19 DISTANCE EDUCATION IN EARLY INTERVENTION PERSONNEL PREPARATION

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Acute shortages of qualified personnel have arisen as states have strived to fully implement the early intervention legislation of the Education of the Handicapped Act Amendments of 1986, PL 99-457. Historically, personnel have been prepared through conventional preservice models in which students attend classes on a university campus. The advantages of this model include the students' in-depth study of the components of early intervention through participation in coursework and supervised practica and research experiences. In addition, students have physical access to faculty, peers, and numerous information resources via libraries, computers, and writing labs. However, this model of instruction is not available to a large body of employed individuals who may not reside within daily commuting distance of a university or whose full-time employment limits their ability to attend traditional classes on campus. Given these constraints, employed individuals often receive training through inservice models (e.g., seminars, conferences, workshops) in which they travel to a centralized site. The inservice program usually is of short duration and typically addresses more narrowly focused content; follow-up instruction or technical assistance often is not provided (see Chapter 7 for more information on follow-up), and college credit typically is not available.

Although both preservice and inservice models serve a particular function in personnel preparation, neither model in its conventional form is sufficient to address early intervention's current shortages of qualified personnel, either in the breadth of individuals who need to be trained or retrained or in the depth of content in which these individuals need training. Distance education as a mode of instruction may be one answer to this quandary.

This chapter explores the issues and challenges associated with distance education within the context of personnel preparation in early intervention. The chapter begins by outlining the history of distance education (including its various definitions) and providing information concerning its efficacy. This is followed by a discussion of the practical issues and challenges associated with implementing a distance education program, including those issues specific to an applied field such as early intervention. The focus of this discussion concerns preservice programs that grant college degree credit in a distance education format for individuals who must use a nontraditional form of education due to family, employment, or geographic distance constraints. However, much of this discussion would also apply to inservice programs designed for this same type of participant.

DEFINING DISTANCE EDUCATION

Distance education is used as an instructional mode in numerous countries around the world (e.g., Australia, China, India, Norway, United States, West Africa). A variety of subject matter is taught in education, engineering, business, allied health, natural sciences, and liberal arts. Internationally, there are more than 1,500 distance-teaching institutions (Holmberg, 1989). Some of the more well-known include Athabasca University (Canada), Everyman's University (Israel), Open Universiteit (Netherlands), Open University (United Kingdom), University of the Air (Japan), and Universidad Nacional de Educacion a Distancia (Spain). The International Council for Distance Education estimates that approximately 10 million people worldwide study at a distance annually (Kaye, 1988). In addition to preservice opportunities through institutions of higher education, the military and the corporate world (e.g., automotive, petroleum, health care industries) use distance education to provide employees with continuing education opportunities. For example, Voluntary Hospitals of America (VHA), the largest alliance of hospitals and multihospital systems in the United States, has signed a contract with the VTEL Corporation to offer VTEL's interactive telecommunications equipment to VHA's 900 not-for-profit hospitals. The equipment will facilitate continuing medical education to health care professionals and also provide opportunities for cross-hospital communication concerning patient diagnosis and treatment (Klinck, 1993). Given these examples, the use of distance education for a variety of preservice and inservice educational purposes seems boundless.

But what exactly is distance education? In the United States, the earliest forms of distance education were correspondence study programs that were established in the late 1800s at Illinois Wesleyan College and the University of Chicago. In 1919, the University of Wisconsin started the first federally licensed educational radio station. Educational television broadcasting originated at the University of Iowa between 1932 and 1937 (Verduin & Clark, 1991).

Internationally, the Open University of the United Kingdom served as a model for distance education programs and heralded the modern era in distance education when it first began teaching students in 1971. In the United States, coursework through distance education has been offered for many years by departments and divisions within conventional universities. However, the Annenberg/CPB Project was a catalyst for the development of many of these programs. In 1981, the Annenberg School of Communications at the University of Pennsylvania committed $150 million to the Corporation for Public Broadcasting to support projects that enhance the use of telecommunications and information technologies in higher education. Thus, this project is a major funding source that supports the development of innovative distance education course materials and technologies (Moore, 1987).

There also has been growth in networks and consortia of institutions that provide distance education (e.g., National Technological University, a consortium of 15 universities from the Association for Media-Based Continuing Education for Engineers). However, distance education in the United States is not as formalized as it is in other countries where centralized policy-making bodies and distance education systems have been established (Moore, 1987).

Distance education is changing rapidly because of the burgeoning growth in telecommunications technologies. Several problems are associated with its evolution and international application. First, the terminology associated with distance education is inconsistent and thus confusing. For example, the term *distance education* is often used

interchangeably with nontraditional education and open learning, and yet many have argued that these terms are not synonymous (Keegan, 1986; Verduin & Clark, 1991). In addition, terms used in English for this field of education include (but are not limited to) correspondence study, home study, external studies, independent study, teaching at a distance, and off-campus study (Keegan, 1986). Distance learning and distance teaching also are commonly used referents; however, Keegan (1986) suggested that distance education is a more suitable term as it brings together both the teaching and learning aspects of the process. Moreover, the International Council for Correspondence Education changed its name to the International Council for Distance Education at its 1982 world conference, thus formally adopting this term and providing international sanction for its use (Moore, 1990).

