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Perceived Effectiveness of Audiographic Distance Education in Three Central Illinois High Schools

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Perceived Effectiveness of Audiographic Distance Education
in Three Central Illinois High Schools

BY

Kenneth R. Reed

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SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

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Abstract

Audiographic conferencing is a distance education practice being used in schools. Audiographic conferencing utilizes hardware and software to provide interactive audio and data transmission between locations. This study was conducted to assess the perceived effectiveness of the components of audiographic distance education by teachers and students in three Central Illinois High Schools involved in utilizing audiographics as a delivery system in terms of hardware, software, teaching techniques, appropriateness of course content, delivery system, and student achievement.

The study took place during the 1994-95, 1995-96 and 1996-97 school years utilizing a survey of a population of teachers and students involved in audiographic classes. Responses to the survey were received by 7 of the 7 teachers and 118 of the 128 students involved in audiographic classes.

Teachers and students reported general satisfaction with audiographics by assigning the highest ratings (4 or 5) to most areas of the components of audiographic distance education identified in the research questions. Some students and teachers indicated lack of satisfaction with the hardware, teaching technique of interaction between

student/teacher and between students and satisfaction with achievement by assigning it the lowest ratings (1 or 2). Eight-six percent of teachers and 33% of students assigned the highest ratings (4 or 5) to recommending continuation of the program of audiographics as a distance education delivery system.

Recommendations as a result of the study included evaluating the audio systems at the schools involved for effectiveness; exploring applying the audiographic system to deliver the instruction over the Internet; providing in-service to audiographic instructors about teaching techniques; looking for alternate modes of assessment of student performance in audiographic classes; and continued systematic observation and data collection to determine whether to continue audiographic distance education.

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Chapter 1

Overview

Background

Distance education has become an important educational practice in rural public schools. As financial resources dwindle, these schools are seeking cost effective methods to provide instruction to their students utilizing distance education tools. One such tool currently being utilized in three rural high schools in Illinois (Shelbyville, Kansas and Marshall) is audiographic conferencing. Audiographic conferencing involves using computer hardware and software which is designed for use with regular phone lines to provide interactive audio and data transmission between schools. Instructors in audiographic conferencing utilize a variety of different teaching techniques to maximize student learning.

Audiographic software programs allow schools to transmit data for distance education use. The software, which runs on a Windows based computer system, creates a shared work place on a computer monitor that teachers can manipulate utilizing the computer's keyboard, mouse or a sketch pad stylus to provide information in real time to all of the locations that are engaged in the conference. Prepared pictures and information that are developed by a draw program, scanned into the computer by the instructor, or imported from a digital camera, may also be stored in

data folders and used for lesson presentations. The software can be used to print out any information that appears on the screen or is stored in a data folder.

Several different pieces of computer hardware equipment are utilized to run the program or assist in the audiographic conference. A computer central processing unit, keyboard, mouse or sketch pad, and monitor enable the software to operate. Peripheral computer devices utilized in the system include a laser printer for output, a scanner and digital camera for input devices, and a modem to transmit and receive data to the other schools utilizing audiographic conferencing. Audiographic conferencing utilizes teleconferencing phones to transmit the voice data during instruction. Finally, it is necessary to have two phone lines at each school involved in audiographic conferencing. One line is utilized to carry the data transmitted by the computer modem and second line is utilized to carry the voice data.

The teaching techniques that are utilized in audiographic conferencing require instructors to use visual and verbal explanations and to coordinate those input sources to complement each other to present lessons. Other teaching techniques that are used to facilitate instruction in audiographic conferencing are done off-line by the teachers or facilitators of the sending or receiving schools. These techniques may include group projects,

discussion, simulation exercises, or role-playing.

If audiographic conferencing was to be continued to be utilized as a distance education delivery system in three Illinois high schools (Shelbyville, Kansas and Marshall), it was necessary to evaluate the effectiveness of this delivery system, with special attention given to the hardware and software utilized, the teaching techniques utilized, and the level of perceived achievement and satisfaction with audiographic conferencing classes. After such an evaluation has been done, educators should be able to better decide whether the practice of utilizing audiographic conferencing should continue in these schools.

Statement of the Problem

The problem addressed by this study was: Should the practice of utilizing audiographic conferencing in the Illinois high schools of Shelbyville, Kansas and Marshall be continued?

It was anticipated that this study would provide assistance to these high schools that utilized audiographic distance education in the evaluation of the computer software and hardware which is designed for use with audiographic distance education and the teaching techniques utilized by instructors. The study provided both teachers and students the opportunity to assess the effectiveness of audiographic conferencing utilizing specified criteria. By providing evaluation on the key components of audiographic

distance education, school personnel should be able to make adjustments in the hardware, software and teaching techniques to improve the teaching/learning process.

It was anticipated that this study would provide student achievement and satisfaction data to assist in program decisions related to the continuation of the instructional practice of audiographic distance education. The study should also enhance the limited body of research related to audiographic distance education. Finally, the study should assist school officials that are considering different methods of delivering distance education to determine whether to select the audiographic conferencing method.

