DOCUMENT RESUME

ED 355 350 CE 063 108

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TITLE Educational Instruction via Interactive Video Network.
PUB DATE Dec 92
NOTE 8p.; Paper presented at the American Vocational Association Convention (St. Louis, MO, December 1992).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Administrator Attitudes; *Agricultural Education; Delivery Systems; Distance Education; Educational Research; Educational Technology; Educational Television; High Schools; *Interactive Video; *Networks; Principals; Program Implementation; Secondary School Teachers; Superintendents; Teacher Attitudes; Use Studies; Vocational Education; Vocational Education Teachers

ABSTRACT

Perceptions of secondary educators were examined regarding delivery of educational programs via interactive video networks (IVN). The population included all agricultural education instructors, principals, and superintendents employed in public secondary schools having an agricultural education program during the 1990-91 school year in a midwestern state. Direct-mail questionnaires gathered data on the educators' self-reported level of understanding and interest in using two-way interactive television. The overall response rate was 81.4 percent (201 of 247). Findings indicated that educators possessed an adequate understanding of IVN and were interested in inservice programs and continuing education to gain more exposure to IVN. They accepted IVN as appropriate technology for high schools, but their reluctance to teach others to use IVN indicated a need for practice in using IVN to gain confidence. The most frequently cited obstacle by a three-to-one margin was cost. Programs perceived as priorities for IVN delivery were high school courses, teacher inservice/staff development, and adult and community programs. (Contains 16 references.) (YLB)

EDUCATIONAL INSTRUCTION VIA INTERACTIVE VIDEO NETWORK

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INTRODUCTION

Agricultural education must overcome the challenges of declining enrollment, increased graduation requirements, and lack of funding for elective courses (National Research Council, 1988). According to Kitchen (1987), America's rural communities face increased challenges for providing equitable services and economic stability. Geographic distances, isolation, shrinking population bases, shrinking tax bases, and inadequate telecommunications infrastructures and related services are major obstacles that rural communities must overcome to attain economic and educational parity with urban communities.

Rural education associations have attempted restructuring of schools through consolidation--the merging of two or more schools into one location. Consolidation has the advantage of bringing students to instructors, thus allowing more time for instructors to concentrate on classes and sharing administrators (Crawford, 1990).

In order to attain educational parity, rural school districts have shared instructors and limited the time spent in each school. Class size is limited to the students available at particular hours of the day. Instructors operate under the burden of additional travel and preparation time in each school (Whisler, 1988).

Technology has produced another alternative: the use of interactive video networks (Whisler, 1988). Rural schools interact with other rural schools via interactive video networks--a type of distance learning. Distance learning is characterized by the use of technology to link instructors and learners who are physically apart from one another (Hughes, 1988).

McClelland (1987) reported that young people in small public high schools in sparsely populated areas experience barriers to taking courses such as vocational education, foreign languages, and advanced mathematics and science because these schools cannot afford to provide a large array of specialized courses. Education in the United States is constantly being monitored and often comes under criticism that calls for improvements to keep abreast of advancements in today's society. More specifically, the discipline of agricultural education is being monitored and evaluated to determine changes needed to keep pace with technology in agriculture (National Research Council, 1988).

Educators and teacher educators are faced with the challenge of how best to combine the many tools of distance education technology with the talents of educators (Norenberg & Lundblad, 1987). Distance education technology can provide a medium that will allow school districts to have an equitable share of the opportunities for advanced courses and other course that rural school districts may not be able to provide (Whisler, 1988).

Distance learning provided by video and audio technologies via interactive video networks (IVN) has helped to alleviate some of the problems facing rural America such as geographic isolation, declining enrollment, shrinking tax bases, and increased requirements for high school graduation (Whisler, 1988). As classes become smaller, the financial burden increases as a result of decreased state funds and retained costs of instructors and facilities (Mihalevich, 1990). By not offering low-enrollment classes, schools deprive students of educational opportunities. Rural public school districts without access to an interactive video network face two options: provide instructors for low-enrollment classes and thereby take on greater financial burden, or eliminate low-enrollment classes and ultimately leave students at an educational disadvantage (Whisler, 1988).