Second, there continues to be debate concerning the definition of distance education as part of the ongoing attempt to delimit it as a field of study. Some definitions have stressed the structural characteristics of the separation of teacher and learner (Holmberg, 1985) whereas other definitions have focused on the use of technical media (Moore, 1973) and the industrialization of the teaching process (Peters, 1973, as cited in Keegan, 1986). Keegan (1986) reviewed the literature and synthesized various characteristics of previous definitions into five interdependent elements. Although his definition gained general acceptance, a more minimalist definition of three elements was proposed (Garrison & Shale, 1987): 1) the majority of educational communication between teacher and learner occurs noncontiguously, 2) communication between teacher and learner is two-way communication, and 3) technology is used to mediate the two-way communication.

All of these definitions emphasize the geographic aspects of distance and focus on the noncontiguous mediated communication between teacher and learner. However, Moore (1983) suggested that physical distance may not be the most critical factor and proposed the concept of transactional distance. Moore defined transactional distance as the interplay between the variables of dialogue (i.e., the extent to which teacher and learner can interact with one another) and structure (i.e., the extent to which the program is responsive to the learner's individual needs). Both of these variables exist on a continuum from high to low, and a more distant program would be one in which there is a negative correlation between dialogue and structure, that is, low dialogue (not much opportunity for teacher–learner interaction) and high structure (program is tightly structured and not responsive to individual needs).

Although it is important to consider both the geographic and instructional aspects of distance, developing a definition of distance education is not as simple as it first appears. Even a minimalist definition seems too restrictive with its focus on the separation between teacher and learner, and none of the existing definitions allow for possible variations in how the physical distance is defined. For example, there are programs in which students travel to campus on the weekends to receive instruction or faculty travel to off-campus sites to teach a class. Moreover, there are programs in which there is some combination of travel (i.e., part of the instruction is physically face to face) and mediated communication (i.e., part of the instruction is through technological means). Would these programs be defined as examples of distance education?

Shale (1990) argued that the debate over definition has outgrown its usefulness and that there is no need for a special definition. However, others find the debate important and use working definitions to clarify their research (Moore, 1990). In this chapter, we view distance education as an instructional mode whose purpose is to provide access to education to those individuals who otherwise would not have access because of family,

employment, or logistical constraints. Furthermore, we have chosen to discuss the issues associated with both the distance and education components of distance education as those components apply to the instruction of early intervention personnel.

EFFICACY OF DISTANCE EDUCATION

Is distance education an effective instructional mode? How does it compare with more conventional modes of teaching? A survey of the literature reveals a large body of research concerning the effectiveness of distance education. The reader is referred to Moore (1990) and Verduin and Clark (1991) for a more comprehensive review; however, several summary points can be made.

Wagner (1990) enumerated four features of distance education literature: 1) a large body exists as papers or conference presentations; 2) it tends to be conceptual (i.e., provides direction for action) rather than theoretical; 3) it tends to be descriptive (e.g., observational data, case study, surveys); and 4) it has an international orientation, with much of the literature produced by countries other than the United States. Both Moore (1990) and Wagner (1990) stated that the majority of the research in distance education has evaluated the effectiveness of various types of technical media, although a review by Gibson (1990) also included literature on student characteristics (e.g., demographics, educational background, cognitive personality style, learning style motivation) and effects on the learner of modifications in the educational environment (e.g., tutorials, telephone contacts, peer tutoring, use of the mail system to provide learner support). However, it should be noted that the subject matter of the courses evaluated in these studies is typically that of factual content (e.g., natural sciences, psychology, business) compared with applied content, although some research has targeted instruction in skill-based areas such as natural sciences laboratory work, photography, mechanics, and airplane equipment troubleshooting (Verduin & Clark, 1991). Those who have studied this research suggest that ''distance education methodology appears to achieve cognitive outcomes equal to those achieved by the more traditional means of education delivery for adults. In many cases, the scale even tips toward distance education'' (Verduin & Clark, 1991, p. 117). However, all agree that much more research is needed, particularly in applied fields.

With regard to teacher education, a database on distance education is beginning to emerge. A perusal of the ERIC abstracts for 1982–1994 under the rubric of ''distance education and teacher education'' revealed a total of 138 records. Although many of these records referred to international programs in personnel preparation (e.g., Australia, China, South Africa), there were numerous entries concerning inservice and preservice teacher preparation programs in general education and special education across the United States (e.g., Alabama, Alaska, California, Iowa, Kansas, Maine, Nevada, New Jersey, Texas, Utah, West Virginia, Wisconsin, Wyoming). Many of these entries are descriptive and provide information about the way in which the program is structured, including advantages and disadvantages. Some include evaluative data on consumer satisfaction, cost-effectiveness, and the comparative effectiveness of various technical media (e.g., videotape, audiotape). In general, the rural states appear to be leading the way in the use of distance education as an instructional mode of delivery. Almost every program cited (except for the international programs) concerned teacher preparation in special education; and most programs offered a combination of technical media and/or physical face-to-face program options.

ISSUES AND CHALLENGES OF IMPLEMENTING DISTANCE EDUCATION

Given the differences between conventional forms of education and distance education, there are numerous issues and challenges associated with the implementation of a distance education program. These challenges appear in varying degrees and in various manifestations in both preservice and continuing education settings. In this chapter, issues and challenges related to the college or university setting are considered; however, these issues also apply to settings in which distance education is used as an avenue for continuing professional development.

