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Interactive or Non-interactive? That Is the Question!!!
An Annotated Bibliography
Barbara G. Zirkin and David E. Sumler

Abstract
When the Maryland Higher Education Commission made public a new state regulation distinguishing between interactive and non-interactive instruction, advocates of distance education objected. The staff of the commission undertook a bibliographic search to determine the effectiveness of various methods of delivering distance education. This article summarizes the results of the bibliographic search. Significantly, several studies reviewed suggest that interactive videodiscs may be the most effective form of instruction. The authors explore this possibility and propose a continuum of delivery modes from least interactive to most interactive. The logic of the continuum leads to a number of issues requiring further research. The annotated bibliography appears as an appendix to this issue.

Résumé
Lorsque la Maryland Higher Education Commission rend public un nouveau règlement de l'état établissant une distinction entre l'instruction interactive et non-interactive, les défenseurs de l'éducation à distance s'y opposent. Le personnel de la commission entreprend une recherche bibliographique afin de déterminer l'efficacité de diverses méthodes d'enseignement à distance. Cet article résume donc les fruits de cette recherche bibliographique. Fait très révélateur, plusieurs études parcourent indiquent que les vidéodiscs interactifs pourraient être la forme d'enseignement la plus efficace. Les auteurs étudient cette possibilité, et proposent un continuum dans les modes d'enseignement, allant de peu d'interaction à beaucoup d'interaction. Cette progression logique mène à un certain nombre d'enseignants sur lesquels il faut également pousser la recherche. La bibliographie annotée figure en appendice du présent numéro.
Introduction

"This regulation is the result of Neanderthal thinking!" stated the exasperated chief academic officer. He was becoming impatient with the Maryland state higher education officials who were proposing a regulation that would distinguish between "interactive" and "non-interactive" instructional modes. Besides objecting to the presumption of state bureaucrats in meddling in matters of faculty prerogative, the academic administrator felt such a distinction would severely limit the ability of colleges and universities to utilize distance education to reach presently unserved populations.

The dispute in Maryland was occasioned in the summer and fall of 1993 by a review conducted by the Maryland Higher Education Commission of its Minimum Requirements for Degree-Granting Institutions. The review was required by a state "sunset law," which mandates that all state agencies review the efficacy of their regulations on a five-year cycle. In 1993 it was the Commission's turn to review the Minimum Requirements.

A great deal had changed since the last revisions of the Minimum Requirements in 1987. Many higher education institutions had undergone round after round of retrenchments in the face of the national economic recession. Demographic trends had increased the competition for a declining number of high school graduates. Moreover, explosive advances in information technologies had made possible radical instructional innovations, including various forms of distance education. In order to address the impact of these forces on colleges and universities, the commission decided to respond to the required regulatory review with an in-depth analysis and revision. This approach inevitably led to concern among the state's institutions, which had adapted to the existing regulations and absorbed them into accustomed routine. Certain institutions saw individual regulatory revisions as direct attacks upon their approval to operate.

One of the major issues in dispute was the proposed distinction between interactive and non-interactive instruction. The origin of the debate was a provision of the state's 1987 Minimum Requirements for Degree-Granting Institutions that required that one-half the course credits for an associate or a baccalaureate degree be earned "through direct classroom instruction." Given the possible conflict between this requirement and the increasing use of distance education in Maryland, the staff of the commission felt a need to establish an operational definition of "direct classroom instruction."

The staff began with the assumption that the essence of direct classroom instruction was the interaction between teacher and student. Therefore, the distinction between interactive and non-interactive modes of instruction became the basis for the proposed regulatory definition. The draft of the regulation was as follows:

"Direct classroom instruction" means live instruction on the collegiate level which allows immediate interaction between student and instructor, including lectures, laboratory instruction, seminars, colloquia, independent study, interactive instructional television, and interactive computer-aided instruction, but not including instruction through correspondence, non-interactive learning, credit for prior learning, cooperative education activities, practica, internships, externships, apprenticeships, portfolio review, departmental examinations, challenge examinations, or courses offered by non-collegiate institutions.1