Significance of the Study

This study should provide information to schools currently involved in audiographic conferencing on its effectiveness. Schools involved in the study should be able to compare the perceptions of teachers and students on the effectiveness of audiographic distance education. Finally, the study should provide satisfaction and achievement information related to audiographic conferencing and should assist in determining whether the practice is perceived by the students and teachers as needing to be continued.

The results of the study will be made available to the three schools involved in the study, the University of Illinois Extramural Programs division that currently is

utilizing audiographic conferencing at the post-secondary level and the Assistant Superintendent of the Learning Technology and Systems at the Illinois State Board of Education. The information for the schools currently involved in utilizing audiographics may be used to improve the current delivery system and make program decisions for the future. The information provided for the University of Illinois may be used as a "springboard" for further research in audiographic conferencing. The Illinois State Board of Education's Assistant Superintendent of Learning Technology and Systems may use the information to consider expansion of audiographic systems to other schools utilizing state funding grants.

Research Questions

The specific research questions addressed by this study follow.

1. What is the perceived effectiveness of the components of audiographic distance education by teachers involved in utilizing the delivery system in the three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

- A. Hardware
- B. Software
- C. Teaching techniques
- D. Appropriateness of course content
- E. Delivery system

- F. Student achievement
- G. Continuance of the program?

2. What is the perceived effectiveness of the components of audiographic distance education by students involved in utilizing the delivery system in the three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

- A. Hardware
- B. Software
- C. Teaching techniques
- D. Appropriateness of course content
- E. Delivery system
- F. Student achievement
- G. Continuance of the program?

Assumptions

For the purpose of this study it was assumed that:

1. There was a willingness on the part of the instructor and students involved to engage in the audiographic conference instructional setting
2. The location where the audiographic conferencing took place was appropriate for the instruction in terms of acoustics and access to viewing of the visuals presented
3. The schedule for the audiographic conferencing happened at reasonable times and length to facilitate the instructional process
4. Each instructor had the appropriate training in

utilizing the hardware, software and the teaching techniques used in audiographic conferencing

5. Each instructor had approximately the same amount of preparation time available for audiographic conferencing class

6. Each school using the audiographic conferencing system utilized the same hardware, software and teaching techniques.

Definition of Terms

Audiographic conferencing. Computer hardware and software which is designed for use with regular phone lines to provide interactive audio and data transmission in real time between locations.

Vis-a-Vis software. One of several software packages that is utilized to transmit data in audiographic conferencing. The software creates a shared workplace which utilizes electronic pens, erasers, highlighters, and electronic file folders for slide storage. Such software enables the user to "scan in" information, use a video input, operate a laser printer and utilize an electronic writing tablet for instruction.

Telconferencing hardware. The computer, monitor(s), scanner, laser printer, digital camera, electronic writing tablet, modem, and audio transmission devices utilized in audiographic conferencing.

Teaching techniques. The amount of interaction at the

sites; the amount of interaction between the instructor and students; the use of visuals/graphics; verbal explanations; coordination between verbal explanations and visuals; and the use of classroom activities and the methods utilized.

Delimitations

The following factors were outside the scope of this study:

1. Use of distance education delivery systems other than audiographics
2. Use of audiographic systems that utilize software other than Vis-a-Vis
3. Schools outside of Illinois that utilize Vis-a-Vis software
4. Perceived effectiveness of audiographic conferencing by students and teachers on a longitudinal basis.

Chapter 2

Related Literature and Research

Bradshaw and Dresser (1990) indicated that the first audiographics system was piloted in Utah in the 1980s by a rural school superintendent and one of his teachers. The purpose of the system was to link students in the district's four high schools to a community college instructor to provide trigonometry instruction. Barker and Goodwin (1990) reported that the model for audiographic teleteaching was usually a collaborative arrangement between two or three schools or institutions to form a cooperative. The average class size ranged between four and fifteen students with class size seldom exceeding 30 students overall.

The basic components of each audiographic system include the following:

1. An MS-DOS computer with a 386 processor and 4 mb of RAM 1 Modem (9600 baud or higher)
2. A digitized tablet for writing
3. Speakerphone system
4. Two telephone lines
5. An audiographics software package
6. A large screen projection device capable of displaying the contents of the computer screen on the wall (Fredrickson, 1990).

Other items that are sometimes present in an audiographic system are a printer, a video input source, a FAX machine and a flatbed scanner. These items are used to transmit material such as homework and handouts back and forth between sites. Initially four different software packages were available for use in audiographic conferencing (Bradshaw & Dresser, 1990).

The need for planning is inherent in implementing distance education programs. Hanrahan (1990) indicated that poor planning and administration can have a devastating effect on such programs. Bradshaw and Dresser (1990) reported the following steps in planning an audiographics program:

1. Form Partnerships -- For distance education programs to succeed, many different groups need to work together to form partners.
2. Obtain Funding -- Because a system costs as little as \$6,000 per site to procure and install and is economical to maintain, you probably won't need monies from outside of the district or county.
3. Select and Schedule Courses -- Carefully examine your school's curriculum and determine what courses need to be added to fulfill graduation requirements or provide a broader array of offerings to students.
4. Select Teleteachers -- While good scheduling and solid content are clearly essential for audiographic

distance courses, the most critical factor for success is the quality of teaching.

