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A Comparison of Learning and Costs of Continuing Education Programming Via Traditional Versus Telephone Delivery in The State of North Dakota

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A COMPARISON OF LEARNING AND COSTS OF CONTINUING EDUCATION PROGRAMMING VIA TRADITIONAL VERSUS TELEPHONE DELIVERY IN THE STATE OF NORTH DAKOTA

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CHAPTER I

PROBLEM

Statement of Problem

Continuing education for physicians, nurses and allied health professions will be required in order for these professionals to remain certified or licensed in their career field. Many professional colleges, societies and associations require their members to participate in a given number of hours of continuing education credit over a specific period of time. In addition, a number of states are requiring accredited continuing education for health professionals to remain licensed within the state. The problem for health professionals, especially in a state the size of North Dakota is where do they obtain the accredited course and at what cost to them personally and to the institutions in which they work.

For example, the American College of Obstetrics and Gynecology requires its fellows to obtain 130 credits called cognates over a three year period. Seventy of these cognates must be in an accredited continuing education course. The College itself offers courses to help fulfill this requirement but also recognizes course work done by physicians which have received the American Medical Association's certification for credit in what is called Category I credit and is applied

to the Physicians Recognition Award (PRA). To receive credit a course must be offered from an institution or association recognized by the American Medical Association or the American College of Obstetrics and Gynecology. To receive recognition for this course, the presentation must include objectives, bibliography, a qualified presentor and evaluation procedures.[1]

The requirement for continuing education for physicians has grown beyond that of being recertified as a fellow in a

TABLE I

States With Legislation Requiring CME for Reregistration of License to Practice Medicine

State	Legislation Requiring CME, Date	CME Requirement Operational	PRA Accepted for CME Requirement
Alaska	5/22/76	No	No
Arizona	2/76	Yes	Yes
Arkansas	1977	No	No
California	1/1/77	Yes	No
Colorado	1976	Yes	Yes
Hawaii	1976	Yes	Yes
Illinois	1977	Yes	No
Iowa	1/1/79	Yes	Yes
Kansas	7/1/78	Yes	Yes
Kentucky	9/1/72	No	No
Maine	6/1/79	Yes	No
Maryland	9/78	Yes	No
Massachusetts	10/20/77	Yes	Yes
Michigan	1977	Yes	No
Minnesota	1976	Yes	No
Nebraska	1976	No	No
Nevada	5/17/79	No	No
New Hampshire	3/2/78	Yes	Yes
New Mexico	11/72	Yes	Yes
Ohio	1/1/77	Yes	No
Pennsylvania	1/1/78	Yes	Yes
Puerto Rico	1976	No	No
Rhode Island	1/1/77	Yes	No
Utah	1976	Yes	Yes
Washington	1976	Yes	Yes
Wisconsin	1977	Yes	No

SOURCE: "Continuing Medical Education," Journal of the American Medical Association 243 (March, 1980): 890-95.

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[1] Interview with Ingrid Ablett, Educational Program Coordinator, American College of Obstetrics and Gynecologists, San Antonio, Texas, March 28, 1980.

professional association to include states that require specified numbers of hours of continuing education to remain licensed to practice medicine within the state. To date, seventeen states have set definite requirements with the trend clearly indicating this number will grow.[2]

The health professions of nursing and allied health have begun to require continuing education in their career fields. The State of North Dakota is expected to require accredited continuing education of its nurses by legislation during the next two legislative sessions.[3] Physical therapy and the other allied health professions, are expected to follow the trend.[4] The requirement for continuing education accreditation will be similar to the physicians requirement for state certification and licensure. While the State of North Dakota can legislate this requirement, the actual majority of courses must be developed and presented within the State by accredited institutions and associations.

In anticipation of the continuing education requirement, the Area Health Education Centers (AHECs) in the State of North Dakota sponsored a conference in which continuing education was discussed. Their keynote speaker,

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[2]Interview with Gary Dunn, Associate Dean, Administration and Development, University of North Dakota School of Medicine, Grand Forks, North Dakota, May 10, 1979.

[3]Interview with Carolyn Singleton, AHEC Nurse Coordinator, University of North Dakota School of Nursing, May 18, 1979.

[4]Interview with Henry Wessman, Chairman of the Department of Physical Therapy, University of North Dakota, May 20, 1979.

Dr. A. H. Blakely, Professor of Adult Education at Syracuse University, notices three trends in continuing education in the health-care field. They are: "One, it is gaining increasing acceptance; two, awareness of the many methods and resources for continuing education is growing; and three, parochialism in the provision of opportunities for continuing education is being broken down by a greater sense of commanility and partnership among the professions and vocations, and a keener awareness of resources for continuing education beyond the immediate geographical neighborhood." Dr. Blakely has also stated that "the main drive of the movement comes from personal and professional desire to provide the best health-care and maintenance possible."[5] Rivlin takes Dr. Blakely's statement one step further in her book, Systematic Thinking for Social Action, when he says, "Educational and health-care clearly increase an individual's productivity, and increases are reflected in his earnings."[6] Therefore, following both Blakely and Rivlin's thinking, education for health-care delivery professionals would not only increase their earning power but their ability to deliver that health-care and at the same time, provide the citizens of the State of North Dakota with an opportunity

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[5]D. H. Blakely, Area Health Education Center Quarterly Report for 1st Quarter, 1979, University of North Dakota School of Medicine, Grand Forks, North Dakota (typewritten).

[6]Alice M. Rivlin, Systematic Thinking for Social Action, Washington, D.C.: The Brookings Institution, 1971, p. 9.

for higher earnings. This would mean not only a healthier public but larger tax base.

During a Health-Care Professionals Continuing Education Conference held in Bismarck, North Dakota, a period of time was scheduled where volunteers from numerous health-care professions met and were assigned to ten (10) groups, each of which were to identify what they felt were the priority needs of helath science continuing education in the State of North Dakota. The groups listed a large number of priorities with the following, emphasizing distribution of programming, included in the list:

1. A system for continuing education program delivery with built-in post-ed evaluation

2. Expansion of programs
   a. Distribution
   b. Accessibility

3. Programs designed for multi-level health professionals

4. Plan so that existing Continuing Education programs could be made available to small isolated communities on a continuing and follow-up basis

5. Develop techniques for making Continuing Education available, i.e., Educational Telephone Network, videotape, etc.

6. Methodology for evaluation of quality and cost-effectiveness of Continuing Education relative to: performance, quality of care, enrichment of the professionals career

7. Mechanism for coordination of schedules and dissemination of information on Continuing Education to facilitate joint planning, geographical distribution and efficient use of resources

8. Provide quality program accessibility in all corners of the State

9. A statewide communication system for dissemination of information, re: Continuing Education

10. How can we develop continuing education programs encompassing all (rural-urban delivery needs differ)

11. Evaluating programs to see if they meet the goals

12. Cost-effectiveness and financial resources

13. Accessiblity to Continuing Education programs

14. Develop and integrate central audio-visual programs to be shared

These priorities indicate a strong need for a statewide distribution center system which can provide continuing education in all health professions and do so with the necessary accreditation requirements in mind and at a reasonable cost to the participant.

