an answer is not apparent.</td>
<td>.58</td>
</tr>
<tr>
<td>Item 6. I am suspicious of new inventions and new ways of thinking.</td>
<td>.61</td>
</tr>
<tr>
<td>Item 7. I rarely trust new ideas until I can see whether the vast majority of people around me accept them.</td>
<td>.64</td>
</tr>
<tr>
<td>Item 8. I feel I am an influential member of my peer group.</td>
<td>.62</td>
</tr>
<tr>
<td>Item 9. I consider myself to be creative and original in my thinking and behavior.</td>
<td>.62</td>
</tr>
<tr>
<td>Item 10. I am aware that I am usually one of the last people in my group to accept something new.</td>
<td>.63</td>
</tr>
<tr>
<td>Item 11. I am an inventive kind of person.</td>
<td>.62</td>
</tr>
<tr>
<td>Item 12. I enjoy taking part in the leadership responsibilities of the group I belong to.</td>
<td>.54</td>
</tr>
<tr>
<td>Item 13. I am reluctant about adopting new ways of doing things until I see them working for people around me.</td>
<td>.72</td>
</tr>
<tr>
<td>Item 14. I find it stimulating to be original in my thinking and behavior.</td>
<td>.44</td>
</tr>
<tr>
<td>Item 15. I tend to feel that the old way of living and doing things is the best way.</td>
<td>.44</td>
</tr>
<tr>
<td>Item 16. I am challenged by ambiguities and unsolved problems.</td>
<td>.64</td>
</tr>
<tr>
<td>Item 17. I must see other people using new innovations before I will consider them.</td>
<td>.70</td>
</tr>
<tr>
<td>Item 18. I am receptive to new ideas.</td>
<td>.55</td>
</tr>
<tr>
<td>Item 19. I am challenged by unanswered questions.</td>
<td>.62</td>
</tr>
<tr>
<td>Item 20. I often find myself skeptical of new ideas.</td>
<td>.71</td>
</tr>
</tbody>
</table>

* All items preceded by an asterisk comprise the 10 item abbreviated IS scale. (IS*)
(Hurt, Joseph, & Cook, 1977, p. 61)
half reliability of the 20 item instrument was .94. Evidence presented indicated both construct and predictive validity.

Hurt et al. (1977) identified 10 items as a possible short form of the IS. These ten items, identified with an * in Table 4, comprised the abbreviated form of the individual innovativeness scale (IS*) used in this study. Responses were scored as 1=strongly disagree, 2=disagree, 3=moderately disagree, 4=undecided, 5=moderately agree, 6=agree, and 7=strongly agree. The Cronbach coefficient alpha obtained for the IS* was .89. Hurt et al. (1977) obtained a correlation with the 20 item scale of .92.

Based on the assumption that innovativeness was a normally distributed construct, Rogers (1995) identified adopter categories by dividing the distribution based on the standard deviation. Innovators should comprise 2.5% of the population; early adopters, 13.5%; early majority, 34%; late majority, 34%; and laggards, 16%. Both the PORGI* and the IS* were tested for construct reliability based on this assumption. Table 5 presents a comparison of expected percentages to actual percentages from both the PORGI* and the IS*. Results from chi-square tests indicated that the data did not differ significantly from these defined percentages.

The items used to measure level of concerns and attitudes have been found to be both reliable and valid based on previous uses in IDEA evaluations. These constructs were not reevaluated as part of this study.

Demographic information requested included gender, education level, years experience at college and K-12 level, and primary teaching responsibilities. Individuals were also asked to rate their current knowledge of and involvement with distance education.

Table 5: Expected and actual percentages by adopter categories

<table>
<thead>
<tr>
<th>Adopter Category</th>
<th>Theoretical Percentage$^1$</th>
<th>IS* Percentage$^2$ (n=45)</th>
<th>PORGI* Percentage$^3$ (n=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovators</td>
<td>2.5%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Early Adopters</td>
<td>13.5%</td>
<td>13.3%</td>
<td>17.6%</td>
</tr>
<tr>
<td>Early Majority</td>
<td>34.0%</td>
<td>44.4%</td>
<td>35.3%</td>
</tr>
<tr>
<td>Late Majority</td>
<td>34.0%</td>
<td>26.7%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Laggards</td>
<td>16.0%</td>
<td>15.6%</td>
<td>23.5%</td>
</tr>
</tbody>
</table>

Three open-ended questions were included on the TEAS. These questions were based on the research questions developed as part of this study. Respondents were asked to describe how distance education is becoming part of their teacher education programs, to identify barriers in the infusion of distance education, and to describe the mission of their college.

Human subject approval was requested and received as part of the IDEA evaluation. The TEAS was distributed to individuals at the conclusion of the site visits. Participants were insured of confidentiality and that response was voluntary. Respondents were provided with a postage-paid envelope to return survey and encouraged to respond by mailing in the survey during the next week.

Document review

Several documents were reviewed to obtain demographic information about each independent, 4-year college or university in Iowa with a teacher education program. Documents reviewed included the Information Digest of Postsecondary Education in Iowa and Peterson's Guide to Colleges: 1996. The IOWA database, a web site, was also reviewed. Data were analyzed to provide information related to institutional size and available technology. The same variables were included for each independent, 4-year college or university in Iowa.

Data Analysis

Quantitative data analysis

Surveys and data from document review were coded to ensure anonymity. Codes used corresponded with a higher education institution in Iowa with a teacher education program.

Quantitative data collected on the TEAS and from document review were entered into a Statistical Package for the Social Sciences (SPSS) database. The SPSS for the Macintosh was used to analyze the data. Frequencies were calculated to ensure data accuracy. Frequencies also provided demographic and descriptive data.

Construct means were computed for each of the five constructs included on the TEAS. Negatively worded items were recoded prior to computing construct descriptives.

An individual innovativeness score was calculated using responses to the IS* portion of the survey. Negatively worded items were recoded to reverse the scale, then responses were summed to obtain an IS* score. A higher score indicated a higher level of individual innovativeness. IS* scores were sorted and ordered from high to low.
A perceived organizational innovativeness score was calculated using responses to the PORGI* portion of the survey. All negatively worded items were recoded to reverse the scale prior to summing responses to obtain a PORGI* score from each individual. Using the codes, PORGI* scores from the same institution were matched and averaged to obtain a single perceived organizational innovation score for each institution. A higher score indicated a higher level of perceived organizational innovation.

Correlations were run to determine relationship among organizational characteristics variables, IS* scores, and PORGI* scores.

**Qualitative data analysis**

Qualitative data was first organized in focus group/site visit summaries and consolidation of responses to open ended questions from the TEAS. Focus group/site visit summaries were written after each site visit. These summaries were a joint effort involving both the researcher and the presenter. Observations and participants comments were clarified by having the input from two individuals.

A constant-comparative methods was used to analyse the data. Notes, summaries and open-ended responses were read and reread to allow the researcher to look for emerging themes. Tentative categories were developed and statements sorted according to these categories. Categories were revised based on the categories emerging from the data. This process was repeated until distinct categories for interpretation were developed.

Where appropriate, the number of responses in each category were counted because this helped established a theme. Themes were established where data indicated a large number of participants identified a similar response. A response that occurred only a few times may have identified a theme because it carried high impact.

Draft copies of the results were shared with the presenter. This member checking process allowed for review, verification and comment. Conclusions were revised and clarified based on recommendations from the member-checking process.

**Summary**

This chapter described the sample, the collection of data, and the treatment of data. The sample consisted of education faculty members participating in the site visit activity of the TEA. Three methods of data collection were used, document analysis, site visit discussion groups, and the TEAS. The TEAS, developed for this study, included Likert-scale items to measure five distinct constructs, demographic items, and open response items to provide data directly
related to research questions. Both qualitative and quantitative data were collected. When qualitative data was reviewed, categories were allowed to emerge. Summary statistics were run from the quantitative data as well as correlations to determine relationships. Results obtained from the use of this methodology are presented in the following chapter, Chapter IV.
CHAPTER IV. RESULTS

Introduction

Three methods of data collection were used for this study. Documents were reviewed to gather data related to organizational characteristics. Discussions held at site visits provided qualitative data related to the integration of distance education. The Teacher Education Alliance Survey (TEAS) was administered to TEA participants to collect data related to innovation, attitude, and current practices.

Chapter IV presents descriptive statistics based on the analysis of the data collected, interpretations of qualitative data, and results of correlations. The three methods of data collection provided a natural organization for this chapter. First, based on document review, characteristics of postsecondary institutions with teacher education programs are described. Second, results of site visit analysis are discussed. Third, results of the analysis of the TEAS responses are presented. Relationships among the various variables are explored in the next section. Finally the chapter concludes with a brief summary.

Teacher Education Institution Characteristics

There are 30 4-year higher education institutions with teacher preparation programs in Iowa. Three of these are regent's institutions and were not included in this study. The Information Digest of Postsecondary Education in Iowa, Peterson's Guide to Colleges: 1996, and the IOWA database were reviewed to reveal organizational characteristics about the remaining 27 institutions. After this review two more were eliminated because the number of education majors was less than 1% of the total enrollment. Characteristics of the remaining 25 institutions are shown in Table 6.

Total enrollment of these institutions for Fall 1994 ranged from 513 to 5954 with an average enrollment of 1632. The total number of graduates in Spring 1994 ranged from 46 to 769 with an average of 287. On average education majors made up 14% of the total student enrollment. At one institution, 40% of the total enrollment was comprised of education majors. Two institutions reported having no tenured faculty. In contrast, another school had 158 tenured faculty.

Institutions were located in communities with varying population densities. The average size of a community with a postsecondary education institution with a teacher education program was 48,335. The smallest population was 1,317. One city of just over 57,000 had
Table 6: Characteristics of 4-year postsecondary institutions in Iowa with teacher education programs (1993-94 Statistics)