Much of the application of interactive video networks is to provide courses that otherwise would not be offered due to minimal student enrollment or to comply with increased state requirements for courses that must be offered. Distance learning provides students with

opportunities to enroll in courses they may not have had the opportunity to experience previously. Distance learning also provides school districts with opportunities to offer classes in subjects for which many school districts do not have qualified instructors. Teacher/staff in-service and student development courses are other possibilities (Evans, 1988).

Another benefit for students who participate in interactive video networks is the capability for videotaping classes in the event students are absent. "Potential uses of interactive video networks are limited only by imagination, time, and budget" (deBlas, Knox, McArthur, Wallace, & Dean, 1988). "Interactive video network systems are limited in potential only by human constraints. Used creatively, the system can offer students a wider range of educational experiences than the institution, hindered by bricks and mortar, can possibly provide" (Kitchen, 1988).

In testimony to the Senate Committee on Labor and Human Services, Kitchen (1987) summarized the results of a study from 1983-1986 by the Minnesota Department of Education which researched the 11 technology demonstration sites in Minnesota implementing interactive video networks (IVN). Following is a summary of the Minnesota findings (Kitchen, 1987):

1. IVN allows schools to offer a wider range of elective courses and permits students greater access to subject matter.
2. IVN requires cooperation among schools. Whereas cooperation may be difficult, the improved programming would have been difficult or impossible to achieve without cooperation.
3. Teachers require training, preparation, and support to deal successfully with teaching via IVN. When teachers are properly prepared, they can adapt to and enjoy teaching via IVN. Seventy-five percent of the teachers who taught via IVN would choose to do so again.
4. Students enjoy learning via IVN and are motivated by it.
5. No systematic, statistically significant difference in achievement was found between students taking courses traditionally and those in IVN sections. Achievement does not seem to be influenced by the use of IVN.
6. IVN seems to be particularly appropriate for language and math instruction, for which it is heavily used.
7. IVN can be relatively expensive as a delivery system. Costs can be reduced, however, through business/education partnerships, cooperative purchasing, and planning.

The results of the study reveal a solid base for the effectiveness and the continued expansion and use of interactive video networks. "With these systems in place there is hope for rural America, without these systems there is not even hope" (Kitchen, 1987). Academic achievement has not been shown to be significantly different between those students taking courses taught traditionally and those in interactive video network settings (Barron 1987; US West Communication, 1988).

Agriculture makes up the largest percentage of America's economic base (Leistritz & Coon, 1991). The National Research Council's 1988 study of agricultural education in secondary schools revealed the committee's vision of what agricultural education is and should become at the secondary level if a competitive agriculture industry is to survive in this country: "Agriculture is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture." Rural America can deliver education about agriculture to more students through the technology of interactive video networks.

PURPOSE AND OBJECTIVES

The purpose of this study was to ascertain the perceptions of secondary educators (agricultural education instructors, principals, and superintendents) in the delivery of educational programs via interactive video networks (IVN). The objectives of this study are reflected in the following research questions:

1. What perceived level of understanding do educators have toward IVN?
2. What perceived level of interest do educators have toward using IVN?

3. What perceived obstacles exist preventing implementation of IVN education?
4. What programs are perceived as priorities for IVN delivery?

PROCEDURES

The population for the study included all agricultural education instructors, principals, and superintendents employed in public secondary schools having an agricultural education program during the 1990-91 school year in a midwestern state. The entire population was sampled. School districts having agriculture education programs were identified by the State Supervisor for Agricultural Education.

The survey instrument constructed for the purpose of this study was based on previous research conducted by Pullen (1989). Thirty-eight items within three parts of the instrument were examined for validity by a panel of experts. To determine the educators' self-reported level of understanding and interest in using two-way interactive television, a Likert-type scale (1-6) was utilized to define the levels. Six pilot sites that offer agricultural education programs were selected from a neighboring state's schools. Analysis of instrument reliability confirmed that the instrument provided sufficiently reliable data, $r = .91$ using Cronbach's Coefficient alpha at the .05 alpha level.

Data were gathered through the use of direct-mail questionnaires. The overall response rate for the questionnaire was 81.4 percent (201 of the 247). Measures of central tendency were calculated to ascertain the perceptions of educators toward the use of interactive video networks in the delivery of educational programs. To determine if significant differences existed between groups, multivariate analysis of variance (MANOVA) procedures were used. Univariate analysis of variance (ANOVA) procedures were used to determine whether any univariate differences existed (SPSS-x, 1988). An alpha level of .05 was used to ascertain significant differences.