Organizational Structures

The organizational pattern and administrative practices of a university are based on the educational philosophy and mission of that institution as well as some economic and political restrictions (Verduin & Clark, 1991). A major issue for effective distance education is in what type of university the program is located and how the administrative infrastructure supports that program.

Rumble (1986) identified three models that reflect ways in which distance education can be administered in a university setting. In one model, the university has distance education as its sole responsibility. An example of this is the Open University of the United Kingdom in which all courses are offered in a distance education mode. This model can be effective because there is a clear focus on the distance students; however, this administrative model is not prevalent in the United States.

At the other end of the continuum is the consortium model of distance education. In this model, several institutions pool their resources and collaborate in implementing distance education. Although the collaborative efforts enable the consortium to provide the distance education program, the collaborative process also is the major obstacle to effective implementation. Philosophical and administrative differences, unequal contributions by the institutions, distrust, and difficulties in sharing costs and materials are some of the problems that may arise (Verduin & Clark, 1991).

A more common arrangement is the model in which both distance education and conventional education occur as a mixed mode (Keegan, 1986). A variety of organizational designs is possible. For example, individual departments may offer distance education courses, or a distinct unit may be created to offer distance education across a variety of areas. A variety of administrative designs also is possible, including the use of the university's central administration or the creation of a specialized administrative unit to oversee and provide support for distance education programs (e.g., office of extramural programs, division of continuing education). According to Verduin and Clark (1991), the major advantage of this model is that it can draw on the resources of the resident faculty and administrative infrastructure that already exist. However, there are numerous problems associated with this model (Verduin & Clark, 1991).

First, there may be a lack of parity of esteem between distance education and campus-based instruction, resulting in second-class status for the distance education program. This may deter faculty participation, particularly if there is no administrative recognition of how the additional time requirements of distance education preparation and instruction may affect progress toward tenure. Second, there may be a lack of faculty participation due to the amount of preparation required for teaching at a distance. This may place an unfair burden on the course loads of junior faculty, or the distance education courses may be relegated to less effective instructional faculty. Third, there may be a lack of effective

distance education instruction due to the inability of faculty or lack of support for faculty to change their conventional campus-based teaching strategies. For example, lecturing is a common form of conventional instruction, but it becomes a ''talking head'' phenomenon when used in a video teleconference format in which there is no built-in mechanism for two-way interaction between lecturer and student. Fourth, there may be a lack of administrative recognition and/or planning for the monetary costs associated with the initial implementation and maintenance of the chosen distance education technology. Although distance education programs can reach a wider audience, they are not necessarily less expensive than conventional education, even from a long-term perspective. For example, equipment must be purchased, maintained, and upgraded, and the instructional faculty may need additional clerical, administrative, and technical staff support to implement the program. Rumble (1986) also suggested that, depending on the type of technology used, the cost structure of distance education is different from conventional education (i.e., there may be significant investment in course development and materials before students are enrolled), and traditional approaches to budgeting and staffing levels may be ineffective when planning and implementing distance education programs.

Given these factors, one key to effective distance education is the provision of administrative support and resources for the instructional faculty. For example, faculty may need additional clerical staff to help with the dissemination of class materials and exams and to respond to inquiries concerning the program. Depending on the type and sophistication of the distance education technology, typically there are needs for additional technical staff such as on-site facilitators to set up and troubleshoot equipment, distribute materials, facilitate group activities and student discussions (Willis, 1993), collect assignments, and proctor exams. Administrative support also encompasses staff development. This may include instruction in effective distance education teaching strategies (Stewart, 1987) and training in the use of technical equipment in addition to equitable workloads and recognition toward tenure (Dillon, 1989).

Administrative flexibility is another key factor in the successful accommodation of distance education students. For example, responsiveness of the system can be seen in flexible admission practices (Holtzclaw, 1988) and procedures that allow flexible time lines for the initiation and completion of coursework outside of the usual semester boundaries (Paul, 1986). In addition, the registration process is a particularly important activity as it can facilitate the smooth entry of students or can be a barrier to student enrollment. It is crucial that faculty maintain communication with the administrative offices responsible for registration, and it is helpful if there is some administrative flexibility so that the process is user friendly for students. For example, are distance education students required to register on campus? If so, are there evening and weekend walk-in hours? Can registration be conducted through the mail or by telephone? Can students pay by credit card (Toby Levine Communications, Inc., 1994)?

Learner Characteristics

In addition to the administrative differences between distance education and conventional education programs, the students who participate in distance education tend to be different from conventional college-age students. Demographic data available from several large national studies of adults studying for college credit (Aslanian & Brickell, 1988; Brey & Grigsby, 1984) show that the majority of students are female, married, employed full time, and older than typical college-age students. The implications of these demographic characteristics are that many of these students have other responsibilities outside of school (e.g., family, job) that place demands or constraints on their time and their level of com-

mitment to school. In addition, these students may be returning to school after a gap of several years, and they may lack confidence in their ability to succeed (Stewart, 1987). Moreover, they may have weak literacy skills, inadequate study habits, and ineffective time management skills (Paul, 1986). However, adults are often motivated, pragmatic, and self-directed learners who bring a wealth of real-life experience to the classes they take. Given time, support, and practice, deficient skills can be remediated, although this necessitates a commitment to make faculty time and institutional resources available and accessible to the distance education student. For example, counseling and advisory services (Gladstone, 1987; Paulet, 1987) may be beneficial to those students who are having difficulty with family and time commitments or who need additional psychological and emotional support to succeed in an academic environment.