<table>
<thead>
<tr>
<th>Institution code number</th>
<th>Total enrollment Fall, 1994</th>
<th>Number of graduates</th>
<th>% of total enrollment in teacher education</th>
<th>Total number of tenured faculty</th>
<th>Population of community where institution is located</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1157</td>
<td>188</td>
<td>40%</td>
<td>29</td>
<td>80,505</td>
</tr>
<tr>
<td>02</td>
<td>2367</td>
<td>664</td>
<td>23%</td>
<td>39</td>
<td>8,769</td>
</tr>
<tr>
<td>03</td>
<td>1458</td>
<td>311</td>
<td>20%</td>
<td>58</td>
<td>9,270</td>
</tr>
<tr>
<td>04</td>
<td>1002</td>
<td>142</td>
<td>10%</td>
<td>23</td>
<td>57,538</td>
</tr>
<tr>
<td>05</td>
<td>1343</td>
<td>289</td>
<td>6%</td>
<td>54</td>
<td>108,772</td>
</tr>
<tr>
<td>06</td>
<td>1133</td>
<td>237</td>
<td>11%</td>
<td>53</td>
<td>3,657</td>
</tr>
<tr>
<td>07</td>
<td>1156</td>
<td>197</td>
<td>25%</td>
<td>39</td>
<td>5,074</td>
</tr>
<tr>
<td>08</td>
<td>5954</td>
<td>769</td>
<td>3%</td>
<td>158</td>
<td>193,189</td>
</tr>
<tr>
<td>09</td>
<td>3892</td>
<td>303</td>
<td>18%</td>
<td>37</td>
<td>2,319</td>
</tr>
<tr>
<td>10</td>
<td>1418</td>
<td>216</td>
<td>13%</td>
<td>43</td>
<td>193,189</td>
</tr>
<tr>
<td>12</td>
<td>876</td>
<td>177</td>
<td>NA</td>
<td>20</td>
<td>8,027</td>
</tr>
<tr>
<td>13</td>
<td>1933</td>
<td>353</td>
<td>12%</td>
<td>74</td>
<td>57,538</td>
</tr>
<tr>
<td>14</td>
<td>2383</td>
<td>474</td>
<td>10%</td>
<td>102</td>
<td>8,063</td>
</tr>
<tr>
<td>16</td>
<td>1207</td>
<td>232</td>
<td>15%</td>
<td>47</td>
<td>80,505</td>
</tr>
<tr>
<td>17</td>
<td>1227</td>
<td>279</td>
<td>13%</td>
<td>39</td>
<td>108,772</td>
</tr>
<tr>
<td>18</td>
<td>513</td>
<td>46</td>
<td>22%</td>
<td>32</td>
<td>29,201</td>
</tr>
<tr>
<td>19</td>
<td>1141</td>
<td>177</td>
<td>20%</td>
<td>42</td>
<td>4,940</td>
</tr>
<tr>
<td>20</td>
<td>2584</td>
<td>356</td>
<td>6%</td>
<td>38</td>
<td>95,333</td>
</tr>
<tr>
<td>21</td>
<td>1613</td>
<td>295</td>
<td>9%</td>
<td>3</td>
<td>11,340</td>
</tr>
<tr>
<td>22</td>
<td>1292</td>
<td>209</td>
<td>12%</td>
<td>0</td>
<td>95,333</td>
</tr>
<tr>
<td>23</td>
<td>834</td>
<td>165</td>
<td>10%</td>
<td>36</td>
<td>57,538</td>
</tr>
<tr>
<td>24</td>
<td>3175</td>
<td>708</td>
<td>10%</td>
<td>6</td>
<td>1,317</td>
</tr>
<tr>
<td>25</td>
<td>1405</td>
<td>298</td>
<td>23%</td>
<td>45</td>
<td>8,539</td>
</tr>
<tr>
<td>26</td>
<td>572</td>
<td>157</td>
<td>NA</td>
<td>9</td>
<td>8,454</td>
</tr>
<tr>
<td>27</td>
<td>576</td>
<td>131</td>
<td>NA</td>
<td>13</td>
<td>10,600</td>
</tr>
</tbody>
</table>

Note: NA = information not available
Table 6: continued

<table>
<thead>
<tr>
<th>Institution code number</th>
<th>Student expenses per year</th>
<th>Yearly expenditures in thousands</th>
<th>Date of ICN classroom available for student use</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>$15,325</td>
<td>$13,301</td>
<td>54</td>
</tr>
<tr>
<td>02</td>
<td>$18,100</td>
<td>$25,273</td>
<td>1996</td>
</tr>
<tr>
<td>03</td>
<td>$15,973</td>
<td>$25,973</td>
<td>1993</td>
</tr>
<tr>
<td>04</td>
<td>$15,905</td>
<td>$10,911</td>
<td>100</td>
</tr>
<tr>
<td>05</td>
<td>$19,035</td>
<td>$23,372</td>
<td>100</td>
</tr>
<tr>
<td>06</td>
<td>$20,375</td>
<td>$24,811</td>
<td>175</td>
</tr>
<tr>
<td>07</td>
<td>$13,640</td>
<td>$14,232</td>
<td>130</td>
</tr>
<tr>
<td>08</td>
<td>$19,250</td>
<td>$91,371</td>
<td>1993</td>
</tr>
<tr>
<td>09</td>
<td>$13,550</td>
<td>$18,966</td>
<td>1993</td>
</tr>
<tr>
<td>10</td>
<td>$15,205</td>
<td>$13,830</td>
<td>60</td>
</tr>
<tr>
<td>11</td>
<td>$15,200</td>
<td>$10,234</td>
<td>1993</td>
</tr>
<tr>
<td>12</td>
<td>$16,185</td>
<td>$26,860</td>
<td>85</td>
</tr>
<tr>
<td>13</td>
<td>$17,850</td>
<td>$41,883</td>
<td>1995</td>
</tr>
<tr>
<td>14</td>
<td>$15,846</td>
<td>$16,165</td>
<td>756</td>
</tr>
<tr>
<td>15</td>
<td>$15,180</td>
<td>$13,244</td>
<td>1995</td>
</tr>
<tr>
<td>16</td>
<td>$14,820</td>
<td>$4,979</td>
<td>30</td>
</tr>
<tr>
<td>17</td>
<td>$14,200</td>
<td>$13,465</td>
<td>175</td>
</tr>
<tr>
<td>18</td>
<td>$16,630</td>
<td>$25,131</td>
<td>1996</td>
</tr>
<tr>
<td>19</td>
<td>$16,585</td>
<td>$19,911</td>
<td>200</td>
</tr>
<tr>
<td>20</td>
<td>$14,920</td>
<td>$10,911</td>
<td>60</td>
</tr>
<tr>
<td>21</td>
<td>$16,000</td>
<td>$15,153</td>
<td>45</td>
</tr>
<tr>
<td>22</td>
<td>$13,850</td>
<td>$12,660</td>
<td>60</td>
</tr>
<tr>
<td>23</td>
<td>$16,482</td>
<td>$21,570</td>
<td>1995</td>
</tr>
<tr>
<td>24</td>
<td>$15,080</td>
<td>$11,635</td>
<td>125</td>
</tr>
<tr>
<td>25</td>
<td>$15,350</td>
<td>$10,067</td>
<td>60</td>
</tr>
</tbody>
</table>
three institutions responsible for teacher preparation in its area. Fourteen of these institutions were located in communities with a population under 12,000.

The average student costs at these institutions was $16,181 with a range from $13,550 to $21,740. The average yearly expenditures for all schools was $21,632,000. The lowest yearly expenditure was $4,979,000 while the highest was $91,371,000.

Two items in the TEAS related to technology. Nine of these institutions had ICN classrooms. Four have had classrooms since 1993, three went on-line in 1995, and two went on line in 1996. On average, these institutions had 170 computers available for student use. However, one institution had only 30 computers while another had 900.

While averages were computed for most of the above variables, it is apparent from the data that using an average to profile these institutions was misleading. The diversity of these institution was apparent indicating no “normal” postsecondary education institution responsible for teacher preparation existed.

Site Visit Results

Seventeen site visits were made reaching 18 private colleges/universities in Iowa. One hundred sixty-one individuals participated in these site visits. One site had only two participants, the entire education department at that institution. The largest number of participants at one site was 21 which included a students enrolled in an education methods class. Participants (see Table 7) included:

- education department faculty (43%);
- teacher education students (25%);
- faculty from departments other than education (16%);
- administrators (11%); and
- media/technology specialists (5%).

Five workshops were conducted using ICN distance education classrooms. These workshops allowed participants to actually use the technology and see for themselves how the system works. It also allowed the TEA to involve distance education experts from other institutions who could not travel to the participating institution. For many participants, this was their first experience with the distance education technology available in Iowa. These ICN sessions involved an extra commitment from the participating institutions as many did not have an ICN classroom on their own campus.
Table 7: Site visit participants

<table>
<thead>
<tr>
<th>Institution code Number</th>
<th>Faculty - Education Department</th>
<th>Faculty - other than education</th>
<th>Technology/ media specialists</th>
<th>Admin- istrators</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
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<td>12</td>
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<tr>
<td>26</td>
<td>2</td>
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<tr>
<td><strong>TOTALS</strong></td>
<td><strong>69</strong></td>
<td><strong>26</strong></td>
<td><strong>9</strong></td>
<td><strong>17</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
Based on discussions with the participants at the college/university site visits, it was apparent that teacher educators recognized the need for providing future teachers with the skills and knowledge to make appropriate decisions related to distance education but identified many barriers to achieving this. Four areas of concerns related to the integration of distance education into teacher education programs were identified:

- accessibility,
- technology,
- instruction/curriculum, and
- course management.

Accessibility

Issues related to accessibility included the lack of ICN classrooms and Internet access at a number of colleges/universities. The time involved with transporting students to and from an ICN classroom was another accessibility concern. Because these institutions prepare a large number of elementary education teachers, the small number of ICN classrooms in elementary schools presented a barrier. Scheduling problems also restricted access.

An interesting issue that mentioned at several of the site visits was the idea of handicap access particularly wheelchair accessibility. Concerns were expressed that while the building might be handicap accessible the room arrangement was not. The ICN teaching console was at the wrong level for someone in a wheelchair and the aisles and spacing were not conducive to mobility.

In summary, accessibility barriers identified included:

- Lack of ICN classroom,
- Location of ICN classroom,
- Arrangement of ICN classroom,
- Funding sources,
- Scheduling,
- Transportation, and
- handicap accessibility.
Technology

The majority of technology concerns related to equipment. Two common complaints were the push-to-talk microphones and the size of monitors. It was felt that the push-to-talk microphones limited the degree of interaction desired in most method classes. Participants indicated that the size of the monitor also limited interaction as they felt it was almost impossible to really see and be able to recognize individuals at the other sites.

Many participants indicated that not being connected to a variety of classrooms (such as music, theater, art) severely limited the types of classes which might be offered. Others indicated that the room arrangement would limit the type of classes which might be offered.

Identified barriers related to technology included:

- push-to-talk microphones,
- size of monitors,
- lack of connections outside of state,
- lack of connections to variety of classrooms, and
- equipment failure.

Instruction/curriculum

The main concern identified under instruction/curriculum referred to locus of control. Participants indicated that the focus on local control of education in Iowa sometimes hampered the ability to identify others with whom to work collaboratively. Some voiced concerns about the quality of the program or the "depersonalization" of instruction if institutions work together to deliver classes. Independent colleges have traditionally respected each other's "boundaries" but distance education changes those boundaries.

Another issue related to curriculum addressed the already overcrowded curriculum in teacher education programs. Participants wanted to know where and how to fit in "one more topic". Closely associated with this was the idea of effective practices. If room was found in the curriculum to include distance education, effective practices needed to be identified so appropriate techniques are being modeled.

To summarize, curriculum barriers included:

- Loss of control of quality,
- Identifying collaborative partners,
• Need for models of effective applications, and
• Overcrowded curriculum.

**Course management**

A course management concern identified was time. Participants indicated that faculty needed to develop expertise in using the technology as well as knowledge of ways to include distance education appropriately in different content areas. This training takes time. It also takes time to prepare adequately to teach at a distance. Also identified under course management were issues dealing with the development of interaction and building a sense of community; not easy to do in a traditional classroom and even more difficult to achieve at a distance.

Barriers related to course management included:

• training time,
• planning time,
• building class interaction, and
• eliminating the “talking head” strategy.

**Other issues**

Other issues that may present barriers included:

• privacy issues,
• equity issues,
• special needs students, and
• a possible loss of school culture.

One concern expressed by a number of the schools was a feeling of having been “left out of the loop”. This highlighted the importance and need for this TEA activity. By personally visiting Iowa’s colleges and universities, the TEA recognized the importance and the contributions of these schools to the preparation of teachers in Iowa. Contacts and networks have been established that contribute to collaborative efforts to integrate distance education in the teacher education programs of Iowa’s colleges and universities.