RESULTS

A significant difference was found among educators in 6 of the 38 items dealing with level of understanding. Items were rank ordered with grand means (GM) ranging from 2.62 to 4.22. The rank order of items were similar for all groups. Educators' self-reported understandings were highest for the following items: (1) IVN GM = 4.22 and (6) cooperation necessary among schools who are using IVN GM = 3.87. Agricultural education instructors' self-reported understanding of IVN were significantly lower on all items than the responses of superintendents. Lowest ranking items of all groups were (4) training in the use of IVN, GM = 2.68 and (5) teaching classes using IVN, GM = 2.62. The lowest ranking items indicate a lack of experience in IVN usage.

Educators' Perceived Use of IVN as Students

The majority of educators, 75.6 percent, reported a willingness to participate on an IVN system as students. Lowest in ranking were principals at 65.1 percent; highest in ranking were agricultural education instructors at 85.0 percent. Results indicate that educators are willing to use IVN as students.

Educators' perceptions were not significantly different on eight survey items. Six of those eight items refer to financial resources. The six items include: (21) be less expensive than busing students, (34) be too expensive for our school, (27) give financial gain by providing classes to other schools, (18) be less expensive than sharing teachers, (33) require school to be a "provider" and receive little in return, and (36) create a classroom shortage. When finances are considered, educators indicate that they are in agreement. There is no indication, however, that agreement exists for the same reasons.

A significant difference existed among groups on 10 items focused on interest in using IVN. Items were rank ordered with a range in GM from 4.02 to 4.96. Educators' self-reported interest was strongest for the following items: (11) increasing the number of inservice programs for teachers, GM = 4.96; (9) offering continuing education for staff via IVN, GM = 4.95; and (12) encouraging the use of IVN by community, GM = 4.62. This self-reported interest is understood to indicate a desire to participate on IVN with their students. Agricultural education instructors' third-ranked item, (14) committing time to become familiar with IVN, GM = 4.47, was ranked sixth out of the ten items as ranked by three groups of educators. Principals' third-ranked item, (8) receiving classes from other schools via IVN, GM = 4.40, was ranked seventh out of the ten items by the three groups of educators. Lowest ranking items included (7) offering classes to other schools via IVN, GM = 4.30; (16) promoting school board in using IVN, GM = 4.20; and (13) teaching others to use IVN, GM = 4.02. Low-interest items indicate a need for practice in using IVN to gain confidence.

The four most frequently listed obstacles perceived as hindrances to successfully implementing IVN in rank order were: (a) costs; (b) negative attitudes of faculty, resistance to change, and "technophobia"; (c) selecting and training quality teachers for system; and (d) coordination of courses, time, schedules, and grading. Of all respondents, 70.6 percent reported cost as the highest-ranked obstacle to the successful implementation indicating one major reason IVN has not been used extensively. Negative attitudes of faculty, resistance to change, and "technophobia" were reported by 20 percent of the respondents and indicates a need for inservice to smooth the transition associated with change.

Educators' Perceived Use of IVN as Teachers

The majority of educators, 72.6 percent, reported a willingness to participate on an IVN system as teachers. Least willing were principals at 66.7 percent; most willing were superintendents at 76.9 percent. Results indicate that educators are willing to use IVN as teachers. Kitchen (1988) reported 75 percent of teachers who taught via IVN as willing to do so again.

The four most frequently listed priorities for use of IVN included (a) high school courses--advanced math and science, business, computers, agriscience, foreign languages, history, social studies, geography, fine arts, writing, English, speech, and home economics courses; (b) teacher inservice and/or staff development; (c) adult and community programs; and (d) continuing education and post-graduate courses. High school courses were reported as a priority by 87 percent of educators, whereas teacher inservice and/or staff development was noted by 43 percent of the respondents, which may indicate the educators' desire to stay current on technology and offer currently unavailable courses to all schools. Adult and community programs were identified by 36 percent.