5. Developing and Implementing an Effective Training Program for Teleteachers -- Training must cover two strands: how to use the equipment and how to adapt a teacher's usual techniques to the distance learning medium.

6. Selecting and Training Learning Facilitators -- The adult at the distance location is best used as a facilitator of small groups and a manager of the work that is assigned.

7. Design an Evaluation Plan -- Teleteachers and school administrators should be aware of project effectiveness (pp. 39-45).

It is the seventh dimension of designing an evaluation plan that was the focus of this study. In the development of that evaluation plan, the literature indicated that it is important to examine several dimensions of audiographic conferencing.

Schaeffer and Schaeffer (1993) suggested that the following particular teaching behaviors facilitate a successful teleconferencing experience:

1. Advanced organization and preparation of written materials for students
2. Providing students printed materials before each class

3. Previewing what is to be covered in each class
4. Repeating and summarizing main points throughout the class
5. Altering pitch and volume throughout the class
6. Speaking to individuals, using their names, not to the whole audience
7. Using various instructional techniques, e.g., question and answer periods, case studies, brainstorming, panels, role playing and interviews
8. Providing a summary at the end of each session
9. Personalizing comments to sites or individual students
10. Utilizing questions to keep students involved.
11. Pausing to ask students for feedback about the class (p. 24).

Other areas suggested in the literature for evaluating the effectiveness of audiographic conferencing are related to learning styles and satisfaction. Gunawardena and Boverie (1993) found that learning styles do not impact how students interact with media and methods of instruction. Learning styles do, however, affect satisfaction with other learners. Class type (whether students were on-campus or off-campus), rather than learning styles, does impact student satisfaction with media, methods, group satisfaction, goal setting and group climate.

Dillion, Gunawardena & Parker (1992) found that three

basic areas of interaction are necessary to evaluate audiographic communication: 1) interaction between the student and instructor, 2) interaction between the students and other students, and 3) interaction between the students and content. The University of Wisconsin Extension Staff has published a manual that is designed to facilitate interaction in these three basic areas. The twelve interactive techniques for teleconferencing identified are lecture, tandem teaching, celebrity guest, interview, panel discussion, brainstorming, question and answer period, reactor panel, buzz group, group work session, case study and role playing (University of Wisconsin, 1990).

Far West Labs in San Francisco has conducted a formative evaluation of an audiographic telecourse and Bradshaw and Chow (1990) reported the following results of that study:

1. The majority of teleteachers, learning facilitators and students agreed that the distance classes were as interesting as other classes.
2. Learning occurred at a comparable rate with traditional delivery.
3. There were no more problems in these classes than in traditional classes.
4. Teleteachers, learning facilitators and students wanted to see curriculum expanded using this technology (p. 3).

One other area of literature related to audiographic conferencing that was examined was the reported strengths and weaknesses of the delivery system. Barker and Goodwin (1990) identified the following strengths of audiographic teleteaching:

1. Low cost in terms of hardware, software and maintenance
2. Relatively simple to learn and to operate
3. Perpetuates (a) small class size for interpersonal interaction and (b) local school control of the teacher and curriculum
4. Permits not only teacher/student interaction, but also allows for student/to/student interaction
5. Any participating site can serve in either a receive or a transmit mode
6. Instructional content is focused more on the organization of the material than on the personality of the teacher
7. Operates over regular telephone lines meaning that linkages between distant sites can be made almost anywhere in the world
8. Low operational costs -- limited to monthly telephone charges
9. Exchange of handouts or student written work via facsimile machines promotes a prompt "turn-around" for homework assignments between the instructor and

students (pp. 3-4).

The following weaknesses of audiographic teleteaching were identified by Barker and Goodwin (1990):

1. Motion is not possible at this time.
2. The instructor cannot see the students, nor can students see the instructor.
3. Extraneous noise or interference can cause voice transmission or the speaker telephones to occasionally "break up."
4. The video graphics/images displayed between computer monitors is limited to the size of the computer screen unless additional hardware is added.
5. Lesson planning (creating of computer visuals) can be considerably time consuming for the teacher, and floppy disks must be distributed to all remote sites prior to transmission (p. 4).

Chapter 3

Design of the Study

General Design of the Study

The study utilized a survey to gather data on two research questions.

1. What is the perceived effectiveness of the components of audiographic distance education by teachers involved in utilizing the audiographic distance education delivery system in the three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

- A. Hardware
- B. Software
- C. Teaching techniques
- D. Appropriateness of course content
- E. Delivery system
- F. Student achievement
- G. Continuance of the program?

2. What is the perceived effectiveness of the components of audiographic distance education by students involved in utilizing the audiographic distance education delivery system in three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

- A. Hardware
- B. Software
- C. Teaching techniques
- D. Appropriateness of course content

- E. Delivery system
- F. Student achievement
- G. Continuance of the program?

Population and Sample

The population surveyed for this study consisted of all of the instructors and students involved in utilizing audiographic distance education at the three Central Illinois high schools of Shelbyville, Kansas and Marshall during the 1994-95, 1995-96 and 1996-97 school years.