**Summary of concerns and suggestions**

While it might sound from the above that perceived barriers were insurmountable, participants were overwhelmingly enthusiastic. They indicated their willingness to work
collaboratively with other institutions and offered many suggestions that might contribute to the integration of distance education into the teacher education program of Iowa's colleges/universities. Some of these suggestions follow.

- create a Iowa college/university faculty directory
- share low-enrollment classes
- provide portable ICN equipment
- connect preservice students to master teachers
- communicate with student teachers in the field
- share costs of bringing in nationally known presenters
- participate in statewide conferences

Results from TEAS

The Teacher Education Alliance Survey (TEAS) developed for this study consisted of 53 items requesting demographic information, ratings on a series of Likert-scale items, and three open-ended questions. The Likert-items on the survey were grouped to form 5 constructs: PORGI* (perceived organizational innovativeness), IS* (individual innovativeness), level of concerns, attitude toward distance education, and current level of distance education coverage. Cronbach alpha coefficients were determined for each of the constructs. Table 2 in Chapter 3 showed the Standardized Cronbach alpha reliability estimate for each construct. The Cronbach alpha estimates indicated that the measures of the constructs were reliable, with coefficients ranging from .63 to .94.

Description of respondents

The TEAS survey was distributed to education faculty members at the conclusion of the site visits. A total of 62 surveys were distributed. Forty-five individuals from 19 different institutions completed and returned the TEAS survey for a response rate of 73%. No follow-ups were made as the study was interested in institutional response not individual response.

Characteristics of the individuals responding to the TEAS are presented in Table 8. Respondents were predominantly male (66.7%). They had a high education level with 68.9% having completed a doctoral degree. The highest response category for experience at the college level was 10-14 years (24.4%) with almost as many responding in the 5-9 years category (22.2%). In response to experience at K-12 level, the highest response was between 5 and 9
years (42.2%). Forty percent of respondents worked with both elementary and secondary education majors and 46.7% were primarily responsible for teaching methods classes.

Table 9 summarizes responses to knowledge of and involvement with distance education questions. The majority of respondents (66.7%) felt they had some knowledge of distance education but few (2.2%) reported extensive knowledge of distance education. The majority of respondents reported that they had none (28.9%) or very little (40.0%) involvement with distance education.

In general, respondents were males with a doctoral degree. They had 10-14 years experience at the college level and 5-9 years experience at the K-12 level. They were responsible for methods classes involving both elementary and secondary education majors. They indicated they had some knowledge of distance education but very little involvement with distance education.

Table 8: Characteristics of TEAS respondents (percentages; n=45)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>66.7</td>
<td>33.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Bachelors</th>
<th>Masters</th>
<th>Specialists</th>
<th>Doctoral</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.4</td>
<td>20.0</td>
<td>6.7</td>
<td>68.9</td>
<td>0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience at the college level in years</th>
<th>Less than 5</th>
<th>5-9 years</th>
<th>10-14 years</th>
<th>15-19 years</th>
<th>20-24 years</th>
<th>25 years or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15.6</td>
<td>22.2</td>
<td>24.4</td>
<td>17.8</td>
<td>13.3</td>
<td>6.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience at K-12 level in years</th>
<th>Less than 5</th>
<th>5-9 years</th>
<th>10-14 years</th>
<th>15-19 years</th>
<th>20-24 years</th>
<th>25 years or more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15.6</td>
<td>42.2</td>
<td>28.9</td>
<td>6.7</td>
<td>4.4</td>
<td>2.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group of primary responsibility</th>
<th>Elementary</th>
<th>Secondary</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31.1</td>
<td>28.9</td>
<td>40.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary teaching responsibility</th>
<th>Foundations</th>
<th>Methods</th>
<th>Technology</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11.1</td>
<td>46.7</td>
<td>11.1</td>
<td>31.1</td>
</tr>
</tbody>
</table>
Table 9: TEAS respondents' rating of knowledge of and involvement in distance education (percentages; n=45)

<table>
<thead>
<tr>
<th></th>
<th>none</th>
<th>very little</th>
<th>some</th>
<th>quite a bit</th>
<th>extensive</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of distance education</td>
<td>0.0</td>
<td>11.1</td>
<td>66.7</td>
<td>20.0</td>
<td>2.2</td>
<td>3.13</td>
<td>.63</td>
</tr>
<tr>
<td>Involvement with distance education</td>
<td>28.9</td>
<td>40.0</td>
<td>20.0</td>
<td>11.1</td>
<td>0.0</td>
<td>2.13</td>
<td>.97</td>
</tr>
</tbody>
</table>

PORGI*

The construct PORGI*, defined as perceived organizational innovativeness, was measured by using an abbreviated form of an instrument created in 1977 by Hurt and Tiegen to measure perceived organizational innovativeness. Table 10 presents responses (prior to recoding) to all 10 items in percentages. In general, the majority of responses were found in the moderately agree range. Respondents had the highest disagreement with the statement “My college follows the belief that the old way of doing things is the best” with a mean response of 2.8 and standard deviation of 1.53. Highest agreement was found with the statement “My college is receptive to new ideas” which had a mean response of 5.13 and a standard deviation of 1.18.

PORGI* scores were computed for each individual by first recoding responses to negatively worded items identified with an * in Table 10. Responses were then summed to compute an individual PORGI* score. Using the institutional codes, individual PORGI* scores were grouped then averaged to compute an organizational PORGI* score for each institution. Theoretically these scores should have ranged from 10 to 70. Actual organizational PORGI* scores ranged from 31 to 60.8 with a mean of 44.83 and a standard deviation of 8.74.

An evaluation study by Maushak and Wright (1996) provided a comparison group (Table 11). Maushak and Wright (1996) used the PORGI* to measure the perceived organizational innovativeness of an academic core team. This team consisted of 28 public university and community college faculty involved in the implementation of VISION 2020, a project designed to create institutional change. The PORGI* mean for this group was 46.3 with a standard deviation of 11. There was no statistically significant difference between the sample means (t=-0.69, df=43).

IS*  

The construct IS*, defined as individual innovativeness scale, was adapted from an instrument created by Hurt, Joseph and Cook (1977). Table 12 summarizes responses to each
of the 10 items comprising the IS*. Highest agreement (mean response = 5.57, standard deviation = .93) was with the statement "I am challenged by unanswered questions." The statement "I am challenged by ambiguities and unsolved problems." also had a high agreement (mean response = 5.39, standard deviation = 1.30). Lowest agreement was with the statement

Table 10: TEAS responses to PORGI* (percentages; n=45)
(SD=strongly disagree, D=disagree, MD=moderately disagree, U=undecided, MA=moderately agree, A=agree, SA=strongly agree)

<table>
<thead>
<tr>
<th>My college (is)......</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>U</th>
<th>MA</th>
<th>A</th>
<th>SA</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Follows the belief that the old way of doing things is the best.</td>
<td>22.2</td>
<td>26.7</td>
<td>24.4</td>
<td>8.9</td>
<td>13.3</td>
<td>2.2</td>
<td>2.2</td>
<td>2.80</td>
<td>1.53</td>
</tr>
<tr>
<td>*Does not respond quickly enough to necessary changes.</td>
<td>8.9</td>
<td>15.6</td>
<td>15.6</td>
<td>11.1</td>
<td>22.2</td>
<td>22.2</td>
<td>4.4</td>
<td>4.07</td>
<td>1.78</td>
</tr>
<tr>
<td>*Rarely trusts new ideas and ways of functioning.</td>
<td>13.3</td>
<td>31.1</td>
<td>33.3</td>
<td>4.4</td>
<td>13.3</td>
<td>2.2</td>
<td>2.2</td>
<td>2.89</td>
<td>1.42</td>
</tr>
<tr>
<td>Considered one of the leaders of its type.</td>
<td>4.4</td>
<td>0.0</td>
<td>11.1</td>
<td>31.1</td>
<td>28.9</td>
<td>15.6</td>
<td>8.9</td>
<td>4.62</td>
<td>1.37</td>
</tr>
<tr>
<td>Creative in its method of operation.</td>
<td>3.7</td>
<td>4.4</td>
<td>17.8</td>
<td>15.6</td>
<td>31.1</td>
<td>20.0</td>
<td>4.4</td>
<td>4.38</td>
<td>1.54</td>
</tr>
<tr>
<td>Seeks out new ways to do things.</td>
<td>6.7</td>
<td>2.2</td>
<td>6.7</td>
<td>13.3</td>
<td>40.0</td>
<td>24.4</td>
<td>6.7</td>
<td>4.78</td>
<td>1.48</td>
</tr>
<tr>
<td>Frequently tries out new ideas.</td>
<td>4.4</td>
<td>2.2</td>
<td>13.3</td>
<td>15.6</td>
<td>33.3</td>
<td>26.7</td>
<td>4.4</td>
<td>4.69</td>
<td>1.41</td>
</tr>
<tr>
<td>Receptive to new ideas.</td>
<td>2.2</td>
<td>0.0</td>
<td>11.1</td>
<td>0.0</td>
<td>48.9</td>
<td>31.1</td>
<td>6.7</td>
<td>5.13</td>
<td>1.18</td>
</tr>
<tr>
<td>*Slow to change.</td>
<td>4.4</td>
<td>17.8</td>
<td>26.7</td>
<td>6.7</td>
<td>28.9</td>
<td>4.4</td>
<td>11.1</td>
<td>3.96</td>
<td>1.71</td>
</tr>
<tr>
<td>Very inventive.</td>
<td>8.9</td>
<td>11.1</td>
<td>15.6</td>
<td>13.3</td>
<td>33.3</td>
<td>15.6</td>
<td>2.2</td>
<td>4.07</td>
<td>1.62</td>
</tr>
</tbody>
</table>

**CONSTRUCT**

4.60 1.20

*negatively worded items recoded prior to computing PORGI* score
Table 11: Descriptive statistics for PORGI*, sample vs. comparison group

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>Independent, 4-year colleges</th>
<th>Comparison group (Public universities and community colleges)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>Mean PORGI*</td>
<td>44.83</td>
<td>46.30</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>8.74</td>
<td>11.00</td>
</tr>
<tr>
<td>Minimum</td>
<td>31.00</td>
<td>34.80</td>
</tr>
<tr>
<td>Maximum</td>
<td>60.80</td>
<td>54.00</td>
</tr>
</tbody>
</table>

"I am aware that I am usually one of the last people in my group to accept something new" which had a mean response of 1.96 and a standard deviation of 1.02.

Individual IS* scores were computed by recoding negatively worded items identified with a * in Table 12 then summing responses to all ten items. Theoretically scores could range from 10 to 70. Actual scores ranged from 31 to 67 with a mean of 54.51 and a standard deviation of 8.131.

These results were compared to the IS* scores obtained for the academic core team by Maushak and Wright (1996) (see Table 13). The mean IS* score obtained for the academic core team was 55 with a standard deviation of 5.45. A comparison of means did not prove to be statistically significant ($t = -0.28$, $df = 71$). This seemed to indicate that faculty from independent, 4-year colleges were similar in their innovativeness to faculty from public universities and community colleges. While the highest IS* are quite similar between the two groups, the lowest IS* at the independent, 4-year colleges was substantially lower.

