DOCUMENT RESUME

ED 272 340 RC 015 847

AUTHOR Barker, Bruce O.
TITLE Live via Satellite: Interactive Distant Learning in America's Rural Schools.
PUB DATE 86
NOTE 21p.; Paper presented at the Annual Colorado Rural and Small Schools Conference (6th, Fort Collins, CO, June 29-July 1, 1986).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Access to Education; *Communications Satellites; *Course Descriptions; Course Evaluation; Credit Courses; Curriculum Enrichment; *Educational Innovation; Program Development; *Rural Education; Secondary Education; Secondary School Curriculum; *Small Schools; *Telecourses

ABSTRACT

Advances in satellite technology hold great promise for offering a broad and varied curriculum in small rural schools. In 1985 and 1986 three vendors in the continental United States pioneered the offering of interactive satellite instruction for high school credit courses. The programs were: (1) German by Satellite offered by the College of Arts and Sciences at Oklahoma State University; (2) the Accelerated Learning of Spanish Project via Satellite Television sponsored by the Utah State Board of Education, the Bonneville International Corporation, and the IBM Corporation; and (3) the TI-IN Network broadcasting 14 different high school courses originating from San Antonio, Texas. These rapidly growing systems currently beam 16 different high school credit courses to over 2,300 students in approximately 200 schools scattered across 13 states. The systems employ a variety of teaching strategies in their televised satellite broadcasts, which are supplemented by features such as computer assisted instruction, live audio interaction between students and video teacher, and electronic mailbox systems. Although no data are yet published assessing the quality of the instruction, survey information shows students and administrators have positive attitudes towards the satellite courses. (JHZ)

LIVE VIA SATELLITE: INTERACTIVE DISTANT LEARNING

IN AMERICA'S RURAL SCHOOLS

AN ADDRESS PRESENTED

At The

SIXTH ANNUAL COLORADO RURAL AND SMALL SCHOOLS CONFERENCE

Fort Collins, Colorado

June 29-July 1, 1986

By

Bruce O. Barker
Assistant Professor
College of Education
Texas Tech University
Lubbock, Texas 79409

LIVE VIA SATELLITE: INTERACTIVE DISTANT LEARNING IN AMERICA'S RURAL SCHOOLS

The Growth of Satellite Telecommunications

Live Via Satellite! Over 20 years have passed since these words first appeared on our home television screens. Since that time, important events spanning the globe have entered our living rooms at the exact time they happened--the 1964 Olympics in Tokyo, Astronaut Neil Armstrong's pioneering walk on the moon, and Richard Nixon's historic visit to China to name just a few.

We live in an age in which we have watched the world virtually "shrink" before our eyes. At least, so it seems in relation to the almost incomprehensible advances which have occurred in the field of telecommunications over the past few years. Many of these advancements are the direct result of America's investment in the space program, with satellite communications being among the most obvious benefits. To watch a program in our homes, brought to us live via satellite, is no longer the novelty it was just a few short years ago. Now, millions of people across the globe watch satellite broadcasts every day. The proliferation of satellite receive dishes (down link earth stations) in our cities, suburbs, and rural communities offer mute testimony that satellite communications is one of the fastest growing industries in our society. The

reception of satellite signals is not restricted to our nation's large population centers. Anyone who travels, even occasionally, by automobile throughout any part of rural America--that is, our wide open spaces, small towns, rolling hills, prairies or our mountains soon recognizes that the sight of a satellite down link adjacent to a private residence is becoming more common place every day.

One of the positive characteristics of satellite communications is that the cost of satellite transmission is insensitive to distance. This is not true in the case of telephone or other land line communication systems. In other words, the cost of satellite transmission between San Francisco and Boston is no higher than that between Boston and New York. Furthermore, as more satellites have been launched into geosynchronous orbit above the earth, the cost for transponder or transmission time has been significantly reduced. One of the major results has been the increased frequency of full motion video teleconferences. The video conference industry, though still in its infancy, already includes major networks linking businesses, educational institutions, religious organizations, political parties, and other groups throughout our society. And now the marvel of satellite technology is beginning to impact America's rural schools.

