A Model for Utilizing Educational Television for Higher Education.

Edward S. Basanez
Louisiana State University and Agricultural & Mechanical College

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A MODEL FOR UTILIZING EDUCATIONAL TELEVISION FOR HIGHER EDUCATION

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in

The Department of Extension and
International Education

by

Edward S. Basanez
B.S., Louisiana State University, 1951
M.B.A., Syracuse University, 1962
May, 1978
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ABSTRACT

Purpose of the Study

The study purpose was answering three fundamental questions about the potential of statewide telecommunications to extend higher education. These questions were:

1. How can telecommunications be employed on a statewide basis to reach people with non-traditional higher education?

2. What is the optimal organizational model to administer a statewide program?

3. What are the fundamental considerations for effective operation of the program?

Objectives of the Study

Major objectives were:

1. To review the literature concerning television for off-campus higher education.

2. To study the Colorado videotape, South Carolina ETV and Indiana educational telecommunication systems by structured observations, interviews, and records examination.

3. To synthesize a functional components model to assist in design of statewide educational telecommunication systems.

Procedure

Evaluation research was performed of Colorado,
South Carolina, and Indiana educational telecommunication systems during period October 24, 1977, through January 10, 1978. On-site visits of two or more days were made to each location to observe operations, interview key officials, and examine records. Also, university and industrial uses of the system were observed and users interviewed.

Observations were structured and interviews systematized by using a functional components format derived from the literature review. The format comprised: general administration, academic administration, delivery system, and curriculum functions and subsidiary subfunctions.

Findings

Evaluation research resulted in these findings:

1. Colorado State University applied videotaped instruction in on-campus classes to offer graduate degree programs in business administration and eight engineering areas to 42 in- and out-of-state locations; to broaden and enrich community and junior college curricula; and, to provide college courses to teachers and advanced students of secondary schools. Over 500 videotapes were shipped weekly.

2. The South Carolina ETV Network combined an open circuit and closed circuit networks of leased microwave facilities to distribute programming to all state educational levels. Approximately 30 percent of the broadcast day was used to deliver 69 college credit courses, including
graduate degree programs in business administration and engineering to businessmen, engineers, teachers, and other adult students at 18 regional campuses and for open circuit programs, their homes. The University of South Carolina provided most instruction by cablecasting on-campus classes live to regional classrooms. "Talkback" telephone enabled students to participate both visually and vocally in cablecasted instruction.

3. Indiana's system consisted of a consortium of universities and a professional staff which operated video, telephone, radio, and conference networks. Linked by leased microwave facilities, the video network transmitted intra- and interinstitutional courses from four state universities and medical center to 41 campuses and 37 hospitals in the state. CATV and ITFS facilitated intra-city terminal distribution. "Talkback" telephone and terminal videotaping were other features.

Conclusions

Interpretations drawn from the findings were:

1. Each system offers an effective incorporation of educational telecommunications to extend non-traditional higher education statewide.

2. Videotaped instruction is economical, independent, and convenient. Coordination of interinstitutional programming is difficult; student/teacher interaction is nil; course applications are limited; and, the receiver
must possess a videotape player.

3. ETV network reaches mass audiences, is simple to coordinate and can be connected with "talkback." Heavy capital and operational outlays and dependence on interconnecting facilities are disadvantages.

4. Without resource parameters, an optimal organizational model is an abstraction.

5. Consortium of higher education institutions effectuates fully coordinated statewide educational programming.

6. Public and academic commitment are imperative.

7. The functional components format with modification can be used as model of considerations for designing statewide systems.

**Functional Components Model**

1. Need assessment

2. General administration
   a. Coordinating administrative agency and responsibilities
   b. Staffing and financial management

3. Academic administration
   a. Admission and registration
   b. Degrees, credits and certificates
   c. Instruction

4. Delivery system

5. Curriculum/course development
CHAPTER 1

THE PROBLEM AND ITS SETTING

STATEMENT OF THE PROBLEM

The home television set offers a ubiquitous dimension for extending the college campus in the lifelong learning process. Three out of four adults, as determined in a 1972 survey by the educational testing service, expressed an interest in engaging in further learning.¹ Television in their homes, which has a greater informational impact on their daily lives than any other medium, could provide an educational interface for those people inadequately served by the traditional higher education system. Principal beneficiaries include the aged, the handicapped, the retired, prisoners, members of the armed forces, and other people whose jobs, family responsibilities or remoteness preclude coming to the college campus.

This study deals with the following basic questions: How can telecommunications be employed on a statewide basis to meet the non-traditional higher education needs of the population? What is the optimal organizational model to

administer a statewide higher education program using television? And, what are the fundamental considerations for effective operation of the program?

To answer the questions, this research proposed: first, to study and describe three functioning state higher education systems that extensively employ television and feature different aspects of telecommunications in their programs; and second, to synthesize an organizational model and operational considerations for a statewide higher education television system. The videotape program in Colorado, cable television in Indiana and public educational broadcasting in South Carolina presented different emphases of telecommunications in the off-campus programs of three reputable statewide higher education television systems.

THE STUDY OBJECTIVES

1. The first objective was to review the literature concerning the use of educational television for higher education and educational telecommunication systems.

2. The second objective was to examine and describe, in detail, the organizational and operational characteristics of the statewide higher educational television systems at Colorado State University, in Indiana, and in South Carolina by on-site visits and interviews.

3. The third objective was to synthesize an organizational model and to develop procedures for the administration,
coordination, and implementation of a higher education system which employs educational television by assessment of the ongoing statewide higher educational television systems in Colorado, Indiana, and South Carolina.

THE DELIMITATIONS

1. To remain manageable, the study did not examine and describe all extant statewide higher educational television systems, and the sample is purposive.

2. The study did not deal with the use of closed-circuit television for on-campus higher education purposes, as the primary interest is off-campus adult education through open-circuit broadcasting.

3. The study did not examine and describe the productive educational television programs which are being conducted by community colleges, e.g., Chicago TV College, Miami-Dade Community College, or Coastline Community College of California, which are essentially programs for local urban audiences.

DEFINITION OF TERMS

Closed-Circuit Television (CCTV)

For the purpose of this study, closed-circuit television is a television delivery system in which the originated signal must be carried by cable, microwave relay, or video cassette or reel tape recording from the originating point directly to the intended reception points. Closed-circuit
systems do not require use of a television channel nor is an operating license necessary.

**Community Antenna Television or Cable Television (CATV)**

Community antenna television or cable television is a private subscription television system which refers to the transmission of television signals by coaxial cable from a single entry point to a home or office; an installation and monthly fee is charged by the CATV companies for the service. CATV companies may or may not have a limited production capability.

**Educational Television (ETV)**

Educational television is a generic term which encompasses instructional television and cultural-informational television programs.

**Instructional Television (ITV)**

Instructional television refers to educational materials which are presented on television receivers or monitors to organized classes, regardless of grade level or physical location. ITV may be broadcast in any form; it can be distributed by open-circuit broadcasts, closed-circuit television, or video cassette or reel tape recording.

**Instructional Television Fixed Service (ITFS)**

ITFS is a television delivery system which was authorized by the Federal Communications Commission in July, 1963, and provides for fixed-service transmission between 2500 and
2690 megahertz. There are 31 channels within the range open for educational institutions and other institutions. To receive the limited ITFS signal power requires point-to-point transmission to a special receiving antenna and down-converter.

**Off-Campus Higher Education Programs**

For the purposes of this study, off-campus higher education programs consist of any post-secondary instructional activity which is conducted predominantly off-campus. The definition includes credit or non-credit continuing education courses and community service courses.

**Public Broadcasting Service (PBS)**

The Public Broadcasting Service is a nationwide interconnected program service for noncommercial television stations which was established by the Public Broadcasting Act of 1967 and the Corporation of Public Broadcasting. The service has the capability to provide programs on a 24-hour-a-day basis. Through long-line Bell System facilities, six regional networks are interconnected to provide the nationwide service.

**ASSUMPTIONS**

1. The first assumption was that the higher educational television systems of Colorado, Indiana, and South Carolina are representative of ongoing productive statewide systems of different operational frameworks.
2. The second assumption was that a study of three different statewide systems would provide an adequate basis for structuring an organizational model which could incorporate the essential characteristics of the varied systems.

3. The third assumption was that current "state of the art" electronics delivery systems will remain fundamentally unchanged in the next decade.

4. The fourth assumption was that usage of cable television will continue to increase in television homes.

THE IMPORTANCE OF THE STUDY

This study contributes to the available literature on statewide higher educational ITV systems. The diversity in functioning systems presents a predicament for administrators in choosing the optimum design of a statewide system. Available literature about existing state systems is too general in their structural and functional characteristics of ETV systems and too laudatory for useful appraisal in designing a state organizational model.

Using the experiences of ongoing productive statewide programs should enable the development of an organizational model with utility in states with embryonic continuing education television programs, such as Alabama, Georgia, Louisiana and Mississippi. By consolidating the planning considerations and operational factors of the Colorado,
Indiana and South Carolina systems and synthesizing an organizational model and associated procedures, a planning guide would be developed to enable policy makers to make more well-informed decisions in utilizing educational television and more specifically, to develop models appropriate for their particular locales and situations.
CHAPTER 2

THE REVIEW OF THE RELATED LITERATURE

THE NEED

To Extend Educational Opportunities

Television has the potential of becoming a natural resource for a state. Broadcasting has become an influential part of the daily life of people. As McCluhan pointed out, television has changed our sense-lives and our mental processes. By its stress on participation, dialogue, and depth, television can illustrate the interplay of process and the growth of structures of all kinds as nothing else can.\(^2\) The educational possibilities include empirical experiences, image magnification and the diffusion of ideas of outstanding teachers in the form of tactile learning experiences to large numbers of adult viewers.

Television makes possible a mass communication channel for extending educational opportunity for the segments of the population that are not adequately served by the higher education system. The principal beneficiaries are adults who for a variety of reasons are unable or do not desire to undergo conventional higher education instruction and who are potential candidates for college degrees.

The State University of New York Chancellor Ernest L. Boyer pointed out that an increase in life expectancy, reduction in the work week, rejection by young people of full-time education and a preference for part-work-part-study schedules necessitate overhauling the traditional concept of postsecondary learning as a "prework ritual" and viewing college as a resource for those from 18 to 85.\(^3\)

Samuel Gould, chairman of the Carnegie Commission for Non-Traditional Study, quantified the potential of adult education through television. The Commission's data revealed 79 million people who had reached the point where they had completed a high school education or equivalent and wanted more education. Yet, those people had never had an opportunity for themselves. The Commission also found 32 million had been involved over the past 12 months (1971) in evening classes, correspondence courses, extension courses, on-the-job training, private lessons, independent study, or television.\(^4\) Also, 16.9 percent (13.5 million) of the aspiring learners would like to pursue a degree, according to the Commission.\(^5\)

---


While prediction of the actual demand for higher education through television is obviously perilous, a possible indication may be drawn from an Educational Testing Service survey performed in 1972. They collected data from a nationwide random sample of nearly 2,000 adults, which was weighted for accurate representation. The following table presents their findings which reflected the interest in adult education by subject areas.

Table 1
Content of Learning Interests
Percent of Those Interested in Learning (United States, 1972)

<table>
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<th>Interest in topic</th>
<th>First Choice Interest in topic</th>
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<tr>
<td>Vocational education (business skills, engineering, education, law, trades, etc.)</td>
<td>78%</td>
</tr>
<tr>
<td>Hobbies and recreation (crafts, travel, arts, etc.)</td>
<td>63%</td>
</tr>
<tr>
<td>General education (humanities, languages, sciences, etc.)</td>
<td>48%</td>
</tr>
<tr>
<td>Home and family living</td>
<td>36%</td>
</tr>
<tr>
<td>Personal development (investment, physical fitness, public-speaking, etc.)</td>
<td>34%</td>
</tr>
<tr>
<td>Public affairs (consumerism, environment, current affairs, etc.)</td>
<td>34%</td>
</tr>
<tr>
<td>Religion</td>
<td>15%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>11%</td>
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In a survey conducted during the Spring, 1976, Basanez found non-existent to multifarious statewide higher educational television systems among 50 major universities. This represented the program status in every state, except Connecticut, Delaware, Kentucky, Mississippi, Montana, North Dakota, Rhode Island, South Dakota, and Utah whose state universities did not respond to the survey questionnaire. Considerable variations existed in administration of educational television programs, course offerings, curricula, and organization. Thirty-four of the reporting universities had credit-awarding programs conducted on educational television; only five reported degree-awarding programs.\(^7\)

Comprehensive educational television programs, to include production, are being conducted at the University of California at San Diego/San Diego State University, Colorado State University, University of Minnesota, University of Missouri, State University of Nebraska, Oklahoma State University, Purdue University, South Carolina University, University of Washington, and the University of Wisconsin. Some of the programs include courses in agriculture, business administration, education, engineering, humanities, physical sciences, and social sciences, all of the major academic areas.

\(^7\)Edward S. Basanez, "A Study of Higher Education Educational Television Programs of Comparable Universities to LSU" (unpublished research report, Louisiana State University, 1976.)
of the modern university.\textsuperscript{8}

Clearly, a statewide model for the administration of higher educational television programs needs to be developed and articulated in anticipation of the increasing number of statewide educational television networks.

To Prepare Adults for Change

Drastic changes have taken place in only a few decades in the demands that are made on human effort. The tools that man uses pursuing his various activities, the attitudes, the beliefs and the expectations of men, all have been altered or changed. Therefore, the task now confronting educators, who have a primary interest in the cultivation of the intellectual processes so that man can cope with the future, must be the most difficult in history. Newsom indicated that possibly a failure of educators to adequately accept the task is a significant factor in the recurrent charge that the present instructional program of our colleges is irrelevant to the needs of the age.\textsuperscript{9}

The necessity to prepare people for change was also strongly and eloquently advocated by Alvin Toffler. "Future shock" is what happens to people when they are overwhelmed by change. The rapid obsolescence of knowledge and extension of the human life span makes it clear that what was

---

\textsuperscript{8}Ibid.

learned during youth is unlikely to remain cogent when old age arrives. 10

Toffler also looked to education to create future consciousness. He suggested teaching history from the future backward or otherwise modifying our view of progress and social responsibility. 11

Ostensibly, the underlying purpose of education has always been to liberate people from the shackles of ignorance and frustration to further the search for truth, and to provide the aspirant with opportunities for a fuller use of their abilities. 12 Television with the capability to reach mass audiences presents the opportunity to offer a chance for learning to those who missed their first opportunity for a university education.

Television with the capability to reach mass audiences gives hope of redressing past educational wrongs: inadequate opportunity, inadequate learning materials, inadequate instructional systems, inadequate motivational processes, inadequate recognition of the teacher as a thinker and creator, and the burdensome concern of teachers and administrators with spirit-sapping trivia. Such humane considerations

are the ends of telecommunications usage. Achievement with the medium depends upon the ends for which it is employed.\textsuperscript{13}

But, as Edward R. Murrow once so succinctly stated about the essential ingredient to achieve the potential of television:

\begin{quote}
This instrument can teach, it can illuminate; yes, it can even inspire. But it can do so only to the extent that humans are determined to use it to those ends. Otherwise, it is merely lights and wires in a box.\textsuperscript{14}
\end{quote}

\section*{HISTORICAL PERSPECTIVE}

\textbf{Educational Television}

The earliest educational television station was established as an electrical engineering experimental station at the University of Iowa in 1932. It was of the scanning disc type rather than tube and transmitted more than 400 cultural and educational programs during the 1930's. After World War II, five educational institutions were seriously involved with television, and the University of Michigan and the American University were producing programs for commercial television. In February 1950, Iowa State University Initiated broadcasts from WOI-TV, the first


nonexperimental educationally owned, commercial television station in the world.\textsuperscript{15}

In April, 1952, the Federal Communications Commission allocated 242 channels for educational television stations; it was later increased to a total of 87 VHF and 178 UHF channels. The first educational noncommercial station was assigned to the University of Houston and the Houston Board of Education as station KUHT.\textsuperscript{16} The potential educational contribution of television was the main motivation for license applications. They believed that talented teachers could reach larger student populations through television, that enrichment of instruction was possible, and that the increases resulting from rising enrollments could be restrained. The primary justification was for classroom use.\textsuperscript{17}

By the beginning of 1976, there were 259 ETV transmitters which were operated by more than 150 licencees.\textsuperscript{18}

Once the channels were reserved, however, it was not


\textsuperscript{16}Ibid.

\textsuperscript{17}John W. Macy, Jr., \textit{To Irrigate a Wasteland} (Berkeley: University of California Press, 1974), p. 9.

educators that gave leadership. From the earliest efforts of bringing educational television into being, broadcasting values played the major role in setting policy for the medium. Persons with broadcast orientation convinced the Washington-based, professional education organizations to give their support to the reservation of television channels for "educational purposes." It was the Fund for Adult Education and cultural leaders in local communities who put ETV on the air. The educators that were involved were minimal. 19

The oldest continuing story of ITV higher education is that of Chicago TV College. Since its beginning in 1956 as a new approach for extending higher educational opportunity the junior college has blended into the educational scene of the Chicago metropolitan area. By the end of 1973, 150,000 individuals had enrolled in 86 televised courses either as credit or non-credit students. Eighty percent of the students completed the courses. About 2,200 students have earned an Associate of Arts degree from the City Colleges of Chicago, of which 20 percent received all of their credits through study entirely by television. 20


Technology has figured prominently in several countries' efforts to extend higher educational opportunities to people who in general could not afford to go to college because they had to devote full time to earning a living. Sweden, Australia, Japan and West Germany have instituted open university programs largely through radio, gradually they are complementing it with instruction by television.\(^{21}\)

Perhaps the most ambitious extramural higher education program is Great Britain's Open University, which offered some 24 courses to part-time students, 21 courses to part-time students, 21 years of age and older. Teaching by television and radio is an integral part of courses which also includes carefully prepared texts, use of 170 computer terminals, access to 280 study centers with instructional tutors throughout Great Britain and Northern Ireland, and a week in residence at the campus during the summer months. In 1971, the initial year, the Open University enrolled 25,000 students out of 42,000 applicants; 18,373 completed the course requirements.\(^{22}\) Since that start, attendance has averaged about 21,000 students per year for undergraduate courses and about 1,000 graduate students.

Instructional television has traversed numerous

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\(^{21}\) Mathematica, Inc., op. cit., pp. 4-12.

academic miles since its early arrival on the American educational scene. Besides Chicago TV College, the trail has covered many efforts by innovative educators and broadcasters alike, such as the first Western Reserve telecourse, the initial Carpenter-Greenhill CCTV research at Penn State University, the physics classes of Dr. Harvey White on NBC's "Continental Classroom," and CBS' comparable "Sunrise Semester" in the late 1950s.  

Perrin reported considerable evidence is available to indicate that ETV is having a significant impact. The advent of public television has been the single most important factor. Successful series like Sir Kenneth Clark's "Civilisation" and Jacob Bronowski's "Ascent of Man" have demonstrated the capability of television to enlarge the educational potentials of the medium.

During 1975, Carlisle criss-crossed the United States, looking at television usage in off-campus higher education at 11 different universities and colleges. This odyssey led him to Brigham Young University, Miami-Dade Community College, Concordia Teachers' College, Pennsylvania State University, Temple University, Michigan State University,


San Francisco State, San Diego State, Syracuse University, Indiana University and St. John's Seminary in New York. He found optimism and common dedication among the educators "to splicing the media into education's methods" and to reaching adult audiences. He reported sizeable cost-effective programs. Clearly, the Carlisle report and the survey made by this writer in 1976 suggest an increasing awareness and trend among universities and colleges to incorporate television delivery into their off-campus adult education programs.

Yet, an analytical look at the use of the medium for educational purposes, as suggested by McBride, a founder of the Nebraska educational television system, indicated that it has not fulfilled its sometimes too noisily pronounced promise and potential. American education has profited by instructional television. But, for all the investments of time, effort, resources and dollars at all educational levels, there have been too few qualified success stories.