This definition was attacked as soon as the draft minimum requirements were distributed for public comment. Although a number of academics welcomed the distinction, the most vociferous reaction came from advocates of distance education—who did not want to see any distinction made between the varieties of instructional modes. The response to the draft regulations of Prince George's Community College, where one of Maryland's leading practitioners of distance education was employed, was representative:

The proposed definition of "direct classroom instruction" could adversely affect extensive and highly successful community college telecredit and cooperative education programs. The proposed definition focuses on "live" and "immediate" instructional feedback, creating a distinction between "interactive" and "non-interactive" television. We believe that the distinguishing characteristic of "direct" instruction should be that of faculty supervision of the experience rather than the mode of "liveness" of the instruction. The lecture method, as we all know, is hardly the paragon of "interactive" learning.2

Advocates of various alternative forms of instruction also found "the lecture" lacking in educational merit. The president of a non-traditional, upper-division weekend college, which leaned heavily upon internships and practica in the education of its students, made the following comments:

These changes are clearly drawn up with traditional collegiate programs as the normative model. Given the direction in which higher education appears to be headed nationally and in Maryland, it is not clear to me that State policy should privilege traditional institutions over non-traditional ones. . . . The concept that seems important to the regulation writers is "immediate interaction between student and instructor." However, some of the kinds of instruction that do not qualify as "direct classroom instruction" do in fact often contain substantial elements of "immediate interaction between student and instructor," while some instructional forms included in the definition contain very little such interaction. For example:

1. Live classroom lectures frequently provide little or no opportunity for student-instructor interaction. . . . 3
The University of Maryland System Administration also criticized the proposed definition as too restrictive and as discriminating against certain forms of computer-aided instruction and non-interactive television instruction. However, the system's flagship campus supported the Higher Education Commission's position rather than that of the System/Administration. Having suggested only a minor grammatical change in the proposed definition, the comments of the University of Maryland College Park concluded:

The above comments are at variance with those submitted by [the System Administration]. [The System Administration] would evidently prefer to soften the requirements for direct classroom instruction. Since as much as 50% of the credits for a degree need not be offered by direct classroom instruction, a weakening of the definition does not seem desirable.

The staff of the Maryland Higher Education Commission found that although some vocal opposition had arisen to the staff's proposed regulatory approach, there was no clear consensus in the academic community on the appropriate distinctions to be made between interactive and non-interactive instructional modes or, indeed, on whether any distinction was justified.

The statewide Faculty Advisory Council to the commission broke the impasse by requesting that the commission "survey the existing literature, undertake whatever additional studies may be required to determine the effectiveness of these instructional modes, and to review the proposed definition of 'direct classroom instruction' in light of their findings."

In response to this request, the commission staff undertook a literature search for studies of the effectiveness of various forms of electronically mediated instruction, including interactive video, non-interactive video, computer-aided instructional modes, and audio-only instruction. The staff sought to rely only on studies that were methodologically neutral, attempting thereby to avoid any self-promoting studies by advocates for one or another specific technology. Although the staff's focus was primarily postsecondary education, it soon became apparent that most research had been on the elementary and secondary levels. The majority of the studies reviewed evaluated the effectiveness of media-assisted distance learning versus face-to-face classroom instruction. There was a paucity of research comparing distance learning via different media.

Methodology
The annotated bibliography that resulted from this inquiry was the product of repeated ERIC, PSYCHLIT, and DISSERTATION ABSTRACTS searches. The search was originally limited to 1985–1992, but repeated references to previous work were also examined and they are cited if appropriate to the focus of the bibliography. Among the keywords searched were: distance education, educational technology, information technology, program effectiveness, higher education, instructional effectiveness, telecommunications, and evaluation. These descriptors were used alone and in combination in order to assure the broadest inclusion of potential citations. The authors consulted shelved journals (American Journal of Distance Education, Journal of Distance Education, T.H.E. Journal, and others), ERIC microfiche documents, and, in the case of dissertations, the abstracts only. The full document was read unless otherwise noted in the citation. Documents not central to the basic question of instructional effectiveness were not included in the annotations.

