DOCUMENT RESUME

ED 103 007 95 IR 001 693

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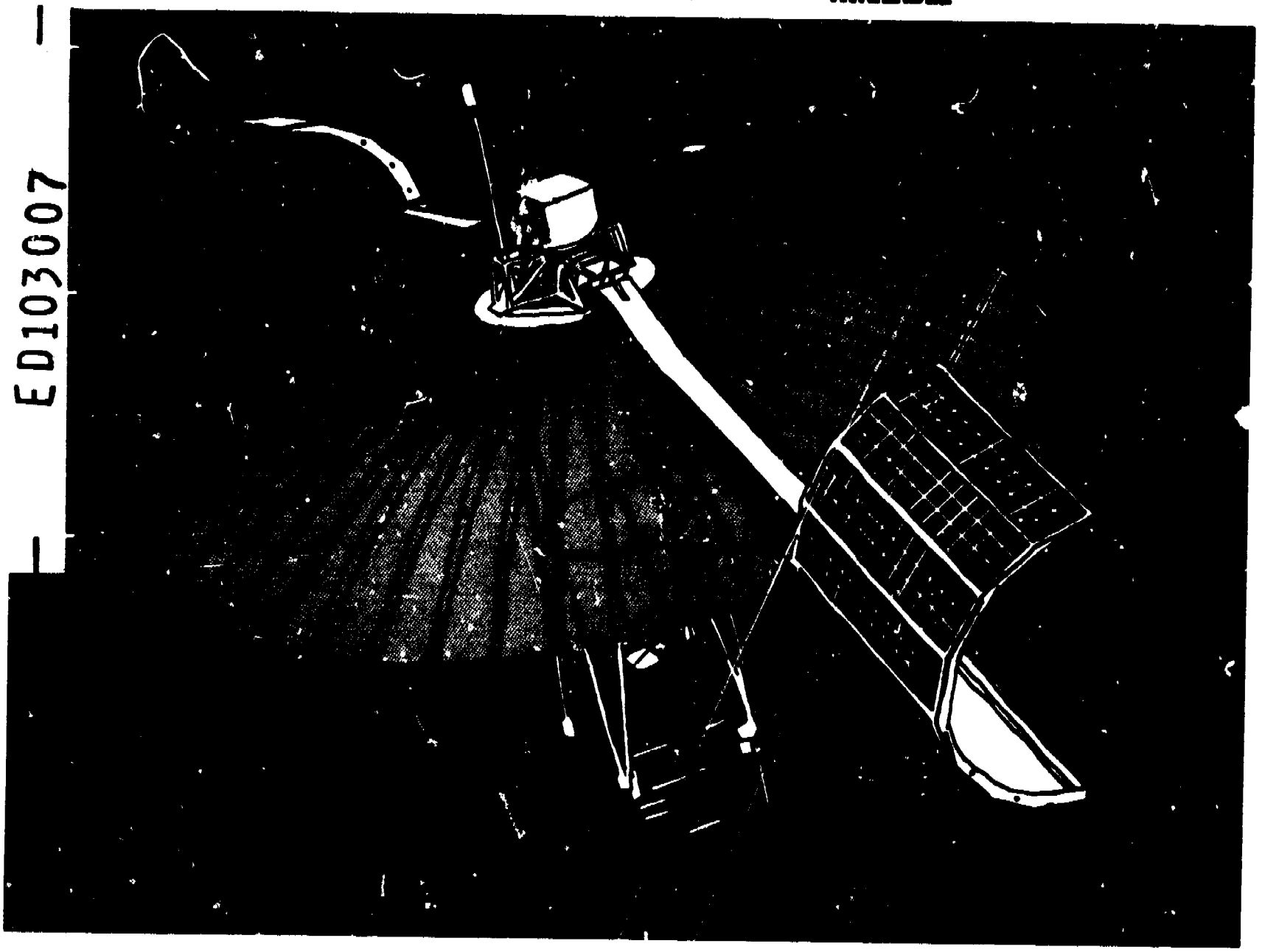
TITLE An Experiment in Educational Technology: An Overview of the Appalachian Education Satellite Project. Technical Report Number 2.
INSTITUTION Appalachian Education Satellite Project, Lexington, Ky.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
REPORT NO AESP-TR-2
PUB DATE Aug 74
NOTE 57p.; For related documents see IR 001 692-695

EDRS PRICE MF-$0.76 HC-$3.32 PLUS POSTAGE
DESCRIPTORS Career Education; *Communication Satellites; Computer Assisted Instruction; *Educational Experiments; *Educational Technology; *Educational Television; Evaluation; Information Systems; Inservice Programs; Inservice Teacher Education; Program Descriptions; Reading; Regional Cooperation; *Telecommunication
IDENTIFIERS AESP; Appalachia; *Appalachian Education Satellite Project; Regional Educational Service Agencies

ABSTRACT

The Appalachian Education Satellite Project was conceptualized in 1973 (1) to develop courses in reading and career-education instruction for teachers in the Appalachian region, and (2) to determine the feasibility of conducting such courses over a large geographical area via communication satellites. The courses consist of pretaped video instructional units, live video seminars, four-channel audio instruction, and ancillary laboratory materials. Each course is expected to upgrade the skills of participating teachers and consequently to improve the quality of instruction the students in the region receive. However, a broader goal of the project is to answer questions of an experimental nature regarding the use of advance technological systems for large-scale dissemination of knowledge. The project includes the development of courseware tailored to the needs of a geographically diffuse population, and the development of an organizational framework for conducting graduate-level courses without on-site teachers. For each course, the AESP is preparing a series of programs. The video and the four-channel audio portions of the instruction are to be transmitted to 15 sites in the Appalachian region via communication satellites in the Applied Technology Satellite (ATS) series. (DGC)



AESP - Overview

appalachian education satellite project

Technical Report

number 2

AN EXPERIMENT IN EDUCATIONAL TECHNOLOGY:

AN OVERVIEW OF THE APPALACHIAN EDUCATION SATELLITE PROJECT

Prepared by

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March, 1974

Revised August, 1974

The Project is supported by N.I.E. Grant #74-4/CO-3009-73-I-OE-0531 to the Appalachian Regional Commission and the University of Kentucky.

The Technical Report Series of the Appalachian Education Satellite Project is edited and published by the RCC Evaluation Component at the University of Kentucky, Lexington, Kentucky.

The purpose of this series is to document and disseminate information about the design, implementation, and results of the AESP experiment.

William J. Pramble and Claudine Ausness

Editors

Technical Report #1 in this series is entitled:

AESP Data Base Information: Rationale, Data Collection Procedure, Interpretation of Results.

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THE APPALACHIAN EDUCATION SATELLITE PROJECT

THE CONCEPTION OF THE APPALACHIAN EDUCATION SATELLITE PROJECT

The Appalachian Education Satellite Project (AESP) is a joint venture of ARC under the auspices of the National Institute of Education (NIE) and the Applications Technology Satellite (ATS) experiment under the direction of the National Aeronautics and Space Administration (NASA)

What is ARC?

The Appalachian Regional Commission (ARC), established by the Appalachian Regional Development Act of 1965, is the federal-state agency Congress delegated to promote the over-all development of the Appalachian Region. ARC brings professional expertise and federal monies to bear on pressing regional problems, ranging from highways to health and education services. Local and state governments implement objectives established by ARC by developing relevant programs and contributing to their funding.

What is the ATS Series?

In 1966 NASA began the launching of a series of six Applications Technology Satellites (ATS) to test and improve satellite equipment. The sixth satellite in the series is scheduled for lift-off by Titan II rocket on June 4, 1974. With this satellite NASA plans (1) to demonstrate the feasibility of deploying a 30-foot parabolic antenna in space (2) to demonstrate fine-point clueing and tracking capabilities of the

satellite, and (3) to test a stability mechanism for the satellite. In addition to testing the mechanics of the satellite, ATS means to demonstrate different ways satellites can be used. The ATS-F satellite will be used in over 20 applications experiments to track weather conditions, analyze the atmosphere, make spacecraft experiments, locate aircraft, and transmit multiple radio and television signals.