The Educational Telephone Network which is a teleconferencing mechanism which utilizes a dedicated system to some nineteen cities and sixty terminal stations. This is not a conference call network, but a design which uses telelecture procedures with teletechniques as a way of enriching the programming offered over the network and utilizing the medium in a way to overcome its limitations.

The cost for continuing education is a real problem which must be addressed by any delivery system of that continuing education. For example, the University in the

last year has raised its cost per mile of in-state travel from 15¢ to 20¢ and now to 25¢ per mile. Motel prices, even in such establishments as the Econotel have risen, for one night's lodging, from $12.95 to $15.95. This is reflected in the increase in the amount of money allocated by the State of North Dakota from $10.00 to $13.00 per day.

Carolyn Singleton, the AHEC Nurse Coordinator stated that to hold a meeting with six nurses around the State in Grand Forks costs a minimum of $1200. This does not represent any loss of money to the institution from which the nurses have come to attend the meeting. Gene Adams, the Executive Secretary for the North Dakota Health Care Review Board indicated that it cost $15,000 to hold a full Board Meeting in Minot with physicians from throughout the State. To hold an Executive Board Meeting costs $4,000. This includes travel, from the home site to the meeting site and return, in some cases the cost of lodging, meals and for physicians a $50 an hour fee required by federal law to compensate for their not practicing medicine while attending the meeting. While these costs represent health professionals attending the meetings they are reflective of the cost for the same health professionals to attend continuing education programming if held at a central location in the State. The Educational Telephone Network does offer one potential answer to this problem of a need for Continuing Education and the increasing cost of travel, lodging and absence from the

institution or practice in the State of North Dakota.

A basic understanding of terms used in the telephone medium would be helpful in comprehending the paper. Therefore, terms have been identified and defined.

Definition of Terms

Teleconferencing is the generic term covering two-way distant telephone discussion between two or more groups..

Conference calls are the type of teleconferencing in which ordinary telephone lines are linked together by a telephone operator or a connecting device. Participants could be using either amplified telephones or a regular telephone at each location.

Telelecture can best be described as a prearranged telephone call from the classroom to a resource person providing students the opportunity to ask questions and to make comments. Responses are amplified through special telephone equipment for the entire classroom. Microphones and speakers may be placed in appropriate locations in the room making it possible for all participants to more conveniently interact.

A dedicated system is a teleconferencing network in which permanently installed lines are leased from the telephone company twenty-four hours a day. All of these centers on a dedicated system are permanent and are wired to operate like a giant party line.

Educational Telephone Network (ETN) is the name given to the actual network of dedicated system lines, terminal station equipment and personnel who coordinate the system in the control center.

Teletechniques is the instructional design system developed to overcome limitations of a nonvisual interactive remote learning environment. It includes such design steps as sending a participant a welcoming letter, calling the participant by name during the presentation, planting questions, assigning feedback, intergroup projects, celebrity expertise, panel discussions, role playing, case studies and brainstorming.[6]

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[6]Lorne Parker, Marcia A. Baird and Dennis Gilbertson, "Introduction to Teleconferencing," The Telephone in Education, 1977, pp. 27-53.

CHAPTER II

HISTORY OF THE TELEPHONE IN EDUCATION

Paladuga D. Rao and Bruce L. Hicks in an article entitled, "Telephone Based Instructional Systems" which appeared in the April, 1972, issue of Audiovisual Instruction gave a concise historical background of the telephone's experience in education. The article stated that the telephone came into existance for public use around 1877. However, it was not until 1939 that the telephone was applied for the first time to instruction. This occurred in Iowa under the direction of Doctor Winterstein. This innovative application of the telephone was designed for homebound and hospitalized students. Interestingly this first application of telephone instruction was to mirror the technology that is available today in terms of capability. The project lasted two years. Students at home were able to participate along with students in the classroom by listening to lectures, answering questions, and in general keeping up to their studies while convalescing using the telephone as the medium. Over 1,000 students benefitted from this mode of instruction. This experience gave evidence to the possibilities for the telephone in instruction.

The first college level application occurred in 1947. This occurred between a location in Chicago, Illinois, and one in Scranton, Pennsylvania. The College of Dentistry

at the University of Illinois Chicago Medical Campus was the origination site with fifty dentists present in the classroom. The presentation was transmitted to Scranton to an additional thirty dentists. A total of six lectures were offered with each one lasting approximately two hours. The project was viewed as a "novel" extension service by the Dental College.

In the 1950s an amplified telephone was designed which allowed large groups to take part at a number of "one shot" projects for large groups in several locations but did not progress beyond the experimental approach.

Stephens College during the 1950s developed the best of these projects. The project was headed by Dr. Alfred Novak and was designed as an inservice training seminar for science faculties at a group of colleges. These colleges included: Drury College, Springfield, Missouri; Kansas Wesleyan University, Salina, Kansas; Langston University, Oklahoma; La Moyne College, Memphis, Tennessee; Morehouse College, Atlanta, Georgia; and Wilbourforce University, Ohio. Participants at each college were given a total of thirteen lectures of between thirty and forty-five minutes each followed by question and answer periods. One participant in these lectures wrote, "Without the telephone facility provided in this experiment it is highly unlikely that any student or teacher would in his lifetime have an opportunity to discuss person-to-person the major idea of such distinguished

company."[1] The project enables leaders in the fields of science to present to participants at these locations exciting new knowledge.

In the 1960s a number of changes took place. The telephone was used, instead of a seminar or "one shot" project, for teaching an entire course within the curriculum. The approach was applied in both the New York and California school systems on a secondary education level. Again the primary impetus of this form of instruction was for those students unable to attend regular classes because of illness or accident. The program was considered a success.

Dr. Lorne Parker in the article, "Teaching by Telephone"[2] describes how the Educational Telephone Network in Wisconsin developed from being a continuing education system for physicians to becoming a continuing education system for nurses and allied health. After it was successful for these health professions it became attractive to other professions such as agriculture, law, librarians and teachers. The extension service of the University of Wisconsin began to use the network to provide services to these non-health related groups.

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[1]Paladuga D. Rao, and Bruce L. Hicks, "Telephone Based Instructional Systems," Audiovisual Instruction, April, 1972.