Instructional Effectiveness: Postsecondary Education
The following comments summarize the findings in the literature cited in the annotated bibliography. Citations refer to items in the bibliography.

Overall, interactivity was found to be an important factor in student achievement, whether in the classroom or through video/audio instruction. Several studies suggested that the greater the interactivity in distance delivery, the more favourably the instruction was perceived. However, student achievement was found to be statistically the same among interactive modalities.

Evaluations of the use of technology in distance education at the postsecondary level have generally been favourable with regard to levels of student achievement and retention. In general, researchers have found that the various distance education instructional formats have been found to be as effective, if not more effective, than traditional face-to-face instruction in the classroom. The formats evaluated ranged from computer conferencing to interactive video and videotape instructional modes.

Many researchers (for example, Blanchard, 1989; Chute & Balthazar, 1988; Fletcher, 1990; Souder, 1993; Spitzer, Bauwens, & Quast, 1991) report that distance education students performed better than on-campus students. Others (for example, Beare, 1989; Chen, 1991; Clifford, 1990; DeLoughry, 1988; Hoyt & Frye, 1972; Pizzorno & Lathen, 1991) report that distance education methods are as effective or demonstrate no significant differences in achievement. Myton and Allen (1992), however, found that students who were in a traditional lecture format received lower examination scores than distant and on-campus students viewing the same lecture on videotape and that those students on campus using the videotape format performed best of all.

Riccobono's 1986 survey of schools of education and teacher training programs found that while many institutions offer training in the use of audio technologies, such instruction is in the use of hardware and equipment.
Only 52% offered training in the management of students using computers, 37% in the use of live interactive TV, and only 26% in audio technologies.

A particularly interesting report by M. DeBloois (1988) reviewed the use and effectiveness of videodisc training. In essence, videodisc is interactive but not person-to-person interactive. The review cited several studies that reported either that there were no significant differences in posttest results or that the results favoured the videodisc modality when comparisons were made between those students receiving their instruction through a videodisc system and students who received their instruction via classroom lecture and textbook. Similarly, Fletcher (1990) reviewed 14 comparisons of interactive videodisc instruction with more conventional approaches in higher education settings. Meta-analysis techniques found that overall instructional approaches and outcomes, there was an average increase in achievement and that interactive videodisc instruction was more effective than computer-based instruction without videodisc interaction.

Many authors commented that the instructional design and plans for evaluation used during distance education needed to follow the models used by face-to-face instructional design. However, few studies provided information or guidelines to implement more innovative instructional methodologies for which interactive instructional technologies are uniquely suited. Jost (1990) makes an effective case that the techniques for the analysis of telecommunication instructional methodologies are inadequate and that attention must begin to be paid to the interactions of the learner with the medium, the interaction of the medium and subject matter, and the objectives of the curriculum in conjunction with the medium.

Across all the studies (with the lone exception of the Myton and Allen study), there was a common element to student achievement success—interactivity. The more interactive the instruction, the more effective the learning outcome was likely to be. The key ingredients appear to be:

- the availability of the instructor, whether through direct person-to-person contact or through electronic means
- the intellectual engagement of the student.

**Instructional Effectiveness: K-12**

The majority of studies of the use of telecommunicated instruction of kindergarten through secondary school students indicate that:

- there appears to be no significant difference in achievement between students taught at a distance and student achievement in the classroom
- teacher preparation is critical

- students report some affective disadvantages with distance education, such as difficulty in maintaining attention span with television and difficulty with teacher feedback
- students' ability to control the learning situation was beneficial to the learning experience
- distance education advantages are in meeting the needs of rural students, of students with unusual learning needs or in atypical subjects, of learners dealing with unusual emotional problems, or of students with learning styles particularly suited to a multimedia format
- students enrolled in interactive courses were found to have similar or better achievement test results when compared to students enrolled in less interactive learning environments.

