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ABSTRACT

An evaluative questionnaire completed by 30 high school principals and 159 high school students who used the TI-IN Network demonstrated the advantages of interactive satellite television instruction for rural and small schools. The study found that a large number of subscribers to TI-IN were small rural high schools whose principals stated that satellite courses were an integral part of their school's curriculum. Most students (85%) enrolled in one satellite course, 14% in two courses, and 1% in three different courses. Most participating students were seniors (44%), followed by juniors (25%), and sophomores (22%); 80% of the schools limited enrollment in satellite courses to "A" and "B" students. Most principals rated student/teacher interaction as excellent/very good and students reported initiating two to three telephone calls each week to television teachers during broadcasts. Students perceived satellite courses as more difficult than regular classes (65%) and 70% would prefer regular classrooms. Major strengths of interactive satellite instruction included a variety of classes available, television teacher personality, and interesting instruction. Least liked aspects included too much homework, too difficult, impersonal, and difficult telephone communication. The report describes the TI-IN Network, reviews costs of Network use, and discusses advantages of interactive satellite instruction in general. (LFL)

AN EVALUATION OF INTERACTIVE SATELLITE TELEVISION AS A DELIVERY SYSTEM FOR HIGH SCHOOL INSTRUCTION

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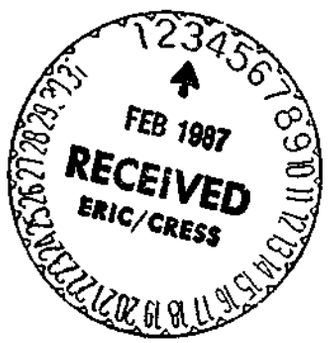

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AN EVALUATION OF INTERACTIVE SATELLITE TELEVISION AS A DELIVERY SYSTEM FOR HIGH SCHOOL INSTRUCTION

Since the release of A Nation At Risk each of the 50 states have addressed efforts aimed at educational reform [1]. In fact, in April of 1984 -- only one year after the U.S. Department of Education issued its alarming report -- the Education Commission of the States had already identified 175 state level task forces formed to address the issue of public school improvement [2]. Included among the mandates for virtually every state's school improvement agenda has been a call for increased high school graduation requirements. Implementation of the reforms has required that many small rural high schools begin to offer courses which were not previously included in their curriculum. This has placed a burden on many small high schools which have been unable to offer some of the required courses due to lack of certified personnel.

The problem of offering a broad and varied curriculum is one of the most frequent concerns associated with small and rural high schools in this country [3]. The problem is a significant one. Of the nation's 15,144 public senior high schools, 7329 (48 percent) enroll less than 500 students each [4]. The matter is also a serious concern in Texas which boasts more independent school districts than any other state in the nation. Of Texas' 1150 public high schools, two-thirds enroll fewer than 650 students each. In

fact, 329 (29 percent) have fewer than 135 students and an additional 217 (19 percent) enroll less than 275 each [5].

Interactive Instruction via Satellite

For rural school administrators who keep up with today's technology, however, it is possible to offer low incidence courses and those for which a locally certified teacher is not available. This can be accomplished without consolidation of schools and without physically transporting qualified teachers from one school to another. The alternative -- and perhaps the biggest educational breakthrough since the computer -- is interactive televised instruction via satellite. Many educators across the country are showing great interest in courses which are transmitted live via satellite.

Televised courses are nothing new. What is new, however, is live, two-way communication made possible by linking satellite technology with regular telephone service. Live TV broadcasts are beamed from the classroom studio via an up-link dish to the satellite. The signal is then beamed back to down-link dishes at the subscribing receive site schools. Satellite technology permits one-way transmission of voice, data, and full motion video. Audio talk-back by participants at the subscribing schools is over regular telephone lines, thereby making the instruction interactive. By picking up a telephone, students at recieve site schools can call in questions on a toll-free line and hear their instructors' answers on the TV. The technology is also capable of electronic copy distribution to create hard copy

handouts, exams, and course administration materials sent via satellite directly to the receive site locations.