**Level of concern**

The construct level of concern included six questions related to an individual's concerns about distance education. Responses were scored as 1=strongly disagree, 2=disagree, 3=moderately disagree, 4=undecided, 5=moderately agree, 6=agree, and 7=strongly agree. These six questions were included as part of the Star Schools Project evaluation and had been included on previous Star Schools surveys and were adapted from the concerns based approach model (CBAM) questionnaire developed by Hall, et. al. (1977). Only the first three stages of concerns were addressed, awareness, informational, and self. Responses to these six questions are summarized in Table 14.
Table 12: Responses to IS* (percentages; n=45)
(SD=strongly disagree, D=disagree, MD=moderately disagree, U=undecided, MA=moderately agree, A=agree, SA=strongly agree)

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>U</th>
<th>MA</th>
<th>A</th>
<th>SA</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>*I am generally cautious about accepting new ideas.</td>
<td>8.9</td>
<td>37.8</td>
<td>22.2</td>
<td>2.2</td>
<td>15.6</td>
<td>13.3</td>
<td>0.0</td>
<td>3.18</td>
<td>1.61</td>
</tr>
<tr>
<td>*I am suspicious of new inventions and new ways of thinking.</td>
<td>4.4</td>
<td>62.2</td>
<td>17.8</td>
<td>0.0</td>
<td>15.6</td>
<td>0.0</td>
<td>0.0</td>
<td>2.60</td>
<td>1.14</td>
</tr>
<tr>
<td>*I rarely trust new ideas until I can see whether the vast majority of people around me accept them.</td>
<td>17.8</td>
<td>55.6</td>
<td>17.8</td>
<td>0.0</td>
<td>4.4</td>
<td>4.4</td>
<td>0.0</td>
<td>2.31</td>
<td>1.18</td>
</tr>
<tr>
<td>*I am aware that I am usually one of the last people in my group to accept something new.</td>
<td>33.3</td>
<td>51.1</td>
<td>8.9</td>
<td>0.0</td>
<td>6.7</td>
<td>0.0</td>
<td>0.0</td>
<td>1.96</td>
<td>1.02</td>
</tr>
<tr>
<td>*I am reluctant about adopting new ways of doing things until I see them working for people around me.</td>
<td>17.8</td>
<td>51.1</td>
<td>22.2</td>
<td>0.0</td>
<td>6.7</td>
<td>2.2</td>
<td>0.0</td>
<td>2.33</td>
<td>1.13</td>
</tr>
<tr>
<td>*I tend to feel that the old way of living and doing things is the best way.</td>
<td>20.0</td>
<td>55.6</td>
<td>15.6</td>
<td>6.7</td>
<td>2.2</td>
<td>0.0</td>
<td>0.0</td>
<td>2.16</td>
<td>0.90</td>
</tr>
<tr>
<td>I am challenged by ambiguities and unsolved problems.</td>
<td>2.3</td>
<td>2.3</td>
<td>6.8</td>
<td>2.3</td>
<td>27.3</td>
<td>47.7</td>
<td>11.4</td>
<td>5.39</td>
<td>1.30</td>
</tr>
<tr>
<td>*I must see other people using new innovations before I will consider them.</td>
<td>11.1</td>
<td>51.1</td>
<td>26.7</td>
<td>2.2</td>
<td>8.9</td>
<td>0.0</td>
<td>0.0</td>
<td>2.47</td>
<td>1.04</td>
</tr>
<tr>
<td>I am challenged by unanswered questions.</td>
<td>0.0</td>
<td>2.3</td>
<td>2.3</td>
<td>0.0</td>
<td>36.4</td>
<td>50.0</td>
<td>9.1</td>
<td>5.57</td>
<td>0.93</td>
</tr>
<tr>
<td>*I often find myself skeptical of new ideas.</td>
<td>6.7</td>
<td>28.9</td>
<td>28.9</td>
<td>8.9</td>
<td>26.7</td>
<td>0.0</td>
<td>0.0</td>
<td>3.20</td>
<td>1.31</td>
</tr>
<tr>
<td><strong>CONSTRUCT</strong></td>
<td><strong>5.48</strong></td>
<td><strong>0.80</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*negatively worded items recoded prior to computing response mean and IS* score
Table 13: Descriptive statistics for IS*, sample vs. comparison group

<table>
<thead>
<tr>
<th>Sample size</th>
<th>Mean IS*</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent, 4-year college faculty</td>
<td>45</td>
<td>54.51</td>
<td>8.13</td>
<td>31.00</td>
</tr>
<tr>
<td>Comparison group (Public university and community college faculty)</td>
<td>28</td>
<td>55.00</td>
<td>5.45</td>
<td>43.50</td>
</tr>
</tbody>
</table>

The majority of respondents disagreed or strongly disagreed with the first two questions which related to stage one, awareness. These questions were both negatively worded. Results indicated that the majority of individuals are no longer in the lowest level or awareness stage of concerns. Related to stage two, knowledge, 42.2% indicated they had limited knowledge about distance education, while 88.8% indicated they would like to know what including distance education would require in the near future. Results indicated that the majority of respondents were still, to some extent, in the knowledge stage of concerns. The two questions related to stage three, self, had high agreement rates. Both items had a mean response of over 5.5 indicating respondents wanted to know how distance education would affect them personally.

Negatively worded items, identified with an * in Table 14, were recoded and an overall construct response mean was computed. The overall response mean for the construct, level of concerns, was 5.64 with a standard deviation of .58.

**Attitude toward distance education**

Attitude toward distance education was measured using eight questions where responses were scored as 1=strongly disagree, 2=disagree, 3=moderately disagree, 4=undecided, 5=moderately agree, 6=agree, and 7=strongly agree. Table 15 presents a summary of responses to these eight items. All positively worded items had a mean response greater than 5, indicating respondents in general were very positive toward distance education. The highest agreement (mean response = 5.87) was with the statement “The use of distance education technologies can expand learning opportunities offered in teacher education.”

Respondents indicated disagreement with the negatively worded item “Distance education classes will not allow interaction between instructor and students” which had a mean
Table 14: Level of concern about distance education (percentages; $n=45$)  
(SD=strongly disagree, D=disagree, MD=moderately disagree, U=undecided, MA=moderately agree, A=agree, SA=strongly agree)

<table>
<thead>
<tr>
<th>Construct</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>U</th>
<th>MA</th>
<th>A</th>
<th>SA</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don’t even know what distance education is.</td>
<td>66.7</td>
<td>26.7</td>
<td>6.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.40</td>
<td>0.62</td>
</tr>
<tr>
<td>I am not concerned about distance education.</td>
<td>42.2</td>
<td>40.0</td>
<td>11.0</td>
<td>0.0</td>
<td>4.4</td>
<td>2.2</td>
<td>0.0</td>
<td>1.91</td>
<td>1.15</td>
</tr>
<tr>
<td>I have a very limited knowledge about distance education.</td>
<td>11.1</td>
<td>17.8</td>
<td>24.4</td>
<td>4.4</td>
<td>28.9</td>
<td>13.3</td>
<td>0.0</td>
<td>3.62</td>
<td>1.64</td>
</tr>
<tr>
<td>I would like to know what including distance education in the teacher education program at my institution would require in the immediate future.</td>
<td>2.2</td>
<td>0.0</td>
<td>2.2</td>
<td>6.7</td>
<td>24.4</td>
<td>51.1</td>
<td>13.3</td>
<td>5.58</td>
<td>1.12</td>
</tr>
<tr>
<td>I would like to know how my teaching is supposed to change when using distance education.</td>
<td>2.3</td>
<td>0.0</td>
<td>4.5</td>
<td>4.5</td>
<td>25.0</td>
<td>47.7</td>
<td>15.9</td>
<td>5.57</td>
<td>1.19</td>
</tr>
<tr>
<td>I would like to know how my role will change when I am using distance education in my classes.</td>
<td>2.3</td>
<td>0.0</td>
<td>4.5</td>
<td>2.3</td>
<td>22.7</td>
<td>52.3</td>
<td>15.9</td>
<td>5.64</td>
<td>1.16</td>
</tr>
</tbody>
</table>

*negatively worded items recoded prior to computing response mean*
response rate of 2.76. The other negatively worded item, “The cost of implementing distance education is too high.” seemed to draw mixed results. Thirty-three point six percent disagreed with the statement but the same percent agreed with the statement. After recoding negatively worded items (identified with a * in Table 15), an overall construct mean of 5.19 with a standard deviation of .90 was computed. This seemed to indicate that respondents had an overall positive attitude toward distance education.

Table 15: Attitude toward distance education (percentages; n=45)

(SD = strongly disagree, D = disagree, MD = moderately disagree, U = undecided, MA = moderately agree, A = agree, SA = strongly agree)

<table>
<thead>
<tr>
<th>Item</th>
<th>SD 1</th>
<th>D 2</th>
<th>MD 3</th>
<th>U 4</th>
<th>MA 5</th>
<th>A 6</th>
<th>SA 7</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of distance education technologies can expand learning opportunities offered in teacher education.</td>
<td>2.2</td>
<td>0.0</td>
<td>0.0</td>
<td>8.9</td>
<td>20.0</td>
<td>35.6</td>
<td>33.3</td>
<td>5.87</td>
<td>1.12</td>
</tr>
<tr>
<td>*The cost of implementing distance education is too high.</td>
<td>13.3</td>
<td>37.8</td>
<td>22.2</td>
<td>13.3</td>
<td>0.0</td>
<td>0.0</td>
<td>2.76</td>
<td>0.0</td>
<td>1.25</td>
</tr>
<tr>
<td>The use of distance education will promote collaboration among colleges with teacher education programs.</td>
<td>2.2</td>
<td>0.0</td>
<td>22.2</td>
<td>20.0</td>
<td>33.3</td>
<td>15.6</td>
<td>5.31</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>*Distance education classes will not allow interaction between instructor and students.</td>
<td>2.2</td>
<td>0.0</td>
<td>22.2</td>
<td>20.0</td>
<td>35.6</td>
<td>17.8</td>
<td>13.3</td>
<td>0.0</td>
<td>1.03</td>
</tr>
<tr>
<td>Instruction in distance education should become an important component of the teacher education program.</td>
<td>2.2</td>
<td>0.0</td>
<td>22.2</td>
<td>20.0</td>
<td>35.6</td>
<td>28.9</td>
<td>11.1</td>
<td>2.76</td>
<td>1.17</td>
</tr>
<tr>
<td>Distance education is important to the future of teacher education and education in general.</td>
<td>2.2</td>
<td>0.0</td>
<td>22.2</td>
<td>20.0</td>
<td>35.6</td>
<td>28.9</td>
<td>11.1</td>
<td>2.76</td>
<td>1.17</td>
</tr>
<tr>
<td>Distance education is important to the future of teacher education and education in general.</td>
<td>0.0</td>
<td>22.2</td>
<td>22.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.04</td>
</tr>
<tr>
<td>Overall, my attitude toward distance education is positive.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.19</td>
<td>0.90</td>
</tr>
</tbody>
</table>

*negatively worded items recoded prior to computing response mean
Current level of distance education coverage

Four two-part questions were included to measure the construct identified as the current level of distance education coverage in the teacher education programs of Iowa's postsecondary institutions. Responses were scored as 1=none, 2=very little, 3=some, 4=quite a bit, and 5=extensive. Respondents were asked their perceptions of the coverage of distance education in both media or instructional technology classes and methods classes. Table 16 presents a summary of these responses.