Cable Television (CATV)

Cable television, which has been in use for the past 28 years, started as "community antenna TV" to provide television reception to communities isolated from TV

\[25\text{Robert D. B. Carlisle, Media and the Adult Student (Lincoln: Great Plains National Instructional Television Library, 1976), pp. 197-211.}\]

\[26\text{McBride, loc. cit.}\]
channels available to ordinary housetop antennae. The CATV operator put up a tall antenna on the highest ground, picked up the signals where possible, and fed them around the community by wire hook-up to the antenna terminals of subscriber's TV sets. Cable television has since spread from valleys to fringe areas, to rural towns and small cities, to parts of larger cities.  

In 1974, there were somewhat over 3,000 operating cable systems in the United States serving approximately 6,000 communities. Another 1,800 systems are approved but not yet constructed, and a similar number of communities have applications pending. The total number of subscribers has grown from 1.5 million in 1966 to almost 9 million in 1976, an increase of nearly 600 percent.  

Seventy-three percent of the American population had CATV coverage in 1973, according to Tressel. Projections for 1982 indicate approximately 35 million CATV subscribers, roughly four-tenths of the television

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29Bretz (1977), op. cit., p. 131.

In February of 1972, the Federal Communications Commission enacted rules governing CATV service in the 100 major market areas. The systems were required to carry at least 20 channels with a greater increase in local programming. One channel would be dedicated for educational access, one for government access, and one for public access. Existing systems were given five years to comply.

The assignment of a local educational access channel was a significant step by the Commission. The provision represented recognition that local educational communications needs were not being completely satisfied by the Public Broadcasting Service and the local ETV station. It also implied that local educational authorities should be given a television alternative to meet the educational needs of their communities.

Open circuit cablecasting permits college credit programming to all CATV subscribers. The programming can be obtained either by acquisition of prerecorded material, such as material from Britain's Open University which is being used at Rutgers and at the Universities of Maryland and Houston, or by the production of video courses at the

32 Bretz (1976), op. cit., pp. xi-xii.
local higher education institution. The Southern California Consortium for Technical Instruction, representing 31 institutions, has used both leased and campus-produced material in cablecasting and telecasting two courses per semester. The estimated enrollment was over 6,000 students per semester. There have been other successful and unsuccessful adaptations of cablecasting to higher education programs.\textsuperscript{34}

Bretz called cable television "the TV of abundance" in recognition of the number of channels possible through a cable system. Any CATV operator can increase his channel capacity by adding higher-frequency channels and supplying special 20- or 26-channel converters to subscribers at minimal cost. The capability also includes the potential for two-way communication.\textsuperscript{35}

Cable television has an immense potential. A cable system is a means of distributing educational programming from a central location to many diverse points. Its great channel capacity, utility among various uses and potential for viewer response offer an excellent educational communications instrument. It should be recognized, however, that economics draw boundaries around its educators to get involved and employ the educational access channel before

\textsuperscript{34} Ibid., pp. 20-24.

\textsuperscript{35} Bretz (1976), op. cit., pp. xi-xii.
it is foreclosed by non-use. 36

Communication Satellites

Communication satellites began in 1963 with the launch of SYNCOM II, a synchronous orbit satellite. The orbit of this type satellite is circular and synchronized with the rotation of the earth. Because they appear to remain fixed in space, costly complex tracking mechanisms are not required on earth. More important, a single synchronous satellite can provide communications coverage to almost one-half of the earth below. 37

Satellites can be used to establish communications with communities in remote and sparsely populated areas. Many configurations are possible in the present state of the art which could be economically sound for various communications applications. Domestic possibilities are being explored by the National Aeronautic and Space Administration with experimental satellites. The Applications Technology Satellite (ATS) program has been one of the experimentations in advanced space technology and has included an educational program.


communications effort. ATS-6 was launched in May 1974 as part of the series of experiments to determine various telecommunications applications. The Appalachian Education Satellite Project was included "to promote the overall development of the Appalachian region." Fifteen classroom sites, of which five were linked by radio to ancillary sites, were designated from New York to Alabama to receive pretaped and live programs via ATS-6. The University of Kentucky served as the coordinating center for the development of the course materials. The programs concentrated on graduate-level lectures, audio reviews, demonstrations and seminars to approximately 1200 elementary and secondary teachers each year.39

The delivery of higher education courses by satellites looms as a way of the future for expanding the educational opportunities available to remote areas. Such areas might be rural communities that are not adequately covered by the state ETV network or by cable television.

**Videotape and Videodisc Capability**

Videotape has been on the scene about 20 years. The current broadcast standards are close relatives of the original Ampex four-headed "quadruplex" system which recorded crosswise

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38 Ibid., pp. V 41-V 43.

on two-inch-wide tape. Four or five years later, a second videotape principle--helical scanning--made its appearance and ushered in video origination and flexible scheduling of TV use by schools. As the market has grown, mass production and rapid new development have followed, bringing the prices of the ever smaller machines down toward the cost of audiotape recorders. In 1972, Sony introduced a 3/4-inch tape, in 10 to 60 minute lengths, totally enclosed in a cassette.  The appearance of increasingly easier-to-acquire and easier-to-operate video-tape equipment has opened the possibility to universities to prepare instructional tapes for subsequent playback on PBS television, CATV local programming, or individual television equipment.

Videodisc technology presages an economic breakthrough in video playback capability for home use. While videodisc playback equipment will be more expensive than a film projector, it will be considerably under the present costs of 3/4-inch video tape recorders. The major savings, however, will be in the cost of discs as contrasted with videotape reels or cassettes.

Schneider reported that videodiscs, which are expected to reach the American market in 1977, will set new standards for inexpensive large-scale media distribution. He indicated widespread educational uses after their advantages become

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41Ibid.
common knowledge. Videodiscs have application linearly for conventional motion pictures and non-linearly for educational interactive applications. 42

LEARNING FROM TELEVISION

Research has substantiated that television can be used to teach any subject matter where one-way communication will contribute to learning. Other characteristics of learning by television have also been researched, of which some studies were made as early as the advent of television broadcasting.

The most definitive compilation of the research on learning from television was made in 1967 by Godwin Chu and Wilbur Schramm of the Institute of Communication Research, Stanford University. Their work has been updated as of 1975 by Monty Stanford for the National Association of Educational Broadcasters. Their studies represented the significant findings of the major research on television learning.

To conserve space, only the summary of major observations of Chu and Schramm are presented to corroborate the utility of television for off-campus adult education programs. The observations are:

1. Based upon available evidence, TV can be used efficiently to teach any subject matter where one-way communication will contribute to learning.

2. TV is most effective as a tool for learning when used in a suitable context of learning activities at the receiving end.

3. TV is more likely to be an efficient part of an educational system when it is applied to an educational problem of sufficient magnitude to call forth broad support (i.e., teaching teachers or adult education and community development).

4. TV is more likely to be an efficient tool of learning if it is planned and organized efficiently.

5. There is insufficient evidence to suggest either visual magnification, large-size screen or color will improve learning from TV.

6. There is no clear evidence on the kind of variations in production techniques that significantly contribute to learning from ITV. However, students will learn better when visuals are presented in a continuous order and carefully planned both by the TV team and the studio teacher.

7. There is no consistent evidence to suggest that either humor or animation significantly contributes to learning from ITV.

8. There is insufficient evidence to suggest that dramatic presentations will result in more learning than will expository presentations in ITV.

9. The students are likely to acquire the same amount of learning from ITV when the materials are presented as a lecture, or in an interview, or in a panel discussion.

10. ITV appears to be equally effective with small and large viewing groups.

11. Whether ITV can teach students who view at home as effectively as students in the classroom seem to depend on other conditions.

12. Learning from TV by the students does not seem necessarily to be handicapped by the lack of prompt feedback to the instructor.
13. Showing, testing, revising, an ITV program will help substitute for lack of live feedback to the teacher and make for more learning.

14. The lack of opportunity for students to raise questions and participate in free discussion would seem to reduce the effectiveness of learning from ITV, particularly if the students are fairly advanced or the material is relatively complicated.

15. Students taught by TV tend to miss the personal teacher-student contact, but there is insufficient evidence to suggest that the lack of such contact will impair learning from ITV.

16. Administrators are more likely to be favorable toward ITV than are teachers.

17. Voluntary home students of college TV courses tend to be more favorable toward learning by TV than are students who take these same TV courses in the classroom.

18. Favorable attitudes are distributed widely enough among different TV courses to cast doubt on the assumption that some academic subject, per se, may be disliked as material for ITV.

19. Among the factors that determine teachers' attitudes toward ITV are: (a) how they perceive the degree of threat to the classroom; (b) how they estimate the likelihood of mechanized instruction replacing direct contact with students; (c) how they estimate the effectiveness of ITV; (d) the difficulties they see in the way of using modern techniques; (3) how conservative they are, and whether they trust or distrust experimentation.

20. Among the factors that determine students' attitudes toward ITV are: (a) how much contact they think they will have with a teacher; (b) whether they find ITV boring or interesting; (c) the nature of the TV programs they have seen; (d) how they compare the relative abilities of the studio and classroom teachers; and, (e) the conditions of viewing.
Formative research can significantly enhance the effectiveness of ITV (Stanford update).\textsuperscript{43}

THE ISSUES UNDERLYING THE UNREALIZED POTENTIAL

Real obstacles still stand in the path of the extensive use of television for adult education. Some of the most serious obstacles are: the perceptual issue, the economic issue, the ambiguity about television among adult educators issue, the conflict between the educator and the broadcaster about educational presentations on television and the public market issue.

The Perceptual Issue

In America, according to Gordon, television has grown up in a general environment of commercialism. Television has been labeled for that reason as an "entertainment" medium, even by serious students of mass telecommunications, with only minor concessions to its informational value. On the basis of the operation of the commercial networks, the description has been more or less fair. But, television has become categorized like print has been labeled the "informational" medium, films an "entertainment" medium, and radio an "orientation" medium.\textsuperscript{44} Perhaps the cause of the


unrealized potential of educational television has been traceable to that underlying issue. The major drawback of such category fixing has been its inaccuracy over the long term and its disregard for potentials.

Gordon also suggested the following as the common criticisms of instructional broadcasting:

1. Most instructional television has closely adhered to the straight lecture classroom procedure when it only works for dynamic lecturers.

2. Instructional broadcasters have aped the producers of commercial TV too closely by being overly concerned with how things were done rather than with what is said.

3. The passive nature of the TV medium has failed to stimulate critical thinking and problem-solving in the viewer.

4. Research has not discovered what methods and means best achieves not only the sense, but also the effect, of interaction among television teachers and students.

5. Emergence of numerous distributing agencies has led some observers to fear that TV has become an agent for decreasing the amount of autonomy which local authorities have over what is taught.45

Tyler, on the other hand, has indicated the causes of the failure of television as an educational means to:

1. Expectation that TV will accomplish the entire educational process without regard to other media;

2. Frequent failure to carry out a sensible scheme for initiation of instructional broadcasting by engaging opinion leaders in planning and the decision-making process, as well as school administrators, broadcasters, teachers and students;

3. Widespread failure to engage in an adequate program of research in the efficacy of the learning strategies to be used to include manner of presenting the material, amount and spacing of repetition, the use of visuals, animation, and other devices, and the role and nature of the presenter and other program personalities; and

4. Failure to adequately consider the receiver, the student, as to his environment, need for practice, and nature of supplementary materials, i.e., program guides, texts, etc.46

Perhaps, the causes of the limited success of educational television have been linked to the causes of educational technology's lack of impact on American education. The report of the Commission on Instructional Technology in 1970, indicated indifference or antipathy toward using technology in education; poor quality and dullness of programming; incompatibility of equipment (especially in videocassette equipment where a recording on the machine of one manufacturer cannot be shown on the machine made by another); inaccessibility caused by copyright laws and difficulty in obtaining research data on optimal ways of designing programs for the improvement of learning; teachers have not been trained in instructional technology; and, media specialists have been excluded from central planning.47 Spencer, in a letter to the Commission, related that there is no


system to reward the innovator, and the organization and
the institutionalization of education itself have formed the
greatest barrier to the use of instructional technology.
The system has controlled what we may experiment upon, how
we may experiment, and how we are to treat the results.\textsuperscript{48}

\textbf{Economic Issue}

A highly practical and visible reason is suggested
by Tickton concerning the insufficiency of money for educa-
tion. Taxpayer resistance, outmoded sources of support, and
rising demands for lifelong schooling have created major
problems for education in general. Most educational dollars
in university budgets have been earmarked for staff salaries
and maintenance and new construction.\textsuperscript{49}

\textbf{Ambiguity Among Adult Educators Issue}

Another principal issue of the unrealized potential
of ETV has been the limited interest exhibited in the
writings of the professional adult educators. Carlson made
the point in a review of selected literature on the subject.
Robert Blakely, Eugene Johnson, and Carlson himself have
been the major adult educators writing on the utility of
educational television for adult education. Others like

\textsuperscript{48}Richard E. Spencer, "Letter to the Commission on
Instructional Technology," \textit{To Improve Learning}, I, ed. Sidney

\textsuperscript{49}Tickton, op. cit., p. 77.
John Niemi and John Ohliger have shown interest but have not explored public television in their writings. Still others, like Coolie Verner and Malcolm Knowles, have generated theoretical arguments rejecting public television because of its failure to provide person-to-person interaction between teachers and learners and to allow for an evaluation process to measure viewer behavioral change.\(^5\)\(^0\) Knowles attacked the medium for an inability to produce change in knowledge, attitudes, or values by involving the learner and his experiences and interaction with the teacher in favor of broadcasting values—entertainment values.\(^5\)\(^1\)

**Educator vs. Broadcaster Issue**

The foregoing issues have related primarily to a basic dichotomy between the educator and the broadcaster. Many of the former have vivid recollections of the impersonality of television teaching and the demands of an insatiable medium which are incongruous with traditional pedagogy. Educational television has been considered a competitor and a relinquishment of academic freedom and instructional control to the broadcaster which destroyed the

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values of face-to-face instruction. The latter has frequently viewed the educator as an interloper who is insensitive to the productivity measurements of audience ratings and timing precision inherent in telecasting. It may well be as Tressel and others have forecasted that the marriage of convenience between instructional broadcasting and public cultural broadcasting represent different orientations which is doomed to a gradual but unavoidable separation. The dichotomy has resulted in the dissolution of the oldest higher education television union, Chicago TV College and WTTW, the Chicago Public outlet.

Public Market Issue

Perhaps the biggest issue deterring the realization of the higher education potential of television has been the resistance of the public at large which Gordon called "the strongest bastion of resistance to educational television." The very concept of instruction by television has run so


55 Gordon, op. cit., p. 95.
strongly counter to what the public has been habituated since the beginning of television, that much popular support or general encouragement of educational television are unrealistic. To many Americans, instructional television has meant cut-rate education, entertainment in the disguise of schooling, time-wasting in the halls of ivy, and the dilution of education.\textsuperscript{56}

Public resistance, however, has not been validated by survey results. The Bower survey indicated a clear demand for more educational programming. "The 1960 public said it wanted more educational programs--only on that item did the proportion who wanted more (65 percent were saying 'not enough') exceed the satisfied customers who thought there were 'enough'. . . . The 1970 population is not nearly so complacent. A higher proportion of it--75 percent--says that there is not enough educational programming."\textsuperscript{57}

\textbf{EXTANT HIGHER EDUCATIONAL TELEVISION MODELS}

Four organizational models were uncovered during the review of the literature. Each of the models, however, are limited to conceptual frameworks which are useful as guidelines but lack the necessary detail that would hopefully

\textsuperscript{56} Ibid., p. 96.

lead to decision-making. They also lack the assessment of the alternatives that lead to their construction. Additionally, the pitfalls and remedial alterations to contend with the tests of day-to-day operations are obscured by the abstract nature of the models. Hence, the utility of the models must be considered in terms of their limitations.

**McBride Model**

McBride reported that the State University of Nebraska system was the result of extensive planning and testing which was supported by grants from the U.S. Office of Education, the National Center for Education Technology and the National Institute of Education. Considerable emphasis has been placed on the bringing together of academicians, instructional designers, and media professionals to develop mediated instruction addressing the specific educational objectives which has served as the curriculum basis. They have also been engaged in combining correspondence study, regional learning centers, and television to compensate for the loss of the teacher at the head of the classroom. During 1974, a carefully developed economic model was employed to assess the economic implications of the various operational procedures.\(^{58}\)

The SUN delivery system has been designed to take advantage of a nine-station statewide public television

\(^{58}\)McBride, op. cit., pp. 68-70.
network in Nebraska. A major link in the delivery plan has been a statewide network of regional learning centers which has joined the adult learner with the delivery system. Video-taping of ETV broadcasts and showing at the learning centers have freed the learners from the constraints of broadcast schedules and the academic calendar. The combination of the public television network and regional learning centers network has provided a two-way flow between the educator in Lincoln and the adult student in the far reaches of the State and vice versa.  

Waniewicz Model

Ignacy Waniewicz provided a functional model in his United Nations Educational, Scientific and Cultural Organization publication which is primarily oriented toward establishing educational television systems for developing countries. The relevant model included the fundamental functions for a decentralized educational system. Bringing together the educational authority and the broadcasting authority was advocated in a project coordinating body. Subject matter would be utilized to program, to develop accompanying material, to produce audio-visual aids, to assess feedback, and to evaluate and perform research. Vertical, two-way information flow between student and faculty

59 Ibid., pp. 69-70.
Dallas Community College District Model

The third model that was found in the review of literature consisted of the ITV course development chart and the ITV center organizational chart of the Dallas County Community College District. The multi-campus institution was composed of a consortium of four colleges in Dallas and surrounding suburbs. They have been offering approximately eight college credit courses to over 10,000 students annually. A mix of ETV viewing, study guides and exercises, optional on-campus discussion meetings, and "hotline" telephone information linkage between learner and teacher have been utilized in the system. All course materials that have not been leased from other sources were developed and produced by the ITV center following a systems approach from needs assessment to course offering and requiring an estimated 20 months in preparation. Notably absent from the organizational charts and the narrative was the broadcaster; it is assumed that the coordination with this important element has been performed by liaison.

60 Waniiewicz, op. cit., p. 120.

Rand Model

A fourth model was uncovered in a Rand Corporation study for the U.S. Department of Health, Education and Welfare which was completed in 1971. The study examined the developmental steps which preceded the production of "Sesame Street" by the Children's Television Workshop, of the Chicago TV College, of Tellekellog in Bavaria and of the Advocates, an educational network public affairs program. The objective was to identify developmental models to be used in connection with the creation of a career education program aimed at women in the home. By synthesizing the developmental phases of the four kinds of television-based programs, the fundamental components of the model were determined to be as follows:

1. Planning
   a. Pre-planning
   b. Planning organization
   c. Planning tasks

2. Development
   a. Translating curriculum content into written and filmed material
   b. Setting up liaison machinery
   c. Feedback arrangements
   d. Pilot programs
   e. Distribution channels
   f. Revision of format

3. Operations
   a. Final production
   b. Actual broadcasting
   c. Provision of supplementary materials
   d. Marketing operations
4. Evaluation

a. Design of evaluation system
b. Plot formative evaluation
c. Program monitoring
d. Summative evaluation

SUMMARY

Telecommunications provide educators with a communications capability whose capacity to reach vast audiences and whose functionality to teach subject matter have been validated by scientific research. Enlightened and imaginative usage offers the promise of extending postsecondary education to people who are unable and unwilling to go to the university or college campus. Such employment would enable educators to project scholarly learning to people through the medium with the greatest informational impact on their lives. It would present opportunities to meet Toffler's urgent challenge to prepare people for change in a dynamic society.

The extent of research in developing higher educational television systems in the United States has yielded a variety of approaches from active statewide and community-wide systems to nonexistent programs. Undoubtedly, the perception of television as a commercial and entertainment

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62Rudy Bretz and others, Models of Television-Based Educational Programs, U.S. Educational Resources Information Center, ERIC Document ED 088 488, August, 1971, pp. 1-2 and 73-76.
medium, insufficient money for life-long learning programs, ambivalence about the value of television in adult education, and divergent interests of educators and television broadcasters have hindered exploitation of the medium for higher education. Nevertheless, public surveys have indicated a growing popular demand for educational programming.