AESP, the Conjunction of ARC and ATS

ARC has initiated and served as coordinator of various Appalachian educational programs. Consequently when it was known that satellite time could be obtained for NASA-approved projects, ARC helped HEW, NCET (National Council for Educational Technology), and NIE conceive an education technology demonstration that eventually became known as the Appalachian Education Satellite Project (AESP). AESP is a communications experiment demonstrating the feasibility of delivering via satellite in-service education courses and supporting information services (in career-education and elementary reading) to teachers in the Appalachian region.

AESP Education Objectives

The immediate educational objective of the AESP is to improve the effectiveness of the classroom teacher, thereby upgrading the quality of reading and career-education instruction available to Appalachian students. The question to be answered by the AESP and similar projects is, can the linking together of existing organizations, like the Regional Educational Service Agencies (RESAs), and communications satellites result in more effective and significant in-service teacher

training.

The educational ramifications are overwhelming when the project is viewed as a demonstration of the feasibility of producing high quality, revenue-shared courses in multiple disciplines for cross-state delivery via satellites. More specifically, the AESP, as an experiment in the applications of space-age technology to education,

1. explores the feasibility of using fixed-broadcast satellites and linking terrestrial communications systems to deliver educational services;

2. examines the effectiveness of the instructional sequence of televised lecture, audio questions with immediate feedback, ancillary practice activities, and review testing;

3. broadens understanding regarding workable ways to organize trans-state projects conceived to solve common problems when greater economy and quality is promised by large-scale delivery and resource pooling;

4. develops procedures for preparing software for heterogeneous audiences and various hardware systems;

5. demonstrates the feasibility of developing central computerized information systems for delivery via satellite;

6. demonstrates the feasibility of increasing the number of communications satellites, broadcast channels, and air time, in order to increase course options and make quality education equally accessible in all parts of the country.

IDENTIFICATION OF AESP COMPONENTS

Implementation of the education experiment conceived by ARC is the function of two organizations, the Regional Education Service Agencies (RESAs) and the Resource Coordinating Center (RCC).

What are RESAs?

RESAs, sometimes called educational cooperatives, regional education service centers or cooperative educational service agencies, are confederations of school districts, that share audio-visual centers and/or specialists. Before the conception of the AESP, New York and Pennsylvania had established networks of RESAs. Kentucky, Tennessee and West Virginia have permissive legislation authorizing the establishment of RESAs, and North Carolina has regionalized organizations similar to RESAs. School districts in the 48 Appalachian counties participating in the AESP joined together to form normative RESAs for the duration of the project. These RESAs coordinate project-related activities at the local level.

Selection of the participating RESAs

In early 1973, 16 RESAs supplied ARC with information on (1) available in-house technology, (2) current career-education programs, (3) teacher in-service accomplishments, (4) local institutions offering graduate credit for courses, and (5) geographic location. After having these presentations evaluated by a panel of outside consultants, ARC designated five as lead RESAs and approved for up to two associate RESAs per lead RESA. During on-site surveys the project engineer approved three antenna locations per lead RESA. Table 1 identifies the 11 RESAs and the 15 receiving sites where the class sessions are held.

Figure 1, a map of the Appalachian Region, shows the RESA triangles (the three classroom sites per lead RESA).

RESA Activities

During the project, the RESAs

1. arrange for local universities to grant graduate credit to teachers participating in the RCC-produced televised courses;

2. develop administrative structures for managing project activities during the planning, developing and operation phases of the experiment;

3. staff a Project Advisory Council with teachers, administrators, representatives of local boards of education and local institutions of higher learning;

4. gather information on local programs and audio-visual equipment and assist in the development of pre-service, site-utilization, teacher-selection, administrative, engineering, and evaluation plans;

5. consult with the RCC on program and scheduling guidelines;

6. prepare funding and other proposals.

What is the RCC?

A Resource Coordinating Center (RCC) is an institution, or a consortium of institutions, that produces software and manages project activities.

Selection of the RCC

Under NCET supervision, ARC developed a Request for Proposal (RFP) and a selected bid list of institutions in Appalachia capable of responding to the RFP requirements. To obtain more information on the

TABLE 1

RESA AND SITE IDENTIFICATION

	Lead RESA	RESA	Classroom Site	Place
1.	CHAUTAUQUA (New York) Ms. Stephanie Bennett*	Cattaragus BOCES Chautauqua BOCES Northwest Tri-County	Olean, N.Y. Fredonia, N.Y. Edinboro, Pa.	Boles So. Central Philip J. LaGuidice Occ. Center I.V. Office Building
2.	CLINCH-POWELL (Tennessee) Larry Hyke*	Clinch-Powell Educational Coop Tennessee Appalachian Educational Coop Upper East Tennessee Educational Coop	Lafollette, Tenn. Coalfield, Tenn. Johnson City, Tenn.	Lafollette High School Coalfield School East Tennessee State University
3.	DILENOWISCO (Virginia) Morley D. Jones*	Dilenowisco Educational Coop Dilenowisco Educational Coop Northwest Regional Media Center	Norton, Va. Sticklyville, Va. Boone, N.C.	Dilenowisco Educational Coop Sticklyville Elementary School Appalachian State University
4.	MARYLAND (Maryland) William Brish*	Cumberland Cumberland Curriculum Improvement Center	Cumberland, Md. McHenry, Md. Keyser, W.Va.	Vo-Tech Center Garrett Community Center Vo-Tech Center
5.	TARCOG (Alabama) Dr. James Hutcheson*	TARCOG TARCOG TARCOG	Huntsville, Ala. Guntersville, Ala. Rainsville, Ala.	Madison Technical School Marshall City Tech. School Northeast State Junior College