Moore (1989) reviewed the literature with regard to learner achievement in K-12 settings. Although he found the literature to be "vague," he concluded that the results of various studies supported the finding that distance education programs are effective in providing educational service to those who would otherwise be unserved. Batey and Cowell (1986) indicate that students learn as well in distance education as they do in regular programs. Further, effectiveness has unanticipated side effects in creating increased co-operation among institutions, in increasing parental involvement and teacher exposure, and/or in mastery of new technologies.

**A Basis for Policy**

The weight of evidence from the research reviewed was that increased student involvement by immediate interaction resulted in increased learning as reflected by test performance, grades, and student satisfaction. The critical factor seemed to be the degree of intellectual and emotional involvement of the student in the learning process. Therefore, interactivity could perhaps be best defined as "involvement." With this definition, one can understand the findings of DeBloois (1988) and Fletcher (1990) that students were more engrossed with instruction delivered by interactive videodiscs than with instruction delivered in a traditional classroom or by non-videodisc computer-based instruction. With the interactive videodisc, the interaction is directed totally at the individual student; whereas, in a teleclassroom with interactive video or in a lecture setting, the instructor's interaction may be directed at another student in the class.

With this perspective, the concept of interactivity must be changed. The emphasis on the interaction of a student with an instructor must be replaced by an emphasis on the "involvement" of the learner in an act-react-act situation. DeBloois and Fletcher indicate that the absorption of
the student may be greater with the videodisc than with live instruction. However, live interactive video and audio instruction are more involving than non-interactive video or computer-assisted learning. This is the basis for the continuum presented below.

**Continuum of Modes of Distance Education**

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<thead>
<tr>
<th>Non-interactive</th>
<th>Live and Immediate Interaction</th>
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<tr>
<td>Correspondence</td>
<td>Interactive</td>
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<td>Video</td>
<td>Interactive</td>
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<tr>
<td>Taped</td>
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<td>Computer-Aided</td>
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<td>Instruction</td>
<td>Interactive</td>
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<tr>
<td>CD ROM or Video</td>
<td>Video and Audio</td>
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<tr>
<td>Videodisc</td>
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The literature review suggested several areas of research. The concept of a continuum of interactivity needs to be tested. Is it only apparent, or is there a true hierarchy of "involvement" for students in using different media? Is the difference in student learning achieved by different media great enough to justify the investment in the required technology? Or is the investment justified only when distance learning is being used to reach those without access to traditional classrooms? That is, if learning by interactive media is truly superior to a traditional lecture-based classroom, should traditional lectures be replaced with media classes on the home campus as well as at remote sites?

Besides the test performance of students and their preference for the interactive media, there are certain intangible, difficult to examine assumptions that also affected the decision of the Higher Education Commission's staff to uphold the 50% interactive standard. There was the belief that learning involves more than the performance on subject matter tests. It also involves the ability to reason and argue cogently, to respond under the pressure of required real-time reactions (rather than on electronic bulletin boards with time for reflection), and to assimilate arguments and ideas from several individuals in a group who may disagree. It is this interplay of minds, which has always been at the basis of the educational process, that advocates of permitting students to earn a college degree solely through non-interactive electronic media or correspondence would jettison.

The development of state policy did not entirely follow the findings of the literature review. Without clear evidence that non-interactive modes of distance learning were undeniably equivalent to interactive modes, the staff of the Higher Education Commission did not feel required to change their 50-50 standard for interactive instruction. However, they also did not follow the clear indications of their research that interactive videodiscs and CD-based courses may provide superior interaction. Instead, in the absence of strongly contradictory evidence, they maintained their standard as stated at the beginning of this article.

The commission staff were acting upon a political judgement as well as the results of their research. They calculated that the forces in the higher education community that would oppose the addition of interactive videodiscs to the acceptable list of interactive delivery modes would be stronger than the supporters of such a change to the proposed policy. The influential Faculty Senate of the University of Maryland College Park had spoken in opposition to any further concessions to technology. The proponents of distance education were not interested in videodisc-based instruction. Their interests were tied primarily to non-interactive video instruction over broadcast television. Therefore, the commission staff saw no constituency for a change in their definition of interactivity. And the results of the bibliographic review were not so decisive as to make the politically convenient stance impossible.