The review of literature revealed four models of higher educational television systems. Each represented a different orientation. The McBride model presented the essential features of the State University of Nebraska system, which profitted from considerable Federal financial support. The Waniewicz model provided the functional considerations for establishing national educational television systems for developing countries. The Dallas Community College District model furnished the essential features of an urban community system. The Rand model listed the conceptual components for developing a higher educational program using television for a specific adult audience--housewives.

From those models, albeit disparate in their target objectives, certain common organizational concepts emerged which appear fundamental to the design of any higher educational television system. These are:

1. General administration
2. Academic administration
3. Delivery system
4. Curriculum development

The concepts suggest a focus for subsequent research of extant systems and a structure for developing an optimal
organizational model for the statewide use of telecommunications for non-traditional higher education.

Expectantly, the formulation and use of the model would enable systematic design and implementation of a statewide educational telecommunication system. This may permit nullifying the admonishment of Vladimir Zworykin, who is generally considered a founder of modern television; he stated:

TV has shown us the moon, the planets and the stars. On earth, it has brought into our homes and our schools man at his best and at his worst. It has shown us our democracy in some of its finest and in some of its poorest hours. Yes, it has distracted, bored and even insulted us. These faults, however, are not inherent in television. Rather, television's failings can be ascribed for the most part to the people responsible for its programming. And, of course, since our main concern... is the use of TV in education, I must point out that the failings in this area rest in good measure on those persons responsible for how instructional TV is used and programmed.\(^{63}\)

CHAPTER 3

METHODOLOGY

This chapter describes the scope, the format used for observation and interviews, the nature of the data, the locations visited and the persons interviewed in the conduct of the study.

SCOPE OF THE STUDY

This study consisted of evaluation research of three on-going statewide educational telecommunication systems during the 1977-78 academic year. The Colorado videotape system, the South Carolina educational television network, and the Indiana telecommunication support system for higher education were selected on the basis of their diversified, effective applications of educational telecommunications as determined from a review of the literature, a study conducted by the writer in 1976 involving 50 universities, and advocacy of media professionals on the subject. Two or more days were spent at each system site observing operations and interviewing key executives and operatives of the system. Also, university and industrial uses of the system were observed and users interviewed.

A total of 22 officials were interviewed during the visits to the various locations. Eleven administrators, television engineers, and managers of educational services
were interviewed at the telecommunication centers. In addition to the systems' personnel, information was obtained from interviews of 11 university and industrial officials. This ascertained the extent to which the medium was used for higher education programs and gave the researcher a different perspective about the statewide system.

Another perspective and source of information was obtained by examination of records, annual reports, and descriptive publications from the three systems. Most of the publications were system-produced, but some evaluations were provided by disinterested observers who completed research and articles about the system for professional periodicals.

**OBSERVATION AND INTERVIEW FORMAT**

According to Selitiz et al. and others in research techniques, descriptive research benefited particularly by employing a variety of research plans to maximize the chances of fully capturing the processes being studied. Using this premise for descriptive research, the conceptual framework which was derived from the literature review and is shown at Figure 1 was utilized to structure and focus the observations and the interviews during the research. The categories were: general administration, academic administration, general administration, academic administration,

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delivery system, and curriculum development.

To make the format workable, each of the conceptual categories of investigation were further defined by sublevels of related concepts. Figure 1 shows the general categories and subcategories used in the evaluation research.

Ostensibly, the categories and their components suggest the fundamental elements for a statewide model for delivering non-traditional higher education through telecommunication. Hence these categories and subcategories could also be perceived as criteria.

NATURE OF THE DATA

Two kinds of research data were utilized to assess the validity of the working model. They were primary data and secondary data. The nature of these two types of data are explained briefly in the subsequent paragraphs.

The Primary Data

The format in Figure 1 provided the basis for the interviews with personnel of the Colorado system, the South Carolina system, and the Indiana system for educational television who are responsible for the planning, developing, budgeting, operating, and evaluating the respective statewide systems. All interviews encouraged open-responses, were tape-recorded, and coded by format functions. The format also provided the structure for the on-site observations of the three systems and ancillary facilities. Another type of
Figure 1. Functional Components for a Statewide Educational Telecommunication System

General Administration

- Coordinating administrative agency and responsibilities
- Staffing
- Financial management among institutional members
- Tuition fees
- Public information and advertising
- Cooperating agencies
- Copyrights
- Interstate sharing

Academic Administration

- Coordinating agency and responsibilities
- Admission
- Registration
- Degrees and/or Certificates
- Credit
- Instruction

Delivery System

- Open-circuit television broadcasting
- Cable television broadcasting
- Video cassettes
- Correspondence
- Radio
- Telephone
- Computers
- Multi-media

Curriculum

- Organization for planning
- Nature of the product
- Selection of curriculum
- Curriculum design
- Supporting instructional materials
- On-campus instructional requirements
primary data came from the annual report, budgets, operational schedules, and descriptive documents published by the three systems.

The Secondary Data

Secondary data was collected utilizing the format criteria during visits to university and industrial users of the three statewide systems to ascertain their programs and plans for higher education programs through telecommunications. Interviews were tape-recorded. Insofar as the responses of the university users pertain to academic administration, however, they are a type of primary data. Published studies and texts, professional periodicals, pertinent government documents, and other published and unpublished sources dealing with higher education through television and non-traditional education telecommunication systems and programs constituted another type of secondary data.

From the data obtained from the evaluation research and the assessment of the observation and interview structure, a statewide higher educational television system model should be synthesized from the statewide systems of Colorado, South Carolina, and Indiana. Cost and performance relationships give some indication of the significance of various attributes and activities. The resulting model should include the organizational and procedural concepts for the administration, coordination, and implementation of a statewide higher educational television system.
LOCATIONS VISITED

The following locations were visited on the dates indicated for the conduct of the systems research:

October 24 and 26, 1977--University of South Carolina
Columbia, South Carolina

October 25, 1977--South Carolina ETV Commission,
Columbia, South Carolina

December 1 and 2, 1977--Colorado State University,
Fort Collins, Colorado

December 2, 1977--Martin-Marietta Corporation
Denver, Colorado

January 9 & 10, 1978--Indiana Higher Education Telecommunication System
Indianapolis, Indiana

January 9, 1978--Indiana University Systemwide Office for the School of Continuing Studies
Indianapolis, Indiana

INDIVIDUALS INTERVIEWED

The individuals interviewed at the various locations during the conduct of the study were:

University of South Carolina:

Milton S. Baker, Director of Continuing Education
James Bradley, Director of the ETV-MBA Program,
College of Business Administration
Howard Carter, Director of Television Field Operations, Instructional Services Center
James Emens, ex-Director of the ETV-MBA Program,
College of Business Administration
E. V. Humphries, Director of APOGEE (MA in Engineering) Program, College of Engineering
C. Earl Whatley, Chairman on Course Development:
"Teacher as Manager" Program, College of Education

South Carolina ETV Commission:

Vernon Hester, Director of Traffic
Boykin M. Roseborough, Director of Field Technical Services
Robert E. Wood, Director of Education

Colorado State University:
Marcia Bankirer, SURGE (MBA & MS in Engineering programs) Coordinator and Assistant Director, Center for Continuing Education
Preston Davis, Director of Educational Media
Joe Kilgore, SURGE Coordinator, Office of Educational Media
John Robledo, Recording Center Manager, Office of Educational Media
John Snider, Director of the Center for Continuing Education
Bill Watson, SURGE Field Representative, Center for Continuing Education

Martin-Marietta Corporation:
Bette Wooster, Education Officer

Indiana Higher Education Telecommunication System:
Randall G. Bretz, Assistant Director of Member Services
James R. Potter, Director of Systems Operations and Development
Jane Richards, Executive Director
W. Neal Robison, Assistant Director of Member Services
Joseph S. Rawlings, Director of Continuing Education, Ball State University, Muncie, Indiana (a visitor)

Indiana University Systemwide Office for the School of Continuing Studies:
Sylvia Bowman, Special Assistant to the President of Indiana University for External Degree Programs

SUMMARY

The Colorado, South Carolina, and Indiana statewide educational telecommunications systems provided three discrete on-going systems for research. An evaluation research was
conducted of each system using a format of functional categories determined from the review of literature. Structured observation and systematic interviews were performed by employing those categories and definitive subcategories for the investigation. Six sites were visited and 23 officials were interviewed in studying the telecommunication applications of the three systems.

Both primary and secondary data were collected to perform the evaluation research. The former consisted of system observations, personal interviews, and examination of documents. The latter comprised structured interviews of the users of the systems and pertinent literature review.

Potentially, the suitability of the research format or instrument suggests the fundamental functional components for an effective statewide educational telecommunication system.
CHAPTER 4

DESCRIPTIVE ANALYSES

INTRODUCTION

In this chapter, the results of the study of three statewide higher education systems employing ETV will be described under the following major headings:

The Televised Higher Education System of Colorado
The South Carolina Educational Television System
Indiana Higher Education Telecommunication System

THE TELEVISED HIGHER EDUCATION SYSTEM IN COLORADO

Historical Background

In Colorado, higher education through television has evolved predominantly from innovative applications of telecommunications by Colorado State University (CSU), the state's land-grant college located at Fort Collins, 70 miles north of Denver. Faced with topographic extremes and uneven population concentrations resulting from the Rocky Mountains, television broadcasting was impractical for distributing higher education programs. Three-fourths of the state's population and most of the industry and government agencies are situated in a 130-mile north-south band with CSU located at the northern tip. Also, the public broadcasting stations that do exist were late developing and independent, community-owned operations. In lieu of
television broadcasting, the University has made extensive utilization of videotaped instruction to reach and serve attracted segments of the population.

Organized usage of television came to the CSU campus in 1965 with the formation of the Office of Educational Media (OEM). In addition to television, audio-visual, photographic, motion picture, and graphic services were centralized into one media service. Placed directly under the vice-president for academic affairs, along with the heads of academic departments, OEM and media were integrated inseparably into the instructional activities of the university. From the onset television became a tool for faculty members in their teaching and researching roles.

The following year, the birth of the videotaped non-traditional education program occurred with the establishment of the Colorado Commission of Higher Education. They engaged Dr. Fred Turmin, former provost of Stanford University and a pioneer in using television for off-campus education of engineers, to consult on possible applications of such a program in Colorado. He recommended that CSU become more active in serving the educational needs of engineers in the extensive industrial community of eastern Colorado and study the potential of television broadcasting for accomplishing that purpose. Given the environmental difficulties for microwave technology, CSU proposed videotape as a more feasible and inexpensive alternative.
In 1967, benefiting from a National Science Foundation grant of $28,000, the Colorado SURGE (State University Resources in Graduate Education) program was initiated by videotaping actual engineering classes in studio-classrooms and shipping them to participating industrial and governmental sites. It was the first degree granting graduate program conducted entirely by telecommunications in the nation. Through SURGE, practicing engineers were able to obtain at their convenience and work schedules the necessary instruction and credits leading to a Master of Science degree in any of several specialized areas. These areas were: agricultural engineering, civil engineering, electrical engineering, mechanical engineering, industrial engineering, environmental engineering, and atmosphere science. A full program leading to a Master of Business Administration was added in 1972.

In the fall of 1968, CSU, with state funds and another grant from the National Science Foundation, extended its off-campus engineering programs into a program with the acronym of CO-TIE (Cooperation via Televised Instruction in Education). This program afforded broadening courses to the state's two-year colleges who lacked the personnel and resources to provide a full range of courses or full content for many of the existing courses. Graduates from such programs, particularly in engineering areas, were arriving at CSU with insufficient preparation to enter their third year
of college. Initially, five junior colleges and one four-year college joined the consortium. They were provided with selected sophomore level courses. In 1971, the effort was augmented by BIO-CO-TIE which was developed to enrich biology education at the colleges. Consortium members have increased to 15.

Beginning in September, 1972, CSU initiated the HI-Tie project which utilized the same videotaping procedure employed successfully in the SURGE and CO-TIE programs. The HI-TIE program consisted of courses offering university credit to both students and teachers of Colorado's secondary schools. Qualified high school seniors were allowed to take freshman college courses prior to their high school graduation. Also through videotaped courses, secondary school teachers were able to earn credits to meet certification requirements.

On July 1, 1977, the Center of Continuing Education at CSU was given responsibility for the administration and coordination of SURGE, CO-TIE, BIO-CO-TIE programs. The move was generated by the need to streamline the administrative and financial controls and operations and to establish the programs on a self-paying basis. Prior to this date, those responsibilities were divided between OEM and the sponsoring academic department.

Since the inception of the videotape alternative to off-campus higher education, the faculty, administrators, and media staff have integrated telecommunications into the
off-campus educational mission of the University and the specific objectives of the faculty. Despite environmental limitations, communication technology has been employed effectively and managed to do what they want to do with it.

**General Administration**

Key administrators created an atmosphere at Colorado State University whereby faculty and media staff efforts could be combined to improve instruction. Historically, the University propagated a technological orientation with the majority of the students engaged in professional, business, and science programs. The Office of Educational Media was prominently placed under the vice-president for academic affairs and visibly located in the center of the campus. Creativity was encouraged by university policy to develop, evaluate, and apply innovative approaches to teaching. As a consequence, team effort was generated by a "service-user" relationship between the instructor and the media specialist with the establishment of a joint responsibility for the outcome.

The favorable media climate among faculty and administrators on campus enhanced the use of telecommunications in extending educational opportunities to citizens off campus. The nexus of those educational activities was Television Services in the Office of Educational Media for the technology and the Center for Continuing Education for the administration.
Organization. Television Services was the agency of OEM responsible for all TV programs: purchase, inventory, and maintenance of all equipment and distribution of televised materials. It was divided into two components--Production and Engineering. Both reported directly to the Director of Media Education. Production consisted of a producer/coordinator, producer, two cameramen, and student helpers. Engineering comprised one senior electronics engineer, one electronics engineer, two senior electronics specialists, and three audio-visual technicians.

The Director of Continuing Education served as the director for all of the non-traditional, credit and non-credit, higher education programs and courses of CSU. This included the videotaped programs. The responsibilities entailed administering and coordinating the various programs and courses. Within the center, SURGE, CO-TIE and HI-TIE were budgeted, advertised, course applications received and processed, and liaison maintained between participating off-campus firms and agencies and the academic departments. To perform these functions, the director was assisted by a program manager who handled budget formulation and execution; by a graduate assistant who maintained liaison between participating parties; and, a part-time secretary who served as a point of contact and maintained the course records.

The academic departments provided their conventional
roles in curricula development, instructor assignment, and student counselling for the videotaped programs. The videotaped classes were an adjunct of regular on-campus classes. To assist instructors assigned to teach such classes with the extra class administration, a graduate assistant was authorized and paid from the continuing budget. The instructors themselves did not receive additional remuneration for teaching videotaped courses.

Financial management. The Center of Continuing Education was assigned responsibility for the administration of off-campus videotaped programs on July 1, 1978. This change occurred primarily for budgetary reasons to put the SURGE program on a business-like footing whereby the program would be on a self-supporting basis. Prior to that time, costs of the program were proliferated between OEM and the academic departments. Budgeting was problematical.

In the 1977-1978 budget for continuing education, there was $123,000 earmarked for the operation of the SURGE program. The other programs were operated on a reimbursable revolving fund basis with state appropriations. The distribution of the SURGE budget was as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEM Operating Expenses</td>
<td>$76,300</td>
</tr>
<tr>
<td>Continuing Ed Salaries</td>
<td>6,200</td>
</tr>
<tr>
<td>Other Personnel Salaries</td>
<td>38,600</td>
</tr>
<tr>
<td>10-15 Graduate Asst</td>
<td></td>
</tr>
<tr>
<td>4 OEM personnel</td>
<td></td>
</tr>
<tr>
<td>Travel for Visitations</td>
<td>1,800</td>
</tr>
</tbody>
</table>

1977-78 SURGE Budget................. $122,900
The detailed cost analysis of SURGE instruction which served practicing engineers and administrators in industry and government was made in 1972 and updated in 1977 by OEM and the College of Engineering. At the time of the study, it was averred that the cost of operation was generally applicable to all regularly scheduled courses that were videotaped for off-campus use. The cost of the SURGE program was divided into three broad categories: (1) amortization of equipment, recording space and tape; (2) operating cost of production, delivery and program administration; and, (3) incremental direct instructional cost of adding off-campus students to existing classes. Table 2 shows the results of that cost analysis.

Viewed from the perspective of graduate instructional costs at CSU, the addition of SURGE students reduced the costs for on-campus graduate students and increased faculty productivity. With the addition of the average SURGE course enrollment of 12 students, the faculty nearly doubled their productivity over the average on-campus enrollment of 16 graduate students per course. As a consequence, the overall instructional costs per graduate student were lowered.

Tuition and enrollments. In the SURGE program, enrollment varied between 423 and 480 students per semester at 33 Colorado and 9 out-of-state plant or agency sites (1977). At the start of the semester, the number of students were actually higher than the enrollment range, but an average attrition
Table 2
Total Cost of SURGE Instruction per Semester Credit\textsuperscript{a}
Colorado State University
(Based on 1976-1977 Dollars)

<table>
<thead>
<tr>
<th>Category</th>
<th>Category Cost</th>
<th>Cost Distr by Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment, Space &amp; Tape\textsuperscript{b}</td>
<td>$ 9.70</td>
<td>23.1%</td>
</tr>
<tr>
<td>OEM Operating Expenses\textsuperscript{c}</td>
<td>27.08</td>
<td>64.4%</td>
</tr>
<tr>
<td>Instr Operating Expenses\textsuperscript{d}</td>
<td>5.23</td>
<td>12.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$42.01</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

\textsuperscript{a}Data calculated on following enrollment data:

- Total courses: 86
- Total off-campus sections: 371
- Total off-campus enrollment: 966

\textsuperscript{b}Amortized costs in facilities for recording an hours' class time

\textsuperscript{c}Based on a level of 86 courses/year.

\textsuperscript{d}Costs for graduate assistants and travel to plants.
Varies according to number of sections, students, and courses.

rate of 15-20 percent occurred before completion of a course. Also, there was characteristically higher enrollments for the fall semester than the spring semester. By 1977, 99 persons had completed SURGE engineering programs and earned Master of Science degrees. Despite a later start, the Master of Business Administration program numbered 120 graduates.

To enroll in a SURGE course in the fall semester of 1977 cost $46 per credit hour.

Public information and advertisement. The most effective advertisement of the SURGE officers at the various firm and agency location. The University was not soliciting enrollments in a formal manner. There was a SURGE catalogue published annually. The Center for Continuing Education published a bulletin at the end of the fall semester to update the SURGE catalogue on course changes or enrollment procedure changes for the spring semester. Both of these publications were provided to the participating firms and agencies and were available upon request of organizations interested in initiating a SURGE program at their location.

Academic Administration

The academic administration of the off-campus videotaped programs was essentially the same as that for regular students. The major difference was registration and coursework were conducted by mail/parcel post. Students had to apply and be accepted for admission by an academic department
and the university. There was no overt indication in student records maintained by the registrar that the student was from a videotaped off-campus program. Similarly, diplomas awarded to off-campus students were the same as those earned by conventional students.

Traditional roles were performed by the academic departments for the SURGE, CO-TIE, and HI-TIE programs. The university maintained five W.A.T.S. lines for the specific purpose of accommodating communications between instructors and off-campus students. Additionally, SURGE instructors were provided with graduate assistants to aid in the extra administration and presentation of their classes.

To prepare and involve faculty members in videotaped classes, as well as in media operations, a variety of in-service training type sessions were routinely scheduled. Approximately two hours were scheduled for media operations in new faculty orientation conducted annually before the fall semester. A monthly seminar called "Let's Talk Teaching" was conducted during luncheons to allow faculty members to share their experiences with others. In preparation for assignment as a videotaped off-campus instructor, OEM provided a one to two hour familiarization session on the equipment and its operation.