* Director

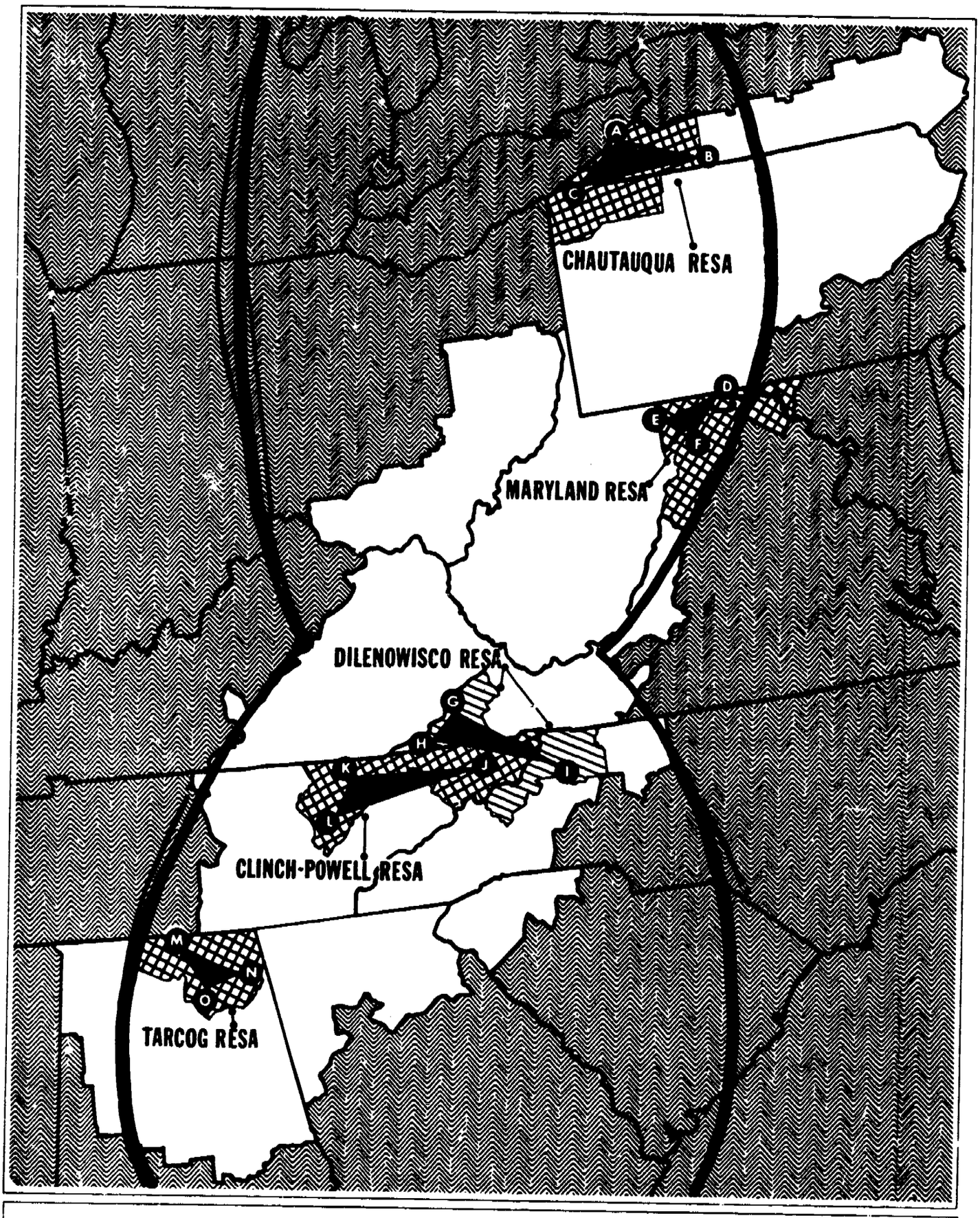

FIG. 1 MAP OF THE APPALACHIAN REGION SHOWING THE FIVE RESA CLUSTERS, RECEIVING TRIANGLES, AND APPROXIMATE SATELLITE FOOT PRINT.

A. Fredonia, N.Y.
B. Olean, N.Y.
C. Edinboro, Pa.
D. Cumberland, Md.
E. McHenry, Md.
F. Keyser, W. Va.
G. Norton, Va.
H. Sticklyville, Va.
I. Boone, N.C.
J. Johnson City, Tenn.
K. LaFollette, Tenn.
L. Coalfield, Tenn.
M. Huntsville, Ala.
N. Rainsville, Ala.
O. Guntersville, Ala.

program elements and procedures specified in the RFP, 14 institutions attended the pre-bidders conference. A panel of outside experts evaluated the resulting seven proposals on the following criteria:

1. academic experience in career-education and reading, rural in-service programs, teacher training, curriculum development, school administration, instructional television, and computer-managed instruction;

2. communications technology capabilities with respect to broadcast video and audio hardware, computer hardware, library and A/V center, and press and print shop;

3. personnel for content and technical components;

4. proposed project management with respect to time-allocations for components, mechanisms for RESA coordination, and organizational structure;

5. methodology for planning, development and evaluation;

6. budget in terms of time, materials, allocation of individuals, and over-all costs;

7. past record in handling locally based in-service programs.

After budget negotiations and site visits to the top two contenders, ARC recommended the University of Kentucky and NCET approved the University of Kentucky as the Resource Coordinating Center for the AESP experiment.

RCC Organizational Structure

Based on its proposal to ARC, the RCC employs a management-by-mission concept for its programmatic and procedural role in the experiment. The following breakdown by mission of the 7 RCC components

illustrates how the RCC organizational units are based on related objectives or missions.

1. The Reading Component is to

   a) develop a course of 12 programs in reading instruction for 300 teachers of students in grades K-3 for broadcast via the Applied Technology Satellite in the summer of 1974;

   b) develop 4 live, interactive seminars for 300 teachers for broadcast in the summer of 1974;

   c) select and develop supplementary instructional materials (ancillary materials) to augment the television and four-channel audio instruction.

2. The Career-Education Component is to

   a) develop a course of 12 programs in career-education for 300 teachers of students in grades one through six for broadcast via satellite in the summer of 1974;

   b) develop 4 live, interactive seminars for 300 elementary teachers in the summer of 1974;

   c) develop 16 live, interactive seminars in career-education for 300 teachers of students in grades 7 through 9 for broadcast in the fall of 1974;

   d) develop 16 live, interactive seminars in career-education for 300 teachers of students in grades 10 through 12 for broadcast in the spring of 1975;

   e) select and develop for the three courses supplementary instructional materials (ancillary materials) to augment the television and four-channel audio instruction.

3. The Television Component is to

   a) produce the televised reading course and the 3 televised career-education courses;

   b) broadcast the televised reading seminars and the 3 televised career-education seminars;

   c) have responsibility for the technical production of the four-channel audio tapes.

4. The Four-Channel Audio Component is to

   a) develop 12 four-channel, one-way audio programs in both reading and career-education for broadcast to 600 teachers;

   b) produce the four-channel audio series in reading and career-education.

5. The Information-Systems Component is to

   a) develop a combination of computer and manual systems for storing, retrieving, and delivering information and instructional materials in the areas of elementary reading and career-education to the 1,200 teachers enrolled in the four courses;

   b) supply the 1,200 teachers in the reading and career-education courses with computer-managed instructional materials.

6. The Evaluation Component is to

   a) design and implement formative evaluation strategies;

   b) design and implement summative evaluation strategies.

7. The Management Component is to

   a) develop a project-management system;

   b) coordinate and manage project activities;

   c) establish an Advisory Board to recommend to ARC policies and guidelines for the experiment;

d) establish a Planning and Development Committee, composed of management, content and field personnel, to assess mission progress against project and mission guidelines.

Figure 2 depicts the organization of the AESP.

Project Planning and Development Committee

Under the leadership of the RCC director, the Project Planning and Development Committee plans, implements, reviews and evaluates the on-going activities of the project. The committee, composed of mission directors, assists the executive director in maintaining the fiscal and professional integrity of the project and facilitates necessary communications between project components.

Mission Components

The RCC director delegates the primary responsibility for day-to-day maintenance of each of the components to the appropriate mission director. The mission director implements project directives, policies, and guidelines pertaining to his component, supervises his mission staff, and facilitates communications within the component. With his component staff he translates the objectives of the project into finished products according to the stipulations of the Planning and Development Committee.

Each mission director assigns tasks to staff members in such a way as to capitalize on their individual expertise. In some cases, a staff member may serve on two or more missions, in which case he is directed by the mission director for whom he performs the task.