The concept of interactive satellite instruction was inaugurated during the 1985-86 school year when three separate vendors began broadcasting courses over the air. Currently, four interactive satellite systems are beaming instruction to subscribing high schools across the continential United States [6]. Undoubtedly, more will enter the airwaves in the future.

The TI-IN Network

The largest and fastest growing of the interactive satellite systems for high school instruction is the TI-IN Network, headquartered in Houston, Texas. In the Fall of 1985, TI-IN became the first private vendor in the United States to broadcast live interactive TV courses to subscribing high schools in the United States. By the end of the 1985-86 school year, TI-IN was broadcasting 14 accredited high school courses to over 50 high schools in Texas, California, Arkansas, and Iowa. The network has since grown considerably. It now beams instruction to approximately 1500 students, scattered across 12 states in over 145 downlink locations [7]. The largest number of sites are in Texas; however, school administrators from throughout the nation are expressing interest in the network.

TI-IN offers over 100 hours per week of live interactive programming from its Texas studio. Offerings during the 1986-87 school year include 17 different high

school courses, 400 hours of inservice training and staff development, selected college credit courses, student enrichment programs across the K-12 curriculum, student remediation courses, test reviews for teachers and students, and community programs.

TI-IN high school class offerings include French, Spanish, German, Latin, computer science, business management, business law, algebra, trigonometry, honors English, honors calculus, psychology, and other subjects. High school classes run 55 minutes per day, with 175 instructional days during the school year. Total class size (at all schools in all states) has been limited by the network to 200 students.

Professional and support staff training enables teachers to acquire college credit hours and meet inservice training requirements without traveling long distances to a university or other central location. During the 1986 fall semester, the Texas College and University Coordinating Board approved the first college credit courses to be offered over the system. Texas Tech University taught a three semester hour course on the "Models of Teaching" and the University of Houston, Clear Lake offered a three semester hour course entitled "Applied Linguistics for Bilingual Education." Other universities in Texas will be teaching over TI-IN during the 1987 spring semester.

Study Objectives

In its first 18 months of operation, much interest has been shown in the TI-IN Network as well as other interactive

satellite systems. These systems have frequently been hailed as the "great curriculum equalizers" for rural and small schools [8]. Indeed, they seem to be a much more viable alternative for curriculum expansion than traditional alternatives of the past -- correspondence courses, one-way only TV courses, video-taped instruction, independent learning, etc. Yet, in our haste to fully embrace the new technology, we need also to look at how well it has been accepted by the participants and evaluate its overall effectiveness. What are the monetary and personnel costs to subscribing school to participate in the TI-IN Network? What is the interest level of students studying over satellite? What are the preceived strengths of satellite delivered instruction? What recommendatiions do first year participants suggest that will improve this approach to delivering instruction? The purpose of this study was to answer these, and related, questions.

Procedures

During the Spring of 1986, a 20 item questionnaire was administered via telphone to high school principals in 30 different subscribing schools participating on the TI-IN Network. In addition, a 25 item self-administered questionnaire was prepared and copies were mailed to the same 30 subscribing schools to be completed by students who were taking coursework via satellite. Usuable responses were received from 159 students. Information about program and equipment costs were obtained by contacting TI-IN administrators at their Houston offices.

The Statistical Analysis System (SAS) computer program for the social sciences was used to list the frequency distributions; and to calculate the mean, standard deviation, and range for each of the variables taken from the two questionnaires.

Results

Based on information gathered from the sample, it was learned that a large number of high schools subscribing to TI-IN were small rural schools. The mean ADA (average daily attendance) reported per high school was 239. In each school, the average sized satellite class fluctuated between eight and nine students. Most students (85 percent) were enrolled in only one satellite course; however 14 percent were enrolled in two courses and one percent was enrolled in three different courses. 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 principal indicated they were planning to re-subscribe to the network the following academic year. Courses in which the highest number of students were enrolled included Spanish, computer science, basic math skills, German, basic English skills, British literature, psychology and sociology.

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). Only nine percent of participating students were freshmen.