Other support services include the provision of student access to information. In many institutions, there are extramural or continuing education offices that have resources for helping students to locate and gain access to journal articles, books, and other sources of information from the university library. Some libraries also offer additional services to distance education students, including consultation services, user instruction designed for the distance education student, assistance in nonprint media and equipment, reciprocal and contractual borrowing, interlibrary loan services, and access to reserve materials (Toby Levine Communications, Inc., 1994). Some institutions may also provide a toll-free telephone number to reduce student costs in gaining access to these faculty and institutional resources.

Provision of these types of resources and support services helps distance education students handle what may be an unfamiliar and challenging environment. Furthermore, a supportive atmosphere may help curb student attrition, a significant problem in many distance education programs (Cookson, 1990).

Communication and Interaction

The geographic and transactional distances between teacher and learner pose significant challenges for distance education. Although communication is essential in any educational endeavor, it is of prime importance in distance education. Unlike conventional instruction in which teacher and student are in face-to-face contact, the interaction that occurs in distance education is usually mediated by some form of technology that, in turn, imposes constraints on the form, frequency, and immediacy of the interaction (Garrison, 1989).

Impact of Technology Table 19.1 delineates the advantages and disadvantages of several types of telecommunications technologies that are often used in distance education programs, should the program choose to use technology as part of its design. (Weekend on-campus study is included in the table for purposes of comparison.)

Faculty must be aware of the strengths and limitations of the technology that they are using and the effect of that technology on the communicative transaction between teacher and student. Of particular consequence for communication are the types of sensory modes used and the direction of the telecommunicative signal. Some technologies provide multiple sensory cues (e.g., interactive television) whereas others are limited to one sensory mode (e.g., audioconferencing). In addition, some types of telecommunication are one-way systems in which communication flows in one direction only (usually from the teacher to the student) whereas other types are two-way interactive systems in which communication flows between teacher and student. However, combinations of sensory cues and signal direction are also possible. For example, two-way audio/one-way video teleconferencing, during which students can be heard but not seen, is one of the most common formats because it is much lower in cost than two-way audio/two-way video

TABLE 19.1. Delivery modes

Mode	Technology Used	Advantages	Disadvantages
Telecourses — Courses are offered via television			
1. live — Students can watch the course and simultaneously call in on phone to talk with other students/faculty or call in after the broadcast.	• Television • Telephones • Telephone lines • Microphones	• Convenient • Flexible • Reaches students across large geographic areas • Can be used with printed materials	• Expensive • Requires access to television • Requires some planning and scheduling • Limits teaching methods
2. taped — Students can either watch the telecast or videotape the course for later viewing.	• Television • Video recorder	• Convenient • Flexible • Reaches students across large geographic areas • Can be used with printed materials	• Expensive (not for frequent use) • No interaction • Requires some planning and scheduling • Limits teaching methods
Video teleconferencing (interactive television) — Courses are broadcast to two or more interactive television sites. Faculty and students from several locations can view and verbally interact with each other with no delay in broadcasting. Generally only one site at a time can actively interact with another site.	• Television • Television channel • Satellite hookup • Telephone lines	• Interactive • Visual and audio • Massive coverage • Convenient (satellites at public facilities) • Suitable for large audience • Satellite less expensive than fiber optic • Allows for more flexible teaching methods	• Expensive (not for frequent use) • Requires access to equipment at each site • Requires operator at each site • Requires planning and preparation

Compressed videoconferencing — Courses are broadcast to two or more interactive television sites. However, there is a delay between broadcast and signal, so individuals will see mouths move and then will hear sounds several seconds later.	• Television • Camera for each site • Control unit for panning, tilting, and zooming • Codec (video encoder and decoder) • Two digital telephone lines • Site linkage mechanism	• More cost-effective than interactive television • Interactive • Convenient (can reach many different sites) • Allows for more flexible teaching methods	• Requires having access to equipment at each site • Requires planning and preparation • Instructor requires training in using the equipment • Requires second person to operate control unit • Requires technician to service equipment • Not as effective for long lectures/discussions
Correspondence study — Courses are packaged with reading materials and assignments. Audiotapes of lectures are provided with the modules as well as commercial videos that cover specific topic areas.	• Textbook • Study guide • Audiotapes • Videotapes	• Convenient, portable • Flexible • Inexpensive • Start any time during the year • Students control learning pace	• No face-to-face interaction • Limited feedback • Need to make testing arrangements • May require access to audio- or videotape player • Limits method of instruction
Audioconferencing — Students and faculty interact via the telephone at regularly scheduled times. Students are responsible for reading and completing assignments before the telephone conference.	• Telephone or speaker telephone • Conference call service	• Convenient • Cost-effective • Eliminates travel • Minimum equipment needed • Interactive • Reaches students across large geographic areas	• No face-to-face interaction • Need to identify each person as he or she speaks • Some planning required • Ineffective for long lectures • Limits method of instruction