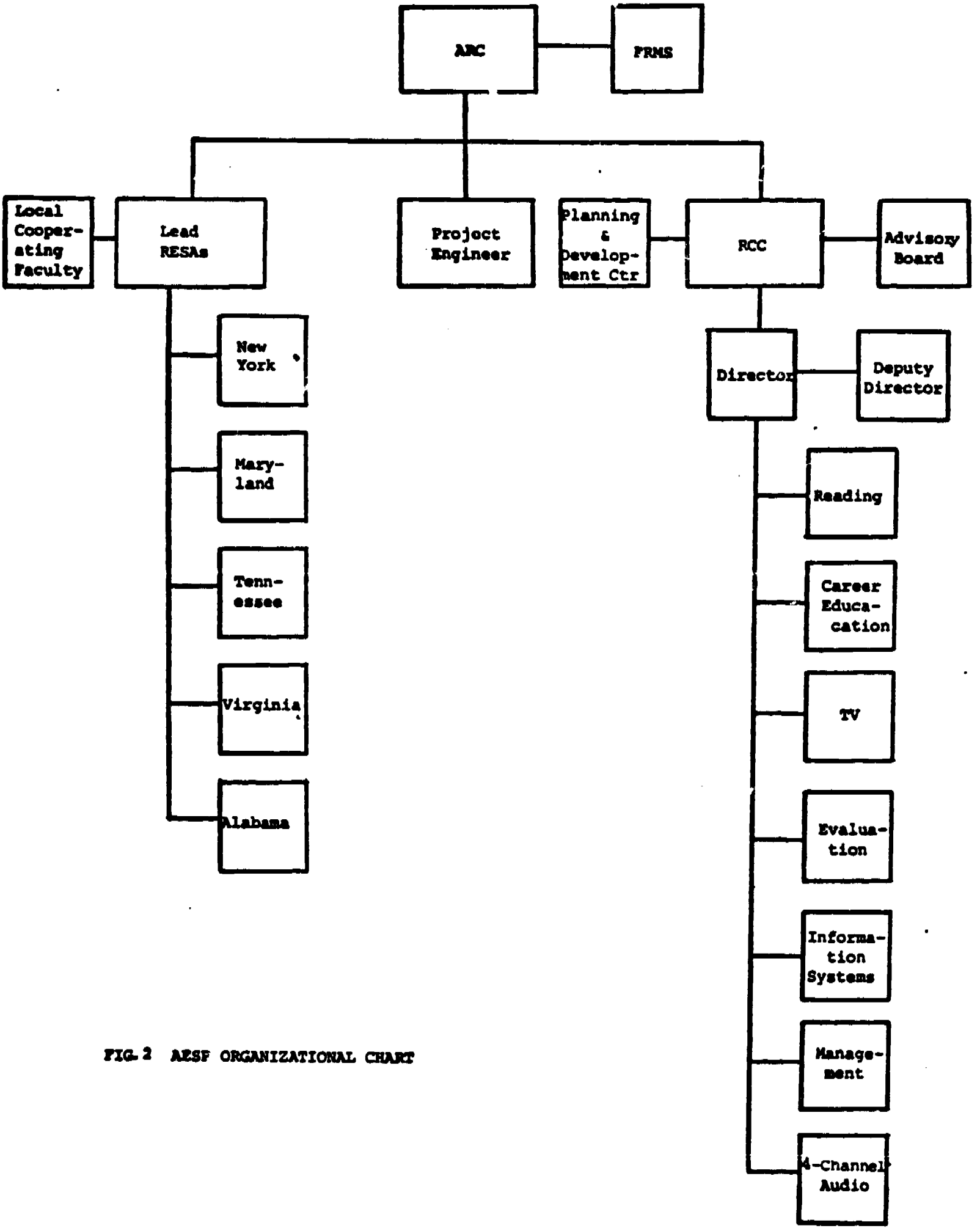

FIG. 2 AESF ORGANIZATIONAL CHART

Advisory Board

The Advisory Board reviews RCC policies and guidelines developed by the Planning and Development Committee. Board membership, limited to 30, includes

1. RESA project coordinators;
2. one school board representative per lead RESA;
3. one principal, superintendent or other administrator per lead RESA;
4. one teacher per lead RESA;
5. one national expert in elementary reading;
6. one national expert in career-education;
7. one national expert in computer-based information services;
8. one or more representatives from participating state departments of education;
9. the executive director of the project;
10. one national expert in instructional television production.

Board members provide the Executive Director with multiple points of view when considering programmatic and field-support policies and procedures. The Board functions in an advisory capacity to RCC, and recommendations are subject to the constraints of budget, staff availability, system resources and delivery capabilities.

Funding

The National Institute of Education (NIE) and the National Center for Educational Technology (NCET) granted approximately $2.2 million

to the Appalachian Regional Commission (ARC) for the Appalachian Education Satellite Project (AESP) to use over a period of two-and-a-half years. Out of this the RCC at the University of Kentucky receives $1,473,000 to develop, produce and evaluate all software and programming for the 4 courses; the RESAs receive approximately $500,000 to organize and monitor the operation of the courses; and ARC receives approximately $200,000 to direct the project. Hardware costs for developing, constructing and launching the satellite are borne by NASA; the AESP is hitch-hiking, then, on a satellite whose primary reason for being is spacecraft research. The cost for installation and maintenance of antenna at the sites and for leasing such peripheral equipment as teletypes and telecopiers is funded by a grant from NIE to the Federation of Rocky Mountain States.

PREPARATION OF THE AESP COURSES

Time Frame

During the summer of 1974, the AESP offers courses in teaching elementary reading and career-education. Upon successful completion of each course the student earns 3 graduate credits. During the 1974-75 school year the AESP offers 16 live, 45-minute video seminars in career-education for junior high school teachers and 16 live, 45-minute video seminars in career-education for senior high school teachers.

Instructional Sequence

Both the reading and the career-education courses, scheduled for transmission during the summer of 1974, consist of 12 one-half hour, pre-taped video programs, followed by twelve 15-minute audio question-answer reviews and 12 pre-planned, auto-instruction application periods. Four times during each course there are 45-minute live-video seminars that allow interaction between the instructor and the students enrolled in the courses. At the session following the presentation of a program unit, there are multiple-choice unit tests.

Both of the career-education courses, scheduled for transmission during the 1974-75 school year, consist of 16 live, 45-minute video seminars during which interaction is possible between the instructor in the RCC studio and the teachers in the classrooms at the 15 receiving sites.

Reading Programs Development

A 1969 ARC survey revealed a desire in Appalachia for more effective classroom instruction in reading. During the planning and development phases of the project the reading instructor made on-site visits to representative schools throughout Appalachia to observe current reading assessment and teaching procedures, so that the course could be shaped to fit the target audience. It was determined that the teachers needed to know more effective ways to recognize student reading deficiencies and strengthen student reading skills. The course focuses on how teachers can recognize and assess reading deficiencies, use diagnostic-prescriptive information systems, apply a large number

of reading-improvement techniques, and conduct individualized and small group instruction.

Reading Course Format

Modeled on the New York State Department of Education In-service Reading Program, the course emphasizes practical techniques for the classroom teachers. Each program is like a documentary in that it is punctuated by slice-of-life shorts showing actual teachers in Appalachia using the techniques. For each of the seminars an audio link between the classroom sites in the RESAs and the studio is maintained for one-hour-and-forty-five minutes. During this time the students enrolled in the courses can ask questions of the instructor or any of the visiting experts.

The reading component director, a professor in reading, is responsible for the development of reading program scripts and accompanying ancillary materials. Assistants collect and organize reference materials and design four-channel audio and ancillary activities. Information on reading skills, assessment procedures, and teaching methods is collected by computerized search of the literature in such files as ERIC, the Texas Computer Retrieval System, and the University of Kentucky Regional Educational Instructional Materials Center. Appendix A presents an overview of the K-3 reading course.

Career-Education Program Development for K-6

The 1969 ARC survey indicated that Appalachian teachers wanted to know more about career-education. The course focuses on ways K-6

grade teachers can structure curriculum around the world of work. The course provides 300 teachers with an understanding of career-education theories and techniques which can be used to help students acquire self-awareness, decision-making skills, occupational information, academic skills, and healthy attitudes toward work.

Format of Career-Education Program for K-6

Similar in format to the reading course, the K-6 career-education course documents ideas with on-site filming. For instance, to impress upon teachers the importance of infusing career-education into normal classroom instruction, there are film segments showing teachers preparing and performing actual career-education lessons. Appendix B contains an overview of the career-education course for elementary teachers.

Career-Education Seminars for Junior and Senior High School Teachers

The career-education courses for junior and senior high teachers consist entirely of live videos from the RCC studio at the University of Kentucky. During each seminar there is an audio return-link from the classroom sites in the RESAs to the studio. This link between the students and the professor is a means of establishing the inter-personal relationship necessary for individualized instruction.

Usually student reaction to a televised course is collected only after the completion of the course. This information is useful in the revision of the course for other students. With weekly feedback via audio connection, it is possible to alter subsequent presentations, thereby adapting the content of the on-going course more toward the expressed needs of the participants.

In addition, the audio interconnection provides the opportunity for students to interact with career-education experts and community leaders taking part in the seminar discussions. Interaction with experts and peers is the basis of seminar instruction in the universities. The transmission by satellite of one-way video and two-way audio makes possible the expansion of this methodology from its present use in isolated classrooms to multiple interconnected classrooms. A reduction in classroom number with continued budgeting at present levels would enable more national authorities and leaders to appear more frequently in the classroom.