[2]Dr. Lorne Parker, Journal of Communication, Summer, 1978, Vol. 28.

Between 1965 and 1969 the Educational Telephone Network developed to over 200 sites located throughout the State. In a personal interview with Lorne Parker it was learned that the Educational Telephone Network in Wisconsin earns $4.8 million a year.[3] That represents a great deal of programming on a very broad range of topics and certainly presents a great service to the people of Wisconsin.

Wisconsin's leadership led to the development of telephone networks in Ohio, Iowa, Colorado, Texas, Oklahoma, Missouri, Illinois, Kansas, Florida, Maine, Michigan, Nebraska and New York. Currently plans are being developed for systems in Minnesota, South Dakota and Tennessee.

History of Development of the North Dakota Network

The University of North Dakota School of Medicine under Acting Dean Neil Thomford decided in October, 1976, to establish a teleconferencing network between Grand Forks, Fargo, Bismarck and Minot. This Network would serve the administrative needs of the statewide Medical School and would be patterned after the Ohio system with which Dr. Thomford was familiar. The administrative responsibility for organizing and operating the Network was given to the Division of Biomedical Communications. The first meeting over the Network was held in February of 1977. In November

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[3]Interview with Dr. Lorne Parker, Director, Center for Interactive Instructional Programs, University of Wisconsin, Madison, Wisconsin, September 9, 1978.

of 1976 an Educational Telephone Network Coordinator was hired, that individual along with the Director was trained at the University of Wisconsin's Educational Telephone Network by Dr. Lorne Parker, Director of the Center for Interactive Instructional Programs, and his staff. A decision was made that the equipment would be used for the North Dakota Network would be Darome Educom, the same equipment that has been used in Wisconsin since 1965 with a minimum of problems. This is different equipment than what is used in Ohio and had been recommended by Dr. Thomford. In addition, it was recommended to Acting Dean Thomford that continuing educational programming in the health professions be offered over the Network as well as administrative meetings and that this programming be given priority over the meetings because of the need for a designated time and date for its offering for advertising and participant planning for attendance. The concept was accepted since the Network was not very busy its first year of existance. In fact, there were only eight programs and eighty meetings held over the Network that first year.

The Network has grown from its February, 1977, size of four cities and fifteen sites to a Network of nineteen cities and sixty sites. Programming has grown from the original eight programs the first year to over eighty programs this last year, with a projection of 152 programs next year. Administrative meetings held over the Network have increased

from the original eighty odd to over 400 last year and a projected 600 for 1981. The original ETN Coordinator is now the ETN Supervisor with a staff including an ETN Coordinator, an ETN Scheduler, a part-time engineer and two part-time work study people.

A listing of the current locations follows.

Educational Telephone Network Local Sites

Bismarck

Bismarck Hospital

Medical Arts Building, AHEC Office

St. Alexius Hospital

UND Family Practice Center

Bottineau

St. Andrew's Hospital

Cavalier

Pembina County Memorial Hospital

Devils Lake

Mercy Hospital

Dickinson

St. Joseph's Hospital

Fargo

Dakota Hospital

NDSU College of Pharmacy

St. John's Hospital

St. Luke's Hospital

Minot

North Dakota Health Care Review, Inc.

St. Joseph's Hospital

Trinity Medical Center

Trinity Professional Building

USAF Regional Hospital

Rugby

Good Samaritan Hospital Association

Valley City

Mercy Hospital

Wahpeton

North Dakota State School of Science

Williston

Mercy Hospital

Public Library Sites

Bismarck: Veterans Memorial Public Library

Dickinson: Dickinson Public Library

Grand Forks: Grand Forks Public Library

Jamestown: Alfred Dickey Free Library

Minot: Minot Public Library

Williston: James Memorial Library

Since its inception there has been a growing interest by agricultural professionals, law and others to use the Educational Telephone Network for meetings and programming.

It was decided to approach the public libraries in a number of the large cities of North Dakota to see if they would be willing to house an Educational Telephone Network site. Grand Forks, Minot, Williston, Bismarck, Dickinson, Jamestown and Fargo accepted the concept and now comprise the Public Library Network. Fargo has decided not to continue its involvement because of scheduling difficulties with the room in which the ETN jack is located. The Public Libraries have been recieving library continuing education from Wisconsin.[4] To date eleven programs have been offered with eighty librarians attending. Plans call for the State Librarians and Public Librarians to begin to offer programming originating from North Dakota.

Legal continuing education programming is planned for the spring and a number of other groups have begun to discuss the possibilities of providing continuing education in different professions so that we may be offering a broad range of programming similar to Wisconsin but on a smaller scale.

Programs Offered Over the Network

The Educational Telephone Network staff has done research on the administrative meetings and has published its findings in a booklet entitled, "Conducting Committee Meetings Via The Educational Telephone Network." The booklet was

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[4] Interview with Thomas Jones, Public Librarian, Veterans Memorial Public Library, Bismarck, North Dakota, October, 1980.

developed with the help of the Office of Medical Education and Evaluation of the Medical School. This information is provided to each meeting chairman whose meeting is to be held over the Educational Telephone Network.

A fee schedule is established to assist in funding the ETN. The schedule is divided into two service charges. The first charge is for line usage. The line usage charge funds the dedicated telephone lines between cities and is billed to all those using the Network, i.e., both for meetings and programs. The line charge is $100 for three hours used. The second service charge is billed to only those using the Network for programming. The programming charge represents staff time and is divided into two categories. The first category is for those clients who will be using the Network for the first time. The staff must work closely with these instructors to explain the advantages and disadvantages of the medium and then how their program can be designed to best use the medium. The charge for the service is $500. the second category of clients have used the Network for programming and feel confident enough to design their own program for delivery over the Network. In this instance the Educational Telephone Network staff provides guidance and assistance to the client. The second category fee is $100. A meeting, therefore, would cost the client $100 for those hours. A program would cost the client the basic line fee of $100 plus either a category one fee of $500 or a category

two fee of $100. The highest fee for programming would, therefore, be $600 and the lowest $200. In addition, there is the cost of handout materials, slides, registration fees, long distance telephone calls for bridging outside speakers to the dedicated system, etc.

Kellogg Bridge

The growth in use of the Educational Telephone Network by health professions has caused a number of smaller hospitals, which are currently not served by ETN jack locations, to request access to the Network. The limitation of accessibility to groups outside the health professions to the public libraries because of scheduling difficulties with the rooms has presented a demand for some other approach to additiona sites and/or technology. In addition to the access problem is the fact that a broad range of programming is being planned for in terms of state agencies and other professional organizations for ETN. This required that the Division seek a new technology to meet these developments which were economical and could be integrated with the existing Network.