The three schools involved utilized audiographic distance education to offer three different classes. Shelbyville High School offered an audiographic distance education course in Accounting II to Marshall. Kansas offered an audiographic distance education course in Telecommunications to Marshall. And finally, Marshall offered an audiographic distance education course in Bible as Literature to Kansas.

During the time period of the study, seven teachers were involved in the delivery and receiving of audiographic distance education. One-hundred and twenty-eight students were involved in the instruction which either originated at their schools or was received by their schools in the classes previously mentioned.

Data Collection and Instrument

Upon the completion of each year's instruction in the time period of the study, teachers were asked to respond to

a survey related to their perceptions of the audiographic distance education course that they either taught or monitored. The following data were collected using the Survey of Teachers of Audiographic Distance Education Classes (see Appendix A) to measure teacher perceptions of each of the corresponding research questions:

1. The hardware utilized including the monitors, modem, speed of the computer, printer, scanner and the quality of the audio system (Questions 5 and 6 on the Teacher Survey)
2. The software utilized including the pen system, video input and operation of the system (Question 4 on the Teacher Survey)
3. The teaching techniques utilized including visuals/graphics, verbal explanations, coordination between the verbal explanations and visuals, the use of classroom activities and the methods utilized, and the interaction with students and between students (Questions 1, 2 and 3 on the Teacher Survey)
4. The appropriateness of the course content for presentation using audiographics (Question 7 on the Teacher Survey)
5. Teacher satisfaction with audiographics as a distance education delivery system (Question 8 on the Teacher Survey)
6. Teacher satisfaction with student achievement in

the distance education class (Question 9 on the Teacher Survey)

7. Whether the practice of utilizing audiographic distance education should continue (Question 10 on the Teacher Survey).

Upon the completion of each year's instruction in the time period of the study, students were asked to respond to a survey related to their perceptions of the audiographic distance education course in which they were enrolled. The following data were collected using the Survey of Students of Audiographic Distance Education Classes (see Appendix B) to measure their perceptions of each of the corresponding research questions:

1. The hardware utilized including the monitors, modem, speed of the computer, printer, scanner and the quality of the audio system (Questions 5 and 6 on the Student Survey)

2. The software utilized including the pen system, video input and operation of the system (Question 4 on the Student Survey)

2. The teaching techniques utilized including visuals/graphics, verbal explanations, coordination between the verbal explanations and visuals, the use of classroom activities and the methods utilized, and the interaction with students and between students (Questions 1, 2, 3 on the Student Survey)

4. The appropriateness of the course content for presentation using audiographics (Question 7 on the Student Survey)

5. Student satisfaction with audiographics as a distance education delivery system (Question 8 on the Student Survey)

6. Student satisfaction with student achievement in the distance education class (Question 9 on the Student Survey)

7. Whether the practice of utilizing audiographic distance education should continue (Question 10 on the Student Survey).

Surveys Returned

Of the seven teacher surveys sent to teachers of audiographic distance education classes at Shelbyville, Kansas and Marshall during the period of the study, seven were returned for a 100% response rate. Of the 128 surveys sent to students enrolled in audiographic distance education classes at Shelbyville, Kansas and Marshall during the period of the study, 118 were returned for a 92% response rate.

Data Analysis

Descriptive statistics were used to analyze the data collected for each component of the research questions. The analyses of the data are presented through tables which represent the number and percentage of responses in each

rating category for each survey question.

Chapter 4
Results of the Study

Overview

The research questions addressed in this study were:

What is the perceived effectiveness of the components of audiographic distance education by teachers involved in utilizing the audiographic distance education delivery system in the three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

1. Hardware
2. Software
3. Teaching techniques
4. Appropriateness of course content
5. Delivery system
6. Student achievement
7. Continuance of the program?

What is the perceived effectiveness of the components of audiographic distance education by students involved in utilizing the audiographic distance education delivery system in three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

1. Hardware
2. Software
3. Teaching techniques
4. Appropriateness of course content
5. Delivery system

6. Student achievement

7. Continuance of the program?

Results of the Research Questions

The tables presented contain the number and percentage, rounded to the nearest whole number, of responses in each rating category on the survey of students and teachers concerning the perceived effectiveness of components of audiographic distance education delineated in the research questions. The rating of NA means that no answer was given.

Tables 1 and 2 present the results related to the research questions about hardware use in audiographics. As indicated in Table 1, 72% of the teachers and 63% of the students assigned the two highest ratings (4 or 5) to the hardware used. As shown in Table 2, 29% of the teachers and 45% of the students assigned the two highest ratings (4 or 5) to the audio quality of the system. It should also be noted that 14% of the teachers and 27% of the students assigned the two lowest ratings (1 or 2) to the audio quality of the system.

Table 3 presents results related to the research question about the software used in audiographics. As indicated in that table, 57% of the teachers and 61% of the students assigned the highest ratings (4 or 5) to the software used in the system.