Table 16: Perceptions of coverage of distance education (percentages; n=45)

<table>
<thead>
<tr>
<th></th>
<th>none</th>
<th>very little</th>
<th>some</th>
<th>quite a bit</th>
<th>extensive</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration of distance education</td>
<td>25.0</td>
<td>15.0</td>
<td>50.0</td>
<td>10.0</td>
<td>0.0</td>
<td>2.45</td>
<td>.97</td>
</tr>
<tr>
<td>technology in media classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation of methods of using</td>
<td>30.8</td>
<td>25.6</td>
<td>38.5</td>
<td>5.1</td>
<td>0.0</td>
<td>2.18</td>
<td>.94</td>
</tr>
<tr>
<td>distance education in media classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeling of ways to use distance</td>
<td>30.8</td>
<td>23.1</td>
<td>41.0</td>
<td>5.1</td>
<td>0.0</td>
<td>2.21</td>
<td>.95</td>
</tr>
<tr>
<td>education in media classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity for students to use</td>
<td>33.3</td>
<td>25.6</td>
<td>35.9</td>
<td>2.6</td>
<td>2.6</td>
<td>2.15</td>
<td>1.01</td>
</tr>
<tr>
<td>distance education technology in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>media classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstration of distance education</td>
<td>46.3</td>
<td>29.3</td>
<td>24.4</td>
<td>0.0</td>
<td>0.0</td>
<td>1.78</td>
<td>.82</td>
</tr>
<tr>
<td>technology in methods classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation of methods of using</td>
<td>53.7</td>
<td>29.3</td>
<td>17.1</td>
<td>0.0</td>
<td>0.0</td>
<td>1.63</td>
<td>.77</td>
</tr>
<tr>
<td>distance education in methods classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeling of ways to use distance</td>
<td>43.9</td>
<td>36.6</td>
<td>19.5</td>
<td>0.0</td>
<td>0.0</td>
<td>1.76</td>
<td>.77</td>
</tr>
<tr>
<td>education in methods classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunity for students to use</td>
<td>48.8</td>
<td>26.8</td>
<td>24.4</td>
<td>0.0</td>
<td>0.0</td>
<td>1.76</td>
<td>.83</td>
</tr>
<tr>
<td>distance education technology in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>methods classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTRUCT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.96</td>
<td>.76</td>
</tr>
</tbody>
</table>
Half of those responding indicated that there was some demonstration of distance education technology in instructional technology classes. One quarter indicated that there was no demonstration of distance education technology in instructional technology classes. Over half indicated that presentation of methods of using distance education, modeling of ways to use distance education and actual hands-on use of distance education technology received very little to no coverage in instructional technology classes.

Respondents indicated that the coverage of distance education topics in methods classes was less than that received in instructional technology classes. Over half (53.7%) reported no presentation of methods of using distance education included in method classes. Almost as many (48.8%) indicated that students did not get the opportunity to use distance education technology in method classes.

Using responses to all eight items, an overall response mean of 1.96 with a standard deviation of .76 was computed. This seemed to support the idea that very little coverage of distance education topics was occurring in either the instructional technology classes or the methods classes of these institutions.

**Open-ended responses**

The TEAS included three open-ended response questions. The first question asked respondents their perceptions of how distance education could become part of the teacher education program. Respondents were then asked to identify any barriers they saw to the infusion of distance education at their institution. Finally, respondents were asked to describe the mission of their institution and how they perceive that mission impacting the teacher education program. Summarized responses to these questions are presented in the following sections.

*Describe ways you see distance education becoming part of your teacher education program?*

Respondents seemed to approach this question from two perspectives. Several mentioned ways distance education would allow them to change what they did as faculty members. Others addressed what students should know or be able to do.

When responses from faculty were examined, three general categories emerged. Distance education should be used to deliver courses, distance education should be used to supplement the current program, and distance education would allow and promote collaboration among institutions.
The most frequent response was that distance education should be used to deliver courses. One person commented that distance education was "a way of permitting professors on the main campus to conduct equivalent courses at other locations". Many felt that this was a way to expand course offerings by providing graduate courses or courses needed for special endorsements such as special education. Comments related to delivering courses included those suggesting distance education be used for providing staff development activities, workshops, and weekend classes.

Respondents identified distance education as an ideal way to supplement the current program. The ability to bring in guest lecturers or experts in "key topics - discipline, multicultural education" was recognized as a potential use of distance education. Respondents indicated that "accessing classrooms which have a greater cultural diversity" would be beneficial for their students.

Collaboration with a variety of institutions from K-12 districts to other independent colleges was important to the infusion of distance education. Respondents wanted to "build partnerships with other institutions to share resources" and share teaching expertise. One suggested that low enrollment methods classes could be taught with a team approach. Some felt that distance education was one way to dialog with faculty at other institutions teaching similar classes. Others wanted to be able to connect with master teachers in the field.

Two categories stood out when examining the responses related to students. Respondents indicated the importance of students having experience in using distance education to teach. "I would expect my methods and my media students to plan, write, and deliver lessons in an ICN classroom," was one comment. Another felt these lessons should be delivered to an audience at another college so the student presenting the lesson could "receive feedback from other students other than those on her campus who already frequently give feedback".

The second category related to students being able to work with K-12 students in the "real" world. Students might be paired with a K-12 class for special activities as part of a method class. Student teachers could make a preliminary visit to their perspective student teaching classroom.

While four institutions commented that their "institution was not ready for distance education at this time", at the minimum, respondents felt pre-service teachers needed to be made aware of distance education technology or at least introduced to the topic by reading related literature.
The possibly uses of distance education identified are summarized below:

- expand program offerings,
- supplement current programs,
- promote collaboration,
- provide future teachers experiences in using distance education, and
- allow students to work with K-12 students in the “real” world.

What barriers do you see to the infusion of distance education in the teacher education program at your institution?

Responses to this question are summarized in Table 17. The response identified most frequently was the lack of resources. While funding or lack of funding dominated this category, the lack of human resources was also identified. One commented that funding was needed just to “attempt to catch up with technology”.

Table 17: Identified barriers to the infusion of distance education based on analysis of TEAS open-ended response question

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of times occurring</th>
<th>Percent of total surveys (n=45)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of resources</td>
<td>24</td>
<td>53.3%</td>
</tr>
<tr>
<td>No or limited access</td>
<td>20</td>
<td>44.4%</td>
</tr>
<tr>
<td>Lack of expertise</td>
<td>13</td>
<td>28.9%</td>
</tr>
<tr>
<td>Time needed for planning</td>
<td>8</td>
<td>17.8%</td>
</tr>
<tr>
<td>Lack of collegial or administrative support</td>
<td>7</td>
<td>15.6%</td>
</tr>
<tr>
<td>Lack of time in general</td>
<td>7</td>
<td>15.6%</td>
</tr>
<tr>
<td>Overcrowded curriculum</td>
<td>6</td>
<td>13.3%</td>
</tr>
<tr>
<td>Do not perceive a need</td>
<td>5</td>
<td>11.1%</td>
</tr>
<tr>
<td>Limits of technology</td>
<td>5</td>
<td>11.1%</td>
</tr>
<tr>
<td>Resistance to change</td>
<td>5</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

The second most frequently identified barrier was lack of access to an ICN classroom. The majority of these institutions do not have an ICN classroom on campus. For some, the nearest classroom is over 20 miles away. For others, a classroom may be near by but availability is limited. While recognizing that the lack of an ICN classroom presented a barrier,
they also identified the need for access. “It is essential that students who will be teachers have access to the classroom and equipment.”

Three categories of responses reflected a lack of time. Many identified a lack of time in general. Others indicated a lack of time to do the essential planning and preparation needed to coordinate the inclusion of distance education. “We all teach so many classes now there is scarcely time to prepare for those.” Other comments related to the lack of time for one more addition to an “already overcrowded curriculum”.

Individuals felt that there was a lack of support for technology in general and specifically distance education from both their colleagues and administration. One commented that “faculty are already convinced that it (distance education) doesn’t have much to offer”. Another indicated that “instructional commitment may be missing at the highest levels”.

Three other categories of responses identified are that individuals do not perceive that there is a need for distance education, the restrictions put on teaching by the technology, and general resistance to change.

To summarize, the barriers identified included:

- funding,
- access,
- planning and preparation time,
- need for knowledge and expertise, and
- lack of support from colleagues and administration.

How would you describe the mission of your college in general and how it impacts the teacher education program?

While descriptions of the mission of the college were varied, the one found most frequently was reflected in “the mission of our college is to provide a combination of instruction in the liberal arts”. This was not surprising as these were liberal arts institutions. Several mentioned that the institution and the teacher education program valued a variety of instruction “so different ways of learning different approaches to delivery of courses is encouraged”. Many described their commitment to field experiences and involvement with K-12 students.

Several participants identified distance education and the ICN as a means of achieving the mission of their institution. “Practical application and theory into practice in classrooms could be done through interactive ICN observations.” One stated that the ICN could be used to
"deliver quality education at a reasonable price even more efficiently" than they were current practice.

Most participants indicated that their college was "strongly supportive of teacher education and that liberal education and teacher education are generally seen as complimentary rather than in conflict". However, a two participants described the teacher education program as being looked on as a "necessary evil". They felt teacher education was continued at their institution because of a long tradition of providing teacher education but was not really "legitimized".

**Summary of TEAS results**

The Likert-scale items on the TEAS were grouped into five constructs and mean scores were computed. A summary of the five constructs measured by the TEAS is presented in Table 18. As can be seen in the table, individuals appeared to be innovative (mean=5.48) and their attitudes toward distance education seemed to be positive (mean=5.19). The area in most apparent need of improvement was current level of coverage (mean=1.96).

While barriers to the integration of distance education were identified, participants did not appear to see these as insurmountable. Several suggestions that might assist in the integration of distance education were identified.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORGI*</td>
<td>4.60</td>
<td>1.20</td>
</tr>
<tr>
<td>IS*</td>
<td>5.48</td>
<td>0.80</td>
</tr>
<tr>
<td>Level of concerns</td>
<td>5.64</td>
<td>0.58</td>
</tr>
<tr>
<td>Attitude toward distance education</td>
<td>5.19</td>
<td>0.90</td>
</tr>
<tr>
<td>Current level of coverage</td>
<td>1.96</td>
<td>0.76</td>
</tr>
</tbody>
</table>

*note*: Scale - 1=strongly disagree, 2=disagree, 3=moderately disagree, 4=undecided, 5=moderately agree, 6=agree, and 7=strongly agree

*note*: Scale - 1=none, 2=very little, 3=some, 4=quite a bit, and 5=extensive

**Relationships and Comparisons**

Pearson correlation coefficients were computed to determine the relationship between 12 institutional characteristics. Variables examined were the five constructs from the TEAS (PORGI*, IS*, level of concerns, attitudes toward distance education, and current level of
distance education coverage), and seven demographic characteristics (enrollment, student expenses, yearly expenditures, number of tenured faculty, number of graduates, number of computers, and percent of total enrollment in education). A significance level of \( p < .05 \) was used to determine statistical significance. Several statistically significant relationships were obtained (see Table 19).