Research was conducted to ascertain what new technology was available to meet the requirements of accessibility and compatibility. The "Kellogg Bridge" was identified as a potential solution to this problem. The "Kellogg Bridge" is named after the Kellogg Coal Company of Denver, Colorado, which had a prototype built for its use in organizational

meetings. The concept was so well received by others in Denver that the Kellogg Coal Company contracted with an engineering firm to design a high technology bridging mechanism. By installing this bridge the North Dakota Network would be taking another step in emulating Wisconsin's history of development, in that they discovered the need for a "meet-me-bridge" because of the same demands. The Kellogg Bridge allows for telephones located anyplace in the state, region, nation or world to dial a number in Grand Forks and then be bridged together with others dialing that number at that specified time.

As indicated earlier in the history section of this paper it is important for an intercom type of instrument to be used to eliminate unnecessary background noise on the line. For example, if the speaker is talking and there are a number of open microphones throughout the system, not only would you hear the speaker, but you would also hear any kind of discussion, noises in the rooms, etc. emanating from the sites participating in the meeting. Therefore, continued research was required in identifying a piece of equipment using the two-wire telephone jack as opposed to the four-wire dedicated system jack. It was discovered that the telephone companies 50-A was antiquated in its design. Further research found that there existed a "Precision 50-B" piece of gear which updated the telephone companies 50-A and provided all the necessary capabilities. The current

status of the Kellogg is that the Division is negotiating with the company in leasing an installation. The Division has already notified hospitals throughout the State regarding this new development. Of the fifty-one hospitals in the State, currently nineteen of those hospitals ar served by the Educational Telephone Network dedicated line, twenty additional hospitals have indicated their interest in participating in ETN using the Kellogg Bridge technology.

The flexibility of the Kellogg Bridge will allow any user to gain access to teleconferencing. This should bring telecommunications in the form of the telephone, telelecture, teleconferencing into the use of those outside the health profession who have expressed interest.

The experiences in the growth of the ETN, as well as plans for its future, require that its advantages be studied and compared to traditional means of instruction. In a state as large as North Dakota and as sparsely populated, methods of bringing instruction to students located in remote locations in an effective cost economic manner must be pursued.

Statement of Hypothesis

The following hypothesis were developed to serve as guides to the collection and analysis of the data: (1) There is little or no difference in student learning via the medium or face-to-face instruction; (2) The Educational Telephone Network has a positive cost advantage when compared to face-

to-face continuing education programs located in a single site in North Dakota. The hypothesis address the problems stated earlier in this paper.

Scope and Procedures

To study the hypotheses and reach a conclusion a number of data gathering techniques are used. They include a case history; a survey questionnaire; a review of the literature with study on experimental and control designs; an ETN program questionnaire which is used to gather input on the technical quality of the program and the subjective opinion of participants, regarding the use of that program in their careers and whether it was a valuable learning experience. Data regarding the subjective opinion of participants will be gathered and presented to indicate in North Dakota whether the Educational Telephone Network is meeting the needs of continuing education in the health professions.

A survey questionnaire has been designed to gather information on the costs of health professional travel from their home site to a central site in North Dakota to attend a continuing education program. This includes average estimates of salary, travel costs, lodging, registration fees, etc. for physicians, nurses, physical therapists and medical technologists. This information will be compared to information gathered on the costs for an individual to attend an Educational Telephone Network program.

The experimental control evaluation design is reviewed in the literature to indicate whether face-to-face instruction can compare favorably with the Educational Telephone Network programs.

The scope of study will include programs on the North Dakota Educational Telephone Network during the last three years. It will involve health professionals subjective opinion of the medium and how it met their continuing education needs. The experimental and control groups in the literature will come from a number of different subject areas which will provide a wider view of ETN's ability to teach as compared to face-to-face instruction.

The primary limitation in this study is funding. If more dollars were available more effort would have been made to gather objective information about the Educational Telephone Network here in North Dakota with experimental/ control design.

CHAPTER III

REVIEW OF LITERATURE

Literature was reviewed to learn what research as well as experiences have been written regarding the use of remote telelecturing and teleconferencing. Articles were found which described the use of teleconferencing which provided subjective evaluations and which provided objective evaluations.

The University of Wisconsin's University Extension English Department began using telelecturing as a delivery system for inservice education on a statewide basis. Each program had participants of approximately eighty teachers at some twenty schools. The presentation was done by a panel of between four and six teachers and lasted between one and one-half hours. The panel presented their information for the first half of the time period. A five minute break was held and then anonymous questions were allowed from any of the twenty sites. This program took place one evening each month. Findings allow one to conclude that teachers in small isolated communities appreciated the workshops most and that the programs design and delivery promoted a free exchange of ideas. The fact that some of the panel members were "bridged" into the system allowed for the guests of English education, etc. to participate in

in the discussions. A one and one-half hour period was found to be a comfortable amount of time for participants and was enough to insure stimulated discussion of issues. To date a similar program is carried out in Wisconsin.[1]

In July, 1963, Moses Hadas, the head of Columbia's Department of Greek and Latin delivered eighteen lectures on "Greek Ideas in Antiquity" to four southern Negro colleges. A total of 500 students participated in this telelecture series which was originated from Dr. Hadas desk in New York to the four college locations. Dr. Hadas said of his experience, "I don't think this is any different from putting 500 people in one room and talking to them through loud speakers. After the lecture the equipment was left on so that we could get an idea of student's reactions. They didn't know that we were listening so they weren't bound by rules of politeness. They heard the lecture clearly and seemed to profit from it."[2]

The Director of Audiovisual Services in Dover's school system in 1969 decided to use telelecture to bring famous authors and personalities to the student via the telephone. The different groups participating in the Dover telelecture program included a ninth grade English class, an entire

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[1]George Hartung, "Something Different in Inservice Education."