The need for outreach efforts to small rural schools seems self-evident. The challenge of offering a broad and varied curriculum is one of the most frequent concerns

associated with small rural schools--particularly the small high school. Although it is true that larger schools also face obstacles in planning and organizing their curricula, the problem is generally of greater magnitude in small schools where lower enrollments increase per-pupil cost of facilities, programs, and certified personnel.

Advancements in satellite technology hold great promise as a mechanism for curriculum enhancement in small rural schools. During the past 18 months three separate vendors in the continental United States have pioneered the concept of interactive satellite instruction for high school credit courses. These include: (1) German by Satellite offered by the College of Arts and Sciences at Oklahoma State University: (2) the Accelerated Learning of Spanish Project Via Satellite Television sponsored by the Utah State Board of Education, the Bonneville International Corporation, and the IBM Corporation: and (3) the TI-IN Network broadcasting 14 different high school courses originating from San Antonio, Texas. My purpose in speaking to you is to provide a brief program description of each of these three systems, and to present evaluative data which assesses the quality and/or benefits of each. Between them, these systems currently beam 16 different high school credit courses to over 2300 students in approximately 200 schools scattered across 13 states. The networks are experiencing rapid growth.

Interactive Satellite System Descriptions

Distance Learning -- that is, the transmission of a master teacher's lessons from a host site to previously identified receive sites simultaneously by means of telecommunications is an educational innovation that is sweeping this country. The medium of communication may include anyone or more of a variety of existing technologies including cable telecommunications, satellite transmissions, ordinary telephone lines to employ slow scan TV and electronic chalkboards, Instructional Television Fixed Services for low power TV, microwaves, microcomputers, etc. Interactive distance learning suggests that the student is able to communicate directly with the instructor and other students at different sites--regardless of the distance--during the time that instruction is being delivered. Another definition implies that learning materials have been designed which provide the student with immediate feedback and guidance on learning activities. In either case, the intent is for the student to become an active rather than a passive learner. Interactive satellite teaching is perhaps the most exciting application to date of distance learning. Interactive satellite instruction permits full motion viewing of the instructor and any visual aids the teacher chooses to display. Furthermore, the technology allows students to ask questions, seek directional help, and to respond to teacher queries and student comments irrespective of the distance between classrooms and broadcast site locations. Televised classes

are nothing new. What is new, however, is live, two-way communications made possible by reduced costs in satellite dishes and advances in technology.

German Language: Oklahoma State University

During the 1983-84 school year, the College of Arts and Sciences at Oklahoma State University and the Oklahoma State Department of Education began telecasting enrichment programs, via satellite, based on science and the environment to 21 different high schools in Oklahoma. During the spring semester of the 1984-85 school year, Beaver High School, located in the panhandle of Western Oklahoma, began offering German language over satellite which was beamed from Oklahoma State University. Less than one year later, over 50 other high schools in the state had joined the network which served more than 700 students at the close of the 1985-86 academic year. Within one year the offering of German language in Oklahoma high schools had doubled.

At present, the Oklahoma project only offers first-year German. In September of this year they plan to add second-year German to their curriculum as well as high school physics. In addition, administrators of the program anticipate expansion of their network into at least 15 more states during the 1986-87 school year. Before the end of this decade, OSU plans to develop and broadcast accredited high school courses in calculus, chemistry, Russian, and Japanese.

The Oklahoma system incorporates a blend of teaching and technologies which was devised by Dr. Harry Wohlert, a professor of German at OSU and instructor of the German satellite course. Two days a week (Monday and Wednesday) students watch their teacher over a regular TV monitor which receives the satellite signal either by means of the school's down link dish or by cable as the signal is redistributed from another dish. Live audio interaction between teacher and students is possible via an audio link over regular telephone lines. On the other three days of the week, students study at their own schools under the supervision of a regular classroom teacher who monitors individualized study by students using headphones and a voice recognition computer software unit which operates on either Apple IIe or Radio Shack III/IV microcomputers. OSU recommends a ratio of two to three students for each computer. Learning strategies involve the students in listening to German TV commercials, weather reports, popular songs and athletic activities. In addition, a toll-free telephone line is manned 40 hours per week enabling students at distant sites to call the OSU Telecommunications Center to either request assistance on assignments or to leave messages for their instructor. The telephone is staffed by graduate students familiar with the lesson assignments and learning activities. Also, an electronic mailbox system is available 24 hours a day to access the Telecommmunications Center.