**Table 19: Correlation coefficients \((n=17)\)**

<table>
<thead>
<tr>
<th>IS*</th>
<th>PORGI*</th>
<th>IS*</th>
<th>Concern</th>
<th>Attitude</th>
<th>Current</th>
<th>Enroll.</th>
<th>Student</th>
<th>Expend.</th>
<th>Faculty</th>
<th>Grad.</th>
<th>Comp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>.13</td>
<td>.41</td>
<td>.61*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.12</td>
<td>.35</td>
<td>.31</td>
<td>.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.38</td>
<td>.40</td>
<td>.19</td>
<td>.02</td>
<td>.66*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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\(^{p} < .05\)

1level of concern, 2attitude toward distance education, 3current level of coverage of distance education, 4yearly enrollment, 1994, 5yearly student expenses, 6yearly expenditures, 7number of tenured faculty, 8number of graduates, spring 1994, 9number of computers available for student use, 10percent of total enrollment in education

The current level of coverage of distance education in instructional technology and method classes was found to be positively correlated with enrollment \((r = .66)\), yearly expenditures \((r = .56)\), number of tenured faculty \((r = .56)\), number of graduates \((r = .77)\), and number of computers \((r = .54)\). These variables with statistically significant correlations to current level of coverage all related to an institution's size. This seemed to indicate that size of an institution directly influenced the curriculum.

Rogers (1995) identified size as a strong predictor of the innovativeness of an organization. A larger organization would be more innovative. Correlations between the variables related to the size of an institution and measures of innovation (PORGI* and IS*) were not statistically significant. Enrollment was found to have the highest correlation with PORGI* \((r = .38)\) and organizational IS* \((r = .40)\).

Level of concerns was found to be correlated with IS* \((r = .60)\). This seemed to indicate that the institutions with a higher level of individual innovativeness possessed a knowledge of distance education, one component of level of concerns. It appeared that respondents had
concerns as to how distance education would or could change the institution as well as concerns as to what the impact would be on the individual. While not statistically significant, a similar relationship was found between level of concerns and PORGI* scores.

Qualitative data from the institutions with the highest and lowest organizational innovativeness were compared. Results were conflicting but interesting.

The least innovative institution was delivering secondary methods classes over the ICN even though they have to go to an area high school for access. In the school's instructional technology course, students were required to present distance education lessons between two sites. They have infused the use of Internet into the methods classes. In looking to the future, participants from this institution indicated the need for private colleges to work together “in order to maintain their viability”. They viewed distance education as a necessity to offer special education and middle school endorsements. While participants from this institution do not perceive their institution to be very innovative, within their department they are doing creative and innovative things with the limited technology available.

The most innovative institution had the highest number of participants at the site visit. The faculty were well represented and one administrator was in attendance. This institution did not have an ICN classroom and was not currently doing much with distance education in either instructional technology classes or methods classes. However, participants were very excited about the possibilities of distance education. They were interested in scheduling and classroom arrangements. They seemed to be looking to the future and offered many suggestions for integrating distance education into not only the teacher education program but into a variety of courses on campus. Not only did they want to make connections with other independent colleges, they wanted to connect with K-12 schools, the area education agency, and sites outside of Iowa.

Summary

Both qualitative and quantitative data were collected as part of this study. Participants were education faculty members at Iowa’s independent 4-year colleges with teacher education programs. Focus groups at site visits and responses to open-ended questions provided qualitative data related to concerns about the integration of distance education into teacher education programs. Quantitative data were collected to measure perceived organizational innovativeness and individual innovativeness. Data were compared and correlated to identify any relationships among variables.
There was a statistically significant positive correlation between the current level of inclusion of distance education in media and methods classes and the three size variables: enrollment, number of computers and expenditures. Based on innovation theory, it would be expected to find a positive correlation between variables related to size and the measures of innovation, PORGI* and IS*. However, results of this study did not identify a statistically significant relationship.

Qualitative data from the most innovative and the least innovative institutions were compared. The least innovative institution was currently using the ICN to deliver courses and preparing preservice teachers to use distance education. The most innovative institution was not currently including distance education or using the ICN classroom, but were planning for the future use of distance education not only in education but across the campus.

Chapter V will discuss the results as they relate to the research questions identified for this study. Conclusions will be presented as will recommendations for future research.
CHAPTER V. CONCLUSIONS

The purpose of this study was to determine the relationship between organizational characteristics and the organizational intent of teacher education programs in institutions of higher education in the state of Iowa to integrate the innovation, distance education. Organizational characteristics studied were background information, individual innovativeness, and perceived organizational innovativeness. The study of organizational characteristics was important to identify characteristics that related significantly to the adoption of the innovation, distance education. A second purpose was to determine the relationship between organizational characteristics and identified barriers to the integration of distance education throughout teacher education programs in institutions of higher education in the state of Iowa.

The following six research questions were developed to assist in accomplishing the above stated purpose.

1) What is the level of individual innovativeness of education college faculty?
2) Are education college faculty integrating or do they plan to integrate distance education throughout the teacher education program?
3) What is the perception of education college faculty of the innovativeness of their organization?
4) What relationship exists between the organizational characteristics individual innovativeness and perceived organizational innovativeness and the organizational intent to integrate the innovation, distance education, throughout teacher education programs in institutions of higher education in the state of Iowa?
5) What are the reported barriers to the integration of the innovation, distance education, throughout teacher education programs in institutions of higher education in the state of Iowa?
6) How do organizational characteristics differ between the least innovative independent, 4-year colleges with teacher education programs and the most innovative independent, 4-year colleges with teacher education programs?

This chapter will first include a summary and discussion of results looking at distance education, innovativeness, and teacher education. Second, recommendations for changes in teacher education as well as directions for future research will be presented. The chapter will conclude with a summary.
Summary and Discussion of Results

Distance education

The innovation under study was distance education, in particular, distance education in Iowa supported by the Iowa Communications Network (ICN). The ICN fiber optic system allows two-way, full motion video, voice and data transmission. This innovation has been available since 1993 when 104 interactive classrooms went on-line to provide educational opportunities for K-12 and higher education learners in the state of Iowa. Since that time, the number of classrooms connected to the network has increased to over 400, all which are available for educational use.

While this comprehensive fiber optic network is unique to Iowa, other distance education technologies are available (satellite, CU-see me, World Wide Web). It is imperative that future teachers be trained to not simply operate the technology but to use it effectively to provide appropriate, effective learning environments for their students. Results from this study indicated that distance education opportunities for teachers were not occurring.

In Iowa, there are 27 independent, four-year colleges or universities with teacher education programs. These institutions account for almost half of all education graduates in the state of Iowa yet only nine of these institutions had an ICN classroom on campus when this study was conducted. While using an ICN classroom in the community where the college was located was a possibility, transporting students and scheduling conflicts made this option cumbersome. Access was one problem identified by participants in this study that contributed distance education activities not being included in teacher education programs.

Innovation theory identifies attitude as a prime contributor to the diffusion of an innovation. Results from this study indicated that participants had, in general, a positive attitude towards distance education. However, participants were a self-selected group and it is probable that they mostly represent only those individuals with an interest in distance education. Participants indicated that this positive feeling towards distance education was not pervasive within each institution. In fact, in some cases, a negative attitude was apparent even among the participants. One individual commented that he hasn’t started using computers in his classes and sees no reason he should be using distance education.

Attitude toward an innovation and the perception of a need for the innovation are closely related. Individuals indicated that there was not wide-spread support for distance education in their institution. Administrators did not see a need for distance education. A study by Queitzsch (1997) that examined the integration of technology in teacher education programs
identified administrative support as a key component to successful integration of technology. The activities in at least one institution studied here support Quetzsch's results. This institution went on-line 1993. Participants reported that it was a key administrator that was the driving force behind the institution's decision to acquire an ICN classroom. This administrator also encouraged the integration of distance education and delivery of courses via distance education technologies. However, it was evident that the majority of administrators did not perceive distance education as a possible solution to problems at their institution.

In addition, faculty did not recognize a need for the integration of distance education. It was obvious from survey responses that individuals felt distance education as well as other technologies belonged in the instructional technology class and not in methods classes. They looked on distance education as "one more add-on to an already full curriculum". This attitude is detrimental to the integration of any technology. There is a need for education faculty to not only model effective use of technology to accomplish course objectives but to require students to use technology in the creation as well as the presentation of lessons.

Another factor contributing to the lack of integration of distance education was that education faculty lacked the requisite knowledge and skills to integrate distance education into their methods classes. While the majority of participants indicated that they had at least some knowledge of distance education, it appeared that their comfort level with the technology was low. Faculty simply did not know what it meant to integrate technology into their method classes and also, they lack the "vision" of how distance education might be used to enhance instruction in a variety of content areas. Though a sampling of current practices integrating distance education were provided at each site visit, faculty continued to state a need for "someone" to identify effective practices so that they might model the techniques in their classes.

The results of this study indicated that distance education was not currently recognized as an appropriate teaching tool by participants. It was identified as an effective way to deliver full courses especially those which traditionally have low enrollments and advanced placement classes. However, the full power of the Iowa system is found in the educational activities that supplement the current curriculum rather than replace it. The possibilities are endless and if explored can expand the classroom community to include the world.

Innovativeness

Three different techniques were used in this study to examine innovativeness. The PORGI* was used to measure the level of perceived organizational innovativeness and the IS*
was used to measure the level of individual innovativeness. The third technique looked at current practice as a indicator of the level of innovativeness of the organization.

At first glance, one would expect to find a close relationship between organizational innovativeness and individual innovativeness. It makes sense that an individual who is highly innovative would wish to work for an organization that is highly innovative, and that an organization with a high level of innovativeness would employ individuals with a high level of innovativeness. However, within any one organization one should find the full range of individual innovativeness from innovators to laggards regardless of how innovative the organization is.

This study found no significant relationship between the level of perceived organizational innovativeness as measured by the PORGI* and the level of individual innovativeness as measured by the IS*. Also, no relationship was evident between how an individual rated his or her own level of innovativeness and how innovative he or she perceived the organization. A highly innovative individual was just as likely to rate the organization as having a high level of innovativeness as to rate the organization as having a low level of innovativeness.

The degree of centralization and formalization of an organization might allow an innovator to continue to work for a less innovative organization. Centralization refers to distribution of power within an organization (Rogers, 1995). When the power is centralized in only a few leaders, new ideas among individuals would not be encouraged. However, as power is decentralized, individuals would have the freedom to initiate innovations.

The effects of formalization are similar. Rogers (1995) defines formalization as “the degree to which an organization emphasizes following rules and procedures in the role performance of its members” (pp. 160-161). In a less formalized organization, the innovativeness of individuals would at least be considered, thus providing an environment acceptable to the highly innovative individual.

Innovation theory identifies size as a key predictor of organizational innovativeness (Rogers, 1995). Several variables related to size were measured as part of this study including total enrollment, number of tenured faculty, and yearly expenditures. Size was not found to be significantly related to either organizational innovativeness or individual innovativeness. There are several possibilities as to why a significant relationship between size and innovativeness was not discovered in this study.

First, the participants in this study were self selected rather than being a random sample from each institution. Also, the number of respondents from each institution was not the same.
TEAS were distributed at the site visits which had a range of participants from two to 21. The number of responses for each individual institution varied from two to six.

Second, perhaps appropriate indicators of size were not selected for this study. As recommended by Rogers (1995), several dimensions of size were included in this study. However, these may have not been adequately measured or there are unidentified, intervening variables.