(continued)

TABLE 19.1. *(continued)*

Mode	Technology used	Advantages	Disadvantages
Weekend on-campus study — Students come to campus and take courses from faculty on the weekend.	• None	• Convenient • Inexpensive • Allows for more flexible teaching methods • Interactive	• Requires travel by students • Faculty teach late evenings and weekends • Support services not readily accessible on weekends
Computer conferencing — Students work individually or in groups to respond to assignments/tasks on the computer. Faculty respond over the computer with students. Telephone lines link terminals enabling two or more to interact simultaneously.	• Computer with modem • Telephone lines • Software links	• Convenient • Cost-effective • Flexible • Eliminates travel • Students can provide anonymous input • Reaches students across large geographic areas • Students get feedback from students and instructor	• Requires access to equipment • Limits method of instruction • Instructor requires some training in using the equipment • No face-to-face interaction
Audiographic conferencing — Faculty and students connect through telephone lines, an electronic pad and pen, and computer so they can interact verbally, draw text or graphics on-line, and/or in writing.	• Telephone • Conferencing call service • Computer with modem • Software • Electronic tablet and pen	• Convenient • Cost-effective • Eliminates travel • Interactive (talk on telephone while sending messages) • Reaches students across large geographic areas • Uses visual aids • Several students can share each computer	• Same as audioconferencing • Requires access to equipment • Instructor requires some training in using the equipment
Videotape distribution — Courses offered on-campus are videotaped and distributed to students. Students are responsible for listening to videotapes and completing assignments, reading, and/or tasks.	• Videotapes • Video camera (for instructor) • Videotape player (for students)	• Convenient for students • Flexible	• Requires access to equipment • More costly to distribute to large numbers of students • No interaction • Need person to operate video camera • Instructor and operator require some training in using the equipment

teleconferencing (Azarmsa, 1987). Compressed videoconferencing also is becoming more popular because it is less expensive than other options. However, there is a time delay between the video and audio signal so that participants see the picture a few seconds before they hear what is being said. This can affect the interaction between teacher and student as well as student-to-student interaction if multiple sites are participating.

The synchrony of the communication also affects the interaction between teacher and student. Real-time communication (e.g., two-way audio, picture telephone) allows for synchronous conversation between teacher and student. Time-delayed communication (e.g., facsimile machine, electronic mail, some forms of computer conferencing) allows teacher and student to converse without having to be ''on'' at the same time (Toby Levine Communications, Inc., 1994). Decisions must be made about which components of the program are better served by real-time communication versus time-delayed communication.

In addition to considering the types of sensory modes, direction of the telecommunication signal, and synchrony of the communication, several other factors can affect the communication between teacher and student when using distance education technologies. Even if the technology is the most interactive format available (e.g., two-way video/two-way audio), the teacher may be interacting with the television camera. This may be disconcerting because nonverbal feedback from students (e.g., eye contact, facial expression, body language) provides teachers with important information about their teaching effectiveness, pacing, and student learning (Zvacek, 1991). One way to address this communicative challenge is to have a live audience participating on-site.

Student-to-student interaction may also be limited, especially if multiple sites are participating in a class session. Many teachers begin the first class with a discussion of the impact of the technology on teacher–student and student–student interactions and what constitutes appropriate communication etiquette. Also, teachers can personalize the mediated communicative process by meeting face to face with each student at least once during the time period in which the class is offered (Willis, 1993), distributing photographs of the participants before the first class, providing time for extended introductions during the first class, and injecting humor throughout the class sessions.

Another communicative challenge is the sensitivity of the chosen technology. Many systems are so sensitive that the noise from a fallen soda container may trigger the system to bring that particular site on camera. This can be very distracting and disconcerting to the teacher, and students may or may not be aware that they are now on camera.

Accessibility Communication between teacher and student also is affected by each student's accessibility to the teacher as well as to other students. Outside of the class sessions, there may be diminished opportunities for students to receive social support from faculty and their peers (Stewart, 1983). From the teacher's perspective, it is more difficult to support students with academic, social, or familial problems that affect their academic work. For example, in difficult situations, face-to-face discussion is the preferred mode of communication; however, the distance education teacher cannot simply ask the student to make an appointment during office hours. Situations must be handled over the telephone, yet nonverbal cues and feedback are missing and it may be difficult, if not impossible, to reach the student in a timely fashion.

Another aspect of accessibility is student accountability. Although teachers struggle with questions of accountability in conventional education, it becomes more of an issue when there is physical separation between teacher and student. How will the teacher know if the assignment or project is the student's own work? Will students take exams? Will an honor system be used, or will a proctor be provided on-site? Who will supervise and

monitor off-campus applied experiences and practica? The challenge is to address these questions in creative and innovative ways.

Instructional Effectiveness

The teaching effectiveness of the faculty is critical to the success of a distance education program. Several variables must be considered, including course design, instructional materials, teaching strategies, and interpersonal skills.

Regardless of the type and sophistication of the technology, teaching a distance education course is not a simple matter of teaching a conventional course in a distance education format (Willis, 1993). When designing the course, faculty must consider the impact of geographic and transactional distance between themselves and their students. For example, will assignments or other products be required? Because of geographic distance, there will be a time delay in the exchange of these products. If the products are designed to build on one another, or if it is important to give students an opportunity to correct and revise various products, how will this time delay affect that process?