[2]Ciel Christiana, "Long Distance Lectures." New York State Education 50 (2), Nov. 1963.

class of high school juniors, Dover Junior Womens Club and other groups able to have a sponsor who would work with the telelecture program staff in developing a program. The first program offered was by Mel Tumin of Princeton University who had written a number of articles on American education. The articles primarily were on non-grading and college entrance requirements. Participants were required to read these articles and then at the time of the telelecture were able to listen to Mel Tumin present an overview and then ask questions specifically regarding his views. The first presentation received favorable comments by the students so the program was continued. The next program had Jesse Stuart at his home in Greenup, Kentucky, speak with a ninth grade English class. Another example of the program was Pete Seeger who spoke regarding ecology and pollution on the Hudson River. On yet another program, Pearl Buck addressed a class of high school juniors. Included in all of the classes were those students who for one reason or another were at home. Through a period of time a resource file of individuals willing to present information was developed by the audiovisual director. While the end results of this entire project are primarily subjective, one specific example was given in the article in which a business law teacher instructed her pupils on cases in insurance and taxes and found that on a previous telelecture, the correct responses

from responses from students were between 70 and 80 percent.[3] This is a similar grading span to other experiences on face-to-face learning experiences.[4]

George N. Hartje decided to use telelecture at the Graduate School of Library and Information Science at the University of Missouri-Columbia during the summer of 1972. He contacted Albert P. Marshall, Director of Libraries at Eastern Michigan University to see if he would be willing to participate as a guest lecturer in Hartje's graduate course, Library Science 433. Marshall indicated that he would and after a number of discussions over the telephone, Marshall prepared a set-up of transparencies and related slides and sent them to Hartje. Hartje asked his students in Library Science 433 to prepare one question for Mr. Marshall's consideration. Mr. Marshall forwarded a biography of his educational work and experience to the students and then at a given time and place made a telephone call from Eastern Michigan to the University of Missouri at Columbia. The formal presentation using the transparencies and slides were made by Marshall and then he answered the classes prepared questions and participated in a follow-up discussion. Students found the experience to be useful and the information

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[3]Donald Kruck and Arnold D. Tversky, "Classroom Communication: Telelecture:" Audiovisual Instruction, February, 1971.

[4]Ibid., pp. 21-22.

gained helpful in fulfilling the requirements for Library Science 433. Marshall stated that this experience does prove that with imagination, energy, help in planning, instructors of Library Science can utilize new media in various learning resource situations just as effectively as other disciplines in higher education.[5]

A graduate course entitled, New Perspectives in Home Economics and its Teaching was taught using telelecture to fourteen full-time home economics teachers. A second group of nine students were taught at the same time in the same course on the Wisconsin campus. The pre-test and post-test were designed for both groups to assess the students changes in points of view, insights and awareness of ideas relating to the teaching of home economics. The following table, (Table II) shows the kinds of levels attained in discussions. This was based on audiotaping of both the experimental and control.

The students participation results, indicated by comments, established learning predominantly in the comprehension level to the instructor. As the course progressed students attitudes became less negative towards the mechanical media used in the experimental group. However, there was comment regarding the missing of the physical presence of the instructor in the room which was expressed more strongly by some students than others.

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[5]George N. Hartje, "Utilizing Telelecture in Teaching" International Journal of Instructional Media, 1 (3), Spring, 1974, pp. 219-225.

TABLE II

Cognitive levels attained in discussions*

	Experimental Group (N = 14)		Control Group (N = 9)	
	Total Comments	Percent**	Total Comments	Percent**
Knowledge	116	23	132	20
Comprehension	370	73	514	76
Application	5	1	18	3
Analysis	12	2	14	2
Synthesis	0	0	0	0
Evaluation	0	0	2	0
Total	503	99	680	101

*Unidentified responses not included
**Rounded to nearest percent

The instructors felt that the experimental group reached a higher achievement level than did the control group although student response and participation were rated higher in the control group. In summary then both tests gave evidence that both groups gave less attention to the mechanical aspects of the situtation and increased their awareness as the course progressed. The post-test showed a growth in the comprehension of the students towards the importance of positive roles for teachers and pupils. Specifically it showed that the teacher should be an activator of learning and the students should be active initiators in learning rather than passive receivers. The final evaluation by the students of the system, indicated more positive comments than negative comments. In the view of the instructors the telephone mechanism provided learning equal to the face-to-face method with the reservation of desire for instructor presence.[6]

Ewbank and Baker in an article entitled, "Tele-Lecture or Traditional Lecture" addressed two important questions. One, the recall of information and two, the audience attitude towards message media. An experimental lecture was designed in which the speaker presented his 39 minute lecture from a manuscript using the telelecture approach, then the experimental group hear the same talk by the same person in the

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[6]Elizabeth Monts and Bernadine H. Peterson, "Graduate Teaching by Telephone and Radio." Journal of Home Economics, Vol. 61, No. 6, June, 1969, pp. 443-446.

same room representing the face-to-face lecture approach. Results of the recall test indicate that the telelecture audience did not differ significantly from the traditional lecture audience. The attitude of the telelecture audience did not differ significantly from the traditional lecture audience in its expressed attitude towards interest level or in the amount of new information in the message. Members of the telelecture audience, however, thought they could learn more from a traditional lecture. And those who had attended a traditional lecture did not believe they would learn more from a telelecture presentation. The audience then gave evidence of more faith in the traditional lecture than in the unfamiliar telelecture. However, there was no significant differences in the information gained in comparison with the two methodologies.[7]

The School of Pharmacy at the University of Wisconsin identified a need for more education about venereal diseases. To meet this need it presented a course entitled, Venereal Disease and Society. The course consisted of five two-hour sessions presented on Thursday evenings from October 14 to November 11, 1971. Each session consisted of a one hour discussion period. The course enrolled 168 participants. All the participants were sent a pre-test prior to the first lecture and a post-test one week after completion of the

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[7]H. L. Ewbank and E. E. Baker, "Tele-Lecture or Traditional Lecture?" Journal of Cooperative Extention, Spring 1968, pp. 46-51.

course. The information gained from the post-test was that all the participants gained in knowledge regarding venereal disease. What remained in question was whether they would be willing to pass this information on to others. A questionnaire was mailed six months after the end of the course and it was found that based on information from the pre-test only, 46% of the learners had tried to give information about venereal disease to others prior to the course, while after the course some 97% of the participants were providing information regarding venereal disease. The author felt that even though 168 people had participated, the number of individuals benefitting from their participation went well beyond that number.[8]

Harold Rubin writes an article entitled, "Telephone Network Courses" how Stephens College offered a semester of lectures by famous authors. The lectures were held at 11:00 on Monday, Wednesday and Friday of each week with Wednesday being the on-campus lecture for each of the six colleges participating. The speakers included John Dos Passos, the author of "Midcentury," poet/critic Horace Gregory, Arthur Mizener who spoke on F. Scott Fitzgerald's "Tender is the Night" and a number of other distinguished lecturers. The course also involved diverse personalities and topics which included John Kenneth Galbraith, Ralph Bunche, David

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[8]J. E. DeMuth, J. R. Arndt and M. H. Weinswig, "Attempt to Initiate Community Action Programmes in Venereal Disease in the United States of America." British Journal of Venereal Diseases, 50, April 1974, pp. 151-159.