**Notes**

2. Letter from Dr. Robert J. Bickford, President of Prince George's Community College, to Dr. Shaila R. Aery, Secretary of Higher Education, July 29, 1993.
4. Letter from Dr. William E. Kirwan, President, University of Maryland College Park, to Dr. Shaila R. Aery, Secretary of Higher Education, July 14, 1993.

**Annotated Bibliography**


This book provides a comprehensive introduction to telecommunications and the applications of electronic technologies to the teaching and learning process. Azaroma provides an overview of telecommunications technology, including its historical development. There is a good discussion of the basic elements of telecommunication systems and data configuration systems, teleconferencing, distance learning, telecommunications management, and the basics of designing a system. Azaroma includes a good glossary of terms used in telecommunications.


This study compares the relative effectiveness of interactive video and linear video. Abrams concludes that the interactive video group recorded significantly and consistently larger achievement gains than did the linear group.

Batey and Cowell’s review of mostly K-12 distance education activities found that interaction is key; when support is provided over distance, both frequent contact and a short turnaround time for all communication have proven crucial for success. Students learn as much through distance education programs as they do through conventional programs. The authors contend that differences between distance education and traditional education demand new program management skills: planning, record keeping, supervising students, class and staff scheduling, etc. Also, they emphasize the importance of incorporating evaluation strategies into any distance education project.


Beare compared six instructional formats for teacher education training: lecture, lecture with videotape backup, telelecture with two-way phone hookup, audio-assisted independent study, video assisted independent study, video on campus (3 interactive, 3 non-interactive). Student performance was compared on three exams, two midterms, and a final examination. The results showed no significant differences among the instructional group formats on the percentage correct. Beare noted that students responded favourably to video and audio instruction when it was seen as access to otherwise unavailable courses or was important for keeping their jobs. Distance education was not received as favourably by those who had a clear option for face-to-face instruction.


In general, telecourses have been found to be as effective as conventional, face-to-face courses. Telecourses were found to trade off the intimacy of face-to-face instructor student interaction for major improvements in the convenience of access. Telecourses were also found to impose a discipline and organizational rigour on instructors not always required in classroom instructional settings. Author’s conclusions: distance learners can perform as well as or better than traditional learners; results suggested that successful distance learning requires extraordinary commitment, a high degree of maturity, and high student motivation.


Students taking the same courses by live satellite transmission and by face-to-face instruction did not show statistically significant differences in posttest achievement or learning retention.


Cheng has compared achievement performance, time-on-task attitude, participation, interaction with peers, and accessibility to instructor between students receiving a course via computer-based instruction and another group receiving the same course in a traditional classroom on campus. Although results showed that the computer conferencing group scored significantly lower than the on-campus group on an achievement posttest; there was no significant difference on the final grade. The completion rate for the on-campus group was 92%; and for the distance learning group, it was 67%. The completion rate of the “independent computer conference” group was 22%, and it was 92% for the “study group computer conference” group.


Chute and Balthazar analyze a 1984 study that compared several modes of delivery and respective student achievement outcomes. In this study, a comparison was made between two intact groups of students: one received traditional, face-to-face instruction; the other received instruction using remote teletraining systems with an electronic conference board, two-way voice communication, and interactive graphics capability. Results showed that the posttest scores of the teletrained group were significantly higher than those of the students in the traditional classroom.


Clark compared the test scores of National Fire Academy students: Control group N = 34; experimental group N=35. Both groups received identical instruction—one live, one taped. The test instrument was criterion-referenced and multiple choice. The results indicated that the group receiving taped instruction had a mean score of 7.3; while the control group’s mean score was 9.6. Clark reports that the result demonstrated a statistically significantly difference in performance between the two groups, although he acknowledges that the results might be explained by other variables.