The base monetary cost for schools to participate on the Oklahoma Network is $1,750 each for any one of the three courses to be offered in 1986-87. Schools with satellite classes of over 10 students will be assessed an additional $50 per pupil. Subscribing schools are responsible to buy their own satellite dish, microcomputers, and tape recorders. Depending on type and quality of hardware equipment purchased, up-front outlay may range from $5,000 to $10,000. The University supplies two 45 minute interactive broadcasts each week (60 telecasts during the year) with rights for off-the-air videotaping, computer software for voice synthesis, cassette tapes, and print materials.

Many small school districts in Oklahoma (those with fewer than 800 ADA) have received financial assistance in their purchase of satellite down link dishes. The 1985 State Legislature allocated $1,000,000 for small school cooperatives. As a result, many districts were able to purchase a receive dish at no direct cost to the district. Funds are still available for qualifying districts during the 1986-87 academic year. Also, in southwest Oklahoma, the Cotton Electric Cooperative approved a plan to offer a free satellite TV system, including a 9-foot dish, and top-of-the-line electronic receiving equipment to every high school within its eight county service area. Dishes have since been installed at 22 Southwest Oklahoma high schools.

Distance Accelerated Learning--Utah

The Accelerated Learning of Spanish Via Satellite

Television Project is jointly sponsored by the Utah State Board of Education, Bonneville International Corporation which is a private satellite corporation, and the IBM Corporation. At the close of the 1985-86 school year, 27 schools and 840 students, scattered across Utah, Colorado, Nevada, and Arkansas had participated in the program's first year of operation. Instructional content for the course has been designed for students at both the junior high and high school level who are studying first-year Spanish. The 1986-87 school year will see no new courses added to the system's curriculum, however, plans are being considered to include Spanish II, English as a second language, and other courses in the future.

The Utah Spanish project is somewhat similar to the German program in Oklahoma. Both utilize televised satellite broadcasts, computerized voice synthesis, and other media in the instructional process. Similar to Oklahoma, over the course of a year, Utah beams a 40-minute telecast every other day. On the non-broadcast days, students work under the direction of a classroom monitor either individually on computer software programs or in group activities which have been developed specifically for the course. Yet, there are significant differences between the two programs. Effective in 1986-87, Utah will broadcast previously taped video lessons--not live instruction. Furthermore, the satellite broadcasts will not include an audio talk-back component for students. Broadcasts will be a one-way video and audio signal only. Utah's philosophy of

"distance accelerated learning" is to provide a structured multi-sensory approach to education. Although the same philosophy may be implied in the Oklahoma program, this approach seems to permeate the instructional design of Utah's satellite system. For example, lessons begin with relaxation exercises intended to stimulate the students' left and right brain hemispherisic processes, followed by a warm up period in which content is introduced using advanced organizers to help students understand the purposes of the lesson and how they can best benefit from the instruction. Satellite broadcasts include planned strategies for "active" as well as "passive" listening. Active listening requests that the students read out loud the Spanish dialogue along with their TV teacher. Passive listening asks that they form in their minds the words as they listen to music or watch scripted dialogue. Classroom practice (non-broadcast days) is highly interactive with students completing computer assisted lesson activities on IBM PC juniors and XT computers which include voice synthesis modules. Games, choral recitation and singing, group and paired study, and oral questioning also promote student interaction in the subject area. An instructional design team of about 25 professionals has worked together to design and produce Utah's accelerated Spanish program.

Costs of the Utah program are higher than those for Oklahoma. Schools who join the network are required to obtain their own satellite receiver, a television monitor

(the recommendation is one monitor for every 10 students), one IBM PC Junior computer to be shared between every two students, one IBM XT computer and appropriate software for networking among the computers. The total estimated cost for equipment to accommodate 10 students is about $18,500. The subscription fee for 1986-87 will be $1,600 plus either a $15 charge per student for printed materials or $100 for camera-ready copies which can be duplicated by the school. The $1600 fee provides the school with 80 televised satellite broadcasts and allows the school to videotape off-the-air, 80 computer programs, teacher materials, enrichment activities for students, and inservice training for classroom monitors. Like each of the other satellite systems, Utah's network is growing.