Riesman and Glenn Seaborg who was a co-winner of a Nobel Prize in Chemistry and then Chairman of the U.S. Atomic Energy Commission. At the end of the lecture series, President Smith of Stephens College stated, "Our experience has proved telephone conference calls to be an economical way of bringing on campus otherwise unattainable resource persons. The price of a long distance telephone conversation between a class and a person in Washington, Los Angeles, Stockholm or Tokyo is obviously modest compared to the cost of bringing the same lecturer to campus to talk face-to-face with students."[9] Dr. Alvin C. Eurich, Vice President for the Fund for the Advancement of Education stated that such a technique makes available some of the finest teaching personnel to institutions which would normally be limited in attracting to their campus such distinguished leadership.[10] The lecture series designers felt very positive about this Stephens experience and went on to develop the Network.[11]

In an article entitled, "...Is Empathy Ear-to-Ear or Face-to-Face" the interesting question of whether a face-to-face relationship is required to counsel or with the growing emergence of telephone crisis centers and rap centers would

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[9]Harold Rubin, "Telephone Network Courses." Educational Screen and Audiovisual Guide, 43, March 1964, p. 136.

[10]Ibid.

[11]Ibid, pp. 126-136.

ditory relationships be as effective in counseling. The udy involves seven trained and eight untrained counselors o volunteered to counsel three co-eds under three different nditions, face-to-face, in confessional type arrangements, d by telephone. The trained counselors were all but disser- tion doctoral students at the University of Wisconsin-Madison. e untrained counselors were students enrolled in an intro- ctory guidance class. The three counselees were junior udents at the University of Wisconsin. The counselees were present their problems in the same way to each counselor d then respond in any way they chose. The counselees were id for their services. The sessions were taped, then given master level graduate students in the Department of Coun- ling and Guidance who rated those tapes on the basis of two atements from a counselor and two from counselees in the ree separate experiences. The results were measured by the nners one-way or analysis of variance repeated measures.

TABLE III

Counselor Groups

nditions	Total (N = 15)	Trained (N = 7)	Untrained (N = 8)	t
lephone	1.74	2.24	1.29	7.85*
ce-to-Face	1.59	1.88	2.33	3.19*
nfessional	1.74	2.15	1.38	3.79

SOURCE: David Austin. "ITV, Telephone, and Computer Instructional System-A Feasibility Study," AV Communi- ion Review, 21 (4), Winter 1973, p. 190.

gnificant at the .01 level

auditory relationships be as effective in counseling. The study involves seven trained and eight untrained counselors who volunteered to counsel three co-eds under three different conditions, face-to-face, in confessional type arrangements, and by telephone. The trained counselors were all but dissertation doctoral students at the University of Wisconsin-Madison. The untrained counselors were students enrolled in an introductory guidance class. The three counselees were junior students at the University of Wisconsin. The counselees were to present their problems in the same way to each counselor and then respond in any way they chose. The counselees were paid for their services. The sessions were taped, then given to master level graduate students in the Department of Counseling and Guidance who rated those tapes on the basis of two statements from a counselor and two from counselees in the three separate experiences. The results were measured by the winners one-way or analysis of variance repeated measures.

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*Significant at the .01 level

The F ratios were close enough that they were not statistically significant enough to indicate any difference in the face-to-face, telephone or confessional type counseling. However, six of the seven trained counselors received lower empathy ratings face-to-face than over the telephone. The results further indicate that a conclusion could be drawn that telephone counseling could be done over the telephone. The voice, therefore is a powerful tool, in which if properly utilized, can bring much to an instructional experience as exemplified by this study of counseling situations.[12]

An article entitled, "Telelecture Experiment in Remote Teaching" described an extension service of the University of Missouri, which had grown to the point where faculty members were spending more time on the highways than in the classroom. It was decided that another method must be used and since the State of Missouri had some experience with the telelecturing method, that mode of instruction was chosen. The study involved the question of whether or not remote teaching can produce results comparable with those observed on campus following the traditional lecture methods. Three classes of introductory psychology were involved in the experiment. One group received the traditional lecture on the home campus. The second group, also on the home campus, received a live lecture but were joined by a third group located in a remote

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[12] Ibid, pp. 188-191.

classroom using telelecture telephone technology. Comparison between the first group and the second group allowed the experiment to assess the effects of the hardware in a transmission of class material. The first and second group were compared to the remote teaching group to see if the material was received. A senior undergraduate student served as a teaching assistant at the remote classroom. His job was to do the typical classroom administration requirements while at the same time observe and report conditions of the classroom during the lecture period. A pre-test and post-test were administered to all groups involved. The pre-test indicated that there were no significant differences in content knowledge among the groups. Post-test showed no differnces among groups after the training. The evaluation also indicated that there were no overall differences in student attitude toward content or the presentation characteristics. Therefore the findings were that the remote teaching technique may be a valid aid to teaching and it certainly indicated that it was an economical vehicle for educating adults in remote areas of the state.[13]

Ellen Blackwood wrote a masters thesis on the "Comparison of the Effectiveness of Face-to-Face and Remote Teaching and Communicating Educational Information to Adults." The purpose of the thesis was to determine the effectiveness of face-to-

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[13] J. J. Boswell, D. W. Mocker and W. C. Hamlin, "Tele-Lecture: An Experiment in Remote Teaching." Adult Leadership, 16 (9), March 1968, pp. 321-322.

face and remote teaching in communicating educational information to adults by immediate recall of information presented. A hypothesis indicated that, "There is no difference in the amount of learning which takes place when educational information is presented to adult audiences by means of face-to-face and remote teaching techniques."[14] The remote teaching technique was the use of the telelecture technique. The areas studied were agricultural production, the management of natural resources, marketing, farm products, home economics, resource development, and public affairs. 250 students were involved in the classes studied while a total to 7,503 students utilized the telelecture technique for their education in 1967 in Kansas. The study involved both pre-test and post-test on each day of the study. The concerns which have continually been found during this review of literature were that there was a feeling that the attitude of people towards traditional methodology might make them not want to try it. They feel that they might not learn more by the telephone lecture; and that the rapport involved between the instrcutor and the students by facial expression would be lost. The disadvantages remained throughout her experience. The hypothesis which stated there was no difference in the amount of learning face-to-face and remote was found to be true. The following table indicates the scores.

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[14] Helen H. Blackwood, "A Comparison of the Effectiveness of Face-to-Face and Remote Teaching in Communicating Educational Information to Adults." (A Master's Thesis, Kansas State University, 1969, p. 4.

TABLE IV

Mean Score Data

	Remote	Face-to-Face	Combined Techniques
Age	4.783	4.676	4.732
Education	3.027	3.352	3.183
Time	1.459	1.470	1.464
Pre-test score	28.108	29.705	28.873
Post-test score	55.405	57.058	56.197
Difference	27.297	27.352	27.323
Attitude	3.353	3.334	3.344

The implications of the study were that there were no differences between face-to-face and remote learning and that remote learning can be used as effectively as the traditional method. The recommendations included a call for continuious investigation of this comparison of face-to-face to remote and also the cost difference between face-to-face and remote.[15]

The literature provided the basis for a study of the ETN programming in North Dakota. A questionaire was designed which sought information about the ETN delivery system acceptance in terms of programs and the media itself.