Course Content in the Career-Education Seminars

The initial seminars deal with career-education themes chosen after analyzing in-service career-education materials and career-development literature in the ERIC collection. The final half of the course focuses on implementation procedures. Since the participating teachers are to serve as career-development resource persons for students, administrators, parents, and other members of the community, they need to know how to deal with common concerns of teachers, how to involve school administrators, support staff, community agencies, and parents, and how to guide the school and community in the step-by-step development of career-education programs. For these reasons, it is essential that the programs have the flexibility and the potential to deal with real problems the participants recognize they will have to face.

Format of Career-Education Courses for High School Teachers

Each session contains presentations on selected topics in the form of lectures, panel discussions or videos of episodes in the operation of successful career-education projects. As questions arrive from the RESAs and repetitions are eliminated by off-stage coordinators, the questions are fed to the on-stage coordinator who asks the appropriate resource person for the answer. These questions are subsequently studied for clues as to how future programs can be modified to meet the needs of the audience.

Four-Channel Audio as an Instructional Activity

A 15-minute pre-programmed audio review of the video content follows each program that is not a seminar. This procedure demonstrates satellite capability for multiple-channel synchronized transmissions. Through the headphones the participant hears a question, usually in the form of a problematical situation, pushes one of four buttons on a touch pad to indicate the response he judges is most appropriate, and hears a description of the factors he should have considered when making his response.

Four-Channel Audio as a Device for Formative Evaluation

The incorporation of a response-accumulation device in the four-channel console makes possible the collection of data useful in program revision. This mechanism accurately records initial student response to questions constructed to elicit behaviors specified in the course objectives. In this manner, it is possible to determine which

behaviors the program does not adequately prepare the student to perform.

The response-accumulation device in the four-channel audio console also provides a mechanism for in-house revision of videos before they are released. This procedure entails having a group similar to the target audience view each completed video. They are told whenever the light over the television comes on they are to turn the dial to A if they understand what is being said or to B if they do not understand. They can be asked to answer any dichotomous question on interest, understanding or any other factor. From the recorded responses, it is possible to chart effective and ineffective sections in the program. By charting these responses, areas in the program in need of reworking are revealed.

Information-Retrieval Systems Backup

Monitored laboratories, with pre-planned activities and a depository of microfiche and hard-copy reference materials, back up each video and four-channel audio unit. To supplement the limited depository of hard-copy or microfiche reference materials at each site, the teachers in the courses have access to computer-based information retrieval systems: The Computer-Based Resource Unit (CBRU), The Texas Computer Retrieval System (CRS), the Select-Ed Prescriptive Materials Retrieval System (PMRS), as well as computerized index tapes to Educational Research Information Centers (ERIC), and Abstracts in Instructional Materials and Abstracts in Research Materials (AIM/ARM).

The CBRU data base consists of units of study on career-education topics. The computer matches the set of objectives supplied for a particular class or individual to potential resources and strategies and prints out a list of appropriate instructional activities, supplementary materials, and evaluative devices.

The Texas CRS with its 10,000-item data base identifies reading instructional materials. During satellite-televised programs, the teachers are shown how to fill in forms specifying the kinds of materials wanted. Requests are teletyped to the RCC for transmission to Texas. There the CDC 6600 Computer prints out microfilm numbers, shelf numbers, and program titles and teletypes the information back to the RCC. The Recordak Microfilm Reader-Printer retrieves the abstracts that correspond to the numbers, and either the abstract or the actual item is sent to the requestor.

The PMRS, based on approximately 4,000 instructional materials, is a manual retrieval system that permits the teacher personally to conduct searches for instructional materials, once certain variables are identified and translated into terms contained in the PMRS thesaurus. The teacher is taught how to use the system during one of the satellite-transmitted programs.

The ERIC tapes allow computerized retrieval of selected citations of educational reports and journal articles from worldwide sources. AIM/ARM citations supplement the ERIC file; these citations are in the same format and are assigned retrieval numbers by the same system.

Transmission of Information Requests

In order to determine the most efficient way to process information requests, three alternate and/or complementary communications systems are being tried out:

1. Voice transmission, via the ATS-3 Satellite during the times it is available to project personnel, and simulated satellite transmission, via long-distance land lines at other times.

2. Facsimile transmission via xerox facsimile telecopiers installed at the RCC and each lead RESA;

3. Teletype transmission via TWX installed at the RCC and each classroom site.

Each of the elements in the learning sequence in the AESP courses explores different ways satellites can be used to facilitate learning. ATS-F transmits taped lectures, followed by four-channel audio questions that supply feedback to the student and the course constructor. Requests from the 5 lead RESAs for computerized information are relayed to the RCC via ATS-3. Questions which arise during the live seminars are transmitted in the same manner.

TRANSMISSION OF THE AESP COURSES

ARC, responsible for the transmission of RCC-produced materials, worked closely with NASA to determine the area to which the satellite could transmit signals (the satellite footprint) and the technologies capable of interfacing the ATS-F and ATS-3. Interfacing techniques include the telephone links necessary to transmit audio and video signals from the RCC in Lexington, Kentucky, to Rosman, North Carolina, for the

uplink there and the downlink to ancillary and lead RESA sites.

ARC has a full-time project engineer, trained by the Federation of Rocky Mountain States (FRMS). The FRMS is the multi-regional technical coordinator of the ATS Project. The project engineer inspected and recommended locations within the footprint as receiving sites. He is also in charge of the installation and maintenance of the earth terminals at the 15 sites.

Equipment Configurations

The AESP uses two of the satellites in the Applications Technology Series, ATS-F and ATS-3. Except for four-channel audio, all the RCC-produced programs -- the taped video programs and the live seminars -- are uplinked at Rosman, North Carolina to ATS-F, which is scheduled to be launched on June 4, 1974. Since the North Carolina uplink does not have the capability for transmitting multiple channels, the four-channel audio programs are uplinked at Denver, Colorado to ATS-F. Voice data, such as the audience questions asked during the seminars and information requests, are transmitted via ATS-3 from the six intensive sites (the five lead RESAs and the RCC). Figure 3 diagrams the AESP delivery patterns.

Contingency Plans

In the event of satellite failure the ARC has developed two alternative distribution plans. The first plan involves the shipping of video tapes and four-channel tapes to th RESAs, along with pre-taped "discussion" seminars. With the tapes and playback equipment the teachers can receive the substantive content of the courses. However,