An interesting phenomenon was discovered when examining the relationship between the level of organizational innovativeness as measured by the PORGI* and the level of organizational innovativeness identified by examining current practices. These two measures appeared to be in conflict. The institution with the lowest PORGI* score, indicating a low level of perceived organizational innovativeness, was, in practice, doing very innovative things. The opposite was also true. The institution with the highest PORGI* score, indicating a high level of perceived organizational innovativeness, was not currently doing much that could be considered innovative.

In speculating about what might be occurring here, at least two plausible explanations are possible. The first explanation ties into the decision making process. Innovation theory divides the decision making process into two broad categories, initiation and implementation. The institution with the highest level of perceived organizational innovativeness appeared to be in the initiating stages of decision making related to the innovation, distance education. These two stages are agenda-setting and matching. The individuals at this institution were gathering information and considering how the innovation, distance education, fit the needs and mission of the institution. The institution with the lowest level of perceived organizational innovativeness appeared to be in the implementation stages, redefining/restructuring, clarifying, and routinizing. The individuals at this institution were actually using the innovation and modifying it to fit the particular needs of that institution. The innovation, distance education had not yet become a part of the institution but was beginning to have an impact as this institution used distance education to provide services not previously available.

It is possible that a high level of organizational innovativeness is important during the initiation stages. During these stages, an institution needs to display a “willingness to change”. This allows individuals within the organization to initiate innovations in an attempt to match problems within the organization with innovations that have potential value in meeting that need. However, once a decision is made to adopt an innovation and the decision making process moves into the implementation stages, it may not be as important for the organization to be perceived as being innovative.
Another possible explanation relates to the instrument used to measure perceived organizational innovation (PORGI*). The instrument from which the PORGI* was adapted was developed in 1977 to measure the level of perceived organizational innovativeness. It was found to be both reliable and valid. Perhaps the instrument needs further adaptation of the instrument to make it appropriate for use within an educational organization.

Table 20: Characteristics of most and least innovative institutions based on PORGI*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average of three institutions with lowest PORGI*</th>
<th>Average of three institutions with highest PORGI*</th>
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<tbody>
<tr>
<td>PORGI*</td>
<td>32.61</td>
<td>57.60</td>
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<tr>
<td>IS*</td>
<td>53.19</td>
<td>56.67</td>
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<tr>
<td>Level of concerns</td>
<td>29.33</td>
<td>34.43</td>
</tr>
<tr>
<td>Attitude toward distance education</td>
<td>44.98</td>
<td>44.43</td>
</tr>
<tr>
<td>Current level of coverage of distance education</td>
<td>14.00</td>
<td>13.23</td>
</tr>
<tr>
<td>Yearly enrollment, 1994</td>
<td>1308</td>
<td>2749</td>
</tr>
<tr>
<td>Student costs per year</td>
<td>15,490</td>
<td>16,699</td>
</tr>
<tr>
<td>Yearly expenditures</td>
<td>17,441,000</td>
<td>37,731,000</td>
</tr>
<tr>
<td>Number of tenured faculty</td>
<td>42</td>
<td>70</td>
</tr>
<tr>
<td>Number of Graduates</td>
<td>242</td>
<td>373</td>
</tr>
<tr>
<td>Number of computers</td>
<td>73</td>
<td>353</td>
</tr>
<tr>
<td>Number of education majors as percent of total enrollment</td>
<td>17%</td>
<td>8%</td>
</tr>
<tr>
<td>Population of community</td>
<td>86,390</td>
<td>115,353</td>
</tr>
<tr>
<td>Number of institutions with an ICN classroom</td>
<td>none</td>
<td>1</td>
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</table>

Averages of the organizational characteristics of the three least innovative institutions based on PORGI* were compared to the averages of the three most innovative institutions based on PORGI*. These characteristics are shown in Table 20. Both groups appeared to have a similarly positive attitude toward distance education. They also were very similar in the current level of coverage of distance education topics, though, the coverage of distance education at the least innovative institutions based on survey responses was just slightly
higher. It would be expected that the opposite would be true. One would think that if an institution were innovative than the educational innovations such as distance education would be integrated into the curriculum.

Of three variables related to size, enrollment, yearly expenditures, and number of tenured faculty, the average for the least innovative group was approximately half that of the more innovative group. Rogers (1995) indicated that size was a good predictor of organizational innovativeness and that seemed to be supported here.

However, one variable related to size had a negative relationship with organizational innovativeness. At the least innovative institutions, education majors accounted for 17% of the total enrollment. In contrast, education majors only accounted for 8% of the total enrollment at the most innovative institutions. From the comparison, it appeared that institutions where preparation of teachers was one of the primary goals are less innovative than institutions where teacher preparation is only a small part of what they do.

In summary, there were no clear and distinguishing relationships between perceived organizational innovativeness and organizational characteristics. Organizational innovativeness apparently depended on the needs of the institution at that particular time. During the initiation stages of the decision making process, the organization is perceived as being innovative. However, during the implementation stages when it appeared institutional support was no longer essential or seemed to conflict with the actual implementation, the organization was perceived as being less innovative.

**Teacher education**

It is perhaps appropriate here to provide a description of the teacher education programs observed as part of this study. Three scenarios provide an inside look at the common elements of the independent, 4-year colleges in Iowa, an example of an institution with a high level of innovativeness, and an example of an institution with a low level of innovativeness.

**Scenario 1: An overview**

The independent, 4-year colleges examined in this study were similar in many ways. This scenario includes broad generalizations and should be interpreted as such.

Located in quiet residential areas of small rural communities, these colleges have quietly gone about the business of providing an educational and cultural center for the surrounding area for over 100 years. The campus consists of broad shaded lawns with a scattering of stately old buildings. Perhaps there is a more recent facility housing the student center or library. The
program includes a strong liberal arts curriculum which reflects the religious heritage of the institution. Teacher preparation has long been a part of this curriculum.

Primarily teaching institutions, professors spend the majority of their time working with students or preparing for the variety of courses they teach. In is not unusual for a professor's teaching load to be between 12 and 15 semester hours. When this is combined with a large number of advisees, there is limited time remaining for research efforts. However, the positive outcome of this is that professors are able to establish a strong rapport with their students. They know their students' capabilities in the classroom and strive to assist each on an individual basis. They also know each student on a more personal level. This contributes to a strong student-oriented environment.

One would be inclined to assume that the student population of these institutions draws primarily from the surrounding area. In fact, Iowa residents make up only half of the student population in contrast to public universities where almost three-quarters of the enrollment is comprised of Iowa residents. In addition, over 5% of first time freshman are from foreign countries in contrast with only 1% at the public universities.

**Scenario 2: A closer look at one of the institutions with the lowest level of organizational innovation**

An inside look at one of the institutions with the lowest level of innovation takes on a different appearance. Entering the building that houses the education department provides insight into the status of teacher preparation at the institution. Newer technology appears to be virtually non-existent. The only computer observed is on the department secretary's desk. The monitor and VCR provided for use during the site visit was old and in need of repair. The system was the only one available in the building and the monitor was only a 13" screen. However, it was color.

Informal discussions with participants confirmed the lack of computer access and ICN classroom access. Internet was only accessible by going to the one computer lab on campus, which was not near the education building. There were ICN classrooms in the local area (radius of 20 miles) but scheduling and transporting students made their use prohibitive.

Comments collected during site visits indicated that maintaining a student-oriented program (of high importance to this institution) and the use of technology were in opposition. One statement was: "Like nostalgia. Should work not to lose this people oriented approach." Maintaining the school culture was of high priority. One indicated that face-to-face interaction was the only way to teach and that "there is no need for all of the electronics".
While some individuals at this institution possibly wished to integrate distance education technology, the current demands on their time prohibit this from occurring. The teaching loads were overwhelming. One individual indicated that she was responsible for the Language Arts methods classes, Reading methods classes, and all early childhood classes. This was in addition to supervising students during early practicums and student teaching. These individuals were not excited about "one more addition to an already overcrowded curriculum".

Scenario 3: An inside view of one institution with the highest level of innovativeness

A visit to one of the institutions with the highest level of perceived innovativeness provides a different picture. A new building included several computer labs and two ICN classrooms. Not only were distance education and computer technology an integral part of the undergraduate teacher preparation program, plans were being implemented to deliver a graduate education program via the ICN.

Participants indicated that they felt distance education allowed them to maintain a strong one-on-one relationship with their students. Communication by e-mail was encouraged and professors had access to the Internet at their desks. They were looking ahead to ways to build communities of learners as part of the graduate program. Plans included having students spend two weeks on campus during the summer. While on campus, students would take a class, but more importantly, they would be establishing a relationship with others that in the future they would only see at a distance.

The two ICN classrooms provided an ideal set-up to allow the inclusion of student distance education presentations in methods classes. Professors were excited about this possibility. In addition, they looked forward to being able to provide expanded learning opportunities for their preservice teachers by connecting with K-12 students and teachers.

The teaching load for these professors was not much different than the teaching load of faculty at the institution with a low level of organizational innovativeness. The difference was their attitude. Instead of viewing distance education as "one more addition to an overcrowded curriculum", they saw it as an exciting way of providing new experiences for their students. Instead of seeing only the barriers, they saw the many possibilities. The participants at this institution indicated that preparing future teachers to effectively use distance education technologies was an essential component of preparing teachers to teach in the 21st century.
Discussion

While there are differences between more innovative and less innovative teacher education programs, it was obvious from this study that teacher preparation programs have changed relatively little as technologies have advanced. Yes, some institutions have computers and/or ICN classrooms and this has changed a little of what is included in the curriculum. However, based on the results of this study, actual integration of technology into the teacher education program was not occurring.

Overwhelmingly, the participants in this study indicated that distance education belonged in the instructional technology or media class; that it was not the responsibility of faculty teaching method classes to include the effective use of distance education technology in these classes. With the current level of responsibilities, education faculty struggled to remain up-to-date in the content area. They disagreed not only on how distance education should be integrated but whether it should be integrated into the teacher education program.

Recommendations

This section has been divided into two categories. First, recommendations for the integration of distance education and change in teacher education will be discussed. Next, directions for future research related to innovativeness, distance education and teacher education are presented.

Teacher Education

The primary goal of teacher education programs is to prepare teachers with the knowledge and skills needed in the classrooms of the future. This includes having the necessary background in being able to integrate technologies, including distance education technologies, in ways that provide stimulating learning activities and contributes to young people being prepared for a world in which technology plays an integral role. To accomplish this, much needs to happen at institutions that prepare teachers.

First, training must be provided to assist education faculty develop the skills needed to use technology effectively. They need to know more than simply how to operate the technology. Education faculty need assistance in seeing how technology can be used appropriately in the content area to expand the learning opportunities teachers provide for their students. Armed with this knowledge, education faculty can then model effective practices and require students to use technologies as part of their lesson presentations.
Second, funding needs to be found to increase the availability of technologies; ICN classrooms, computers, networking, etc. and to assist with training costs. Traditionally funding has been provided to K-12 schools to acquire technologies and to train inservice teachers. These same funding sources need to direct at least a portion of these moneys to preservice programs. Professional organizations may need to offer more assistance to teacher education institutions in locating funding sources and acquiring funding.