Tables 4 through 9 contain the results related to the

Table 1

Hardware -- The Hardware Utilized Including the Monitors,
Modem, Speed of the Computer, Printer and Scanner.

| <u>Rating</u> | <u>Teachers</u> | | <u>Students</u> | |
|---------------|-----------------|-------------------|-----------------|-------------------|
| | <u>n</u> | <u>Percentage</u> | <u>n</u> | <u>Percentage</u> |
| NA | 0 | 0% | 0 | 0% |
| 1 | 0 | 0% | 7 | 6% |
| 2 | 0 | 0% | 11 | 9% |
| 3 | 2 | 29% | 25 | 21% |
| 4 | 2 | 29% | 44 | 37% |
| 5 | 3 | 43% | 31 | 26% |

Table 2

Hardware -- The Audio Quality of the System

| <u>Rating</u> | <u>Teachers</u> | | <u>Students</u> | |
|---------------|-----------------|-------------------|-----------------|-------------------|
| | <u>n</u> | <u>Percentage</u> | <u>n</u> | <u>Percentage</u> |
| NA | 0 | 0% | 0 | 0% |
| 1 | 1 | 14% | 7 | 6% |
| 2 | 0 | 0% | 25 | 21% |
| 3 | 4 | 57% | 33 | 28% |
| 4 | 2 | 29% | 34 | 29% |
| 5 | 0 | 0% | 19 | 16% |

Table 3

Software -- Pen System, Video Input, Operation of the System

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 0 | 0% | 1 | 1% |
| 1 | 0 | 0% | 4 | 3% |
| 2 | 0 | 0% | 14 | 12% |
| 3 | 3 | 43% | 27 | 23% |
| 4 | 4 | 57% | 38 | 32% |
| 5 | 0 | 0% | 34 | 29% |

research question about the teaching techniques used in audiographics. As indicated in Table 4, 60% of the teachers and 52% of the students assigned the two highest ratings (4 or 5) to the interaction with teachers/students. It should also be noted that 29% of teachers and 23% of students assigned the interaction with teachers/students the lowest ratings (1 or 2). As indicated in Table 5, 57% of teachers and 32% of students assigned the interaction between students the lowest ratings (1 or 2). It should also be noted that 14% of the teachers and 44% of the students assigned the two highest ratings (4 or 5) to the interaction between students. As indicated in Table 6, 57% of teachers and 66% of students assigned the two highest

Table 4

Teaching Techniques -- Interaction with Teacher/Students

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 0 | 0% | 0 | 0% |
| 1 | 0 | 0% | 11 | 9% |
| 2 | 2 | 29% | 17 | 14% |
| 3 | 1 | 14% | 29 | 25% |
| 4 | 3 | 43% | 36 | 31% |
| 5 | 1 | 17% | 25 | 21% |

Table 5

Teaching Techniques -- Interaction Between Students

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 0 | 0% | 0 | 0% |
| 1 | 1 | 14% | 21 | 18% |
| 2 | 3 | 43% | 16 | 14% |
| 3 | 2 | 29% | 29 | 25% |
| 4 | 1 | 14% | 33 | 28% |
| 5 | 0 | 0% | 19 | 16% |

ratings (4 or 5) to the use of visuals/graphics. As indicated in Table 7, 71% of teachers and 65% of students

Table 6

Teaching Techniques -- Use of Visuals/Graphics

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 1 | 14% | 1 | 1% |
| 1 | 1 | 14% | 6 | 5% |
| 2 | 0 | 0% | 13 | 11% |
| 3 | 1 | 14% | 21 | 18% |
| 4 | 3 | 43% | 36 | 31% |
| 5 | 1 | 14% | 41 | 35% |

Table 7

Teaching Techniques -- Use of Verbal Explanations

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 0 | 0% | 1 | 1% |
| 1 | 0 | 0% | 10 | 9% |
| 2 | 1 | 14% | 10 | 9% |
| 3 | 1 | 14% | 20 | 17% |
| 4 | 4 | 57% | 32 | 27% |
| 5 | 1 | 14% | 45 | 38% |

assigned the two highest ratings (4 or 5) to the use of verbal explanations. As indicated in Table 8, 57% of

Table 8

Teaching Techniques -- Coordination Between Explanations
and Visuals

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 1 | 14% | 2 | 2% |
| 1 | 0 | 0% | 6 | 5% |
| 2 | 0 | 0% | 16 | 14% |
| 3 | 2 | 29% | 18 | 15% |
| 4 | 3 | 43% | 47 | 40% |
| 5 | 1 | 14% | 29 | 25% |

teachers and 65% of students assigned the two highest ratings (4 or 5) to the coordination between explanations and visuals.

As indicated in Table 9, 43% of teachers and 61% of students assigned the two highest ratings (4 or 5) to the use of classroom activities/methods. It should also be noted that 21% of students assigned the lowest ratings (1 or 2) to the use of classroom activities/methods.