Clifford reports on a televised language program at North Carolina State University in Japanese. The course originated during a live, un/rehearsed class session at North Carolina State University, which was videotaped and sent unedited to participating institutions. Students at distant sites viewed the tapes and participated in the course by (1) doing practice activities; (2) completing the same homework assignments as the original on-campus class;
(3) taking the same quizzes and exams; (4) having access to instructors during special telephone office hours; and (5) visiting the state instructor on campus. No statistically significant differences were found between classroom-based students and students participating in the televised program.


DeBloois reviews several programs using videodisc training methods, alone or in contrast to more traditional teaching techniques. He believes that a well-designed, high-quality interactive videodisc training program will draw learners into more intense, overt responses. The new technology will require new assumptions about training, instructional design models and methods, and new instructional strategies. DeBloois argues that videodisc training offers the opportunity to overcome the limitations of more traditional computer-based training. His paper provides a review of some experimental research conducted on classrooms utilizing videodisc technology and provides more in-depth discussions of several key projects.


DeLoughry reports on research at the New Jersey Institute of Technology that tested the effectiveness of on-line instruction by studying five courses in which a total of 98 students were enrolled for classroom-based instruction and 80 were instructed on-line. The researchers turned up no statistically significant differences between the experimental and control groups. Courses included classes in computer science, statistics, management, and sociology.


Eiserman and Williams review a 1980 Kirman and Goldberg study which reported that distance inservice training of teachers was at least as effective as face-to-face training based on subsequent performance of students taught by two groups of teachers. Results indicated that one-way television mode is at least as effective as face-to-face mode of delivery.


Fletcher found that interactive videodisc instruction improved achievement over less interactive, more conventional approaches to instruction. Interactive videodisc instruction was more effective as more interactive features of the medium were used. Overall, Fletcher contends that interactive videodisc instruction was more effective than conventional instruction in higher education. Fourteen comparisons of interactive videodisc instruction with conventional approaches to instruction in higher education settings were identified. Students receiving instruction by videodisc experienced an average increase in achievement calculated using pooled standard deviations of 0.69 standard deviations (an increase for 50th percentile students to about the 75th percentile of achievement). Interactive videodisc instruction was equally effective for both knowledge and performance outcomes. Directed tutorial approaches were more effective than stand alone simulations in interactive videodisc instruction. Within-group variability was smaller in interactive videodisc instruction than in conventional instruction. Interactive videodisc instruction was more effective than computer-based instruction without videodisc interaction. Subjects studied: Biology; foreign language (beginning French and Spanish); physics; chemistry; public health; medical education.


Hoyt and Frye compared telenet and on-campus courses; all telenet locations were staffed by monitors responsible for instructional support by assisting in handout of material, proctoring of tests, and AV equipment maintenance. In a comparison of the telenet and on-campus classes (government, linguistics, consumer issues and adult basic and GED), end-of-course achievement in the telenet classes does not differ from that in on-campus courses. In a comparison of final grades, the results were mixed. One study cited by Hoyt and Frye made a particularly strong case. Pizzoli (1970) studied the effectiveness of telelectures in two extension classes: Education 308 and Mining Engineering 224. Two semesters and variety of instruction combination: telelecture/on campus, telelecture only, on-campus only, telelecture (new model)/campus. Significant difference was found in academic achievement in the education course: students instructed by telelecture obtained higher posttest achievement scores than those who received on-campus instruction.


Jost reviews media comparison studies, which most often result in "no significant difference" conclusions. The author argues for a methodology for analyzing an instructional goal that will facilitate the selection of an appropriate delivery medium: task/content requirements of the objectives; type/level of learner-medium interaction; type/level of adaptation by the medium; and characteristics of the medium needed to provide the adaptation. Jost concludes that the medium does not directly influence learning but is just the vehicle for instruction. The use of interactive video can provide benefits of magnifying live demonstrations, the ability to replay in slow motion, to show close-ups,
to pause and rewind, and to choose time and place that are not present with live lectures.


Kerka discusses delivery modes and the use of communications technologies. A review of various studies that have researched instructional effectiveness indicates that instruction is most effective when it is "high touch" and interactive and the instruction does not imitate face-to-face teaching.