SURGE program. The SURGE program was conducted by the dissemination of videotapes of actual engineering and business classes on campus. On-campus enrollment justified
the class. Although a minimum of five SURGE students were desired at each site, SURGE enrollment was insufficient for a course. Figure 2 shows the SURGE sites for the 1977-1978 academic year.

A person applied for a SURGE course by completing a special registration form at the plant site which was forwarded to the Center of Continuing Education. Students wishing to pursue a Master's degree were required to make a formal application to the department of their choice after completing one or two SURGE courses. Acceptance into a SURGE program required a baccalaureate degree with a "B" or higher grade average, three letters of recommendation, and evidence of satisfactory completion of the Graduate Record Examination Aptitude Test or the Graduate Management Aptitude Test for business students.

Generally, SURGE students took two courses a semester and attended all of their classes and met class requirements at their plant sites. Business courses which required extensive class participation or library facilities necessitated on-class attendance, normally during the summer months. SURGE students met regularly, at their convenience, to view the videotaped presentation, usually two days after the on-campus class. In addition to telephone communications, SURGE instructors or their graduate assistants visited SURGE classes once or twice a semester.
Figure 2. Firm and Agency Sites Participating in SURGE Program of Colorado State University, 1977-1978

Colorado Sites:

Ball Brothers Research Corporation, Boulder
Bell Telephone Laboratories, Denver
Climax Molybdenum Company, Golden
Colorado Division of Water Resources, Denver
Colorado Division of Water Resources, Greeley
Coors Brewery, Golden
Coors Container, Golden
Coors Porcelain, Golden
Denver Public Library, Denver
Gates Rubber Company, Denver
Hewlett-Packard, Colorado Springs
Hewlett-Packard, Fort Collins
Hewlett-Packard, Loveland
Honeywell, Inc., Denver
IBM Corporation, Boulder
Johns-Manville Corporation, Denver
Eastman Kodak Company, Windsor
Lowry Air Force Base, Denver
Martin-Marietta Corporation, Denver
Miner & Miner Consulting Engineers, Greeley
Mountain Bell, Denver
National Center for Atmospheric Research, Boulder
Rockwell International, Golden
Schlumberger, Fort Morgan
Stearns-Roger Company, Denver
Storage Technology, Louisville
U.S. Air Force Academy--Business
U.S. Air Force Academy--Engineering
U.S. Bureau of Reclamation, Denver
U.S. Bureau of Reclamation, Grand Junction
U.S. Geological Survey, Denver
Water Pic, Fort Collins
Woodward Governor, Fort Collins

Out-of-State Sites:

Mountain Bell, Cheyenne, WY
North Dakota Department of Environmental Engineering, Bismark, ND
North Dakota Division of Water Resources, Bismark, ND
University of Nebraska Institute of Agriculture, North Platte, NE
SURGE students were required to complete the same assignments, reports, and examinations as on-campus students. Lab requirements were executed in the employer's facilities. Similarly, firm or agency computers were used if necessary. Access to the CSU computer was also available through eight Colorado community colleges. Library borrowing was possible at 11 four-year colleges, 10 community colleges, and the public libraries throughout Colorado through reciprocal arrangements with CSU.

SURGE classes were conducted in one of four classrooms. Three of the classrooms accommodated 30 students and were equipped for black and white television production. The fourth was a 200-student classroom with four color cameras. The classrooms contained three fixed TV cameras with a pan and tilt head and in most cases, a 25mm zoom lens. One camera was located in the rear of the classroom and used for viewing the instructor, blackboard, and any visual aids that were employed in the class. The second, in front of the room, viewed the students. A third was situated above the lectern to focus on diagrams, notes, or other materials.
used by the instructor. Two microphones were employed to pick up the lecture and class discussion. Other features of the studio-classroom included full use of graphics, slides, and films and a computer terminal.

Usually a graduate assistant operated the console in OEM to follow the instructor and the class discussion with the first two cameras. The instructor, however, controlled the camera in use from a lectern console. Minimum distraction was caused to class presentations by the manipulation of the equipment.

OEM controlled the maintenance and scheduling of these classrooms. In fact, OEM personnel constructed the electronic capability using manufactured components and wiring ingenuity. Each classroom required six months to become operational as a studio-classroom at a cost of $60,000-70,000.

**CO-TIE and BIO-CO-TIE programs.** The Co-TIE and BIO-CO-TIE programs were instituted to fill instructional voids at Colorado's junior colleges and to strengthen their programs by sharing resources available at CSU. Many two-year colleges lacked the personnel and facilities to conduct adequate instructional programs so that their students would be competitive when they moved to four-year universities. By 1972, there were two four-year colleges, eight community colleges, and five two-year colleges that had joined with CSU into a consortium to enhance their pre-professional course
offerings. Figure 3 shows the consortium members and the program activities in which they were receiving support from CSU.

The CO-TIE and BIO-CO-TIE classes differed from the SURGE programs in style and format. They were designed primarily for freshman and sophomore courses.

In some courses, such as engineering, the videotaped classes were the course presentations. Students attended three videotaped classes a week. In addition, tutorial sessions were conducted for two hours weekly with the CSU instructor over the telephone network. Slow-scan television was also utilized to present visual instructional materials over the phone line.

In the biology programs of BIO-CO-TIE, the classes of the consortium members were augmented with 5- to 20-minute videotapes. These tapes were prepared at CSU and presented advanced information, phenomena, and experiments which would be difficult to duplicate on some small college campuses. Accompanying the videotapes were tape-narrated slide packages and laboratory specimens.

A third type of videotaped course was mathematics which was similar to the SURGE courses. The primary audience of the mathematics courses was math teachers at the community colleges. The teachers were enabled to improve their mathematical background and improve their effectiveness as instructors. Since these were graduate level courses, some of the students applied the study toward advanced degrees.
Figure 3. Colorado State University CO-TIE Programs with Participating Institutions

<table>
<thead>
<tr>
<th>Institution</th>
<th>BIO-CO-TIE</th>
<th>Avian Sc</th>
<th>Engr Cr</th>
<th>Math Cr</th>
<th>Cmptcr Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aims Community College, Greeley</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arapahoe Community College, Littleton</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Colorado Mountain College (East)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorado Mountain College (West)</td>
<td>X</td>
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<tr>
<td>Colorado Community College (East)</td>
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<tr>
<td>Colorado Community College (West)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Community College of Denver, Aurora</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Community College of Denver (North)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Community College of Denver (West)</td>
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<td>El Paso Junior College, Colorado Springs</td>
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<td>Fort Lewis College, Durango</td>
<td></td>
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<td>X</td>
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<tr>
<td>Lamar Community College, Lamar</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Mesa College, Grand Junction</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Northeastern Junior College, Sterling</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Otero Junior College, La Junta</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Rangely College, Rangely</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Trinidad State Junior College, Trinidad</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

X Indicates campus program activity

Source: Lionel V. Baldwin, Preston Davis, and Lee M. Maxwell, "Innovative, Off-Campus Educational Programs of Colorado State University." Special report to the President's Science Advisory Committee Panel on Educational Research and Development. Colorado State University, April, 1972. (Mimeographed).
Another media service provided by CSU to participating institutions was a computer network. Initially funded by a National Science Foundation grant, this program gave nine small colleges in Colorado access electronically to the CSU computer. The purpose was to enhance their instruction with computer technology which they were unable to afford otherwise. CSU has produced a series of videotaped course materials on computer languages and computer programming. This program has been particularly valuable in the engineering and mathematics courses at the recipient colleges.

Faculty members of the consortium institutions controlled the classes, administered examinations, participated in tutorial sessions, and assigned course grades. Semi-annually, they met with the CSU faculty to create, coordinate, and implement the various program phases.

HI-TIE program. The HI-TIE program was designed to take advantage of the communications lessons learned from the SURGE and CO-TIE programs which preceded it. The program was aimed at secondary school teachers and eligible seniors.

Through graduate level mathematics courses by videotape similar to the CO-TIE mathematics program, secondary school teachers obtained CSU graduate credit to enhance their instruction and to apply toward an advanced degree. Such credits were useable equally for satisfying certification requirements.
Qualified high school seniors were the other target of the HI-TIE program. They were able to take freshman engineering courses from CSU for credit. Additionally, some B1O-C0-TIE materials were shared with the HI-TIE program for advanced high school student use.

Delivery System

Recording center. In addition to the four studio-classrooms, OEM maintained a centralized recording center which was wired to each of those classrooms for the aural and visual recording of classes. The recording center contained 46 videocassette recorders (17-1/2" and 29-3/4" recorders), a switching apparatus, and a videotape control system. As the class was conducted, an original videotape was made for each of the off-campus sites participating in the course. The switcher, which was designed by OEM personnel at a cost of approximately $12,000, programmed the needed number of recorders for any given course. The tape control system consisted of a card catalogue for controlling the inventory of 6000 tapes.

Videotaping coordination between the instructor in the studio-classroom and the recording center was accomplished by a course and instructor identification visual and a warning system. Each class lasted 50 minutes. The instructor keyed the start of the class by displaying the identification visual before the lectern overhead camera. A red light on the lectern console signalled the videotaping
start. During the class, the instructor was able to see what was being videotaped by observing one of the two television monitors in the studio-classroom. The recording center switcher blinked the red light to give 2-minute and 1-minute warnings to the instructor denoting the approaching end of the class. Redisplay of the identification visual was the instructor's indication to terminate the videotaping.

**Tape delivery.** Each videotape in the inventory was assigned a control number. A log was maintained against each control number. Each tape recording was logged and the location of the tape recorded. For quality control, a tape was discarded after 100 recordings.

After a class recording, the videotapes were packaged in fiber shipping containers along with any instructional material provided by the instructor. The containers were addressed for the appropriate firm or agency location. Each evening a commercial delivery service picked up the tapes for delivery usually the following day. The university paid for the delivery of the tapes to the recipients. Over 500 tapes were shipped weekly to the various remote locations. Normally, these tapes were gone from the immediate control of OEM about 30 days; the loss rate averaged between two to three percent per annum.

**Off-campus classes.** At the firm or agency site, the videotapes were received by the education officer. The tapes were made available to the students according to their schedules. Usually, a room with a television monitor and
videotape player was set aside as the classroom. The television equipment was obtained by the site organization from a vendor at a cost of $1,500. If the organization preferred to rent the equipment, OEM maintained six sets for such purpose and charged $40 per semester. The organization was also responsible for the cost of returning the videotapes to the university.

Audio network. A dedicated audio network was utilized for the recitation and tutorial sessions of the CO-TIE and HI-TIE programs. Leased telephone facilities were employed for that purpose. In addition to two-way audio communications, an electromechanical writing system was located at CSU for transmitting graphic information to TV monitors at the off-campus locations. For the computer network, a state-owned system of microwave facilities was used to interconnect CSU with the nine participating campuses.

Curriculum Development

From the onset of the videotaped off-campus program, the curricula that were developed focused on specialized needs of special clientele. The principal program, SURGE, offered two graduate curricula in engineering and business. Both programs were clearly targeted on enhancing the individual career goals of the sizeable engineering community of eastern Colorado. Even the later M.B.A. program offered a career option for engineers, but the broad application and utility
of the business curriculum have expanded the market to many professional areas. Table 3 shows the various types of SURGE courses offered in the 1977-1978 academic year. Conversely, the courses offered in the CO-TIE, BIO-CO-TIE, and HI-TIE programs were designed to supplement or expand existing curricula of other academic institutions.

Table 3
Number and Type of SURGE Courses, Colorado State University 1977-1978 Academic Year

<table>
<thead>
<tr>
<th>Type Courses</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural engineering</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Atmospheric science</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Business management</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Chemical engineering</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Civil engineering</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Electrical engineering</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Industrial science</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical engineering</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Physics</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Statistics</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Systems engineering</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
<td><strong>45</strong></td>
</tr>
</tbody>
</table>


Development of the SURGE curricula emanated from existing graduate engineering and business programs of the College of Engineering and the College of Business respectively. Since the course offerings were identical to those
courses provided on campus, the same curricula was adopted for practicing professionals off campus. Videotaping of the on-campus classes allowed those individuals to capture the total live-classroom setting without significant interruption of their normal employment activities.

**Master of Science program for engineers.** This program was designed to enhance the career goals of engineers in specialization areas, but admission was possible for persons holding a B. S. degree from other fields, particularly physics or mathematics. The curricula of the eight engineering programs were drawn from advanced undergraduate and graduate level courses of all branches of engineering, atmospheric sciences, mathematics, statistics, and physics. The SURGE student could specialize in agricultural engineering, atmospheric science, civil engineering, electrical engineering, mechanical engineering, industrial engineering, environmental engineering, or systems engineering.

To earn the degree, a minimum of 30 semester credits in coursework must be completed and research with or without a thesis requirement. Twenty-four of the 30 credits had to be completed from CSU courses in the preceding six years before program completion. By taking one or two courses per semester, the SURGE student could complete the degree requirements after three years of part-time study, but most took another year or longer.
Master of Business Administration program. This was a management-oriented degree program designed for potential or practicing managers to develop and sharpen their professional administrative skills. The curriculum focused on administration with specific emphasis on decision making. Persons with undergraduate degrees from other than business areas were permitted into the program. Before acceptance, however, they were required to demonstrate a basic proficiency in economics, mathematics, business law, statistics, accounting, finance, marketing, production, management and human relations, and a computer language by course completion or satisfactory examination.

A minimum of 32 graduate credits were required to earn the degree. Table 4 shows the prescribed curriculum for the SURGE program. Some of the courses necessitated active class participation or extensive library use; they required the student to enroll the actual class usually during the summer months. Two to three calendar years were normally required to complete graduate business degree program by taking two courses a semester.

Summary

In Colorado, higher education through television has resulted from innovative applications of telecommunications by Colorado State University. The University has made extensive utilization of videotaped instruction to reach and serve specialized statewide educational needs. It offered Master's
Table 4
Curriculum for the SURGE M.B.A. Program,
Colorado State University

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Computer Applications in Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>Methods in Business Research&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2</td>
</tr>
<tr>
<td>Business Policy&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Independent Study</td>
<td>2</td>
</tr>
<tr>
<td>Marketing Strategy</td>
<td>3</td>
</tr>
<tr>
<td>Management</td>
<td>3</td>
</tr>
<tr>
<td>Statistical Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>

<sup>a</sup>Required on-campus classes

Source: Colorado State University, "SURGE Catalogue, 1977-1978." Center for Continuing Education.

degree programs to on-the-job administrators and engineers in business administration and eight areas of engineering. It broadened community college and junior college curricula throughout the state by offering courses and enrichment materials in sciences, engineering, mathematics, and computer programming. It provided courses for college credit to both advanced students and teachers of Colorado's secondary schools. To support those and other diversified educational programs, over 500 videotapes were shipped weekly to various industrial, governmental, and educational locations in Colorado. Other
videotapes were shipped to out-of-state sites where people were embellishing their education through CSU courses and programs.

The faculty of CSU has merged telecommunications with traditional instruction to transform on-campus courses and programs into relatively inexpensive off-campus higher education programs. By imaginative exploitation of videotape flexibility, CSU has developed a unique application of telecommunications to overcome extreme environmental restraints in providing higher educational opportunities to Coloradans through television.

THE SOUTH CAROLINA EDUCATIONAL TELEVISION SYSTEM

Historical Background

Social concerns prompted the birth of the South Carolina educational television system. During the late 1950s, state business and political leaders became concerned with the high illiteracy rate of the state, the low educational level, and the shortage and inferior qualifications of certain public school teachers. Concomitantly, the state's economy was undergoing a transition from an agricultural to an industrial base which was imperiled by the inadequacy of training and education in the manpower resources. Television was viewed as the means to provide

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the quantum jump in educational communications that was needed to remedy those social ills throughout all geographic areas of the state.

In 1957, the state legislature passed a resolution calling for a study of television usage in public schools. Consequently, a study committee was formed, studied the existing situation, and recommended a pilot, closed circuit television project in several high schools in Columbia. After three years of testing, the legislature authorized the Educational Television Commission in 1961 with a mandate to serve primary and secondary education, higher education, business, and industry through a state-supported closed circuit network. The initial expansion of the system to 31 schools in 11 counties required negotiation of the first reduced tariff rate for educational television in the nation with the telephone companies of South Carolina.

Since those early days, the closed circuit television coverage has been extended to all counties, and open circuit television stations have been added to the network. Educational programming has been distributed by eight public television stations and the closed circuit system which interconnected the ETV center in Columbia with 381 statewide

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66 Ibid.
receiving locations by telephone company cable and microwave facilities. Public television, in addition to cultural programming, has been used to broadcast ITV courses to preschool and elementary school grades, staff development courses to teachers, and college-level courses for the general public. The closed circuit system has grown to provide approximately 150 educational programs per day over four channels to regional university campuses, secondary schools, hospitals, technical education centers, and police departments. An FM educational radio network was added to the system in 1972 which made possible the initiation of services for blind and other handicapped South Carolinians.

Formal higher education ETV programs for the general public were initiated in 1970 when the University of South Carolina adapted the distribution of its off-campus graduate program in business administration to television. It permitted live classes to be transmitted over the closed circuit network to 18 receiving classrooms. A "talkback" capability in each classroom allowed direct student participation with the professor and students of the originating university classroom. College credit courses have since been offered by other public colleges and universities. Course coverage has been enlarged to include education, history, government, mathematics, English, psychology, computer science, and general studies courses. A complete graduate degree program has also been added in engineering which
leads to a M. A. degree. In 1977, 4,063 students were enrolled in one of 69 college credit courses offered over the ETV closed circuit or open circuit facilities.

Among the other significant events in the development of the ETV network were the assignment of a regional public television distribution responsibility and the participation in satellite transmission of educational programming. Since 1967, the South Carolina ETV network has served as the headquarters station for the Southern Educational Communications Association (SECA) in the national public broadcasting network. SECA has comprised and served nearly 50 per cent of the ETV stations in the nation covering states from Maryland to Texas. In 1969-1970, the nation's first live domestic satellite transmission was organized by the network and transmitted for live broadcast in Los Angeles, California. Beginning in 1976, educational television programming was produced by the ETV network and was transmitted via a NASA Communications Technology Satellite to more than 50 public television stations in the Southeast. As the flagship for SECA, the network presents the potential through satellite transmissions of interconnecting an entire national region and of making possible televised educational programs in even the remotest areas.

General Administration

The South Carolina ETV Commission was created by legislative statutory code to provide a comprehensive educational communications system to the citizens of the
From the outset, the system has been committed to elevating, augmenting, and diversifying educational opportunities for South Carolinians, regardless of age, education or geographical location. The Commission was organized into two principal components—a supervisory committee and a working staff. Specific objectives and responsibilities of the Commission were:

1. to provide instructional lessons on television for use in elementary, secondary, post-secondary, and technical training schools of the state;

2. to provide comprehensive programs for the teachers of South Carolina to continue their professional development and upgrade their certification;

3. to provide continuing professional education in medicine, law, dentistry, nursing, pharmacy, law enforcement, and other fields as the need arises;

4. to offer educational television materials for the continuing education and training of business and industrial personnel;

5. to cooperate with all state agencies by providing training for agency personnel and inter-agency communications; and,

6. to provide social and cultural information about the world to the general public.

Organization. The supervisory committee of the ETV Commission has served as a board of chairmen for the statewide ETV system. The committee established general policy for the working staff component, interfaced with comparable state agencies, and answered to the general public for ETV activities and performance by reporting to the governor and the legislature. Committee membership was prescribed in the
enabling legislation of the ETV Commission. It allowed the governor to appoint seven members and specified that the Chairmen of the General Assembly and Senate Education Committees, the Chairmen of the General Assembly and Senate Finance Committees, and the State Superintendent of Education must serve as ex-officio members. With such legislative and educational representation, sufficient clout has been interwoven into the agency to substantiate financial requirements and to assure their competitiveness among other state priorities for appropriations.

Daily functioning of the ETV network was managed by a general manager who is separate from the supervisory committee. His primary responsibility was the effective and efficient management of the statewide ETV system consisting of the closed circuit network, the open circuit network, the educational FM radio network, and the production center. To assist in the overall management of the system, there were seven functional divisions: The division of continuing education, the division of operations, the division of special services, the division of radio, the division of station operations, the division of administration, and the division of finance. Approximately 250 employees operated the ETV network.