Third, standards related to technology preparation of teachers need to be strengthened. While most states require, at minimum, an instructional technology course for certification, little direction is provided as to what this should involve. In addition, there is little recognition of the importance of learning more than simply operation of technology. More emphasis needs to be put on the actual integration of these technologies and the role they play in expanding educational opportunities in all content areas.

In summary, three areas have been identified that need to change in order for distance education to become integrated into the teacher education program. Technology training needs to be provided and perhaps required of all education faculty. Funding needs to be provided not only to retrain inservice teachers but to assist in the technology training of preservice teachers. Standards need to reflect the growing capabilities of technology and the contributions technology literate teachers can make to enhancing educational opportunities for all students.

Future research

Results from this study indicated that something is occurring during the decision making process that changes how individuals perceive the innovativeness of the organization. A case study approach that follows three-five institutions through all the decision making stages involved in the adoption of an innovation would provide insight into variables contributing to this shift.

Distance education has been shown to be an effective teaching medium (Hanson & Maushak, 1996). Students at a distance learn as well as their counterparts in traditional classes. However, most of this research has focused on complete courses delivered at a distance. Distance education research needs to examine what occurs with one time events and/or supplemental distance education activities. In some ways, these types of activities seem to be the real power of distance education. Questions related to if, how, and why these contribute to enhance learning opportunities need to be explored.

The Office of Technology Assessment (1995) has identified models of teacher education programs where reform related to technology preparation of teachers is occurring. A
greater understanding of variables promoting change at these institutions is necessary to promote wide-spread change in teacher education.

To summarize, a more in-depth look at the decision making process related to innovations is needed to provide a clearer understanding of underlying variables contributing to the innovativeness of an organization. More studies are needed that look at the impact, both motivational and achievement, of one-time or supplemental distance education events. Studies looking at change in teacher education, particularly a look at institutions that have successfully integrated technology, are needed to identify those variables which assist the change process.

Summary

The purpose of this study was to determine the relationship between organizational characteristics and the organizational innovativeness of teacher education programs in institutions of higher education in the state of Iowa in reference to the integration of the innovation, distance education. A second purpose was to determine the relationship between organizational characteristics and identified barriers to the integration of distance education throughout teacher education programs in institutions of higher education in the state of Iowa.

Participants were 45 education faculty members from Iowa, independent, 4-year colleges and universities with teacher education programs who attended site visits conducted by the Teacher Education Alliance (TEA), a component of the Iowa Distance Education Alliance, Iowa's Star Schools Project. Three methods of data collection were used for this study. Documents were reviewed to gather data related to organizational characteristics. Discussions held at site visits provided qualitative data related to the integration of distance education. The Teacher Education Alliance Survey (TEAS) was administered to TEA participants to collect data related to innovation, attitude, and current practices. Data were compared and correlated to identify any relationships among variables.

There was a statistically significant (p<.05) positive correlation between the current level of inclusion of distance education in media and methods classes and the three size variables: enrollment, number of computers and expenditures.

Qualitative data from the most innovative and the least innovative institutions were compared. The lease innovative institution was currently using the ICN to deliver courses and preparing preservice teachers to use distance education. The most innovative institution was not currently including distance education or using the ICN classroom, but was planning for the future use of distance education not only in education but across the campus.

Interesting outcomes of this study include:
• A strong evaluation of the TEA site-visit activity including accountability, effectiveness, and impact.

• A greater understanding of the independent, 4-year college environment that will allow change agents to design appropriate assistance and guidance in the integration of distance education in the teacher education program.

• A broader understanding of the barriers to integrating distance education as viewed from the perspective of independent, 4-year college education faculty members.

• Smaller institutions were using the resources available to accomplish innovative things.

• There is evidence to suggest that perceptions of an organization’s level of innovativeness is related to the stages of the innovation-decision process.

• Overall, there were two major differences between institutions with a high level of innovativeness and institutions with a low level of innovativeness: attitude and administrative support.

The results from this study provide guidance for individuals or agencies assisting small independent colleges to integrate technology. While funding and human resources may expedite the innovation process, convincing both faculty and administration of the need to innovate is of high priority. As long as these individuals believe distance education is an add-on to an already overcrowded curriculum the integration of distance education into the teacher education program will not occur. For distance education to diffuse, the change agent will need to assist these institutions in seeing how distance education not only fulfills a need of the institutions but is compatible with institutional values and beliefs.

In addition, institutions that prepare teachers need to dedicated funding or locate alternative funding sources to assist in acquiring technology as well as in the training of education faculty to use the technology. Until these professors have adequate access to technology and can develop their own comfort level, few will model effective uses of technology in the methods classes.
APPENDIX A. TEACHER EDUCATION ALLIANCE SURVEY
Teacher Education Alliance Participant Survey  
Spring, 1996

Your involvement in the Teacher Education Alliance is appreciated. As part of the project's evaluation activities, we are collecting information to determine the perceptions of teacher education faculty about the use of distance education in their college. Your responses will be confidential. Thank you for your help!

Name of your college/university ____________________________

Professional position/title ________________________________

My institution is connected to the ICN ______ yes ______ no

PART I College

Use the following scale and respond to the statements by circling the appropriate number.

1 = strongly disagree  2 = disagree  3 = moderately disagree  4 = undecided  5 = moderately agree  6 = agree  7 = strongly agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>MD</th>
<th>U</th>
<th>MA</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Follows the belief that &quot;the old way of doing things is the best.&quot;</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2. Does not respond quickly enough to necessary changes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>3. Rarely trusts new ideas and ways of functioning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4. Considered one of the leaders of its type.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>5. Creative in its method of operation.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6. Seeks out new ways to do things.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7. Frequently tries out new ideas.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8. Receptive to new ideas.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>9. Slow to change.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>10. Very inventive.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
PART II Individual

Now, think about yourself and your behaviors and attitudes and respond to each statement. Use the following scale.

1=strongly disagree  2=disagree  3=moderately disagree  4=undecided  5=moderately agree  6=agree  7=strongly agree

11. I am generally cautious about accepting new ideas.  
12. I am suspicious of new inventions and new ways of thinking.  
13. I rarely trust new ideas until I can see whether the vast majority of people around me accept them.  
14. I am aware that I am usually one of the last people in my group to accept something new.  
15. I am reluctant about adopting new ways of doing things until I see them working for people around me.  
16. I tend to feel that the old way of living and doing things is the best way.  
17. I am challenged by ambiguities and unsolved problems.  
18. I must see other people using new innovations before I will consider them.  
19. I am challenged by unanswered questions.  
20. I often find myself skeptical of new ideas.  
21. I don't even know what distance education is.  
22. I am not concerned about distance education.  
23. I have a very limited knowledge about distance education.  
24. I would like to know what including distance education in the teacher education program at my institution would require in the immediate future.  
25. I would like to know how my teaching is supposed to change when using distance education.  
26. I would like to know how my role will change when I am using distance education in my classes.  
27. The use of distance education can expand learning opportunities offered in teacher education.  
28. The cost of implementing distance education is too high.  
29. The use of distance education will promote collaboration among colleges with teacher education programs.  
30. Distance education classes will not allow interaction between instructor and students.  
31. Instruction in distance education should become an important component of the teacher education program.  
32. Distance education is important to the future of teacher education and education in general.  
33. Distance education is important to the future of my college.  
34. Overall, my attitude toward distance education is positive.
PART III Demographic information

A. Please tell us a little about yourself by responding to the following questions.

35. What is your gender? ☐ Female ☐ Male

36. What is your education level? ☐ Bachelors Degree ☐ Masters Degree ☐ Specialists Degree ☐ Doctoral Degree ☐ Other (Please specify)

37. How many years experience do you have at the college level?

☐ Less than 5 years ☐ 10-14 years ☐ 20-24 years
☐ 5-9 years ☐ 15-19 years ☐ 25 years or more

38. How many years experience do you have at the K-12 level?

☐ Less than 5 years ☐ 10-14 years ☐ 20-24 years
☐ 5-9 years ☐ 15-19 years ☐ 25 years or more

39. Which group of students is your primary responsibility?

☐ Elementary Education Majors ☐ Secondary Education Majors ☐ Other (Please specify)

40. Which category of education classes best describes your primary teaching responsibility?

☐ Education Foundations ☐ Methods (Pedagogy) ☐ Media (Technology) ☐ Other (Please specify)

41. Have you attended a previous workshop/institute on distance education? ☐ yes ☐ no

42. How would you rate your knowledge of distance education?

1 = none 2 = very little 3 = some 4 = quite a bit 5 = extensive

43. How would you rate your involvement in distance education?

1 = none 2 = very little 3 = some 4 = quite a bit 5 = extensive

44. If distance education over the ICN was available at your institution, would you use it to teach education classes? ☐ yes ☐ no

45. If distance education over the ICN was available at your institution, would you teach preservice teachers how to use it? ☐ yes ☐ no

46. Do you know of a private college that you feel is a model institution for the infusion of distance education?

If yes, please identify.

B. Think about the extent of coverage of distance education topics in media and method classes at your institution. Use the following scale and respond to the statements by circling the appropriate number for both media classes and method classes.

<table>
<thead>
<tr>
<th>Extent of coverage</th>
<th>Media Classes</th>
<th>Method Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = none</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2 = very little</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3 = some</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4 = quite a bit</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5 = extensive</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>

47. Demonstration of distance education technology

48. Presentation of methods of using distance education

49. Modeling of ways to use distance education

50. Opportunity to use distance education technology.
PART IV Open ended questions

Please take a moment to reflect and respond freely to the following questions.

51. Describe ways you see distance education becoming part of your teacher education program.

52. What barriers do you see to the infusion of distance education in the teacher education program at your institution?

53. How would you describe the mission of your college in general and how it impacts the teacher education program?

THANK YOU for your willingness to complete this survey.
Return competed form to: Research Institute for Studies in Education, Star Schools Evaluation, E005 Lagomarcino Hall, ISU, Ames, IA 50011
APPENDIX B. HUMAN SUBJECTS APPROVAL
Last name of Principal Investigator: Maushak

Checklist for Attachments and Time Schedule. The following are attached (please check):

12. □ Letter or written statement to subject indicating clearly:
   a) the purpose of the research
   b) the use of any identifier codes (names, numbers), 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
   d) if applicable, the location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, when and how you will contact subjects later
   g) that participation is voluntary; nonparticipation will not affect evaluations of the subject.

13. □ Signed 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: March 1996  Last contact: June 1996

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

18. Signature of Departmental Executive Officer

19. Decision of the University Human Subjects Review Committee:
   □ Project Approved  □ Project Not Approved  □ No Action Required
   This would have been approved had it been submitted prior to the research.
   Patricia M. Keith, Committee Chairperson  6/14/96  (signature of committee chairperson)
REFERENCES


Iowa Distance Education Alliance (IDEA), (July, 1992). Partnerships for interactive learning through telecommunications in Iowa’s elementary and secondary Schools. (Available from Research Institute for Studies in Education, Iowa State University, Ames, IA 50011).

Iowa Distance Education Alliance (IDEA), (December, 1994). Final evaluation report. (Available from Research Institute for Studies in Education, Iowa State University, Ames, IA 50011).

Iowa Distance Education Alliance (IDEA), (June, 1996). Evaluation report. (Available from Research Institute for Studies in Education, Iowa State University, Ames, IA 50011).


Encyclopedia of Distance Education Research in Iowa (pp. 131-148). Ames, Iowa: Teacher Education Alliance