Testimony at the hearing described ITV projects in Minnesota, with specific reference to rural districts that benefit from the ability to share with others. Findings include: ITV allows schools to offer a wider range of electives; requires increased co-operation among schools; requires training, preparation, and support of teachers involved in ITV; seems most appropriate for language and math instruction; is relatively expensive as a delivery system; and does not appear to influence achievement.


Libler gathered and analyzed data about the impact of interactive television on student achievement and attitude in high school physics classes. The researcher found that there was no significant difference in achievement between those students with teachers acting as on-site facilitators and those with no facilitators. No significant differences in attitude were found.


McNeil and Nelson reviewed 63 studies that investigated cognitive achievement effects following interactive video instruction and integrated them through a meta-analysis technique. Overall, the mean achievement effect was similar to that for computer assisted instruction. Critical factors in student achievement were the skill of the teacher, group instruction, and program controlled interactive video, which was found to be more effective than learner controlled.


Martin and Rainey investigated the effect of satellite-delivered instruction on student achievement and attitude in a high school anatomy and physiology course offered through the TI-IN Network (Alabama). Seven high schools taught the course by satellite. A control group consisted of seven schools in which classroom teachers provided face-to-face instruction. The study's findings showed no significant difference in attitude among the two sets of students; but the mean achievement posttest score of satellite-taught groups was significantly higher.


Moore's review of the literature for K–12 reports that distance learning enhanced equity between small rural schools and their larger counterparts; comparable scores on achievement measures and comparable levels of participation between students learning by two-way interactive television and by face-to-face instruction; higher levels of teacher efficiency using interactive television; and the potential for use with homebound students. Moore's discussion of instructor skills indicates that the literature reviewed supports the view that those instructional behaviours that contribute to effectiveness in the traditional classroom must be replaced with alternative behaviours for effective video instruction: promptness of delivery; natural, slow, and enunciated delivery; spontaneity (no script); the effective use of visuals; frequent changes of pace or stimuli; involvement of participants/students where possible; and a concluding summary. Moore provides a useful bibliography.


Morehouse reports on the results of the evaluation of Minnesota’s Technology Demonstration Projects. With regards to student achievement, no consistent, statistical difference was evident in any of the nearly one thousand individual grades and test scores. Television and two- or multi-way delivery of course content had no significant impact on achievement among K-12 students.

Teachers' basic interaction levels appeared unaffected by the medium whether live or remote. However, inherent disadvantages of instructional television included a greater frequency of cheating, a lack of personal contact, etc. Teachers utilizing instructional television tended to use more visual media, allocate more time to preparation, and made a greater effort to maintain student interest, involvement and interaction. Most important were the need for inservice training in the use of media, participatory decision making, and a clearly articulated education need and strategic planning.


Myton and Allen compared instruction using different modes of delivery: traditional lecture and blackboard; videotaped lecture with visuals and a viewing guide; distance learning, (e.g., live closed circuit television with a viewing guide); and delayed broadcast, videotaped instruction without the guide. They found that students who experienced the traditional lecture setting
had lower examination scores than students who were taught using videotaped action sequences with a story line. Those students on campus receiving the videotaped instruction scored the highest of all three groups.


Nixon compared learning outcomes of postsecondary students enrolled in various liberal arts and sciences courses for one full semester as a measure of effectiveness of live two-way interactive television. Results suggested postsecondary students taking courses via interactive television at remote distance sites can do as well academically as students who are located at the origination site with the instructor physically present.


Pirrong and Lathem examined the effectiveness of using an interactive television system to broadcast an introductory accounting course at the college level. They compared instruction in three settings: traditional classroom, on-campus interactive television classroom, and remote site interactive television classrooms. Their results support the hypothesis that no significant differences exist between students taught via interactive ITVs to off-campus sites and students in traditional on-campus classrooms.


Riccobono conducted a survey during 1984–85 of national college and university use of instructional technology to assess:

- the availability, extent of use, and institutional support for instructional technologies
- the extent to which teacher education programs offered or provided training in the use of technology.