Results related to the research questions about the appropriateness of course content for presentation in audiographic classes are presented in Table 10. As revealed in that table, 72% of teachers and 62% of students indicated that course content was appropriate for

Table 9

Teaching Techniques -- Use of Classroom Activities/Methods

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 1 | 14% | 0 | 0% |
| 1 | 0 | 0% | 8 | 7% |
| 2 | 0 | 0% | 17 | 14% |
| 3 | 3 | 43% | 21 | 18% |
| 4 | 2 | 29% | 43 | 36% |
| 5 | 1 | 14% | 29 | 25% |

Table 10

Appropriateness of Course Content

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 0 | 0% | 1 | 1% |
| 1 | 0 | 0% | 11 | 9% |
| 2 | 1 | 14% | 11 | 9% |
| 3 | 1 | 14% | 22 | 19% |
| 4 | 3 | 43% | 40 | 34% |
| 5 | 2 | 29% | 33 | 28% |

presentation through the use of audiographics by giving it the highest ratings (4 or 5).

Results related to the research question about the satisfaction with audiographics as a distance education delivery system are presented in Table 11. As revealed in Table 11

Delivery System Satisfaction with Audiographics as a Distance Education System

| <u>Rating</u> | <u>Teachers</u> | | <u>Students</u> | |
|---------------|-----------------|-------------------|-----------------|-------------------|
| | <u>n</u> | <u>Percentage</u> | <u>n</u> | <u>Percentage</u> |
| NA | 0 | 0% | 1 | 1% |
| 1 | 0 | 0% | 18 | 15% |
| 2 | 0 | 0% | 6 | 5% |
| 3 | 2 | 29% | 31 | 26% |
| 4 | 5 | 72% | 31 | 26% |
| 5 | 0 | 0% | 31 | 26% |

that table, 72% of the teachers and 52% of the students assigned the two highest ratings (4 or 5) to their satisfaction with audiographics as a distance education delivery system. It should be noted however, that 20% of the students assigned the lowest possible ratings (1 or 2) to their satisfaction with audiographics as a delivery system.

Results related to the research question about teacher/student satisfaction with achievement in the audiographic classes are presented in Table 12. As

Table 12

Student Achievement Satisfaction in the Audiographic Class

| Rating | <u>Teachers</u> | | <u>Students</u> | |
|--------|-----------------|------------|-----------------|------------|
| | n | Percentage | n | Percentage |
| NA | 0 | 0% | 1 | 1% |
| 1 | 0 | 0% | 16 | 14% |
| 2 | 2 | 29% | 11 | 9% |
| 3 | 2 | 29% | 35 | 30% |
| 4 | 1 | 14% | 32 | 27% |
| 5 | 2 | 29% | 23 | 20% |

indicated in that table, 43% of teachers and 47% of students reported satisfaction with achievement by assigning it the highest ratings (4 or 5). It should be noted, however, that 29% of teachers and 23% of the students indicated lack of satisfaction with achievement by assigning it the lowest ratings (1 or 2).

Results related to the research question about continued use of audiographics as a distance education delivery system are presented in Table 13. As indicated in that table, 86% of teachers and 33% of students assigned the two highest ratings (4 or 5) to continuing the program of audiographics as a distance education delivery system. It should be noted, however, that 21% of students assigned the lowest ratings (1 or 2)

Table 13

Continuance of the Program of Utilizing Audiographics as a
Distance Education Delivery System

| <u>Rating</u> | <u>Teacher</u> | | <u>Students</u> | |
|---------------|----------------|-------------------|-----------------|-------------------|
| | <u>n</u> | <u>Percentage</u> | <u>n</u> | <u>Percentage</u> |
| NA | 0 | 0% | 1 | 1% |
| 1 | 0 | 0% | 14 | 12% |
| 2 | 0 | 0% | 10 | 9% |
| 3 | 1 | 14% | 19 | 16% |
| 4 | 3 | 43% | 27 | 23% |
| 5 | 3 | 43% | 47 | 10% |

to continuing the program of audiographics.

Chapter 5

Summary, Findings, Conclusions and Recommendations

Summary

The specific research questions addressed by this study were:

1. What is the perceived effectiveness of the components of audiographic distance education by teachers involved in utilizing the audiographic distance education delivery system in the three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

- A. Hardware
- B. Software
- C. Teaching techniques
- D. Appropriateness of course content
- E. Delivery system
- F. Student achievement
- G. Continuance of the program?

2. What is the perceived effectiveness of the components of audiographic distance education by students involved in utilizing the audiographic distance education delivery system in three Central Illinois high schools of Shelbyville, Kansas and Marshall in terms of:

- A. Hardware
- B. Software
- C. Teaching techniques
- D. Appropriateness of course content

E. Delivery system

F. Student achievement

G. Continuance of the program?

This study was based on data collected from a survey of the perceived effectiveness of audiographic distance education by teachers and students in three Central Illinois high schools of Shelbyville, Kansas and Marshall during the 1994-95, 1995-96 and 1996-97 school years.

Findings

The data collected were presented in tables that contained the number and percentage of responses in each rating category on the survey of students and teachers concerning the perceived effectiveness of components of audiographic distance education delineated in the research questions.