On the following four survey items, agricultural education instructors had a higher mean perception than either of the administrators: (22) likely be replaced by other technologies in the future, (33) require school to be a "provider" and receive little in return, (40) eliminate teaching positions, and (36) create a classroom shortage. Based on these negatively worded items, a more negative attitude toward the technology is exhibited by agricultural education instructors than by principals or superintendents.

Educators' perceptions were not significantly different on eight survey items. Six of those eight items refer to financial resources. The six items include (21) be less expensive than busing students, (34) be too expensive for our school, (27) give financial gain by providing classes to other schools, (18) be less expensive than sharing teachers, (33) require school to be a "provider" and receive little in return, and (36) create a classroom shortage. When finances are considered, educators indicate an agreement. There is no indication, however, that agreement exists for the same reasons.

CONCLUSIONS AND/OR RECOMMENDATIONS

Interactive video networking is a relatively new technology, and educators have an unknown quantity of knowledge regarding the technology. Educators were surveyed to ascertain where their knowledge of interactive video network was acquired. Assumption One was presented in Chapter 1: The amount of knowledge of interactive video networks among respondents was adequate to formulate meaningful perceptions of the items presented in the instrument. Following are the major reported sources of information about IVN from highest to lowest: interactive video network systems in local schools and/or other sites (34.3%); demonstrations, workshops, personal observations, and/or telephone companies (32.8%); consortia, meetings, and the Department of Public Instruction (DPI) (28.9%); and magazines and journals (20.4%). Adequate knowledge of interactive video networks was gained by educators to formulate meaningful perceptions toward the use of interactive video networks.

Question One

A significant difference was found among educators in all items in Section A of the survey instrument. Educators possess adequate understanding of IVN, cooperation necessary among schools who are using IVN, and classes or programs used on IVN. Educators possess least adequate understanding of teaching methods to be used on IVN, training in the use of IVN, and teaching classes using IVN. The items ranked lowest refer to the application of interactive video networks and indicate a lack of experience in the actual use of IVN.

Question Two

A significant difference existed among groups on all items. Educators' interest in interactive video networks regarding inservice programs and continuing education for the school staff and community indicates a desire to gain more exposure to IVN by participating with the system from a student-type role. Educators' lack of interest in offering classes to other schools, promoting school board use, and teaching others to use IVN indicates a need for practice in using IVN to gain confidence.

Question Three

The four most frequently listed obstacles perceived as hindering the successful implementation of interactive video networks by rank order include costs; negative attitudes of faculty, resistance to change, and "technophobia"; selecting and training quality teachers for system; and coordinating courses, times, schedules, and grading.

The fact that cost was considered an obstacle to the implementation of interactive video networks, by greater than a three-to-one margin over the second-ranked obstacle, indicates a very evident reason why more schools have not implemented interactive video network. Negative attitudes of faculty and resistance to change indicate a need for inservice to smooth the transition associated with change.

Question Four

High school courses were reported as a priority by 87 percent of educators, nearly two times the number of the second priority. Teacher inservice and/or staff development was ranked second in priority by 43 percent of the respondents. Adult and community programs were ranked third with 36 percent of educators indicating this as a priority. Educators' second highest ranking priority teacher inservice and/or staff development, may indicate a desire to stay current on technology and offer currently unavailable courses to all schools.

Based upon the findings reported, the following conclusions have been formulated:

1. Educators accept interactive video networks as appropriate technology for high schools.
2. Educators express interest in gaining more knowledge of IVN through inservice.
3. There is a perceived need for financial assistance in the start-up of interactive video network sites.
4. There is a need for inservice in educating teachers, principals, superintendents, and

constituents of the school districts involved with IVN.

5. Rural America can deliver education about agriculture to more students through the technology of interactive video network.

RECOMMENDATIONS FOR FURTHER RESEARCH

Based upon the findings and conclusions, the following recommendations are offered:

1. Similar studies should collect data from a population made up of all educators.
2. Future studies should concentrate on the courses to be taught via IVN, and the results should be shared with curriculum writers to develop courses specifically for IVN delivery.
3. Results of this study should be reviewed by State Boards for Vocational Education for the purpose of educating teachers in American public high schools.
4. Results of this study should be reviewed by all teacher educators to assist in the preparing of future teachers and fulfilling the inservice needs of present teachers.
5. Future studies should collect data from school districts using IVN for specific system uses.

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