The organizational structure of the ETV Commission is shown in Figure 4.
PLEASE NOTE:

Print on some pages is small and indistinct. Filmed in the best possible way.

UNIVERSITY MICROFILMS.
Figure 4. Organization of the South Carolina Educational Television Commission (1977)
The division of continuing education was managed by a director of education. The division was responsible for programming development, content and scheduling of ETV programming. It served the public school educational system and the higher education program of the state, which included continuing professional education, technical education, and adult education. Likewise it assisted state agencies in their training programs by advising, producing, and distributing educational materials through the network. This division was also responsible for serving local community, at-home viewing requirements by interfacing with the national public broadcasting service to obtain public interest, social and cultural programs.

The division of operations fulfilled four major functions for the network. These were:

1. to combine technical and aesthetic aspects of telecommunications in the production of ETV programs.

2. to operate five broadcast transmitters, four for the closed circuit cablecasts and one for open circuit broadcasts, and to construct additional stations for the delivery of programs to schools and the citizens of the state;

3. to provide scheduling of transmission resources and quality control of production and transmission activities; and,

4. to maintain the technical equipment of the network.

The special services division provided assistance to the users of the network. Specific responsibilities included assistance to public schools in the design, purchase,
installation, maintenance, and replacement of receiving systems; the development, installation, and evaluation of the closed circuit expansion in the state for higher education, public schools, professional organizations, state agencies, and the medical network; and, miscellaneous supporting activities to the ETV network staff. It also operated the ETV trouble reporting center.

The radio division consisted of educational FM radio stations in Greenville, Sumter, Charleston, and Columbia. The division provided programming development and production, content, and scheduling of instructional radio programs. Primary users of the educational radio service were the public schools, teachers, the Commission for the Blind, and the general public. Production was decentralized to the four broadcasting stations who were responsible for meeting the needs of their respective coverage areas.

The division of station operations was organized to manage educational television stations in Beaufort and Sumter which have a local production capability. These stations enabled the network to increase ETV coverage to fringe areas at a more economical cost than expanding the network level.

The divisions of administration and finance assisted general management in overall coordination of the operating divisions. The administration division provided personnel management, public information and other administrative
services. And, the finance division provided financial management for the organization, which included financial accounting and budget formulation and execution.

Annual budget. Table 5 shows the state-supported budget for the ETV network. In addition to state appropriations, funding has also been obtained periodically on a project basis from federal sources, industry, and private donations. Significantly, the ETV Commission budget represented 1.25 per cent of the total state education budget.

Table 5

Annual Budget of the South Carolina ETV Commission Supported by State Appropriations (in Thousands of Dollars)

<table>
<thead>
<tr>
<th></th>
<th>FY76</th>
<th>FY77</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal services</td>
<td>3021.7</td>
<td>3362.1</td>
</tr>
<tr>
<td>Other operating expenses&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5623.5</td>
<td>7060.9</td>
</tr>
<tr>
<td>Employee benefits&lt;sup&gt;b&lt;/sup&gt;</td>
<td>11.8</td>
<td>30.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$8657.0</td>
<td>$10453.3&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>Includes $2.5 million for leased cable and microwave facilities.

<sup>b</sup>Nonappropriated state funds.

<sup>c</sup>Includes $25,391 for the operations of the Rock Hill ETV station which is scheduled to begin broadcasts in 1978.

Institutional users of the ETV network were not required to pay for programming service or the use of the transmission capability as in the case of higher education users. Installation costs within receiving schools and the costs of television receivers were paid for by local communities. The University of South Carolina paid for tie-in lines from their Instructional Service Center, an ETV production center, to the ETV network center in Columbia. The University also paid for the terminal service from the main trunk line in local communities to the regional campuses in those instances where the latter are not collocated with secondary schools or technical training centers. Likewise the telephone lines for the "talkback" system were paid for by the university.

Use of the ETV network. The utilization and performance of the ETV network for instructional programs and general education programs for the fiscal years 1976 and 1977 are shown on Table 6.

Colleges, universities, and agencies offering continuing or adult education, have employed the services of the ETV network in three ways. They have produced their own programs and utilized the network as the means for dissemination. They have engaged the ETV network in both the production and distribution of higher education programs. Or, in one instance, a college offered a college credit course in conjunction with the ETV network's open circuit broadcast of the "Ascent of Man," a national series of the
### Table 6

**Utilization and Performance of the South Carolina ETV Network for the Fiscal Years 1976 and 1977**

<table>
<thead>
<tr>
<th></th>
<th>Percentage of Broadcast Day</th>
<th>Number of Programs</th>
<th>Course Enrollments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FY76</td>
<td>FY77</td>
<td>FY76</td>
</tr>
<tr>
<td>ETV Instr Programs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public schools</td>
<td>79.8</td>
<td>81.9</td>
<td>999</td>
</tr>
<tr>
<td>Tchr development</td>
<td>1.9</td>
<td>4.8</td>
<td>33</td>
</tr>
<tr>
<td>Higher education</td>
<td>16.3</td>
<td>17.9</td>
<td>60</td>
</tr>
<tr>
<td>Professional ed</td>
<td>7.0</td>
<td>6.4</td>
<td>822</td>
</tr>
<tr>
<td>ETV General Programs</td>
<td>20.2</td>
<td>18.1</td>
<td>26c</td>
</tr>
<tr>
<td>Gen information</td>
<td>2.5</td>
<td>3.4</td>
<td>4</td>
</tr>
<tr>
<td>Children's prog</td>
<td>7.6</td>
<td>5.6</td>
<td>8</td>
</tr>
<tr>
<td>Public affairs</td>
<td>6.3</td>
<td>3.9</td>
<td>9</td>
</tr>
<tr>
<td>Cultural</td>
<td>3.8</td>
<td>5.2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>Radio Instr Prog</td>
<td>20</td>
<td>20</td>
<td>23,938</td>
</tr>
</tbody>
</table>

Total Course Enrollments: 1,167,894 1,413,330

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*a* Represents 88.4 hours/day of ETV programming over 4 closed circuit and 1 open circuit channels.

*b* Total course exposures/student; thus a student who takes 2 courses is counted twice.

*c* Programs per typical broadcast day.

Public Broadcasting Service (PBS). The initiative for and the development and administration of higher education programs on ETV, however, belonged to the colleges and universities. The ETV network played no role in the initiation and production of higher education programs unless needed or wanted by those institutions.

The main campus of the University of South Carolina, which was the principal user of the ETV network for higher education programming, had substantial production capabilities. University programs on ETV were developed and executed by their academic departments and administered by University policy and regulations, which included course content, credit, method of instruction, enrollment procedures, and tuition fees. Those departments produced courses in the form of live transmissions to regional campus classrooms from the studios of the Instructional Service Center or in television-equipped studio-classrooms. The transmissions were distributed through the closed circuit system of the ETV network without charge to the University. Higher education programs disseminated over the open circuit system were produced by the ETV network production center. Other materials were acquired through consortium arrangements or from outside film and videotape libraries and companies.

Academic Administration

Most of the college credit courses offered on the closed circuit system originated from television facilities
of the University. Likewise the University provided academic input into two of the four courses on open circuit television and coordinated the activities of a consortium in developing the third course. South Carolina State College developed the fourth open circuit course offered in 1977. Hence, the academic administration of college credit courses on ETV was primarily the procedures and regulations practiced by U.S.C.

Responsibility for the administration and management of ETV college credit courses at U.S.C. was decentralized to proponent academic departments. Open circuit television courses were administered by the Division of Continuing Education. Closed circuit courses were offered simultaneously with conventional on-campus classes from television-equipped classrooms. Those courses were administered in semi-traditional fashion through the respective academic departments. For both type ETV courses the registrar's office processed student registration and maintained student records in the conventional manner. Nevertheless, revision of typical application forms, enrollment forms, and machine-readable forms was necessary to allow for registration by mail.

**Open circuit courses.** Televised courses were broadcasted by the ETV network beginning the fall semester, 1974, with four courses. Since that time, two to four 3-credit hour courses have been offered during each fall and spring
semester by the continuing education division, and four more courses have been added to the list of available courses. All of these courses were produced by the ETV network in conjunction with an academic department and placed on broadcast-quality videotape for the actual telecasts.

Getting the open circuit courses "into the can" required proponency, a funding source, faculty approval, accompanying course software, production, and videotaping. The entire process takes 18 to 24 months before the first telecast, and frequently that telecast occurs before all the course lessons are produced and videotaped.

The birth of an open circuit course occurred from a flow of ideas between a state commission, such as the Commission of Higher Education, the higher education institutions, or an individual professor and the education director of the ETV network. The need for such a course was largely based on the perceived need as seen by the course sponsor. Two examples of this origination process were "The Teacher as Manager" and "Conversations in American Government" courses, which were two of the original open circuit courses.

"The Teacher as Manager" was generated through a dialogue in the Commission of Higher Education (the ETV network's education director is a member) in recognition of a need to provide management skills for the teacher of a public school classroom. To create the course, the
Commission put up $55,000. The University of South Carolina, South Carolina State College, Winthrop College, and Clemson University—the four teacher-training institutions of the state—put up $7,000 each. The ETV network donated $26,000 worth of staff, studio time, and miscellaneous equipment costs. Over a 17-months period, a committee of professors and a New York consultant worked with the network staff to produce the 26 half-hour segments that comprised the course and an accompanying manual for students. Professional actors were used to teach the lessons prepared by the different institutions. The copyrights of the course belonged to the Commission of Higher Education. Since the first course in 1974 through the fall semester of 1977, 1362 students have taken the course for graduate or undergraduate credit.

"Conversations in American Government," a government and international relations course, originated with a government professor at U.S.C. who wanted to supplement issues discussed in class with commentary from important national figures. The project was launched with seed money provided to the University by the Ford Foundation for innovative educational projects. From those funds, the professor's salary and travel costs, for both him and the ETV camera crew, were paid. The ETV network funded the salaries of its crew and the costs of the telecommunications materials used in the production. This multi-purpose course
has been used on-campus before 300 to 400 students per semester and off-campus for 54 undergraduate students. It also spawned two subsequent ETV government courses.

Table 7 shows the credit courses and enrollments that have been offered by U.S.C. on open circuit television since the initiation of the program.

Table 7
Open Circuit Credit Courses and Enrollments
University of South Carolina

<table>
<thead>
<tr>
<th>Courses</th>
<th>1974</th>
<th>1975</th>
<th>1976</th>
<th>1977</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Teacher as Manager&quot;</td>
<td>143</td>
<td>484</td>
<td>376</td>
<td>359</td>
<td>1362</td>
</tr>
<tr>
<td>&quot;Television in Education&quot;</td>
<td>71</td>
<td></td>
<td></td>
<td></td>
<td>71</td>
</tr>
<tr>
<td>English:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Cinematic Eye&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>98b</td>
</tr>
<tr>
<td>Government &amp; Intl Relations:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Conversations in Am. Govt.&quot;</td>
<td>21</td>
<td>33</td>
<td></td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>&quot;Problems in Am. Government&quot;</td>
<td>44</td>
<td>25</td>
<td></td>
<td></td>
<td>69</td>
</tr>
<tr>
<td>&quot;Issues among Nations&quot;</td>
<td>16</td>
<td>26</td>
<td></td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>History:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Saints and Legions&quot;</td>
<td>35</td>
<td>64</td>
<td>36</td>
<td></td>
<td>135</td>
</tr>
<tr>
<td>&quot;And Then There Were Thirteen&quot;</td>
<td></td>
<td></td>
<td>34</td>
<td>24</td>
<td>58</td>
</tr>
<tr>
<td>Totals</td>
<td>270</td>
<td>625</td>
<td>451</td>
<td>543</td>
<td>1889</td>
</tr>
</tbody>
</table>

\(^{a}\) All courses were 3-hour graduate or undergraduate credit.

\(^{b}\) Initially offered in Fall Semester, 1977.

Source: Division of Continuing Education, University of South Carolina, 1977.
The adoption of the open circuit courses was to optimize convenience and costs by not requiring that students come to the campus or that faculty go to the students. The contact between the student and the University was through the Continuing Education Division with the exception of instructor/student contact which will be described later. Application for the courses and university registration were combined and accomplished entirely by mail. Both on-campus and off-campus students were eligible for the ETV courses. To accommodate students who were not degree candidates, classification as special students allowed acceptance on a semester basis. Students enrolling in open circuit courses were charged fees payable to the University comparable to those charged on-campus students for 3-credit hour courses. These course fees were:

<table>
<thead>
<tr>
<th></th>
<th>State Resident</th>
<th>Non-resident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate courses</td>
<td>$90</td>
<td>$210</td>
</tr>
<tr>
<td>Graduate courses</td>
<td>$102</td>
<td>$255</td>
</tr>
</tbody>
</table>

Text book costs were separate and ranged from $4 to $15 for the courses offered during the fall semester, 1977. Graduate students were also required to pay an additional $10 application fee upon initial enrollment if in a degree program.

In addition to arranging and advertising the courses to be offered in a semester, accepting student applications and fees, and publishing and mailing instructional
materials to the student during the course, the continuing education division paid the instructor for his services and obtained leased telephone communications between the student and the instructor. The instructor received $1200 for teaching an open circuit course, the same amount paid to professors teaching other continuing education courses. Students were provided with a means of contacting the instructor during the course through a toll-free, state-wide, wide-area telephone system (WATS line). The instructor was provided with a 24-hour answering service which enabled the student to call free at any hour on any day and leave a recorded message if the instructor was not available. State leased telephone lines were used for the service, and the continuing education division paid a one-time cost of $400 to $500 for the answering device.

According to the Director of Continuing Education, the experience with open circuit courses has allowed the recovery of the division's operating costs for the program from about 50 percent of the student course fees. The University has realized revenue by having open circuit courses on television.

Other observations provided by the Director of Continuing Education were:

1. The open circuit ETV courses were properly assigned as a responsibility of the continuing education division.
2. The mail application/enrollment system worked but placed an administrative burden on the division staff to handle student support requirements.

3. Normal university catalogs, announcements, and bulletins were neither suitable nor timely for publicizing ETV programs.

4. Advertisement of ETV programs/courses require a comprehensive program employing public service radio and television spot announcements, notifications in professional newsletters, and mailing lists. Paid newspaper ads were too unprofitable.

5. College deans were more receptive to the use of ETV courses than their faculty.

6. Videotaped lectures should be avoided.

7. Most of the enrollment for ETV courses came at the graduate level for Education courses. (South Carolina allowed certification and step-increase credit for completing ETV Educational courses.) There is a need for a Master's level program in Education which can be completed in whole or in part through ETV courses.

8. Courses with time- and event-sensitive content, such as international relations courses on contemporary issues, are not recommended for ETV because of the high production costs to update frequently.

9. Use of selected PBS programs for college credit purposes, such as the "Ascent of Man" series, was not made at U.S.C. because of faculty disdain for the academic quality.


Closed circuit courses. The closed circuit program of U.S.C. took advantage of the statewide television capability of the ETV network through leased lines to offer college coursework to the major population areas of the state. U.S.C. was the sole university providing courses over the closed circuit system. Two programs were structured with sufficient coursework to enable students to earn
a Master's degree in business administration or engineering and science which could be completed entirely through ETV courses. Closed circuit courses were available to off-campus students at 18 locations--U.S.C. Regional Campuses at Aiken, Allendale, Beaufort, Conway, Lancaster, Spartanburg, Sumter, and Union; Technical Education Centers at Charleston, Cheraw, Florence, Greenville, Greenwood, Orangeburg, Pendleton, and Rock Hill; and, high schools at Camden and Georgetown.

Closed circuit courses were a simultaneous extension of actual on-campus classes brought together by telecommunications. On-campus, the classes were conducted in one of three classrooms specially equipped for closed circuit television transmission. With the exception of selected videotaped classes for engineering courses and for make-up purposes, off-campus students participated in on-campus classes visually and audibly through their television monitors and vocally through the telephone "talkback" system. The arrangement gave flexibility to the University in counting on-campus enrollment to justify conducting the course.

The number and types of closed circuit courses offered recently by U.S.C. are shown in Table 8.

Sponsoring academic departments administered and managed the closed circuit courses and programs. Besides the traditional departmental functioning in curriculum
Table 8

Number and Type of Closed Circuit College Courses and Enrollments,\(^a\)
University of South Carolina

<table>
<thead>
<tr>
<th>Type Courses:</th>
<th>Cr</th>
<th>En</th>
<th>Cr</th>
<th>En</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Administration:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MBA-ETV program</td>
<td>20</td>
<td>1447</td>
<td>22</td>
<td>1285</td>
</tr>
<tr>
<td>Other</td>
<td>(14)</td>
<td>(1179)</td>
<td>(17)</td>
<td>(1032)</td>
</tr>
<tr>
<td>Engineering:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APOGEE program(^b)</td>
<td>28</td>
<td>556</td>
<td>32</td>
<td>498</td>
</tr>
<tr>
<td>Education</td>
<td>6</td>
<td>1354</td>
<td>7</td>
<td>1217</td>
</tr>
<tr>
<td>Government &amp; Intl Relations(^c)</td>
<td>1</td>
<td>742</td>
<td>1</td>
<td>246</td>
</tr>
<tr>
<td>Math &amp; Computer Science</td>
<td>2</td>
<td>168</td>
<td>2</td>
<td>114</td>
</tr>
<tr>
<td>Psychology(^d)</td>
<td>1</td>
<td>134</td>
<td>1</td>
<td>167</td>
</tr>
<tr>
<td>Health Education</td>
<td>1</td>
<td>96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Studies</td>
<td>1</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>60</strong></td>
<td><strong>4515</strong></td>
<td><strong>65</strong></td>
<td><strong>3527</strong></td>
</tr>
</tbody>
</table>

\(^a\)All courses are 3-credit hours, except 2 business administration courses which are 5-credit hours.
\(^b\)APOGEE - A Program of Graduate Engineering Education
\(^c\)Course taken on U.S.C. campus by videotape cassette of "Conversations in American Government" open circuit course.
\(^d\)An introductory psychology course taken by advanced high school seniors in their own schools.

development, instructor assignment, and course and classroom scheduling, a professor was assigned the additional responsibility and provided a special secretary to coordinate on-campus and off-campus closed circuit instruction. Instructors for ETV courses were assigned from the regular departmental faculty members with an allowance made in their on-campus workload to accommodate the added administrative requirements caused by off-campus students. They were not provided special remuneration for teaching ETV classes.

ETV students met the same admission requirements as conventional students. Initial applications were submitted to the registrar through the sponsoring department and included previous academic transcripts, letters of recommendation, and entrance test results (the Graduate Record Examination or Graduate Management Admission Test for graduate applicants). A $10 non-refundable fee was also submitted with the application. For tuition, ETV students paid $30 per credit hour for undergraduate courses or $34 per credit hour for graduate courses. Out-of-state students paid $70 and $85 respectively. Texts and course materials were not included in those figures. ETV coursework or the degree earned through ETV coursework were indistinguishable on the students' records or diplomas from those of conventional students.

The closed circuit ETV program, particularly those leading to Master's degrees, were considered a viable
success by the University hierarchy. The courses were serving the educational needs of persons who had to meet normal work and family schedules throughout the state. Although there was competition between U.S.C.'s ETV programs and other universities' on-campus programs at certain locations, it was justified on the basis of offering alternatives to prospective students. Furthermore, the closed circuit courses required students to go to the Columbia campus four times during regular sessions and two times during summer sessions on Fridays or Saturdays to facilitate interaction between students and instructors and to allow for testing and other supervised activities as required by the instructor. Generally, there was an implied sense of community generated by the closed circuit graduate programs between the University and business leaders and engineers of the state.