Course design also must incorporate the needs and desires of the students targeted for the course. A needs assessment is an effective planning tool when making decisions about course format and technology because faculty may discover important characteristics about their student population that, in turn, may impinge on the selection of technology (Ho, 1991). For example, do the targeted students spend large amounts of their time traveling by car to deliver early intervention services in rural areas? If so, the use of audiotapes might be preferred over videotapes. A needs assessment may also provide faculty with a framework to develop examples, case studies, and other activities that are contextually relevant to the students, thereby enhancing student learning (Ho, 1991).

Because of the altered communication between student and teacher, the quality of the instructional materials plays a large role in the effectiveness of distance education (Stoffel, 1987). Faculty must consider the types of materials to be used and the impact of the chosen technology on the use of materials such as overheads and instructional videos. In addition to materials used in class, faculty must consider whether students will require additional materials to facilitate their participation (e.g., study guides) and what type of media or combination of media will be most effective (e.g., print, audio, video). Print materials often compose a large portion of items mailed to students, and it is important that these materials are clear, concise, neat, well organized, and error free (Ho, 1991). Nonprint materials such as audiotapes and videotapes also may be used, but two questions in particular should be addressed. First, are there back-up tapes in case of loss, and second, will someone be responsible for checking the clarity and quality of the tapes before they are mailed to students?

In addition to course design and materials, the instructional effectiveness of the faculty is paramount. From his review of the research literature, Willis (1993) suggested that the following components have a positive impact on general instructional effectiveness: Understand the demographic and cultural diversity of the students, and use contextually relevant examples in class discussions; provide informative feedback in a timely fashion (see also Stoffel, 1987); encourage interaction between students, and foster face-to-face contact (to the extent possible) between teacher and students; provide an on-site facilitator as a bridge to link student and teacher; enhance student motivation; help students keep up with assignments, thereby discouraging attrition; realize that family support is critical to the success of the student; and be prepared to handle technical difficulties with the equipment.

Distance education also challenges the faculty to consider and evaluate the appropriateness of particular teaching strategies and techniques within the bounds of the chosen

technology. Lecture, guest speaker, panel, interview, demonstration, simulation, group discussion/report, and role play are effective techniques that may be used singly or in combination (Ho, 1991). Willis (1993) also suggested that faculty consider the following strategies: Provide course goals and objectives both verbally and in writing, develop strategies for student review and remediation, realistically assess how much course content can be covered per session, diversify activities and vary the pace, humanize the course in as many ways as possible and personalize instructor involvement through opportunities for face-to-face contact, provide a strong print component, and use contextually relevant examples. (Although further detail is outside the scope of this chapter, several sources provide additional information on general teaching strategies [Willis, 1993], interactive television [Ho, 1991], compressed formats [Breckon, 1989], and student motivation [Zvacek, 1991].)

Final consideration also must be given to the interpersonal skills of the faculty. Although there is no extant research literature in this area, anecdotal report suggests that faculty play many roles, including facilitator, encourager, problem solver, counselor (Holmberg, 1989; Moore, 1987), and technocrat. In addition, effective instruction via distance education requires that faculty be flexible in their teaching strategies and in their interactions with students; innovative and willing to try new strategies, techniques, and technologies; persistent in their quest to overcome instructional and administrative barriers; and well organized to make the best use of limited time with students. They must possess skills in communication, problem solving, decision making, and self-evaluation to handle the diversity of students and challenges associated with distance education.

Choosing a Technology

Choosing the appropriate technology is another challenge of distance education. The needs of students and faculty and the existing resources and technology that are available and accessible are some of the factors that must be considered when choosing a distance education technology (Verduin & Clark, 1991). In addition, the advantages and disadvantages of the various technologies must be weighed in conjunction with the economic costs. Willis (1989) suggested that the technological systems that have lasted have similar characteristics, including ‘‘ease of teacher/student control and use, high interactivity, and low maintenance—with flexible interaction being the most critical factor by far’’ (p. 33).

Implementing Applied Experiences

A major challenge for distance education programs that require applied practical experiences, internships, or student practica is the provision of supervision or mentorship. At the present time, the amount of supervision for distance education students enrolled in early intervention practica appears to vary widely across programs. For instance, in 14 early intervention distance education preservice programs surveyed by the authors (see the appendix at the end of this chapter), some students receive no supervision, some receive minimal supervision via telephone contact and/or minimal on-site visits, some do their internship with their own work caseload and are supervised by a local professional who may or may not be experienced, and some are required to take time off from their job to do an internship or practicum with supervision provided by the university or college distance education program.

Given the range of possible experiences, it is obvious that student participation in practicum and the supervision of that experience present unique challenges for distance education programs in applied fields such as early intervention. Cost is a major factor, as many programs have limited staff available for on-site supervision of students or have limited funds that preclude hiring off-campus supervisors from the student’s local com-

munity. Some programs may choose to have students videotape themselves as they work with children and families and then submit those tapes for supervisory feedback; however, students must have access to video cameras, and families must be willing to be videotaped.

The challenges associated with this issue call for innovation and creativity in the design and implementation of applied experiences. Students must be challenged to be accountable for their learning, and faculty must be flexible in their approach to supervision.