Questions 5 and 6 on the teacher and student survey of audiographic distance education related to the hardware used in audiographics. Sixty-three percent of students and 72% of the teachers assigned the highest ratings (4 or 5) to Question 5, concerning the hardware utilized including the monitors, modem, speed of the computer, printer and scanner. Twenty-nine percent of teachers and 45% of students assigned the highest ratings (4 or 5) to Question 6, concerning the audio quality of the system. It should also be noted that 14% of teachers and 27% of the students assigned the two lowest ratings (1 or 2) to Question 6, the

audio quality of the system.

Question 4 on the teacher and student survey of audiographic distance education related to the software used in audiographics. Fifty-seven percent of teachers and 61% of students assigned the highest ratings (4 or 5) to the software used in the system including the pen system, video input and operation of the system.

Questions 1, 2 and 3 on the teacher and student survey of audiographic distance education related to the teaching techniques used in audiographics. Sixty percent of the teachers and 52% of the students assigned the two highest ratings (4 or 5) to the interaction with teachers/students. It should be noted, however, that 29% of teachers and 23% of students assigned the interaction with teachers/students the lowest ratings (1 or 2). Fifty-seven percent of teachers and 32% of students assigned the interaction between students the lowest ratings (1 or 2). It should also be noted, that 14% of the teachers and 42% of the students assigned the two highest ratings (4 or 5) to the interaction between students. Fifty-seven percent of teachers and 66% of students assigned the two highest ratings (4 or 5) to the use of visuals/graphics in audiographics. Seventy-one percent of teachers and 65% of students assigned the two highest ratings (4 or 5) to the use of verbal explanations in audiographics. Fifty-seven percent of teachers and 65% of students assigned the two

highest ratings (4 or 5) to the teaching technique of the coordination between explanations and visuals. Forty-three percent of teachers and 61% of students assigned the two highest ratings (4 or 5) to the teaching technique of the use of classroom activities/methods. It should be noted, however, that 21% of students assigned the lowest ratings (1 or 2) to the use of classroom activities/methods.

Question 7 on the teacher and student surveys related to the appropriateness of the course content in audiographics. Seventy-two percent of teachers and 62% of students indicated that course content was appropriate for presentation through the use of audiographics by giving it the highest ratings (4 or 5)

Question 8 on the teacher and student survey of audiographic distance education related to the satisfaction with audiographics as a delivery system. Seventy-two percent of teachers and 52% of students assigned the two highest ratings (4 or 5) to their satisfaction with audiographics as a distance education delivery system. It should be noted, however, that 20% of the students assigned the lowest possible ratings (1 or 2) to their satisfaction with audiographics as a delivery system.

Question 9 on the teacher and student survey of audiographic distance education related to teacher/student satisfaction with achievement in the audiographic class. Forty-three percent of teachers and 47% of students

reported satisfaction with achievement by assigning it the highest ratings (4 or 5). It should also be noted that 29% of teachers and 23% of the students indicated lack of satisfaction with achievement by assigning it the lowest ratings (1 or 2).

Question 10 on the teacher and student survey of audiographic distance education related to continuance of the program of audiographics. Eighty-six percent of teachers and 33% of students assigned the two highest ratings (4 or 5) to continuing the program of audiographics as a distance education delivery system. It should be noted, however, that 21% of students assigned the lowest ratings (1 or 2) to continuing the program of audiographics.

Conclusions

The perceptions of students and teachers related to the hardware used in audiographic distance education indicated satisfaction with the monitors, modem, speed of the computer, printer and scanner as evidenced by 72% of the students and 63% of the teachers assigning the highest ratings (4 or 5) to that question. Teacher and student perception of the hardware audio quality satisfaction was not as strong with 29% of teachers and 45% of the students assigning the highest possible ratings to audio hardware used. The 14% of teachers and the 27% of students who assigned the two lowest ratings (1 or 2) to the hardware

audio quality would indicate dissatisfaction with hardware audio quality.

Student and teacher perceptions related to the software used in audiographics including the pen system, video input and operation of the system indicated satisfaction. Fifty-seven percent of the teachers and 61% of the students assigned the highest ratings (4 or 5) to the software used in the system.

The perception of students and teachers related to the teaching techniques used in audiographic distance education indicated varying levels of satisfaction. Sixty percent of teachers and 52% of students indicated satisfaction by assigning the highest ratings (4 or 5) to the interaction with teachers/students, however, 29% of teachers and 23% of students indicated dissatisfaction by assigning the same category the two lowest ratings (1 or 2). Fifty-seven percent of teachers and 32% of students indicated dissatisfaction with the interaction between students by assigning it the two lowest ratings (1 or 2). Sixty-six percent of students and 57% of teachers indicated satisfaction with the visuals/graphics used in audiographics by assigning them the two highest ratings (4 or 5). Verbal explanations used in audiographic teaching were assigned the highest two ratings (4 or 5), as an indication of satisfaction, by 71% of the teachers and 65% of students. Fifty-seven percent of teachers and 65% of

students indicated satisfaction with coordination between explanations and visuals by assigning it the two highest ratings (4 or 5). The final teaching technique, the use of classroom activities/methods, was assigned the two highest ratings (4 or 5) by 43% of the teachers and 61% of the students indicating satisfaction, however 21% of the students gave the lowest ratings (1 or 2) to the use of classroom activities/methods indicating dissatisfaction.