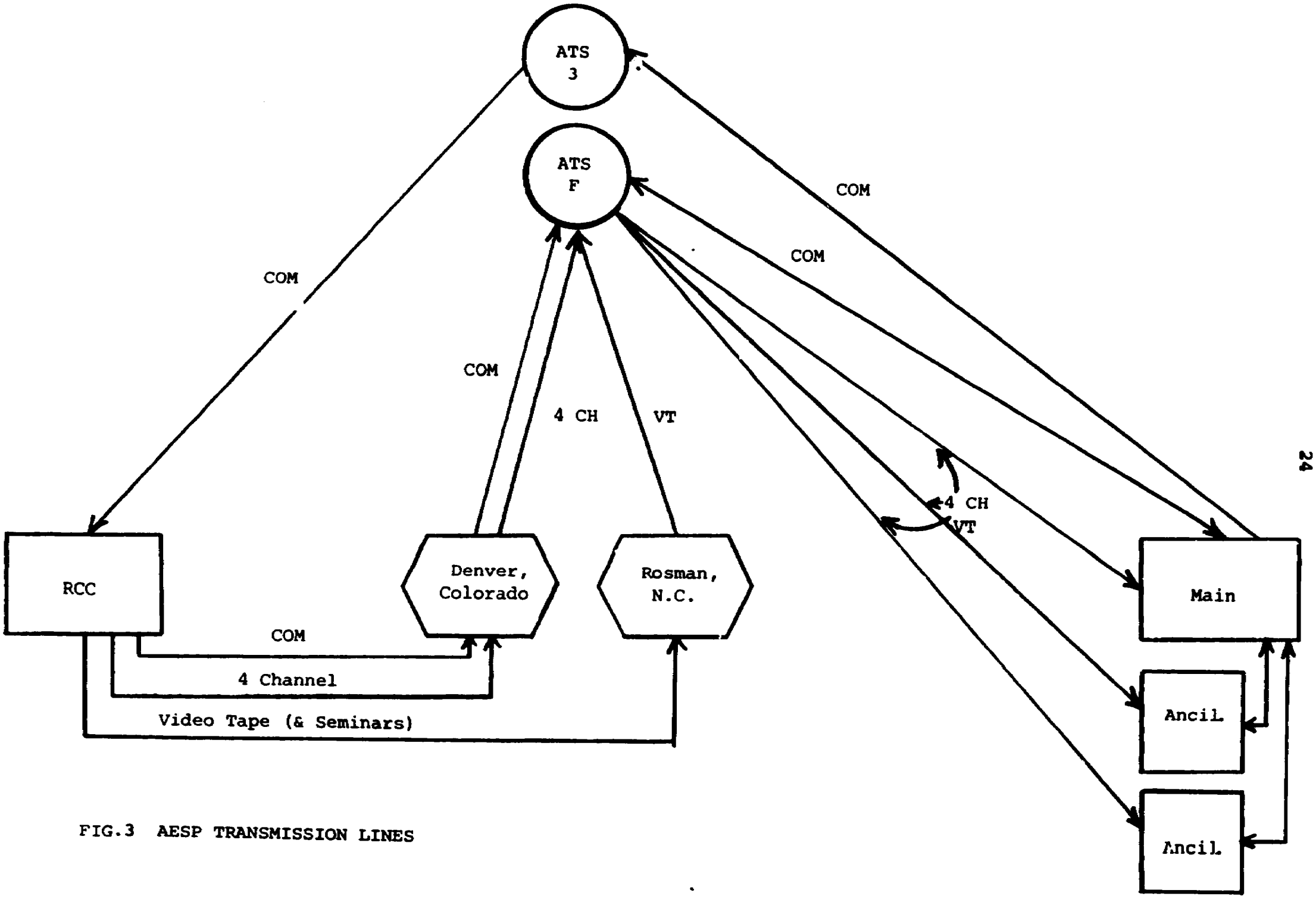

FIG.3 AESP TRANSMISSION LINES

there can be no interaction between the RESAs and the University of Kentucky during the seminars, since the seminar would have to be filmed prior to viewing.

The second plan is an addition to the first. The seminars would be broadcast over the Public Broadcasting Service system. The purchase of audio lines from the RESAs to Lexington would make possible interaction between the RESAs and the University of Kentucky during the seminars. This plan would permit a simulation of the satellite demonstration.

If the programming schedules of the PBS and the ARC could be made compatible by rescheduling and if PBS and its funding agency, the Corporation for Public Broadcasting (CPB), allows ARC to use their routing system, the programs could be routed via the existing PBS round-robin to educational television stations located at or near the RESAs. Since PBS to Lexington is one-way inbound to Kentucky Educational Television (KET), it would be necessary to purchase linkage from Lexington, Kentucky to the round-robin access at Louisville.

OPERATION OF THE AESP COURSES

Course Schedule

In early July of 1974 the RCC begins transmission of the 64 instructional units. Every Tuesday morning from July 2 to August 20, 300 elementary teachers (grades K-6) hear 2 taped, 30-minute career-education programs followed by 15-minute audio reviews. In addition there are 4 live, 45-minute seminars. Every Thursday morning from July 11

to August 22, 300 elementary teachers (K-3) hear 2 taped, 30-minute reading programs followed by 15-minute audio reviews. Of the 4 live, 45-minute reading seminars, 3 are scheduled for the afternoon. 300 teachers in junior high (7-9) and 300 in senior high (10-12) hear 16 interactive seminars in career-education on Tuesday evenings from September 10 to January 7 and January 21 to May 13, 1975 respectively.

Site Coordinator

Site coordinators at the 15 sites during each broadcast and laboratory session administer each course. These site coordinators

1. check to see that systems are operating prior to transmission and that activities are proceeding according to the experimental format;

2. arrange for the transmission to RCC of questions during seminars and information requests during specified periods;

3. assist students in preparing information requests;

4. assist in the evaluation of the program by recording the quality of transmissions and the periods of down-time, administering unit tests, taking roll and reporting drop-outs, distributing, collecting, and returning evaluation materials, and supplying data for context and product evaluation;

5. implement library and instructional materials procedures, including the orderly handling of library materials and the purchase of materials requested by reading teachers;

6. aid project communications by maintaining contact with the RCC, cooperating universities, and students;

7. attend a pre-course workshop to become familiar with course procedures and materials.

Local Consultants

For every three classrooms (receiving triangle), there is at least one cooperating faculty member for each course who

1. serves as an advisor to students at the classroom sites;
2. assists in evaluating student performance on projects and homework;
3. observes the courses being delivered to assure local universities of their appropriateness for credit;
4. facilitates communications between the RCC, cooperating universities, and students;
5. assists in project evaluation by administering pre- and post-tests, assessing video and four-channel scripts, objectives, and test items and summarizing consulting activities;
6. attends a pre-course workshop.

The cooperating faculty member tries to remain as unobtrusive as possible, since one of the objectives of the experiment is to determine whether courses can be conducted without on-site professionals doing the teaching.

Pre-Course Workshop

To acquaint site coordinators and cooperating faculty from the RESAs with their roles, the RCC plans a week-long seminar for five representatives from each lead RESA. There is to be a three-day workshop in reading course procedures and a three-day workshop in career-education course procedures, with the intervening day for equipment, informations systems and four-channel audio system descriptions.

Teacher Identification

The 20 teachers per site per course, for a total of 1,200 teachers (300 in reading and 900 in career-education), are selected by local education advisory boards comprised of local teachers, school administrators and elected officials. Information obtained from the application cards supplies the data base for a computerized client-registry system that is used to identify participants and prepare computer-generated mailing labels for disseminating project information.

Teacher Recruitment

From the University of Kentucky or the local institution of higher learning that has agreed to participate in the project, teachers receive 3 hours of graduate credit for each course. Other incentives for teacher participation are: (1) well-researched, highly practical courses, (2) access to information-retrieval systems during the course and the 1974-75 school year, (3) a set of textbooks, reference materials, and teaching materials valued at over $100 that can be carried back to the classroom for the teacher to use when implementing the procedures presented during the courses.

PROJECTIONS OF THE AESP

AESP Objectives

The AESP, an experiment in education-by-satellite, hopes to

1. improve teacher effectiveness in the classroom in reading and career-education;

2. test the effectiveness of satellite technology in broadcasting instruction;

3. produce high quality course-ware that can be re-used;

4. test linking via satellite the computer resource center at the University of Kentucky to teachers in the RESAs;

5. encourage greater utilization of technology in education in the Appalachian region;

6. determine the cost and effectiveness of installing antenna and terminals to receive satellite signals;

7. design in-service instruction around the needs of a target audience.

The Evaluation Component of the AESP has developed procedures for measuring the exit-behaviors of the course paticipants and experimental subjects. Analyses of these data provide information on the effects of the courses on teacher behavior. Interpretation of these data helps provide answers to these questions: "Are the courses geared to the needs and abilities of the target audience?" "How effective were the different elements in the instructional sequence?" "Were the products and services produced worth the investment?" "Did the trainees really learn anything?" "Did the RCC components achieve their objectives?" "Was the evaluation of the project adequate?" "What were the side effects of the project?" "What did the project reveal that could help other projects?"

Educational Applications

The AESP is only one of the projects in the ATS experiment that demonstrate educational use of satellites. In Alaska, where terrestrial television coverage is not feasible, programs in health education and

English as a second language will be broadcast via satellite to elementary students in 19 communities. In Hawaii the satellite will transmit information from one university to another. The satellite will transmit documents from Stanford University to Brazil and cultural programs from Brazil back to Stanford, in addition to broadcasting courses for in-service teacher training and student instruction. The Federation of the Rocky Mountain States will broadcast programs in career-education to 56 junior high schools. A more detailed description of these projects can be found in Educational Technology (April, 1973) and Nation's Schools (October, 1973).