EDUCATION FOR LIFELONG LEARNING

Distance education can be used by many different individuals in various settings (e.g., agencies, schools, hospitals, universities, homes) for many different purposes. Thus, it is uniquely suited as a delivery mode for inservice and other types of lifelong learning opportunities. For instance, there are many programs that provide individuals with the opportunity to communicate with others, thereby gaining peer support and access to information. These include programs such as the Colorado Meeting Place (a public access computer network for disability issues) and the MCH-Net-Link (a national telecommunications network for maternal and child health information dissemination). In addition, more professional organizations are taking advantage of the continuing education opportunities afforded by telecommunications technologies by hosting distance education vehicles such as national satellite teleconferences and videoconference series.

Each state also offers unique opportunities for distance education, although they vary by amount and sophistication. Out of necessity, rural states (e.g., Montana, New Mexico, North Dakota) seem to be leading the way as they implement distance education systems to reach their geographically dispersed populations. However, more states are beginning to take advantage of burgeoning technological opportunities and are developing distance education systems or collaborating with other states (via consortia) to share the costs of such systems. As the logical site for much of this activity and often in conjunction with state agencies and organizations, colleges and universities are taking the lead in using distance education for continuing education purposes. For example, the University of Georgia is launching an Interactive Teaching Network that will offer teleconferences augmented by support materials and wraparound activities on such topics as inclusive schools, attention-deficit disorders, and vocational special needs. The Paraprofessional Training Project is a collaborative effort of the Minnesota Department of Education, Hutchinson Technical College, Minnesota Board of Technical Colleges, and the University of Minnesota to provide distance education (via interactive television) to special education and rehabilitation paraprofessionals in Minnesota. Ohio State University hosts the Center for Advanced Study in Telecommunications, which facilitates national networking and interdisciplinary research on telecommunications and its application to distance education. These examples represent only a few of the myriad programs available.

For applied fields such as early intervention, distance education may offer opportunities for consultation from related service personnel and others who hold specialized expertise but may be in short supply (e.g., physical therapists, occupational therapists). For instance, Rule and Stowitschek (1991) described an inservice program in which distance education technology was used to provide consultation to classroom teachers as they taught preschoolers with disabilities. Through the interactive capabilities of the technology, consultants observed what was happening in the classroom and provided immediate feedback to the teachers.

Whether the focus is preservice or inservice, the general issues and challenges associated with distance education remain the same and must be considered in program design. However, the factor that makes distance education technology most appealing for inservice programming is the ease with which it can be extended over time. There is no reason to provide one-time instruction without follow-up sessions. In addition, if an interactive technology is used, individuals can be observed at their worksite and specific feedback can be given without the need for travel or time away from the worksite. However, as with preservice programs, inservice distance education programs require a supportive infrastructure, and teamwork is a necessity. At a minimum, instructors must be prepared to troubleshoot the equipment (unless a technician is available) and understand how the technology impinges on their interaction with the local participants. In addition, local on-site facilitators can help by making advanced logistical arrangements and facilitating the on-line session(s). It also is particularly crucial that the local participants are part of the planning process so that the instruction can be individualized to meet their particular needs. Ongoing evaluation also provides pertinent information concerning the appropriateness and effectiveness of the inservice program.

CONCLUSION

Distance education is an effective instructional mode to reach individuals who may lack access to more traditional forms of education. Those who are contemplating the use of distance education are encouraged to consider the advantages and disadvantages of the various technologies and to investigate what type of telecommunications options and distance education opportunities are available in their state and local community. Resources for this type of information include the following in each state: early intervention lead agency, early intervention interagency coordinating council, and the department of education. Local universities and colleges and state chapters of professional organizations also may be informational sources.

In addition to these state-level sources, the appendix at the end of this chapter provides information on 14 early intervention distance education preservice and inservice programs. These programs were identified in two ways. First, numerous directories were culled for information (e.g., the Directory of University Affiliated Programs and Early Intervention Initiative Projects). Second, the early intervention coordinators in all states were asked for information concerning distance education preservice and inservice programs in their respective states. The resulting 14 programs represent a range of distance education approaches along a continuum of technology, from weekend on-campus study in which no special technology is required to interactive video teleconferencing. Each program serves as an example of a design that addresses the unique needs of its students while using available resources and technology. In surveying these programs, we found that they were willing to share information about their respective programs, including the advantages, disadvantages, costs, development phases, implementation strategies, and evaluation data.

Distance education is one of the keys to addressing the shortages of qualified personnel in early intervention by enabling us to broaden our preservice and inservice efforts. Careful consideration of the numerous issues associated with distance education and thoughtful planning concerning participant needs can lead to an effective program that can potentially reach all early intervention personnel who are interested in enriching their knowledge and skills. We encourage you to consider ‘‘going the distance’’ in early intervention personnel preparation!

RESOURCES

Moore, M. (Ed.). (1990). *Contemporary issues in American distance education.* Elmsford, NY: Pergamon. Cost: $81. (800) 366-2665.

A multipurpose text providing information about types of distance education, relevant research, sources of funding, critical design factors, and instructional issues to assist in effective and efficient use of the technology.

Nevada State Department of Human Resources. (1990). *Project NETWORC final reports.* Sparks, NV. (ERIC Document Reproduction Service No. ED 329 073) Cost: $15.88 plus shipping and handling. (800) 443-3742.