[15]Ibid, pp. 33-34.

1. Rate the speaker's presentation of the subject matter:

199	Excellent
349	Good
109	Average
16	Poor
4	Very Poor
0	No Answer

2. Information is of immediate usefulness:

133	Excellent
337	Good
220	Average
36	Poor
2	Very Poor
0	No Answer

3. Scope of coverage was:

230	Excellent
403	Good
97	Average
2	Poor
0	Very Poor
0	No Answer

4. Opportunity for participant involvement:

186	Excellent
127	Good
38	Average
3	Poor
73	Very Poor
0	No Answer

5. Quality of illustrative materials (slides, handouts, etc.):

142	Excellent
325	Good
139	Average
14	Poor
6	Very Poor
0	No Answer

6. Rate the organization of the program:

202	Excellent
503	Good
126	Average
7	Poor
1	Very Poor
0	No Answer

7. ETN location--few outside distractions, lighting, room temperature, seating arrangement, acoustics, etc.:

164	Excellent
194	Good
67	Average
12	Poor
5	Very Poor
0	No Answer

8. Quality of sound recieved over the ETN:

152	Excellent
179	Good
83	Average
23	Poor
5	Very Poor
0	No Answer

9. Rate the discussion period:

29	Excellent
125	Good
53	Average
4	Poor
2	Very Poor
0	No Answer

10. Overall reaction:

112	Excellent
224	Good
329	Average
29	Poor
4	Very Poor
0	No Answer

11. After learning how, I felt at ease conversing with my colleagues at other listening locations:

12	Strongly Agree
57	Agree
1	Disagree
0	Strongly Disagree
33	No Opinion
51	No Answer

of special note are numbers two, "the information is of immediate usefulness," three, "the scope of coverage," and four, "the opportunity for participation." The positive response given on those specific topical areas indicate an acceptance of the Educational Telephone Network by the participants.

The evaluation allowed for written comments to be made in response to strengths, weaknesses, improvements and general comments. The original evaluation instrument and comments are included in the appendix. In all, after one reads the comments, it is apparent that the design of the program is all important. As described earlier in this paper, by the proper instructional design and inclusion of teletechniques the program is greatly improved.

This response indicated a positive view of the programming and medium as an effective means of reaching students throughout the State. A cost comparison between a traditional conference or workshop and one offered over ETN would further establish the economy of the medium.

Survey of Costs

To test the second hypothesis involving the cost advantage of ETN when compared to a traditional one site conference, a telephone survey was conducted in October, 1980. The survey contacted specific health professionals in medicine, nursing,

medical technology and physical therapy and were located at both University and hospital institutions. Of the fifteen people contacted the following averages were established for mileage reimbursement, food cost and one night lodging since the average length of stay for any conference located in the state was two days and one night. The Nursing cost was 17½¢ per mile, allowed $22.50 for lodging and $14.50 for food per day. Physicians received 25¢ per mile, $20.00 for food and $25.00 for lodging. Medical technologists received 20¢ per mile, $15.00 for food and $20.00 for lodging. Physical therapists received 20¢ per mile, $18.00 a day for food and an average of $30.00 per night for lodging. These costs are for the base line period of October 1980.

To gain an estimate of the cost for a statewide conference for physicians, nurses, physical therapists or medical technologists a single city was identified as the conference city and then a number of individuals were identified as coming from different cities throughout the State to that central location. Bismarck was chosen as the central location since it is often used as a site for statewide conferences.

To obtain an estimate of mileage, since the other costs are fixed, a number of cities were chosen which currently have Educational Telephone Network link-ups and a number of individuals attending from each site were assigned based on what experience indicated would attend a meeting in Bismarck. The following map shows the locations of the cities chosen, round

trip mileage to Bismarck and back and the number of attendees from each location. The mileage was multiplied by the cost per mile, the nights lodging and the number of dollars for food per day.

This sample would only reflect the cost of a conference attended by 25 people. Additional costs would be involved in travel with more conference attendees.