**Delivery System**

Statewide delivery of higher education programming was provided through the services and facilities of the ETV network. Utilizing a closed circuit television system, television broadcasting, and FM radio broadcasting, a comprehensive educational communications network was established which provided statewide educational programming on a planned, systematic basis. To provide higher education programming was one of the reasons for establishment of the ETV network, but higher education institutions were only one of the
reasons for establishment of the ETV network. Hence, higher education institutions were only one of the customers of the network and a competitor for broadcasting and cable-casting time allocation. Those institutions involved with the system accounted for approximately 18 percent of the broadcast day of the ETV network's closed circuit and open circuit systems.

Providing courses over the closed circuit system required public universities to wire into the ETV network center for optimum distribution. Only one university--the University of South Carolina at Columbia--has done so which is largely attributable to its advantageous and proximal location to the center. (In 1978, the distance between U.S.C. and the ETV network center is scheduled to become even shorter as the latter will move into new facilities on the campus.) By means of telephone company cable facilities, the University linked its television-equipped classrooms with the statewide transmission capability of the ETV network center. The University television system, therefore, provided an essential component of the higher education delivery system. Additionally, the University employed other media in the ETV process by allowing student access to the University computer and using print materials for study guides, texts, and examinations.

ETV production and distribution. Located at the headquarters of the ETV Commission in Columbia, the hub of
the ETV network was the production and distribution center. The center had three color studios with the capability of making 2-inch broadcast-quality videotapes. A mobile color van which cost $500,000 was available for program production throughout the state. The center also employed a $100,000 CMX computer for videotape editing and a fully equipped animation studio.

To provide statewide coverage, the ETV network operated two transmission systems. One was the closed circuit coaxial cable system with numerous links to schools, colleges, and state and local public sites throughout the state. Multi-channel capacity was provided, but this did not allow access to individual homes. For home coverage, the other system utilized television broadcasting stations. Their transmissions, however, were limited to delivery on a single channel. Figure 5 shows the statewide coverage of the ETV network.

**Closed circuit network.** Linked by cable and microwave facilities leased from 14 telephone companies in the state, the closed circuit network reaches 253 secondary schools, 23 colleges and universities, 18 technical education centers, 32 hospitals, and 57 other state and local public locations.

The extensive coverage was achieved by four major arms of the network which go to various parts of the state. These arms cablecasted four closed circuit channels, three
Figure 5. The South Carolina ETV Network
dedicated primarily for ITV use and one for higher education and hospital use. By way of regional distribution centers and videotaping capability, the number of outgoing channels was increased to 10 at some locations. Channel programming was controlled by a computerized master control system that starts and stops programs automatically, transmitting to one, two, three, or four arms of the system.

Table 9 shows the average hours of use for ITV, higher education, health education, technical education, and law enforcement training during a normal school week in 1977.

Table 9
Average Number Hours of Closed Circuit Channel Use During a Normal School Week in 1977a

<table>
<thead>
<tr>
<th>Users:</th>
<th>Channels</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A  B  C</td>
<td></td>
</tr>
<tr>
<td>ITV</td>
<td>9.7 9.3 7.8</td>
<td>26.8</td>
</tr>
<tr>
<td>Higher educationb</td>
<td>1.2 2.2 5.4</td>
<td>4.7</td>
</tr>
<tr>
<td>Healthb</td>
<td>.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Law enforcement trng</td>
<td>.6</td>
<td>.4</td>
</tr>
<tr>
<td>Technical education</td>
<td>.6</td>
<td></td>
</tr>
<tr>
<td>Total Channel Hrs.</td>
<td>12.1 12.3 13.2 7.8</td>
<td>45.4</td>
</tr>
</tbody>
</table>

aNormal cablecast day begins at 8:30 a.m. and ends at 10:00 p.m.
bAlso use closed circuit channels on Saturdays

Open circuit network. To provide ETV coverage to the home, the network included a system of eight ETV broadcasting stations. These stations were located in Columbia, Greenville, Charleston, Allendale-Barnwell, Florence, Sumter, Beaufort, and Rock Hill. Six of the stations were programmed entirely from the ETV network in Columbia. The Beaufort and Sumter stations have local studio facilities, and produced material both for their use and for network use.

Planning was underway to construct three additional stations. Bonding authority has been provided by the State Legislature which was awaiting matching Federal funding to put the stations on the air.

In the fall semester of 1977, the daily broadcast times for the four college credit courses being offered were generally not in prime viewing time. The course broadcast times were:

1. "Reading: The Road to Understanding"
   7:30 a.m. to 8:00 a.m., Sunday
   6:15 a.m. to 6:45 a.m., Wednesday
   10:00 a.m. to 11:00 a.m., Saturday (repeat)

2. "Cinematic Eye"
   2:00 p.m. to 4:00 p.m., Sunday
   8:00 p.m. to 10:00 p.m., Tuesday

3. "Teacher as Manager"
   6:15 a.m. to 6:45 a.m., Tuesday & Friday
   11:00 a.m. to 12:00 Noon, Saturday (repeat)

4. "Saints and Legions"
   6:15 a.m. to 6:45 a.m., Tuesday & Friday
   12:00 Noon to 1:00 p.m., Saturday (repeat)
U.S.C. closed circuit system. Since 1972, the University of South Carolina has put together a sophisticated television capability at a cost of approximately $1.6 million which was acquired through the years from state appropriations. It consisted of four studios interconnected by cable, three leased lines to the ETV network center, and a telephone "talkback" system connecting the studio classrooms with off-campus classrooms. The television organization was a division of the Instructional Services Center, and the facilities were used for on-campus television instruction as well as for off-campus ETV programs.

Three of the studios were located in the Instructional Services Center. The main studio comprised a full color studio production facility which could broadcast and videotape a variety of programs by combining slides, audio tapes, graphics, videotapes, 8mm and 16mm motion pictures, and live television production. It was configured into a classroom for ETV closed circuit classes. There was also a full color van for on-location videotaping. The other studios served as a master control facility or as a videotaping facility.

The fourth studio was located in the College of Business Administration. Partially funded by local corporations and a bank in Columbia, the studio-classroom accommodated 24 students with additional space in an adjoining classroom with television monitoring equipment. The
studio-classroom contained three fixed color cameras--two for long shots and one for over the instructor's desk to cover written and graphic materials. Slides and films could be incorporated into class presentations. Personnel of the Instructional Services Center manned an adjacent control room to transmit and monitor the programs. Each program was taped to permit playback in the event of communications failure.

The leased telephone lines between the studio-classrooms and the off-campus classrooms permitted two-way communication between the instructor and the off-campus student. Since all telecasts were "live," the system enabled any student to ask questions and participate in the ongoing discussion in the class, regardless of the student's location. The University paid $74,000 annually to the telephone company for the "talkback" service and the cable facilities linking the studio-classrooms with the ETV network center.

Curriculum Development

Curriculum development for the ETV program was facilitated by the nature of the television distribution system. Since the majority of the classes were cablecasted "live" from the campus, the curriculum for off-campus programs was simply an extension of the on-campus curriculum for the same program. The two major programs offered by the University were graduate programs leading to a Master's
degree in business administration or engineering and science.

**ETV-MBA programs.** The curriculum for the ETV-MBA program resulted in every student completing a minimum of 36 semester hours of coursework. Persons with little background in business and economics required 46 semester hours to earn the degree. Prior to entry into the program, all students demonstrated a basic proficiency in written communication, elementary mathematics, and computer fundamentals by examination. The regular body of the program included four foundation courses, four functional area courses, two integrative courses, and four electives. A normal course load consisted of one five-hour course or two three-hour courses in a regular semester and one three-hour course during the summer session. Successful accomplishment of the workload at that rate enabled the student to complete the program in three years.

**APOGEE program.** The engineering program or APOGEE was designed to accommodate the engineering community of the state. Physical science graduates may take the program, but they earn a Master of Science degree. Previously, faculty went to the students; however, the specialized nature of the courses restricted the demand to the point that it was uneconomical. Furthermore, the system then in effect did not allow for the varied working schedules of the practicing engineer. The ETV program was developed to permit completion of a 30-hour curriculum in two and a
half years. Student goals were primary in determining a curriculum with the exception of three core courses. For each course in a regular semester (there were no summer courses in the program), the student viewed weekly a videotaped presentation of a problem or points for discussion at his convenience, performed the exercises, and attended the cablecasted lecture which covered the earlier problem or exercise. Students were required to attend classes on the main campus four times during the semester, usually on Saturdays, to meet the instructor, to take tests and to take the end-of-course examination.

Summary

The South Carolina ETV network provided a comprehensive statewide communication system for extending post-secondary education in the state. Although primarily oriented toward educational enrichment programs for youth in elementary and secondary schools, approximately 30 percent of the broadcasting day was employed to deliver educational programming for adults. Through the statewide closed circuit ETV system and to a lesser extent, public broadcasting, diversified credit and noncredit continuing education was offered in the communities and for some programs, homes to an average enrollment of 47,000 adult students consisting of businessmen, engineers, medical personnel, teachers, unskilled and semi-skilled laborers, and other adults.

The closed circuit ETV network, which consisted of
a production and distribution center and leased telephone microwave facilities, enabled origination of credit courses on the main campus of the University of South Carolina and reception of those programs at regional campuses located in the population centers of the state. By means of the closed circuit system and a telephone "talkback" capability, students at off-campus sites became involved visually and vocally in live on-campus classes. The University of South Carolina offered a total of 65 college credit courses which included complete Master's level programs in business administration and engineering.

Unfortunately, the effluent nature of the closed circuit system restricted origination of off-campus programs to those universities and colleges situated nearby the network distribution center. As a consequence, the University of South Carolina which is adjacent to the ETV network headquarters originated the courses.

Four to five college credit courses per semester were also available through the open circuit system of the ETV network. Here again, the University of South Carolina provided most of the public broadcasting courses. Since the start of televised courses in 1974, the mean enrollment per annum has been 471 students. Nearly three-quarters of that enrollment consisted of teachers who could obtain certification credit for successful completion of the Education course, "Teacher as Manager."

Educational opportunities have been made available
to South Carolinians by their ETV network. The students served ranged from pre-school to advanced higher education levels. Yet, the ETV budget represented only 1.25 percent of the total educational budget in South Carolina.

INDIANA HIGHER EDUCATION TELECOMMUNICATION SYSTEM

**Historical Background**

The Indiana Higher Education Telecommunication System (IHETS), a statewide consortium for higher education communications, had its beginning in the early 1960s. A television microwave system utilizing leased telephone lines was established linking Indiana University at Bloomington, Purdue University at Lafayette, and their regional campuses in Indianapolis. The primary purposes of this configuration were to exchange instructional materials between the two main universities and to provide materials to the regional campuses. In practice, most of the network traffic consisted of materials distributed to the regional campuses with minimal interinstitutional sharing among the two main schools.

Further expansion of the network, emergence of a continuing medical education requirement, and potentially drastic implications for smaller state universities led to an extensive evaluation of the television system and its future development. Purdue University initiated the study by contracting Jansky and Bailey, a private engineering firm. Subsequently, Indiana State University at Terre Haute,
Ball State University at Muncie, and Indiana University joined in the support of the study. It recommended the formation and development of a state-supported higher education telecommunication system to serve higher education in Indiana.

IHETS became an institutional entity following enactment of legislation by the General Assembly in 1967. The four state universities were empowered to "jointly arrange...for the use of a multi-purpose, multi-media, closed-circuit, statewide telecommunication system...to interconnect the main campuses and the regional campuses of the state universities, and centers of medical education and service." Two years later, IHETS was a fully switched, statewide closed circuit television network; it also included a statewide telephone service network and a "talkback" feature for the television system. The State legislatures of 1971, 1972, and 1973 added respectively to the system: Vincennes University, Indiana Vocational Technical College, and the consortium of 34 independent colleges and universities in Indiana. After six years, IHETS became a statewide educational communications consortium joining the 69 campuses of Indiana's public and private higher education institutions.

Initially, the communications services of IHETS consisted of operating and maintaining the closed circuit television network and the telephone and data transmission network. In 1974, the telephone companies of Indiana initiated a statewide TELPAK system between cities which enabled IHETS to offer a telephone-buying service through shared usage of fixed circuit packages. Since this led generally to cost savings and additional circuitry, an educational radio network was formed linking the public radio stations of five state universities. In 1977, a conference network consisting of two separate audio networks was organized for conducting administrative meetings, faculty meetings, regional reporting, instruction, and other types of program sharing.

General Administration

Since its authorization in 1967, IHETS has become a focal point and a catalyst of interinstitutional innovation and cooperation in devising creative solutions to education and in utilizing the comprehensive telecommunications capability. System services and programs included:

1. a closed circuit television network with a "talkback" capability transmitting from six statewide locations and offering seminars, workshops, and credit and non-credit courses to 41 campus locations and 37 hospitals in Indiana;

2. a State University Voice Network (SUVON) which connected 69 campuses of the state's public and private colleges and universities and provided standard telephone service, facsimile transmission, slow-speed computer data transmission, and conference call meetings;
3. a radio network connecting the radio stations of 12 colleges and universities for sharing of program materials;

4. administration of the State TELPAX System which enabled reduced telephone rates through leased circuit packages and which allowed connecting computers and terminals, as well as voice communications, between state agencies and educational institutions; and,

5. a conference network configured between Vincennes University and its regional campus and between Indiana Vocational Technical College and its 13 centers for administration and instructional uses.

**Organization.** Overall control and supervision of IHETS consisted of three levels of management: a trusteeship level, a supervisory level, and an execution level. Coordination of institutional interests and of IHETS' operational procedures, system development, and programming transpired through a council and standing committees comprised of institutional representatives. Figure 6 shows the managerial structure.

Charged by legislative fiat, the Indiana University Board of Trustees was given the responsibility and authority to organize, operate and evaluate a telecommunications system for educational purposes for the higher education institutions and other groups in Indiana. Supporting resources were provided by funds appropriated biennially by the state legislature. Executive supervision of the telecommunications system was vested in the President of Indiana University.
Figure 6. Organization of the Indiana Higher Education Telecommunication System (1977)

- Indiana University Board of Trustees
  - President
    - Director for IHETS Development
      - Executive Director IHETS
        - Committee on S.D.
          - One member per institution
          - Project Committees as needed
        - Committee on Programming
          - One member per institution
          - Project Committees as needed
        - Advisory Council on Policy
          - One member per institution
          - Director for IHETS Development
          - Executive Director Ex-officio members
          - Ex-officio members
The supervisory level of management consisted of the President of Indiana University, his agent, and an advisory council. Policy for the general administration of IHETS was established at this level. The agent, the head of Learning Resources at Indiana University, was designated Director of IHETS Development and was assisted in his policy-making function by the Advisory Council on Policy. The Council consisted of one member, usually at vice president or assistant provost level, from each higher education institution, the consortium of independent colleges and universities, the vocational technical college, and the medical center. Both the Director of IHETS Development and the Executive Director of IHETS were ex-officio members of the advisory council.

The execution level of IHETS comprised the professional staff and institutional coordinating committees charged with planning, programming, budgeting, operating and evaluating the system. An executive director was appointed to manage IHETS. To plan IHETS development and employment as an educational instrument and to represent institutional interests were two standing committees of institutional members: the Committee on System Development and the Committee on Programming. Each committee was empowered to organize project committees as they were needed to meet specific educational objectives.

The executive director and the professional staff of IHETS were organized along functional and operational lines.
They operated the IHETS communications networks interconnecting educational centers in Indiana; assisted and encouraged users in shaping applications of the media in attaining educational objectives; and, provided a stimulus through committees, publications, conferences in which the people involved in higher education cooperated in devising creative solutions to educational problems. The IHETS staff was organized as follows:

<table>
<thead>
<tr>
<th>Admin and Member Services</th>
<th>System Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Director</td>
<td>Director of System Opsns and Development</td>
</tr>
<tr>
<td>Admin Secretary</td>
<td>Assistant Director Operations Secretary</td>
</tr>
<tr>
<td>Coordinator of Admin</td>
<td>Chief Engineer Chief Design Engineer</td>
</tr>
<tr>
<td>Services</td>
<td>Operations Secretary</td>
</tr>
<tr>
<td>Coordinator of Bus Affairs</td>
<td>Network Control Supervisor</td>
</tr>
<tr>
<td>and Radio</td>
<td>Network Control Engineer</td>
</tr>
<tr>
<td>Adm Assistant</td>
<td>Traffic Coordinator</td>
</tr>
<tr>
<td>Asst Dir of Member Services</td>
<td>Electronic Lab Asst</td>
</tr>
<tr>
<td>Asst Dir of Member Services</td>
<td></td>
</tr>
<tr>
<td>Member Services Secretary</td>
<td></td>
</tr>
</tbody>
</table>

Annual budget. IHETS was funded by the state legislature for constructing, operating, maintaining, and administering the telecommunication system. Payment for the telephone and microwave facilities between campuses was funded by the IHETS budget; this included capital investments for construction of terminal facilities at the various campuses. The member colleges and universities budgeted for intracampus circuitry, media equipment, and studios. They also paid for the materials transmitted over the networks. Federal, foundation and industry funding was obtained where possible for network projects. The annual state-supported budget for the telecommunication system is shown on Table 10.
Table 10

Annual Budget of the Indiana Higher Education Telecommunication System Supported by State Appropriations (in Thousands of Dollars)

<table>
<thead>
<tr>
<th></th>
<th>1975-76</th>
<th>1976-77</th>
<th>1977-78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries, wages and fringe benefits</td>
<td>285.7</td>
<td>310.6</td>
<td>338.6</td>
</tr>
<tr>
<td>Telecommunication&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1398.6</td>
<td>1404.7</td>
<td>1442.2</td>
</tr>
<tr>
<td>Video/data lines</td>
<td>(831.2)</td>
<td>(792.1)</td>
<td>(824.1)</td>
</tr>
<tr>
<td>SUVON</td>
<td>(551.4)</td>
<td>(598.1)</td>
<td>(509.1)</td>
</tr>
<tr>
<td>Radio, teletype, and talkback</td>
<td>(16.0)</td>
<td>(14.5)</td>
<td>(20.0)</td>
</tr>
<tr>
<td>Supplies and expenses&lt;sup&gt;b&lt;/sup&gt;</td>
<td>89.8</td>
<td>101.0</td>
<td>113.7</td>
</tr>
<tr>
<td>Capital&lt;sup&gt;c&lt;/sup&gt;</td>
<td>132.2</td>
<td>155.1</td>
<td>151.8</td>
</tr>
<tr>
<td></td>
<td>$1906.3</td>
<td>$1971.4</td>
<td>$2046.3</td>
</tr>
</tbody>
</table>

<sup>a</sup> Included $900,000-1,000,000 for leased telephone microwave facilities.

<sup>b</sup> Included office supplies, publications, travel, and other administrative expenses.

<sup>c</sup> New equipment purchases and construction, primarily ITFS reception items.


Use of the telecommunication network. The utilization and performance of the IHETS network for higher education and public service programming for recent years are shown in Table 11.
Table 11
Utilization and Performance of the
Indiana Higher Education
Telecommunication System
Video Network

<table>
<thead>
<tr>
<th>Pct of Bcast Day</th>
<th>Prog/Hrs/ Bcast Day</th>
<th>Course Enrollments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1975</td>
</tr>
<tr>
<td>Credit courses</td>
<td>39</td>
<td>8.3</td>
</tr>
<tr>
<td>Noncredit courses</td>
<td>16</td>
<td>3.4</td>
</tr>
<tr>
<td>Medical programs</td>
<td>37</td>
<td>7.9</td>
</tr>
<tr>
<td>Gen info programs</td>
<td>8</td>
<td>1.6</td>
</tr>
<tr>
<td>100%</td>
<td>21.2</td>
<td>18512</td>
</tr>
</tbody>
</table>

aData calculated from Spring semester, 1978 TV schedule.

bCalculated from distribution of the total number of students served by television/indicated year, based on distribution data that was determined during Fall semester, 1974, as follows:

Non-credit students 49%
Credit students 27%
Medical students 24%


The television network was the media mainly used for the continuing education programs. Public service programming, medical education programming, and credit and non-credit courses that were developed by an institution or collectively by two or more institutions were produced in
university television studios and studio-classrooms; the network central of IHETS did not have a production studio. Educational programming originated from one of ten channels and was received in campuses, hospitals, industrial sites, and public television stations in as many as 17 cities of Indiana. By the 1976-77 school year, there were 27,613 students served by television, which reflected an average annual enrollment increase of 3600 students since the 1970-71 school year when televised course enrollment was first compiled.