Student and teacher perceptions related to the appropriateness of the course content in audiographic conferencing indicated satisfaction. Seventy-two percent of the teachers and 62% of the students indicated that course content was appropriate for presentation through the use of audiographics by giving it the highest ratings (4 or 5).

Perceptions of students and teachers indicated satisfaction with audiographics as a distance education delivery system. Seventy-two percent of the teachers and 52% of students assigned the two highest ratings (4 or 5) to their satisfaction with audiographics as a delivery system. Some dissatisfaction was indicated by students with 20% assigning the two lowest ratings (1 or 2) to their satisfaction with audiographics as a delivery system.

Student and teacher perceptions of satisfaction with achievement in the audiographic class were mixed. Forty-three percent of the teachers and 47% of students reported satisfaction with achievement by assigning it the highest

ratings (4 or 5), however 29% of teachers and 23% of students indicated dissatisfaction with achievement by assigning it the lowest ratings (1 or 2).

The perception of students and teachers related to continuing the program of audiographics indicated varying levels of satisfaction. Eight-six percent of teachers and 33% of students indicated satisfaction with continuing the program of audiographics by assigning it the highest ratings (4 or 5). Twenty-one percent of the students indicated dissatisfaction with continuing audiographics by assigning it the lowest ratings (1 or 2).

Recommendations

The hardware, specifically the audio systems, used at the three schools needs to be evaluated for its effectiveness in the delivery of audiographic distance education. Additionally, the rooms where the audiographic system is located should be examined to see if any acoustical treatment(s) could be installed to enhance the audio quality.

The software, for the audiographics system may be better applied to utilize over the Internet. With the increasing cost of maintaining phone lines, a lower cost method of using current Internet technologies to transmit and receive the graphic portion of the system is desirable. Utilizing the Internet would also allow more schools to receive audiographic distance education because of the

distribution system that is afforded.

Schools involved in utilizing audiographics need to continue to in-service teachers on the most current teaching techniques related to distance education. Emphasis should be placed on how to increase interaction among teachers/students and students/students and the use of classroom activities/methods.

Achievement in audiographic classes should be monitored closely. The use of alternate modes of assessments of student performance should be considered and implemented where appropriate. Grade options should probably include credit/no credit or pass/fail options to take into account the diversity of learning styles that may be present in the audiographic classes.

There needs to be additional systematic observation and data collection to determine whether to continue audiographic distance education at the three Central Illinois schools of Shelbyville, Kansas and Marshall. The emphasis of the observations and data collection should be on the hardware, software, teaching techniques, appropriateness of course content, student achievement and delivery system satisfaction.

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Appendix A

Survey for Teachers of Audiographic Distance Classes

Below are listed a series of questions related to the audiographic distance education class which you teach.

Please circle the number of the rating which best represents your perception of audiographic distance education. Five is the highest rating and one is the lowest rating.

1. Your interaction with the students

1 2 3 4 5

2. The interaction between students

1 2 3 4 5

3. The following teaching techniques used by you:

Visual/Graphics

1 2 3 4 5

Verbal Explanations

1 2 3 4 5

Coordination between the verbal explanations and
visuals

1 2 3 4 5

The use of classroom activities and the methods
utilized

1 2 3 4 5

4. The software that was utilized in terms of the pen system, video input that was utilized and the operation of the system

1 2 3 4 5

5. The hardware that was utilized including the monitors, modem, speed of the computer, printer, and scanner

1 2 3 4 5

6. The audio quality of the system

1 2 3 4 5

7. The appropriateness of the course content for presentation using audio graphics

1 2 3 4 5

8. Your satisfaction with audiographics asa distance education delivery system

1 2 3 4 5

9. Your satisfaction with your students' achievement in the audiographics class

1 2 3 4 5

10. Using audiographics as a distance education delivery system should continue

1 2 3 4 5

Appendix B

Survey for Students of Audiographic Distance Classes

Below are listed a series of questions related to your perceptions of the audiographic distance education class in which you are enrolled. Please circle the number of the rating which best represents your experience while enrolled in an audiographic course. Five is the highest rating and one is the lowest rating.

1. Your interaction with the teacher

1 2 3 4 5

2. The interaction between students

1 2 3 4 5

3. The following teaching techniques used by the teacher:

Visuals/graphics

1 2 3 4 5

Verbal explanations

1 2 3 4 5

Coordination between the verbal explanations and
visuals

1 2 3 4 5

The use of classroom activities and the methods
utilized

1 2 3 4 5

4. The software that was utilized in terms of the pen system, video input that was utilized and the operation of the system

1 2 3 4 5

5. The hardware that was utilized including the monitors, modem, speed of the computer, printer and scanner

1 2 3 4 5

6. The audio quality of the system

1 2 3 4 5

7. Appropriateness of the course content for presentation using audiographics

1 2 3 4 5

8. Your satisfaction with audiographics as a distance education delivery system

1 2 3 4 5

9. Your satisfaction with your achievement in the audiographics class

1 2 3 4 5

10. Using audiographics as a distance education delivery system should continue

1 2 3 4