The TI-IN Network -- Texas

The TI-IN Network Incorporated is a Houston based firm which over a year ago received approval from the Texas Education Agency to begin the broadcast of interactive satellite programs in Texas. It has since become the most widely distributed and the fastest growing satellite system beaming course work to our nation's high schools. TI-IN initially began as the Texas Interactive Instructional Network. The network quickly dropped the Texas title to avoid the connotation that it was restricted to the Lone Star state. When first beginning broadcasts in September 1985, TI-IN reported 53 down link sites in Texas. One was in Dallas which redistributed to 36 other sites via low

frequency TV signals (Instructional Television Fixed Services). Another site was in California which redistributed to 18 schools over ITFS. The network now beams to schools in six different states, with many others expressing interest.

TI-IN's satellite instruction operates somewhat differently than either the Oklahoma or the Utah systems. Among the most notable differences is that TI-IN offers 14 different courses in its curriculum -- Calculus, Pre-Calculus, Latin I, Computer Science I, Personal Business Management, Business and Consumer Law, Psychology, U.S. Government, Computer Math I, Spanish I, English Honors, German I, Trigonometry, and French I. Furthermore, live broadcasts of these courses are telecast five days a week. TI-IN does not use computer assisted instruction or individualized learning modules as do the Utah and Oklahoma programs. Rather, TI-IN perpetrates the existing -- and familiar -- model of teacher-present/student-recite pattern of traditional classroom instruction. This, and the variety of courses available may be reasons why the network is growing so rapidly. Other factors may be that TI-IN offers much more to subscribing schools that just accredited high school courses. Other offerings include a large array of enrichment programs for levels K through 12, extensive inservice training for teachers and administrators, staff development training, and test reviews for both teachers and students. Because of TI-IN's success in offering quality interactive programming in Texas, the Texas College and

University Coordinating Board recently approved the offering of college credit courses on a pilot basis over the system. The network is approved by the Texas Education Agency.

TI-IN administrators in their promotional literature and contact with instructors who are teaching over the network emphasize interaction between teacher and students over the system. Four cordless telephones are provided with each classroom monitor. These are programmed to automatically dial the broadcast studio so that the teacher can stop her presentation in order to attend to the individual student. The idea is to maintain as close-to-normal interchange of ideas between teacher and students as possible.

The first year cost for subscribing schools to participate on the TI-IN network ranges between $16,000 to $18,000. Thereafter the annual subscription fee for each high school course is about $4,000. Fees for inservice training, staff development, and test reviews are separate.

Evaluation of Interactive Satellite Instruction

To date, no data have been published assessing the quality of high school courses taught via interactive satellite technology. In May of this year, the Oklahoma State Department of Education did collect survey information from schools who had participated in the German by Satellite program. Based on opinions of building administrators, the program was indeed worthwhile because it provided students with an opportunity to study a foreign language which

otherwise would not have been provided. It was also felt that, due to the manner in which the class was taught, students received a cultural learning experience as well as exposure to a foreign language. Furthermore, students became more familiar with advancing technologies and were taught skills in independent learning and self study. Instruction by the teacher and materials provided for the students were deemed to be excellent. In terms of weaknesses of the system, school officials stated that their major concern was that the broadcast time for the satellite class was not synchronized with the school's bell schedule. They indicated that live broadcasts should be increased from two to three classes per week in order to (1) maintain student interest and motivation and (2) to answer student questions. Also, concern was expressed that the "turn-around" time between testing and reporting scores to students was too long. Timely feedback is needed to keep students enthused.

In late May of this year, I telephoned several school principals in Utah and Nevada where students had participated in accelerated learning of Spanish via satellite. I also gathered information from several classes of students who were just completing their first year in the program. The overwhelming attitude of both principals and students was that learning by satellite had been a meaningful experience. Individual comments emphasized the positive qualities of the TV teacher, the value of

student/computer interaction, and that small remote school districts were able to provide students in their schools with increased opportunities for learning. Many students reported that the way in which the class was taught made it fun, interesting, and a quality learning experience. Suggestions for improvement centered on the need for more class offering besides just Spanish language, as well as the need to increase opportunities for student talk-back to the TV teacher.