The AESP project demonstrates ways to use "satellite power" to make quality education accessible to all, regardless of where they live. What the AESP and other satellite communications experiments eventually could lead to staggers the imagination:

1. a University-via-Satellite, broadcasting on 25-40 channels, in-service training courses for teachers, doctors, lawyers, engineers, and other professionals, the courses being prepared continually by RCCs at universities across the country;

2. national or international multiple-channel satellites that make possible: (1) inter-library sharing of resource materials, (2) the bringing to the classroom of famous people from all parts of the world, (3) the broadcasting to schools of subjects requiring competencies not available locally, (4) the transfer of instructional information from a large central computer to local request centers, and (5) the connection of students to groups at other locations for discussion.

The Pragmatics of a National Information Network

Designing such a system requires the consideration of many educational, social, political, administrative, and economic factors, such as how to develop quality software, how to establish a national network without sacrificing heterogeneous interests of regions, and how to secure funding for the building of satellites. In Nation's Schools (October, 1973) it is estimated that it will cost 50-100 million dollars to build, launch, and operate a 12-channel satellite with a maximum life expectancy of seven years. If the benefits justify the creation of a national network of communications satellites, it is likely that effective implementation procedures can be developed.

There are several things that schools can do now to prepare for education-by-satellite. They can

1. consider installing a cable system that can be connected to an inexpensive satellite receiving antenna or a cable TV network that is tied to a remote satellite receiving station;

2. familiarize school personnel with audio-equipment;

3. plan and write proposals for the use of satellite facilities.

AESP Products

If the Appalachian Education Satellite Project ends in the fall of 1975, these things remain:

1. 15 sites in Appalachia equipped with TV receivers, 4-channel audio, teletype intercommunicators, libraries, and specialized instructional materials;

2. 1,200 Appalachian teachers who have completed in-service training courses;

3. 4 graduate-level courses available for use on closed-circuit or educational television systems;

4. a staff at the University of Kentucky experienced in the development of software and the management of education-by-satellite projects;

5. a nucleus of trained teachers to work with RESAs to provide similar experiences for their colleagues;

6. a mass of data analyzed and interpreted to guide the designing of similar projects.

AESP Continuation

In 1975 when the ATS-F satellite is repositioned over India, the AESP experiment formally comes to an end. What happens after 1975 depends on whether local school systems, State Departments of Education, the ARC and NIE want to support continued educational programs via satellite. Perhaps,

1. ETV stations, universities, and school systems across the region re-use the taped portions of the AESP courses for in-service teacher training;

2. the RCC at the University of Kentucky becomes a training center for personnel from other universities or groups who plan to produce satellite education programs;

3. the RCC at the University of Kentucky continues to produce software for an expanding number of courses and RESAs.

The problems and mistakes as well as the accomplishments of the Appalachian Education Satellite Project contribute to the information base necessary for the use of satellites as educational and communications media. "The age of inordinately expensive, fractional effort, typified by 'n' teachers (of 'x' capability) individually preparing 'n'

lesson plans for 'n' topics in 'n' classrooms in 'n' schools (Educational Technology, August 1972, p.10) may one day be as outmoded as the one-room schoolhouse.

APPENDIX

1. Appendix A: Diagnostic and Prescriptive Reading Instruction
2. Appendix B: Career-Education in the Elementary School

APPENDIX A

DIAGNOSTIC AND PRESCRIPTIVE READING INSTRUCTION (K-3)

Lowell Eberwein
University of Kentucky

Course Overview

The Diagnostic and Prescriptive Reading Instruction (DPRI) course is designed to offer K-3 teachers individual experience in diagnosing children's specific reading problems and locating materials to remedy those problems. The course shows classroom teachers and students using new and innovative reading techniques. The course is classroom oriented, providing teachers with

- diagnostic procedures
- procedures for connecting the diagnosis with prescriptive instruction
- prescriptive instructional techniques.

Course Assignments

Teachers view 12 half-hour course videotapes, participate in 4-45 minute seminars, answer audio questions on the program content that provide immediate feedback, read related materials, perform ancillary activities that show them how to apply contents presented, and take applications and pre- and post-tests.

Teachers give diagnostic tests to one pupil, compile the information into a diagnosis of strengths and weaknesses, use the diagnosis as a basis for locating procedures for prescriptive instruction, and teach

prescriptive reading skills lesson to a student. This practical experience shows the teachers how to develop DPRI systems for teaching reading to their classes. Consultive and back-up services are provided by the RCC at the University of Kentucky to participating teachers during the school year following the course.

Schedule

The organizational meeting of the DPRI course is planned for June 27, 1974. The course is aired on subsequent Thursdays, with the exception of July 4. The last planned class date is August 22.

Class sessions begin at 8:30 a.m. and run until 3:30 p.m. The teachers view the televised lectures in the morning and participate in planned ancillary activities and seminars in the afternoon.

Course Objectives

The objectives for each of the twelve programs with the identification of materials focused on follow:

Program 1 - DPRI Introduction

1. identify reading sub-skills;
2. identify the parts of the diagnostic-prescriptive reading instruction model;
3. realize the importance of early diagnosis and correction of reading problem.

Program 2 - Informal Tests

1. recognize the advantage of informal reading tests;
2. interpret the results of informal reading tests;
3. identify the sequence of activities involved in constructing an informal reading inventory.

The Potter and Rae book, Informal Reading Diagnosis, will be used.

Program 3 - Standardized Tests

1. identify the procedures necessary for effective administration of standardized tests;

2. interpret the results of standardized tests;

3. recognize the strengths and limitations of standardized tests.

The Stanford Achievement Test, Primary I and II and the Murphy-Durrell Reading Readiness Analysis will be used.

Program 4 - Word Recognition Tests

1. interpret the results of the Wisconsin Design for Reading Skill Development: Word Attack;

2. connect diagnosis to the instructional materials;

3. identify the sequence of activities involved in going through a complete test-teach-test instructional cycle using the WDRSD: WA;

4. recognize the strengths and limitations of the WDRSD: WA.

The Wisconsin Design for Reading Skill Development: Word Attack will be used.

Program 5 - Miscue Analysis

1. identify and do the sequence of activities involved in administering the reading miscue inventory;

2. categorize reading miscues;

3. compile the results of the reading miscue inventory on coding sheet.

The Reading Miscue Inventory will be used.

Program 6 - Prescriptive Instructional System

1. translate test results into words (descriptors) that can be used to find materials in the retrieval systems;

2. identify the sequence of steps in the process of materials selection;

4. recognize the strengths and limitations of different retrieval systems.

The Select Ed and the Texas Retrieval System will be used.

Program 7 - DPRI Management

1. identify several patterns of grouping;

2. assess the strengths and limitations of grouping patterns;

3. determine the most appropriate grouping pattern in a given situation;

4. recognize reasons for using a grouping pattern in a given situation.

Program 8 - Reading Readiness and Beginning Reading

1. identify activities used to teach reading readiness and beginning reading;

2. list advantages and disadvantages of each activity;

3. determine which activity is most appropriate for a given situation.

The Teaching of Reading will serve as a resource for programs 8 - 11.

Program 9 - Word Recognition

1. identify activities used to teach word identification;

2. list advantages and disadvantages of each activity;

3. determine which activity is most appropriate for a given situation.

Program 10 - Comprehension and Vocabulary

1. identify activities used to teach comprehension and vocabulary;

2. list advantages and disadvantages of each activity;

3. determine which activity is most appropriate for a given situation.

Program 11 - Comprehension

1. identify question strategies used to reach comprehension;

2. write questions to stimulate student responses in various categories (i.e., knowledge, translation, etc.)

3. determine the most appropriate question strategy for a given situation.

Program 12 - DPRI Summary

1. identify ways to encourage parental participation in reading programs;

2. determine ways to integrate trade and library books in diagnostic-prescriptive reading instruction;

3. recognize the strengths and limitations of DPRI;

4. determine ways to implement diagnostic-prescriptive reading instruction in a total reading program.