In addition to the graduate and undergraduate students participating in credit programs, many organized professional groups used IHETS facilities in conjunction with higher education institutions to transmit statewide specialized continuing education programs. Among these groups were: accountants, attorneys, businessmen, clergy, engineers, farmers, journalists, medical and dental personnel, pharmacists, real estate salesmen, speech therapists, teachers, university administrators, and veterinarians. This programming was primarily non-credit and irregular in duration.

Interinstitutional cooperation. An interinstitutional project comprised the programming and course material carried on the television network which was developed by two or more institutions working together. Cooperation to achieve effective use of the system and attain the educational objectives was primarily effectuated through IHETS committees
and project committees and specified in a procedural handbook for system use and participation committees. They were fundamental to the planning, developing, and budgeting of interinstitutional projects. The IHETS staff expedited those efforts by providing facilitative services, such as proposal-writing, coordination services, and technical consultation. Projects were approved by the Advisory Council with the concurrence of the participating institutions; one institution was designated as the "academic agent" and another as the "producing institution."

The institution assigned as "academic agent" managed the academic portion of the budget and appointed the academic course director. Preparation of the course content, assembly of the faculty, which could come from other institutions if authorized, and division of course responsibilities were the principal tasks of the academic course director.

The "producing institution" designated the executive television producer for the production of the course. Working closely with the academic course director, the executive television producer managed the production and the production budget, including materials, services, and originating costs during the initial offering of the course. Also, scheduling of IHETS telecasting time was arranged for the course.

Other interinstitutional operational responsibilities were also detailed in the IHETS procedural handbook through a series of agreements and policies. Procedural guidelines were established insofar as enrollment on the
various campuses, collection of fees by the receiving campuses, recovery of costs, financing course materials, provision of library materials, and procedures to be used for publicizing the course. Participating institutions defined faculty rights and negotiated agreements concerning such matters as copyright, course revision, subsequent use, storage, and disposition. After the initial course offering, ownership of the course passed automatically to Indiana University as the statutory fiscal agent. Similarly, when copyrights were obtained, they were held by Indiana University.

**Academic Administration**

The television network served a broad spectrum of clientele with a variety of educational courses from different state universities. Packaged programs leading to external degrees, however, were not offered on television. In fact, non-credit courses, primarily medical education programming, dominated televised higher education programming. Credit courses that were being offered served mostly the special needs of professional groups. Purdue originated most of the credit courses which were principally graduate engineering courses.

Examples of the diversified statewide higher education programming on the IHETS network were:

1. Purdue sent six to eight graduate engineering courses not only to campuses around the state but also to industrial sites in several cities in Indiana. They also
produced credit courses and seminars in agriculture, nutrition, and speech and audiology.

2. Indiana Schools of Dentistry, Medicine, and Nursing offered weekday programs and their educational resources to training hospitals as part of the State Medical Plan. A nursing home administrators course was offered for licensing purposes.

3. Indiana University produced a real estate salesmen's course which was preparation for state licensing and which was viewed by an average of 5000 people annually from 37 locations. A stellar astronomy course was also offered to other institutions to share the professional talents of Dr. Frank Edmundson, the noted astronomer.

4. The state universities jointly produced courses for credit and noncredit in history, consumer law, global education, juvenile justice, and Afro-American studies.

5. Ball State joined the University of Evansville to produce a career education seminar series.

6. Indiana State produced and offered graduate research courses in educational psychology and special education and seminars for high school science teachers.

7. Six IHETS members combined efforts to write and produce a series of 19 videotapes on the Occupational Safety and Health Act for the training of employees.

8. Ball State's School of Architecture, one of two such schools in the state, developed and telecasted a course on the history of city planning which was delivered to 14 campuses.

9. The Butler College of Pharmacy, the Purdue School of Pharmacy and Pharmacal Sciences, and the Indiana Pharmaceutical Association developed a professional refresher course which annually served 1500 to 1700 pharmacists on 12 Indiana campuses.

10. The Indiana University/Purdue University in Indianapolis offered a noncredit graduate course in microcomputers to 276 enrolled students from locations in Indiana and the University of Louisville.

Admission and fees. The institution granting credit to the student was responsible for the admission and
registration of students taking televised courses. Registration occurred on the campus on which the course was taken. For students of other institutions, the registration officer used the instructions and forms of that institution for the registration and forwarded them upon completion.

Fees for graduate and undergraduate courses varied according to the institution offering the televised course. There was no charge for the IHETS services.

For interinstitutional courses, a uniform credit-hour fee structure was charged by the participating institutions. Normally, the fees for such courses were the highest of the regular fees charged by the participants. The student fees were collected by the institution whose facility was used for taking the course and forwarded to the participating institution where the student was registered. Any syllabus or other course material was purchasable by the student through local bookstores in accordance with local campus practices.

Credit and certificates. Credit from courses offered through the IHETS video system were acceptable toward degrees at the member institutions. Credits were also transferable among those institutions in the same manner that transfer credits are presently accepted by colleges and universities. Similarly, students could obtain self-acquired competencies credit for completion of certain noncredit courses.
Non-IHETS televised courses. In addition to the televised courses over the IHETS system, Indiana universities utilized intermittently open circuit television programming for credit courses, and Purdue employed CATV for course offerings in the Lafayette area. Ball State and other universities and colleges utilized national PBS broadcasts for courses. Some of these programs included the "Ascent of Man" series and "The Adams Chronicles." They were offered for credit only to students within the local viewing area.

Purdue University engaged two commercial CATV systems in Lafayette in a unique and innovative channel for providing educational opportunities to the local population. In the early 1970s, the University obtained exclusive use of Channel 5 by the Greater Lafayette TV Cable Company and invested $18,000 for installation of a microwave transmitter to deliver to the head end of the cable company's distribution system. Both credit and noncredit courses emanating from campus studio-classrooms were offered to subscribers of the CATV system.

Since 1973, Purdue has programmed between 30 and 40 hours weekly over CATV including as many as seven three-credit-hour courses. To enroll in a course, students paid $4 to $7 for the printed material of the course. Toward the end of the 15-week course, students paid $25 to the University if they desired to take the final examination and earn
credit for the course. From the fall of 1973 through the spring of 1975, 531 students enrolled in CATV courses by purchasing the course syllabi; 267 took the examination and 223 passed and received course credit.

Delivery System

IHETS comprised a number of media networks which employed a full application of telecommunications. Through these media networks, various capabilities, such as a large computer at one university being linked with a terminal at a small college, augmented on-campus' capacity for reaching and abetting the higher education endeavors of people throughout the state. The basic networks of IHETS were: the video network, SUVON, the radio network, and the new, and under test, conference network.

Video network. The video network was a statewide, computer-controlled, fully switched closed circuit network utilizing a 10 megahertz band for transmitting and receiving instructional and educational programming. Since 4.5 mhz was used for video and 6.6 mhz as subcarrier for the associated program audio, the bandwidth could be channeled for additional subcarriers such as high-speed data, high-fidelity sound, and a number of voice-grade and teletype circuits. The basic components of the closed circuit network consisted of: leased microwave radio paths from the telephone company; special switches for routing signals;
ITFS or CATV terminal distribution; a teleprocessing capability for video storage at terminals; and, a Varian 620-1 minicomputer for controlling, switching, and videotaping of programming. The basic configuration of the network is shown in Figure 7.

Multiple, bi-directional trunks emanated from six locations with a total of ten channels. The arrangement of video trunks enabled six originators of educational programming: Ball State, Indiana State, Indiana, and Purdue Universities, the Indiana University Medical Center, and IHETS network control. Simultaneous transmission of two different programs were possible at Indiana University in Bloomington, Purdue University in Lafayette, and the Medical Center and network control in Indianapolis.

Concurrent reception of two different programs was possible at the Fort Wayne, Gary, Hammond, and South Bend terminals, and the Medical Center and network control in Indianapolis. These programs could have been originated from the same or different locations. The other locations received only one program at a time. Utilization of teleprocessing gave the single trunk a capability of storing pre-transmitted programming.

Switches at six locations in the state permitted network reconfiguration from hour to hour to meet program transmission requirements. Switching was controlled automatically by a minicomputer at network control. Teleprocessing was also controlled through the minicomputer by
Figure 7. Indiana Higher Education Telecommunication System Video Network (1977)
signalling when to videotape and when to playback programming.

Instructional Television Fixed Service (ITFS) was the principal alternative utilized at certain terminal locations to extend inter-city network transmissions in local areas. IHETS installed and operated four ITFS systems with a fifth scheduled for operation in early 1978. Additional ITFS systems were planned for other locations in the future. At a cost of $15,000 for the ITFS transmitter, $5,000-10,000 for the antenna, and $2,500 for the receiving package, educational programming was extended from the network terminal in Dyer, Evansville, Indianapolis, New Albany, and when fully operational, Vincennes for a distance of 20-25 miles. For the various campuses and in some cases, industrial sites to receive the ITFS broadcast required a special antenna and a down converter attached to the television receiver.

Another alternative employed to locally distribute network programs was utilization of commercial CATV facilities. At a hook-up cost of $2,000, contractual agreements were made by IHETS with the television cable companies in South Bend and Kokomo which extended educational programming to the public and private colleges and universities in those areas. By remodulating network transmissions to the mid-band signals of the CATV system, the arrangement enabled confidential reception on the same television cable that
delivered programs to the homes of subscribers. Hook-up to the CATV system and the use of a converter, at a cost of $50 per unit, were required to receive the programming at the recipient institution.

IHETS employed dedicated telephone circuits to provide two-way exchange between the instructor and students during televised classes. Labelled teleresponse, this system used a portable, self-contained telephone unit with two telephone handsets and two 28-foot extension cords. By plugging in the equipment into a telephone line terminal in the classroom, conversation was possible between the viewer of the educational program in a remote classroom and the instructor in the originating studio.

**SUVON.** The State Universities Voice Network provided a direct-distance dialing telephone network interconnecting 69 colleges and universities in Indiana which included the public universities and their regional campuses, the independent colleges and universities, and the vocational technical college campuses. Although the primary function of the system was voice communications, the circuitry carried any type of signals transmitted over standard telephone lines, such as facsimile, teletype, and slow-speed data.

The individual circuits which made up SUVON were obtained by leasing bulk circuits through the shared-usage TELPAK system of the telephone companies of Indiana.
Packaged circuitry in one of four sizes provided discounts which significantly reduced the monthly cost per circuit mile and brought savings of 10 to 90 percent over leasing the same lines individually. Additionally, where there were extra lines in a TELPAK package, small colleges were able to make arrangements for sharing the computer resources of larger universities.

Radio network. Through additional circuitry of the TELPAK system, employment of circuits for shared FM-radio programming became possible. Initially, five university radio stations tested the sharing of news and special feature programming. Those five (Ball State, Indiana State, Indiana, Purdue, and Vincennes Universities' stations) were later joined by seven radio stations operated by independent colleges and universities. Each station transmitted and received programs. The Indiana University station served as the coordinating station for the network. Educational programming applications have been limited to carrying institutions' news, public affairs, and instructional programming.

Conference network. This, the newest of IHETS media networks, was still undergoing testing insofar as potential uses for the system. Essentially an audio network employing dedicated telephone circuitry, the conference network offered the possibility for providing class lectures with accompanying
projections from a 35mm slide carousel to remote campuses. Two subnetworks were operational: Vincennes University was linked with its regional campus and the vocational technical college was linked with its 13 regional centers. Conceptually, the conference network suggested an alternative to telecasting of educational materials where television scheduling or production costs are a problem.

**Curriculum Development**

There was limited applications of curriculum development of the educational programming on the IHETS video network. Most of the televised courses, particularly those offering credits, were part of a curriculum for a field of study. Some of the noncredit courses, however, necessitated course development for programming which encompassed special educational objectives for a specific group. Examples of programs that required the development of the course were the OSHA instructional series, the real estate courses, and the nursing home administrators' courses.

Responsibility for course development varied whether the program was an institutional offering or an interinstitutional offering. For intra-institutional courses, the academic policies of the producing institution prevailed in developing the program.

For interinstitutional courses, an academic agent was assigned among the participating institutions by the
Advisory Council upon approval of the course/program project. The institution that was designated the academic agent selected and appointed the academic course director who prepared the course content and coordinated the educational input of the participating institutions.

Summary

The Indiana Higher Education Telecommunication System was an innovative and comprehensive communication system that employed a video network, a telephone network, a radio network, and a conference network in supporting the higher education program of Indiana. Both public and private colleges and universities were capacitated to utilize one or more of the communication capabilities of the statewide system. By representation on the various committees and project committees guiding IHETS operations the institutions shared educational resources, yet maintained their academic autonomy, in employing IHETS facilities for extending their higher education programs.

The video network was the primary channel for distributing educational programming. Medical education, seminars, workshops, credit and noncredit courses could be telecasted from six locations over ten origination channels. Through leased telephone microwave facilities which were extended by ITFS or CATV terminal distribution systems, programs were delivered to each of the population centers of Indiana. Television scheduling was augmented by
teleprocessing which was automatically controlled as was the switching of transmitting and receiving channels by a computerized network control. Two-way communication between instructor and student in televised classes was permitted by a flexible teleresponse system.

A degree-awarding program was not part of IHETS programming. Medical education programming was the predominant user of the video network, followed by the credit courses, primarily graduate engineering courses, offered by Purdue University. This apparent disproportionate usage of telecasting time for specialized educational needs restricted the potential academic applications of the network.

Nevertheless, the statistical evidence of increased student enrollments and educational programming hours suggested expanding utilization of the IHETS system. The system was making possible the statewide enhancement of medical education, continuing education, professional retraining and updating, vocational and technical training, on-the-job training in business and industry, and general higher education. IHETS appeared to be a viable investment of the slightly more than $2 million annual state appropriations in providing expanded educational opportunities to the people of Indiana.
CHAPTER 5

SUMMARY, FINDINGS AND CONCLUSIONS

This chapter presents the summary of the considerations which provided direction for the study, the findings of the in-depth study of the Colorado, South Carolina, and Indiana educational telecommunications systems, and the conclusions drawn from those studies.

SUMMARY

The Problem

Methodical establishment of a statewide telecommunication system for off-campus higher education compels identification of the underlying organizational concepts and the basic functions for appropriate allocation and integration. Identification of these concepts and functions which must be considered in designing a statewide educational telecommunication system constituted the major problem toward which this study was directed. A model containing such information would be a useful tool and is needed for effective and efficient design of a statewide system.

Purpose of the Study

This study was undertaken to answer three fundamental questions. These were:

1. How can telecommunications be employed on a statewide basis to reach people with non-traditional higher
education programs?

2. What is the optimal organizational model to administer a statewide program?

3. What are the fundamental considerations for effective operation of the program?

**Specific Study Objectives**

Three objectives were established to guide the conduct of the study. These were:

1. To review the literature on higher education through television and on applications of statewide educational telecommunications systems;

2. To perform an in-depth study of the Colorado videotape system, the South Carolina educational television system, and the Indiana higher education telecommunication system, which are considered by many to be three of the foremost systems in the Nation; and,

3. From the in-depth studies, to synthesize an organizational model and the procedural concepts for the administration, coordination, and implementation of a statewide educational telecommunication system.

**Research Procedure**

The in-depth study of the three statewide systems was performed by using structured observation of the systems in operation, systematic interviews which solicited open-ended responses of key system operators, and examination of
documents. Operations of organizations and institutions served by the telecommunication system were also observed, which included personal interviews to obtain other perspectives of the system.

To conduct the observations and interviews, a research instrument (see Figure 1) was developed in the form of a format of the functional considerations of an educational telecommunications system which was determined from evaluation of models found in the literature review. This format consisted of: general administration, academic administration, delivery system, curriculum development, and the definitive subfunctions.

On-site visits were made to the Colorado, South Carolina, and Indiana educational telecommunication systems during the period, October, 1977 through January, 1978.

FINDINGS

This section outlines the findings of the study by the functional categories used in making the observations and interviews.

General Administration

Coordinating administrative agency and responsibilities. Operational and organizational dissimilarities among the three systems resulted in three discrete general administrative control mechanisms and levels of authority. These
were as follows:

1. In Colorado, a system of bicycling videotaped-instruction to firm and agency sites was operated by Colorado State University. General administration was divided between management of continuing education and that of media services. The Center for Continuing Education accounted for the videotaped off-campus programs, exercised fiscal control, and maintained liaison among appropriate academic departments, the media services, and the participating sites. The Office of Educational Media administered and maintained the television equipment, the videotaping of classes, the shipment of tapes, and the tape inventory.

2. The South Carolina ETV system for higher education comprised public closed circuit and open circuit networks and primarily the academic efforts of the University of South Carolina. The South Carolina ETV Commission administered and coordinated the networks which served all levels of educational and informational programming in the state. The primary originator of college-level programming (University of South Carolina) administered, produced, and delivered by electronic means their off-campus programs to the ETV network for inter-city distribution to their regional campuses.

3. The Indiana system, from the onset, consisted of a consortium of state universities and the IHETS distribution
network which existed solely for supplementing higher education. IHETS performed under the aegis of Indiana University but received operational guidance from an advisory council and standing committees composed of representatives of participating institutions. The IHETS Procedural Handbook for System Use and Participation delineated clearly administrative responsibilities for educational programming. IHETS provided various networks and stimulated institutional use of the capability. The universities administered and coordinated the educational programming in conjunction with their regional campuses. For interinstitutional courses, academic and production administration was affixed in the project approval process.

Staffing, budget and programs. (1) Table 12 allows a comparison of the sizes of the staffs, the budget, and programs of the three systems. (2) The committees and project committees used in the IHETS organization permitted minimum staffing.

Tuition fees. (1) Each system maintained tuition fees that were comparable to on-campus fees for enrollment. (2) By procedural fiat, IHETS interinstitutional projects established uniform enrollment fees among participating institutions.

Public information and advertising. (1) The three systems agreed that the best form of advertisement for off-
Table 12

Staff, Budget and Programs of the Colorado State University Videotape, Indiana Higher Education Telecommunications, and South Carolina ETV Systems (1977)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Staff (000)</th>
<th>Budget (000)</th>
<th>Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Carolina ETV Network</td>
<td>250</td>
<td>$10453.3\textsuperscript{a}</td>
<td>Closed Circuit ETV:</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Sec Sch ITV</td>
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<td>College Credit Cr</td>
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<td>Tech Credit Cr</td>
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<td>Professional Ed</td>
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<td></td>
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<td></td>
<td>Teacher Develop</td>
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<td>Open Circuit ETV:</td>
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<td>Elem Sch ITV</td>
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<td>Cultural</td>
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<td></td>
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<td></td>
<td>Public School Radio</td>
</tr>
<tr>
<td>Indiana Higher Education Tele¬</td>
<td>17</td>
<td>$2046.3\textsuperscript{a}</td>
<td>Closed Circuit ETV:</td>
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<tr>
<td>communication System</td>
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<td>College Credit Cr</td>
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<td>Telephone Network</td>
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<td>Radio Network</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Conference Network</td>
</tr>
<tr>
<td>Coloradio State University</td>
<td>16</td>
<td>$122.9\textsuperscript{b}</td>
<td>College Credit Cr</td>
</tr>
<tr>
<td>Videotape System</td>
<td></td>
<td></td>
<td>Professional Ed</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Includes state appropriations for network operations only.

\textsuperscript{b}Self-supporting program which includes all costs, less instructor salaries.
campus courses and programs were satisfied former students. (2) Newspaper advertisements were uniformly considered unprofitable. (3) Carefully planned public information programs were considered essential as a forerunner to course advertisements. Observed techniques included public service radio and television spot announcements, development, maintenance and use of mailing lists of former off-campus and on-campus students, and creation of a climate of bringing education to people. (The APOGEE program at the University of South Carolina was especially notable for generating an engineer community relationship between practicing engineers and the College of Engineering by addressing the former's professional needs and making available comprehensive engineering courses and degree-awarding programs.)