My most thorough evaluation of interactive satellite delivery of high school credit courses has been the TI-IN Network. One month ago, I conducted a survey of 31 subscribing schools participating on the network. These were chiefly located in Texas. Responses were received from school administrators at each site and from 159 students who have studied on the system. Data collected has yet to be fully analyzed and will be reported in depth at the Rural Education Annual Conference to be held this coming October in Little Rock, Arkansas. That which follows is a highlight of preliminary findings.

Based on information gathered from the sample, it was learned that virtually all high schools subscribing to the network are small rural schools. The mean ADA reported per high school was 239. In each school, the average sized satellite class fluctuated between eight and nine students. Over 80 percent of the principals stated that satellite courses had become an integral part of their school's

curriculum. The others were investigating the system on a pilot basis. Still, all but one school indicated they were planning to re-subscribe to the system this coming school year.

In terms of student academic achievement, principals indicated that in most schools (80 percent) student enrollment in satellite courses was reserved only for "A" and "B" students. In the other 20 percent of the schools, enrollment was open to all students. Although student participation was across the spectrum of grades 9 through 12, most participating students were seniors (44 percent), followed about evenly by juniors (25 percent) and sophomores (22 percent).

One of the interesting findings from the survey was the level of reported interaction between students and their TV teacher. On an five point attitudinal scale, 32 percent of the principals rated student/teacher interaction as "excellent" and 45 percent rated it "very good." In addition, students reported that an average of two to three calls each were initiated by them every week to their teacher during the lesson broadcast. Also, between two to three times each week the instructor called them by name over-the-air and asked for their response to specific aspects of the lesson.

An associated finding was the level of difficulty--academic rigidity--reported for satellite courses. Although 24 percent of the students stated satellite courses were about the same as regular classes in terms of difficulty, sixty-five percent said they were harder. Similar findings

were reported in terms of homework assignments and exams and quizzes. When asked if they preferred satellite instruction over regular classroom teaching, almost 70 percent of the students said they would opt for the regular classroom.

As expected, the major strengths of satellite instruction reported by both principals and students were the variety of courses available and the opportunity to take coursework which otherwise would not be offered at the school. Many students also expressed approval of the personality and teaching style of their respective satellite teacher(s). Principals were overall very favorable in their view that satellite courses were a definite benefit to their instructional program. And finally, the vast majority of principals felt that the monetary outlay for equipment and subscription fees was well worth the money.

Conclusion

What does all this tell us? First of all, interactive television instruction via satellite technology works. Second, it works so well that each of the networks is experiencing rapid growth, and this after only one year of broadcasting. Simultaneously, we have witnessed three separate producers in different regions of the United States introduce a new and profoundly innovative idea that has tremendous potential to impact American education. For rural districts, satellite instruction equalizes access to educational resources by overcoming barriers of distance and geographical isolation. In most cases, small and rural

schools are simply unable to offer the same range of courses and services as bigger schools in suburban and metropolitan areas. Interactive satellite instruction is not necessarily the answer to solve this dilemma, but it is one answer. In the past, rural educators have relied on correspondence courses, traveling teachers, pairing agreements, telephone conferencing, and other alternatives to provide rural youth with a full range of curriculum offerings. Educators in small and rural communities now have the added alternative of interactive satellite learning. Live, full motion video, with audio talk-back, coupled with electronic mail and microcomputer learning is an exciting consideration for any small school faced with the challenge of expanding or improving its curriculum. Interactive satellite teaching could well be the curriculum equalizer for small and rural schools in the 1980's and beyond.

APPENDIX

Appendix

Readers desiring additional information about the programs mentioned in this paper should contact:

Smith Holt, Dean
College of Arts and Sciences
Oklahoma State University
Stillwater, OK 74078-0265
Telephone: (405) 624-5663

Kenneth L. Neal
Coordinator, Instructional Technologies
Utah State Office of Education
Curriculum & Instruction Division
250 East 500 South
Salt Lake City, Utah 84111
Telephone: (801) 533-5573

Patsy S. Tinsley
President
TI-IN Network
100 E. Nasa Road, Suite 201
Webster, Texas 77598
Telephone: (713) 554-5545