Describes a model designed to deliver instruction to preservice and inservice personnel in rural areas. The model used an audio-teleconferencing system, an instructional television system, and facsimile transmitters to link three pilot sites and three replication sites to deliver a four-course series of classes. Information is also provided on curriculum development, student and facilitator evaluations, and cost comparisons.

Rule, S., & Stowitschek, J.J. (1991). Use of telecommunications for inservice support of teachers of students with disabilities. *Journal of Special Education Technology*, *11*(2), 57–63.

Describes a distance education project developed to reach personnel in early childhood special education at geographically distant locations. The project included the use of two-way, full-motion video with interactive audio communications delivered to the preschool classroom.

Toby Levine Communications, Inc. (1994). *Going the distance: A handbook for developing distance degree programs using television courses and telecommunications technologies.* Arlington, VA: PBS Adult Learning Service. Cost: Free. (703) 739-5360.

Identifies steps involved in establishing distance degree programs, issues to examine before beginning the process, and the main issues involved in program development. Provides detailed information regarding faculty, student, and financial issues involved in establishing a distance degree program. Several examples of established distance degree programs are also provided.

Verduin, J.R., Jr., & Clark, T.A. (1991). *Distance education: The foundations of effective practice.* San Francisco: Jossey-Bass. Cost: $32.95. (415) 433-1767.

Describes various methods of distance education delivery and the advantages and disadvantages of each. Identifies organizational and administrative issues to consider in developing a distance education program and the opportunities and challenges for distance education in the future.

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APPENDIX

DISTANCE EDUCATION PROGRAMS

The following list of distance education programs was compiled in January 1995.

Program	Location / telephone #	Method of distance education used	Undergraduate or graduate program	Preservice or inservice focus	Supervision provided	Student financial support	Grant funded
Center for Persons with Disabilities Utah State University	Utah State University Logan, UT 84322-6800 (801) 750-1981	Mail correspondence / interactive television	Graduate / undergraduate	Preservice / inservice	Yes	Stipends	Yes
Department of Special Education and Communicative Disorders Arkansas State University	P.O. Box 1450 State University, AR 72467-1450 (501) 972-3061	Interactive television	Graduate	Preservice	No	No	No
Department of Special Education West Virginia University	Research & Office Park 955 Hartman Run Rd. Morgantown, WV 26505 (304) 293-3450	Live telecourse	Graduate	Preservice	No	Tuition	Yes
Department of Special Education University of Alaska at Anchorage	ECSE Program School of Education 3211 Providence Dr. Anchorage, AK 99508 (907) 786-4435	Audioconferencing Mail correspondence Taped telecourses	Graduate	Preservice / inservice	Yes	Stipends	Yes
Department of Special Education University of Kentucky	229 Taylor Education Bldg. University of Kentucky Lexington, KY 40506 (606) 257-7909	Live telecourse Compressed video-conferencing	Graduate	Preservice	Yes	Tuition	Yes
Early Childhood Special Education Program University of Maine	Merrill Hill College of Education University of Maine at Farmington Farmington, ME 04938 (207) 778-7000	Live telecourse	Undergraduate	Preservice / inservice	Yes	No	Yes

Early Intervention and ECSE Program University of Illinois	Department of Special Education University of Illinois 288 Education Bldg. 1310 South Sixth St. Champaign, IL 61820 (217) 333-0260	Students travel to university	Graduate	Preservice	Yes	Stipends; assistantships (includes tuition)	Yes
Human Development and Family Studies Iowa State University	Iowa State University 101 Child Development Bldg. Ames, IA 50011 (515) 294-7838	Mail correspondence	Undergraduate	Preservice	No	Tuition and books	Yes
Rural Early Intervention Training Program Affiliated Rural Institute on Disabilities Montana University	University of Montana 52 Corbin Hall Missoula, MT 59812 (406) 243-5763	Audiotapes/mail correspondence	Graduate/undergraduate	Preservice	Yes	Stipends	Yes
Special Education Department University of North Dakota	P.O. Box 7189 Grand Fork, ND 58202 (701) 777-3144	Interactive television	Graduate	Preservice/inservice	Yes	Stipends	Yes
South Dakota University Affiliated Program University of South Dakota	School of Medicine 414 East Clark St. Vermillion, SD 57069 (604) 677-5311	Videotaped telecourse and instructor travels to site	Graduate/undergraduate	Preservice	Telecourse: no Seminar: yes	Stipends	Yes
University Affiliated Program Research and Education Planning Center University of Nevada	College of Education/MS 278 University of Nevada Reno, NV 89557-0082 (702) 784-4921	Audioconferencing	Undergraduate	Preservice	Yes	Stipends	Yes
University Affiliated Program University of Arkansas	1120 Marshall, Suite 306 Little Rock, AR 72202 (501) 320-3760	Interactive television	Graduate	Preservice/inservice	Yes	Stipends	No
Waisman Center Early Intervention Program University of Wisconsin	University of Wisconsin 1500 Highland Ave. Madison, WI 53705 (608) 263-5984	Video-teleconferencing/compressed video conferencing	Graduate/undergraduate	Preservice/inservice	Teleconferencing: no Compressed video: yes	Stipends	Yes