Cooperating agencies. Among the three systems, there were a number of instances of mutual benefit between a cooperating agency and the telecommunication system. Some of these were:

1. Fifteen junior colleges and community colleges in Colorado provided a market for videotaped instruction which they were otherwise unable to provide with their faculty.

2. The South Carolina Department of Education worked with the University of South Carolina in developing teacher development programming on both open and closed circuit
networks.

3. The Pharmaceutical Association of Indiana collaborated with the Colleges of Pharmacy at Butler University and Purdue University to establish professional continuing education programs which attracted 1500 to 1700 pharmacists annually to view the programming delivered by IHETS.

4. Uniform real estate instruction was provided to 37 locations in Indiana by IHETS. The programming originated at Indiana University in cooperation with the State Board of Realtors. More than 5000 students enrolled for the instruction annually.

5. CSU obtained usage of telephone circuits from the Colorado state-owned microwave system which allowed establishment of a consortium with small colleges for sharing computer time.

6. Both the Indiana and the South Carolina ETV systems were used to conduct statewide gubernatorial press conferences and periodic statewide meetings, thereby eliminating travel and per diem expenses.

Copyrights. (1) The live nature of the closed circuit courses of Indiana and South Carolina with minimum videotaping did not necessitate obtaining copyrights. Similarly, CSU videotaped-instruction was erased when the tapes were returned from the plant sites. (2) Where instructional courses were produced for videotaping, subsequent broadcasting, and possible sale, copyrights were obtained and held
usually by the primary funding agency. For example, copyrights for the "Teacher as Manager" series in South Carolina were held by the State Commission on Higher Education, the primary funding source for the program production.

Interstate sharing. Examples of interstate sharing of educational programming were relatively few. CSU did provide videotaped classes to students enrolled in SURGE degree programs, residing and working in Montana, Nebraska, New Mexico, North Dakota, and Wyoming. And, the Indiana system maintained an inventory of ETV programming which might be obtained from other colleges and universities in the United States.

Academic Administration

Coordinating agency and responsibilities. Noticeably, academic administration was a function of the colleges and universities offering off-campus ETV courses and programs. Neither IHETS nor the South Carolina ETV Commission, the two statewide network administrations, performed or believed they should perform any aspect of academic administration.

The coordinating agency assigned by the universities to perform academic administration was either the continuing education department or the academic department providing the course. In some instances, the responsibility was
shared between the two.

Specific university practices for administering off-campus courses by telecommunication were:

1. The University of South Carolina diffused administration for its ETV courses depending upon the ETV network utilized. For closed circuit courses, the appropriate academic department handled receipt of applications, assigned instructors, scheduled studio-classrooms and media assistance, mailed instructional materials, and maintained a point of contact for off-campus students. The technical aspects of the televised class were performed by the Instructional Services Center. For open circuit courses, the Division of Continuing Education administered the courses.

2. At Colorado State University, academic administration was shared jointly between the Center for Continuing Education and the course-sponsoring academic department. The former's administrative responsibilities were previously discussed under general administration and will not be reiterated here. In addition to routine course administration, the academic departments scheduled studio-classrooms, provided a graduate assistant for ETV course instructors, provided instructional materials to the Educational Media Office for dispatch with the video-tapes, and set up instructor or graduate assistant visits to each plant site receiving the videotaped instruction.

3. In Indiana, academic administration varied
according to the institution that was originating or receiving an ETV course, but it followed the pattern found in the other two systems.

**Admission and registration.** (1) Special rules were not established by any of the three systems for admission or registration. Different application forms, however, were necessary at Colorado State University and the University of South Carolina to identify off-campus registrants. Otherwise, admission, registration, and student records requirements were identical with those for regular students. (2) Generally, off-campus ETV students were considered as part-time students. (3) Students in the Colorado and South Carolina systems were encouraged initially to refrain from enrolling in a degree program until completion of one or two ETV courses.

**Degrees and certificates.** (1) Degree programs were offered through the Colorado and South Carolina systems. The institutions visited in those systems were in agreement that their degree programs were essential to their off-campus higher education programs. (2) A graduate degree program in education appeared to be a forthcoming addition to the University of South Carolina off-campus programs to complement the state's teacher development programming. (3) The Indiana System which provided a number of noncredit courses issued certificates of self-acquired competency to
the students completing those courses. (4) Indiana University adopted an external degree program in general studies which may eventually be offered partially or completely through IHETS facilities. (5) Providing teacher certification for teacher development courses was cited as a major incentive for the high enrollments of South Carolina's off-campus education courses. Seventy-five percent of the enrollments in open circuit ETV courses were attributable to education courses.

Credit. (1) The award of credits for off-campus courses was dictated by university academic policy and the regional accreditation institution in the three systems. (2) There was a sizeable market for noncredit courses desired by practicing professionals who sought abbreviated instruction about specific phenomena to learn new developments or update themselves. Most of these requirements occurred in the biological sciences, physical sciences, or computer technology. Income tax regulations and form preparation was a seasonally popular course demand of the South Carolina and Indiana systems. (3) Credits earned through ETV coursework were acceptable at the sponsoring institution and other participating institutions toward completion of degree requirements.

Instruction. (1) Instructors operated under the authority of their academic departments and universities and not under the consortium arrangements. (2) As a general
rule, instructors of ETV courses did not receive special remuneration. They did receive a reduction in normal teaching to account for additional effort involved in ETV courses. In Colorado, a graduate assistant was assigned to SURGE instructors to assist with the increased administrative workload and with the off-campus visitation policy. 

(3) At the University of South Carolina, instructors of open circuit courses received $1200 per 3-hour credit course from the continuing education division which was comparable to the amount paid for other continuing education instruction. (4) The faculty rights policy was specified in the IHETS Procedural Handbook for System Use and Participation for interinstitutional courses. Essentially, agreements were established during course planning as to ownership, dissemination of instruction, copyrights, revision rights, and compensation.

**Delivery System**

An attitude of resourcefulness and industriousness prevailed among the technical personnel observed in the three systems. It was evident at IHETS, the Instructional Services Center of the University of South Carolina, and CSU's Office of Educational Media. Many of the technical features of the systems were a direct result of their innovative use of their technical skills in finding economical methods or systems to reduce costs, in designing and fabricating electronic items, and in exploiting campus
resources, such as electrical engineering classes.

Open circuit television broadcasting. (1) Broadcasting was a secondary means of providing ETV courses. (2) Educational programming that was used consisted of two types: PBS educational-quality broadcasts and packaged production of a university or a consortium of universities. (3) Colorado State University, Ball State University, and Purdue University among others offered credit courses in conjunction with the PBS broadcast of the "Ascent of Man" series and the "Age of Uncertainty" series. (4) South Carolina State University and the University of South Carolina offered open circuit programs which they produced jointly with the South Carolina ETV Commission. (5) IHETS used ITFS systems to extend telecommunication of courses to the various educational institutions and locations in several cities. ITFS provided a less expensive alternative than telephone company circuitry in terminal sites. (6) The "Teacher as Manager" program, a consortium production in South Carolina, cost $109,000 for the 26 segments. The cost was recovered within three and one-half years by high teacher enrollments, but the price was indicative of the heavy costs for developing and producing a broadcast-quality program. Revising such a program may be cost prohibitive. (7) The University of South Carolina realized a net profit of 50 percent from enrollment fees, once course production costs were recovered.
Cable television broadcasting. Cable television served the systems of Indiana and South Carolina in several ways:

1. Leased microwave facilities from the telephone companies of Indiana and South Carolina provided the conduits for transmitting educational programming in those states. In Indiana, programming could originate from six locations over ten channels and was delivered to 41 campuses in 17 cities at a leasing cost of $925,000 per year. In South Carolina, programming was delivered from the ETV network center over four channels to 253 secondary schools, 23 colleges and universities, 32 hospitals, and 57 other state and local public installations. The rental cost to the ETV Commission was $2.5 million annually.

2. CATV was utilized for terminal distribution by IHETS.

3. Purdue University provided credit courses over the educational access channel of the commercial CATV system in Lafayette, Indiana.

Video cassettes. (1) CSU operated an effective off-campus ETV program by videotaping classes and distributing to locations where students viewed them at their convenience. To view the tapes necessitated a videotape player and television monitor. (2) Both South Carolina and Indiana augmented their closed circuit channel broadcasting capacity by videotaping programs for later viewing at the convenience of
Correspondence. Print material in the form of course syllabi, study lessons, written student requirements and tests supplemented ETV classes.

Radio. Use of radio for instruction was in an embryonic stage. The South Carolina educational radio network carried 20 public school courses, but not higher education programming. IHETS had a radio network used for program sharing, but continuing education programs were nil.

Telephone. (1) Telephone provided an instantaneous "talkback" capability for the IHETS and South Carolina closed circuit courses. It allowed the integration of off-campus students into on-campus classes. This was a network service in Indiana but not in South Carolina where the university paid for the telephone circuitry. (2) IHETS included a telephone network for 69 universities and colleges. In addition to standard voice communications, the network carried facsimile and slow-speed computer data. Through a TELPAK system of packaged telephone circuits offered by the telephone companies in Indiana, IHETS was able to realize overall savings for the users of the network and to add other services which linked their radio network and allowed computer time-sharing and development of a conference network. (3) The conference network of IHETS offered the potential of educational programming by telephone by
including 35mm slide carousel and electronic blackboards into the system. (4) Provision was made for telephone communications between instructors and their off-campus students to supplement instruction where "talkback" was not used. Recording devices with a one-time cost of $400-500 were provided to instructors for flexibility in receiving student calls.

Computers. Access to computers existed between universities and colleges in both the Indiana and Colorado systems.

1. The capability of sharing computer time was an IHETS feature; however, agreement between the institutions was made by those parties.

2. A consortium was established in Colorado between nine small colleges and CSU for sharing time on the latter's computer.

3. Engineering students of the SURGE program and the South Carolina APOGEE program were expected to utilize company computers for their coursework. If one was not available, other arrangements were made.

Multi-media. Studio-classrooms and studios of the three systems incorporated for possible instructional use: graphics, 35 mm slides, films, and audio-cassette.

Curriculum Development

Curriculum development for off-campus ETV courses
consisted of utilizing regular college curricula for the programs that were offered by CSU and the University of South Carolina. Special adaption of the administrative procedures was necessary in handling off-campus students, but no change was made in the curricula.

On the other hand, ETV course planning was a structured process. This was an absolute necessity for the complex courses broadcasted on open circuit television. Both educators and broadcasters were involved in the development, organization, and production phases, usually as members of project committees.

CONCLUSIONS

At the outset of this chapter, the purpose of the study was reidentified in the form of three questions. The findings from an on-site study of three effective telecommunications systems for off-campus higher education provided the bases for this writer's response to those questions.

How can telecommunications be employed on a statewide basis to reach people with non-traditional higher education programs?

Each of the three systems offered a sound use of educational telecommunications for their off-campus programs. There were advantages and disadvantages of each system.

A statewide videotaped instruction system has these advantages:
1. The system offers a relatively inexpensive technology to operate and maintain.

2. Operations are more independent than statewide ETV networks that depend on telephone microwave facilities.

3. Establishment of a system is facilitated by easily obtainable items of equipment (1/2" and 3/4" videotape recorders) and low-cost portable-type television cameras and by easily trainable semi-skilled personnel requirements.

4. A university or college can operate the system without a large and technologically sophisticated media services center.

5. On-going classes can be utilized for videotaped instruction.

6. Instruction can be viewed off-campus at the convenience of the student with savings in time and travel.

7. The use of a telecommunications system would provide revenue to sponsoring universities through increased faculty productivity and reduced travel costs for conventional continuing education programs.

8. Distribution of videotaped instruction is not confined to state boundaries.

The disadvantages of a statewide videotape system are:

1. Initial capital outlays to equip and link studio-classrooms and recording center and to obtain
sufficient videotape recorders and tape inventory can be heavy.

2. Once financially committed to a videotape system of sufficient size to meet statewide requirements, technological inflexibility may be induced which would impact on change to take advantage of state of the art improvements.

3. Student/teacher interaction in the class is nonexistent which handicaps both student and instructor in gauging progress.

4. Course offerings are restricted to those courses with minimum discussion requirements.

5. Videotaped instruction requires a mature, highly motivated student to conduct the inherent self-study regimen which probably limits the extent of use for undergraduate courses.

6. The student or receiver of videotaped instruction must have available a television monitor and a videotape player that is compatible with the recorder.

7. When the statewide system is operated by a university, the system may not incorporate the faculty talents of other universities and colleges.

A statewide telecommunication network like the Indiana and South Carolina systems offers these advantages:

1. The network can serve mass audiences with diverse educational needs.
2. With the "talkback" capability, off-campus students can participate in live on-campus classes.

3. Coordinated educational programming can be originated from a number of universities and colleges.

4. The ETV network can be utilized to provide educational programming for all educational levels and statewide communications for other state agencies which could result in overall savings in time, travel, and energy consumption.

5. The closed circuit system can be readily integrated with a statewide open circuit network and could be adapted to employ with satellite distribution.

6. Off-campus instruction gains revenue for the participating institutions by increased faculty productivity and elimination of costs associated with the instructor going to the student.

7. ETV network circuitry when not in use for television transmissions (normally between midnight and 6 a.m.) could be utilized for high speed computer traffic.

Disadvantages of a statewide ETV network are:

1. Heavy initial capital outlays are required for control devices, studios, and terminal facilities.

2. Heavy operational costs are incurred in leasing telephone microwave facilities which are subject to periodic, usually upward, tariff changes. (This may be reduced when satellite technology becomes available.)
3. Leased microwave facilities are operated and maintained by an outside agency.

4. Terminal facilities, which may be costly, must be provided for intra-city distribution of ETV network programs.

5. Highly trained technicians are necessary to operate the system.

What is the optimal organizational model to administer the statewide program?

1. Without resource parameters, an optimal organizational model becomes an abstraction. Increasing diversity and numbers of courses, enrollments, and applications of educational telecommunication that were found in the study suggest that the systems were adequately serving their respective states. These system or mix of systems' characteristics could be utilized in other states, given sufficient resources priority. Paramount, however, is the public and academic commitment to provide access to education for bypassed learners, particularly those older than the traditional 18-22 year olds.

2. Centralized or consortium planning and operating by public and private universities and colleges in the state appears essential to effectuating a fully coordinated statewide off-campus higher education program.
What are the fundamental considerations for effective operation of the program?

Based upon the findings of the study, the functional components format with some modification provides a comprehensive model for identifying the fundamental considerations in designing a system. The modifications are:

1. Need assessment should be included as a major function to provide for identification of target populations and their educational needs.

2. Curriculum development should be altered to include course development to recognize the detailed planning and execution considerations in special credit and non-credit college courses offered in educational programming.

3. Goal establishment and assessment and process and product evaluation should be included as subfunctions of each of the major functional categories to assure considerations of the continuing review and analysis requirements of the system components.
CHAPTER 6

A FUNCTIONAL COMPONENTS MODEL FOR A STATEWIDE ETV SYSTEM

The proposed model is presented with the assumption that there is a public and academic commitment to employ telecommunication in a state to extend off-campus higher education.

Operationally, the model identifies the major functional concepts which comprise the considerations and actions in designing a statewide system. The major functions of need assessment, general administration, academic administration, delivery system, and curriculum/course development are further subdivided into dimensions which delineate the subfunctions which must be considered and acted upon to suggest evidence of adequate coverage.

The reader is reminded here that the proposed model is a product of the writer's interpretation of the literature review, findings of the study, and reinforcement gained by doing the study. The functional concepts and elaboration of the model are presented in the subsequent sections.

THE MODEL

Need Assessment

Since the goal of the educational telecommunication system aims toward bringing higher education to people now
outside of the academic mainstream, the target populations and their educational needs require identification to give direction to system functioning. There are two aspects that should be recognized. First, the individual types should be identified and classified into categories according to their specific higher educational needs. Second, an assessment should be made as to why extant continuing education programs are not meeting those needs.

**General Administration**

Centralized administration should be formulated to coordinate the educational component and the telecommunication component of the system. A consortium arrangement of the public and private universities and colleges offers the potential of optimal sharing of faculties and facilities in bringing higher education to a statewide audience. Membership, however, should consist of officials of those institutions with sufficient clout to represent the institutional position on matters before the consortium.

**Coordinating administrative agency and responsibilities.** Questions to be addressed are:

1. What organization will legally and functionally coordinate the statewide off-campus program? What should be its nature in relation to education? To telecommunication?

2. What are the objectives of the organization?
Who will establish policy for attaining them?

3. What are the organization's relationships with the public and private universities and colleges of the state?

Staffing and financial management. Relevant issues are:

1. Who will staff the organization? How will it be configured?

2. How will the organization be funded?

3. What Federal, state, and private funding sources are available for initiation and operation of the statewide system?

4. How will academic institutions interface with the organization in development, production, fiscal management, and operation of academic projects?

Interinstitutional matters. Functional considerations are:

1. What is the optimal method of determining target audiences?

2. Who will be responsible for public information and advertising? What techniques will be used?

3. How will tuition fees be determined for inter-institutional courses? For co-sponsored intra-institutional courses?

4. Who will obtain and hold copyrights?
5. What public and private organizations may have a vested interest in the educational opportunities afforded by the telecommunication system?

6. What are the rights of the faculty and institutions in interinstitutional projects? For co-sponsored intra-institutional courses?

7. How will educational programming in other states be ascertained, maintained, and utilized?

8. What are potential out-of-state markets for consortium-produced educational programming?

Academic Administration

Development and employment of academic procedures which will be compatible with existing academic policies of the universities and colleges are important considerations. The specific areas of concern in academic administration are:

Admission and registration. Questions to be addressed are:

1. What will be the academic prerequisites for enrollment in a credit course? In a noncredit course?

2. Will there be credit allowance for experiential learning?

3. How will course withdrawals or failures to complete work be processed from a monetary standpoint and from an academic standpoint?

4. How will diverse registration procedures and periods of the universities and colleges be accommodated?
5. With what university or college will the off-campus student register?

Credit, degrees and certificates. Relevant functional considerations under this category are:

1. What courses should be offered through the telecommunication system? How will they be approved for educational programming?

2. Will there be graduate and/or undergraduate programs? If so, what degrees will be awarded and who will operate the program?

3. Will certificates of self-acquired competency be awarded for completion of noncredit courses?

4. Will credits earned from ETV coursework be acceptable towards a degree at any of the member institutions?

Instruction. Considerations are:

1. Who will select instructors for ETV courses?

2. How will course design and production responsibilities be assigned? How will they be budgeted?

3. What incentives will be utilized to attract and encourage instructors to provide ETV courses?

Delivery System

1. Essential to the design is determining what delivery system or mix of technology will be utilized in a statewide system. A corollary consideration is deciding
the institutions that will originate the educational programming. Phasing should be considered in accordance with a long range development plan because of the capital-intense nature of telecommunications. In other cost effectiveness studies should be considered, and a series of optimal goals over a prolonged period should be established.

2. Other considerations for the delivery system include design flexibility to take advantage of supplementary support and to permit changes in the state of the art.

Curriculum/Course Development

1. If a curriculum leading to a degree is to be offered through the ETV system, a fundamental question becomes whose curriculum will be utilized. Other considerations concern selection of the curriculum and the adequacy and design of a regular curriculum for telecommunication application.

2. Course development concerns credit and non-credit courses which are not identified with a specific degree-awarding program. Courses which are constructed to meet a specific need require an organization for planning the course content, the employment of supporting media, the development of instructional materials, and the actual production. For interinstitutional course projects, delineation of these responsibilities are essential.

RECOMMENDATIONS

1. The model should be used in the design of a
2. Given the present state of the Louisiana educational network with three broadcasting stations and the growing use of cablecasting, the time for developing a statewide system for educational telecommunications appears to be now. The model could be tested in the design of such a system.

3. The model should be updated whenever utilized to take advantage of lessons learned from planning and developing a statewide educational system.
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Title of Thesis: A Model for Utilizing Educational Television for Higher Education

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