The survey found that

- more than 90% of all institutions surveyed had some form of instructional technology available for use
- availability and use was greater in the public rather than private institutions surveyed, both two- and four-year
- the most frequently cited technologies were cable system drops and master TV antenna
- the most frequent instructional use was for one-way presentation to students on campus
- about 1/4 of the colleges and universities surveyed used live camera-in-the-classroom television to some extent, with the greatest use being among professional/graduate schools
- faculty training was mostly related to use of computer and/or video equipment using canned software

- more than 50% of teacher education programs offered training in instructional technology—with greatest emphasis on computer usage and proportionately less on audio and video respectively.


Scott compared the grades of students attending courses in a traditional classroom versus those enrolled in telecourse programs. His analysis was based on responses from 6,300 students in seven foundation courses over four years. He did follow-up course performance evaluations for 555 students' grades in six higher level programs. Grade consistency was found between the two student groups and also between their performance on higher level programs.


Smith reports on an effort to use interactive videodisc technology to construct a course in cultural anthropology and evaluates the project's impact on student/instructor relationships, student/content relationships, and student satisfaction and learning experiences. Comparing passive control of the videodisc-based program (students were non-interactive viewers only) with interactive access to the course, the author/instructor found that the student patterns of performance were clearly responsive to the presence or absence of interactive resources. He concluded that it is the interactivity that creates a measurable positive effect on student performance. Neither passive nor interactive treatments were "real time" experiences; students utilized materials at their convenience and although an instructor/advisor was available, students made little use of them.


Souder made comparisons between traditional education and distance education among master's degree students. As measured by their examination results, distance education students performed best in comparison to two different traditional classroom groups. Souder includes the caveat that because the students receiving the courses by distance education were older, part-time students, some of the difference in exam scores may be attributable to the age and experience of the individuals in the group.


The authors compared three instructional modes: video instruction via videotape and monitored by a graduate assistant; one comparison group of students receiving live instruction at the videotaping session; and one group of students taking the course in a conventional lecture environment. The
dropout rate for conventional classroom students was higher than for those receiving the video lecture. Also, percentage grades were higher for the videotape students.


Thorman and Amb demonstrated equal learning by teacher education students receiving video tape instruction versus live instruction.


This study reports on research related to distance learning requested by the Senate Committee on Labor and Human Resources. The document analyzes various technological options, examines current developments, and identifies how federal, state, and local policies could encourage efficient and effective uses of distance learning. The study found that, in most instances, distance learning appears to be as effective as on-site, face-to-face instruction in the classroom and that it is equally effective in applications for adult learners in non-traditional programs and training of professionals. The study points to the need for competent teachers, valid instructional models, and appropriate institutional support and indicates that much must be learned (or relearned) about instructional design and teaching techniques. Evaluation needs to be conducted to see if instruction, especially at the K-12 level is equally effective for all students.

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Association of College and Research Libraries
Potential Research Topics

Providing library services to distant learners is a fertile field of research for anyone interested in making a significant contribution to a growing and increasingly important area of academic librarianship. This is the conclusion reached by the Research Committee of the ACRL Extended Campus Library Services Section after analyzing the results of a comprehensive survey of extended campus librarians across the United States and Canada. The hope of the committee is that by offering key research topics as identified by professionals working in the field, they will stimulate interest among library school faculty, graduate students, and others seeking problems and issues for original research.

Respondents to the committee's survey itemized a total of three dozen research topics they would like to see addressed. Based on a tabulation of rankings, the following five topics emerged as the highest priority:

- **Bibliographic instruction for extended campus students.**
  What techniques are being used to deliver bibliographic instruction to distant learners and what is their relative effectiveness?

- **Use of new technologies to enhance support for distant learners.**
  How can newly emerging digital resources best be integrated into library services for extended campus students? How do we measure their effectiveness?

- **Perceptions of campus administrators regarding the value of extended campus library services.**
  Do campus administrators view library services to extended campus students as an important and justifiable use of resources? If so, why? If not, why not?

- **Funding extended campus library services.**
  What are the cost components of providing library services to extended campus students? What funding models and formulas are being used and how adequate are they?