One of the interesting findings from the survey was the level of reported interaction between students and their TV teacher. On a five point attitude scale ("poor, fair, good, very good, and excellent"), 32 percent of the principals rated student/teacher intereaction as "excellent" and 45 precent rated it "very good." No principals reported the level of interaction to be "poor;" only 10 percent said it was "fair;" while 13 percent reported it to be "good." In addition, students reported that an average of two to three phone calls each were initiated by them every week to their TV teacher during the lesson broadcasts. 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 student preceived 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, 65 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. School principals were favorably impressed with the quality of student learning achieved in satellite courses. Twenty-six percent rated it "good;" 61 percent, "very good;" and 13 percent, "excellent." No principal rated quality of learning as either "fair" or "poor."

In descending order of frequency reported, the major strengths of satellite teaching as noted by students were: (1) the variety of classes available which otherwise would not have been offered in the school; (2) personality of the TV teacher; and (3) the instruction was interesting and varied. Among the least liked aspects of satellite teaching were: (1) too much homework was required and it was too difficult; (2) communication over the telephone made hearing difficult; (3) it was often hard to get hold of the TV teacher by telephone during the lesson broadcast; (4) the contact between the TV teacher and classmates in other receive site locations seemed too impersonal; and (5) some TV teachers were poorly prepared or lacked ability to portray themselves well over the TV.

Student recommendations to improve the system included: (1) improve the audio quality and efficiency of telephone calling from the receive site schools to the TV teacher's studio; (2) get a bigger TV screen in the schools so that students can see easier; (3) keep the receive site equipment in proper repair so that students don't get behind on lesson broadcasts; and (4) get better teachers to teach over TV.

Principals were overall very favorable in their view that satellite courses were a definite benefit to their instructional program. The vast majority felt that the monetary outlay for equipment and subscription fees was well worth the money.

Costs

Cost reported herein are those indentified by TI-IN Network administrators for the 1986-87 school year [9]. School districts that want to participate in programming offered via the TI-IN Network must purchase satellite receive equipment and become Network "subscribers." Equipment and engineering services required to join and use the network are provided by TI-IN. The average first year costs for a district for all programming, equipment, and installation is between $15,000 to $18,000. Thereafter, the annual subscription fee is approximately $5000 which covers the lease, maintenance, and electronic monitoring and control of the satellite receive dish. It also helps pay for the cost of the toll-free telephone line students use to communicate with their instructor(s) while on the system. Student enrichment viewing is offered to all network subscribers as part of their subscription fee. The cost to receive inservice training is based on school district size. For districts with ADA (average daily attendance) of less than 2000, the cost is $2200; 2000 to 12,000 ADA $4400 and greater than 12,000 ADA, $8800. Pay-by-participant programs, which include, college credit courses, some staff development offerings as well as teacher and student test

reviews, are priced on a pre-registration basis. Fees for the full range of high school credit courses are approximately $4000 per year but do vary depending on number of students enrolling in courses per school.

Remarks

Findings from this initial study of the TI-IN Network have overall been very favorable. That the concept of interactive learning via satellite has been well received is also evidenced by the fact that TI-IN is the fastest growing interactive satellite television instructional network in the United States. The network presently broadcasts on two satellite channels, but plans to expand broadcasting to six channels by the Fall of 1987 [10]. In addition, new uplink sites have been identified on both the East and West coasts. Increased broadcast capability will make network offerings more accessible. Furthermore, three uplink sites will permit TI-IN administrators to increase program offerings as well as target special programs to geographical regions of the United States.

The study reported in this article has been a first attempt to evaluate instruction via interactive satellite. As TI-IN -- and other interactive instructional satellite systems -- continue to grow, more indepth evaluative studies need to be conducted to ascertain how to best use this new approach to delivering instruction. For the present, it would appear that educators in our nation's schools have reason to be excited. Subscribers to interactive satellite instruction are chiefly rural and small schools which are

hampered by low student enrollments which increase per pupil cost of programs, facilities, and certified personnel. Satellite technology is a viable approach to bringing educational opportunity to students in these schools. The technology is now here to reach thousands of students via "long distance" where we have been unable to reach them before.

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