TABLE V

Survey of Travel Costs

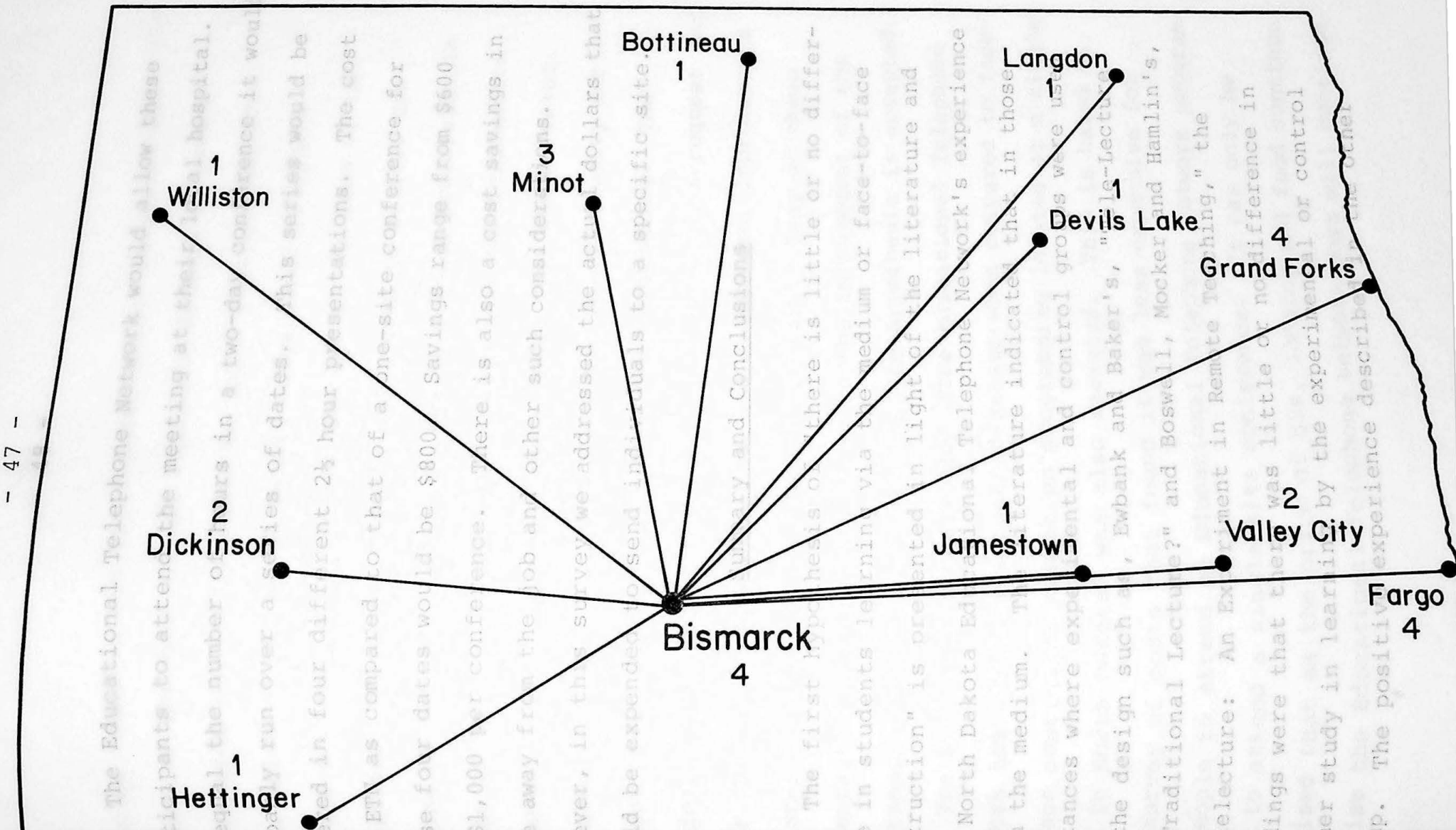
City	Number Attending	COST FOR: MDs*	Nurses	MTs**	PTs***
Williston	1	$101.25	$76.38	$80.00	$95.00
Minot	3	$218.25	$169.29	$171.60	$216.60
Bottineau	1	$92.50	$70.25	$73.00	$88.00
Langdon	1	$107.00	$80.40	$84.60	$99.60
Devils Lake	1	$89.75	$68.33	$70.80	$85.80
Grand Forks	4	$430.00	$323.00	$340.00	$400.00
Fargo	4	$373.00	$283.12	$294.40	$354.40
Jamestown	2	$141.00	$109.70	$110.80	$70.40
Valley City	1	$78.25	$60.28	$61.60	$153.20
Hettinger	1	$116.50	$62.03	$63.60	$78.60
Dickinson	2	$139.50	$108.66	$149.20	$159.60
Bismarck	4	-0-	-0-	-0-	-0-
TOTAL	25	$1887.00	$1411.44	$1499.60	$1801.20

*Medical Doctors

**Medical Technologists

***Physical Therapists

1979- Official Highway Map
Mileage Chart



Williston – 225
Hettinger – 143
Dickinson – 99

Minot – 111
Bottineau – 190

Langdon – 248
Devils Lake – 179

Grand Forks – 250
Fargo – 193

Jamestown – 102
Valley City – 133

articles found in the literature further indicated the ability of the Educational Telephone Network to present information and for students to learn that information. Compilation of the North Dakota Educational Telephone Network programs give a clear support to the idea of the Educational Telephone Network being used to deliver continuing education programs to health science professionals in the state. Evaluations indicated that the information presented was of immediate usefulness, that the coverage was above average, and that there was an opportunity for student participation built into the programming. The participants written comments in a response to a request for their opinion of the strengths and weaknesses, improvements and other general thoughts were positive. Many of these comments have been incorporated in the improvement of the programming to date. Therefore, the hypothesis is accepted.

The second hypothesis that "the Educational Telephone Network has a positive cost advantage when compared to face-to-face continuing education programming located at a single site in North Dakota" was also accepted. This is based on the survey of costs that found it was less expensive for 25 people to attend an Educational Telephone Network program than to attend a single site conference. It can only be surmised that as the price of gas, lodging and food continue to rise the Educational Telephone Network cost will continue

to become more attractive. In addition, the more people who attend a conference via the Educational Telephone Network the more the actual savings over a single site conference.

CHAPTER V

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Conclusions

The telephone as used in a telelecture format, has provided education to remote locations since 1939. The literature indicates that where experimental and control designes were used to compare teleconferencing to face-to-face presentation there was little or no significant difference in the amount of learning which took place. The growth, since 1977, of the Educational Telephone Network in North Dakota has provided continuing education to physicians, medical technologists, laboratory technologists, nurses, physical therapists, radiology technologists, pharmacists and potentially will serve groups outside the health profession. The evaluation completed and compiled by the Division of Biomedical Communications involved eight Educational Telephone Network programs indicated a very positive opinion of the usefulness of the information in the programs, the participant participation and the medium itself.

The possibility of reaching more locations through the use of the Kellogg Bridge opens new areas of exploration for the Educational Telephone Network. It provides the technology

required to serve groups not located in hospitals and clinics throughout the State of North Dakota. The Public Library Network has provided some support for these new health related groups but has not been able to offer the flexibility needed to reach some students. The literature indicated that groups outside the health care professions have had positive experiences with teleconferencing and telelecturing.

Our survey of costs gave a clear indication that the Educational Telephone Network is a cost savings mechanism as conpared to the traditional statewide conference located at one site in the State.

Implications

Based on the findings of this study the writer feels the following implications can be stated: (1) The study showed there was no significant difference in the amount of learning which took place between face-to-face traditional lecturing and remote teaching techniques via teleconferencing and telelecture. Therefore, instructors should be encouraged to experiment with this method of communicating educational information to students. (2) Students can be reached via a remote teaching technique, such as the Educational Telephone Network, who are not easily accessible through traditional classroom instruction. Therefore, the Educational Telephone Network should be viewed as a positive alternative

in achieving accessibility for remote students. (3) The Educational Telephone Network, because of its nature as an "innovation" may offer the opportunity for experimental designs which included pre-test, post-tests, control and experimental groups. Not only would this be good for developing the medium but it would be of additional value to the teacher in learning improved ways of presenting information to students. (4) Because the teleconference is an audio medium those presenting over the medium should utilize the teletechniques in designing their programs. These teletechniques should involve planned participation, visuals such as slides, video tapes or handouts and clear directions on the role of presentors, moderators and participants.

Recommendations for Further Research

(1) An experimental control design study should be done using the North Dakota Educational Telephone Network and a traditional classroom. (2) A study should be made to upgrade the cost comparisons between the Educational Telephone Network and face-to-face lectures on a periodic basis. (3) A study should be made on the effectiveness of the telephone medium as compared to the television medium and other various remote lecture techniques which will evolve as technology evolves. (4) A pilot study should be established between designated sites and research done on the

effectiveness of the telephone medium for educational purposes at these sites as well as the cost of delivering that education to the sites.

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