Course Materials

The books and tests list below are provided to each teacher free of charge.

Debor, John and Martha Dallman. The Teaching of Reading. New York: Holt, Rinehart and Winston, Inc., 1974.

Goodman, Yetta and Carolyn Burke. Reading Miscue Inventory Manual. New York: The MacMillan Co., 1971.

Madden, Richard and others. Stanford Reading Test, Primary I and II. New York: Harcourt, Brace and Jovanovich, Inc., 1972. Specimen Sets.

Murphy, Helen and Donald Durrell. Murphy-Durrell Reading Readiness Analysis. Chicago: Harcourt, Brace and Javanovich, Inc., 1964. Specimen Set.

Otto, Wayne and Eunice Askov. The Wisconsin Design for Reading Skill Development: Word Attack. Minneapolis, Minnesota: National Computer Systems, Inc., 1973. Specimen Set plus manual.

Potter, Thomas C. and Gwenneth Rae. Informal Reading Diagnosis. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973.

Select-Ed Thesaurus. Freeport, New York: Educational Patterns, Inc., 1973.

Veatch, Jeanette, et al. Key Words to Reading: The Language Experience Approach Begins. Columbus: Charles E. Merrill, 1973.

Appropriate mimeographed material accompanies the ancillary activities for each unit.

Included in the collection of reading materials available to the student at each classroom site are

Buros, Oscar K. Seventh Mental Measurement Yearbook, Volumes I and II. Gryphon Press: New Jersey, 1972.

Dunn, Lloyd M. Peabody Picture Vocabulary Test. Minneapolis: American Guidance Service, Inc., 1965.

Sloson, Richard. Sloson Intelligence Test. East Aurora, New York, 1973.

APPENDIX B

CAREER-EDUCATION IN THE ELEMENTARY SCHOOL
(K-6)

University of Kentucky

The Appalachian Education Satellite Project desires to provide quality graduate education courses to teachers in remote areas by developing a series of videotapes on reading and career education to be broadcast via NASA satellite to teachers in fifteen Regional Education Service Agencies (RESAs) in Appalachia. As an introduction to career education, this course surveys the major principles, concepts, and practices of career education in the elementary school. In an effort to base the course upon a consensus of scholars and practitioners, preliminary scrips were circulated to university career education specialists and to classroom career educators throughout Appalachia. The eight week course includes twelve half-hour videotapes, four live, two-way interactive seminars, four multiple choice questions on each program's content -- with immediate audio feedback, and ancillary activities that illustrate actual application of the career education concepts.

Course Overview

The Career Education in the Elementary School course combines television and laboratory experiences in offering the students a practicum wherein they view a televised program and apply what they see toward the development of a career education learning package. The videotapes feature classroom teachers and students illustrating career education concepts, and interviews with practitioners and authorities.

Successful completion of the course should allow the student:

1) to comprehend the major principles and practices of career education in an elementary school setting;

2) to recognize the need of career education in an elementary school setting;

3) to recognize the formative nature of the career education concept and beware of areas of possible conflict among educators;

4) to introduce career education to an elementary school staff.

Course Assignments

Each student will:

1) participate in the pre-program activities at the RESA sites;

2) view the course videotapes;

3) perform the ancillary activities;

4) complete the four-channel audio system;

5) participate in the live seminars;

6) develop a learning package that incorporates career education at his or her grade level.

The Resource Coordinating Center at the University of Kentucky will provide consultive services for the participating students during the school year following the course.

Class Meetings

During the summer of 1974, the course meets on Tuesdays for eight weeks, beginning July 2, 1974 and ending August 20, 1974, at 9:00 a.m. EDT, with an organizational meeting being held on June 27, 1974.

The mornings are spent viewing the videotapes and completing the four-channel audio system; the ancillary activities are performed in the afternoon.

Course Content and Objectives

Week I: July 2, 1974

Program I -- The Concept of Career Education

1. demonstrate the need for career education

2. present a "basic tenents" definition of career education

Program II -- A Comprehensive Career Education Program

1. illustrate the actual implementation of a career education program

2. introduce career development concepts

3. initiate consideration of "sequencing" in a career education program

Week II: July 9, 1974

Program III -- Job Clustering: A Tool for Career Education

1. demonstrate the need of "sequencing" and ordering the world of work

2. acquaint students with various clustering systems

3. show the application of a single clustering system in the classroom

Program IV -- Integrating Career Education into the Curriculum

1. detail the steps needed to integrate career education into the curriculum

2. exhibit how to establish career education goals

Week III: July 16, 1974

Program V -- Total Curriculum Integration

1. detail the development of curriculum integration skills

2. illustrate total curriculum integration

Seminar 1 -- Curriculum Integration, Alternate Ideas, and Special Problems

1. provide an opportunity for immediate exchange between students and experts in curriculum

Week IV: July 23, 1974

Program VI -- The Collection and Utilization of Instructional Materials

1. focus on the types of available resource material
2. offer guidelines on how to access and utilize commercial materials
3. present potential ideas for the teacher to use in creating resources

Program VII -- Community Resources

1. assert the importance of the community
2. demonstrate actual classroom use of the community
3. discuss the teacher's role as liaison

Week V: July 30, 1974

Program VIII -- Implementation Strategy for the School System

1. illustrate the variety of roles individuals might fill in implementing career education programs
2. detail steps needed to implement career education into a school system
3. show the necessity of involving different individuals in the implementation process

Program IX -- Attitudes About Change

1. acquaint the student with various attitudes about change
2. display points of views of concerned parties

Week VI: August 6, 1974

Program X -- Dealing with Educational Change

1. present career education's case with regard to negative attitudes
2. provide students with examples of resistance to change and how to deal with such resistance

Seminar 2 -- Problems in Program Planning and Special Concerns

1. provide an opportunity for immediate exchange between students and experts in program planning
2. offer students a forum for exchanging views on attitudes about educational change

Week VII: August 13, 1974

Program XI -- Special Interests and Career Education

1. illustrate some of the needs of special interest groups
2. consider the likely response of special interest groups
3. focus on career educator's responses to these needs
4. stress the individualized nature of career education

Seminar 3 -- Discussion on Assessing and Dealing with Local Special Concerns

Week VIII: August 20, 1974

Program XII -- The Rewards of a Comprehensive Career Education Program

1. summarize the major points of career education
2. present prominent views of career education's future

Seminar 4 -- Summary Discussion with National Career Education Authorities

1. discuss the implications of career education
2. outline the probable future of career education

Course Materials

The readings bibliography below gives a sampling of the books which are used during the course. These references are either provided to the student or made available for reference at each RESA site.

Bailey, Larry L. and Ronald Stadt. Career Education: New Approaches to Human Development. Bloomington, Illinois: McKnight Publishing Co., 1973

Bottoms, James E. and others. Career Education Resource Guide. Morristown, New Jersey: General Learning Corporation, 1972.

Dictionary of Occupational Titles, Vol. I, Vol. II, and Supplement. Washington, D.C.: U.S. Government Printing Office, 1964-67.

Hoyt, Kenneth, Rupert Evans, Edward Mackin, and Garth Mangum. Career Education: What It Is and How to Do It. Salt Lake City, Utah: Olympus Publishing Company, 1974.

Hoyt, Kenneth, Nancy Pinson, Darryl Laramore, Garth Mangum. Career Education and the Elementary School Teacher. Salt Lake City, Utah: Olympus Publishing Company, 1973.

Isaacson, Lee E. Career Information in Counseling and Teaching, 2nd edition. Rockleigh, New Jersey: Allyn and Bacon, Inc., 1971.

Osipow, Samuel H. Theories of Career Development. New York: Appleton-Century-Crofts, 1973

Students also have access to computer and manual information retrieval systems.

Mimeographed material accompanies the ancillary materials of each program.

This program was produced under a grant from the National Institute of Education. The views expressed do not necessarily reflect those of the National Institute of Education or the U. S. Department of Health, Education, and Welfare.