Using Distance Education Technologies to Overcome Physical Disabilities

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Introduction

The Rochester Institute of Technology (RIT), is working to create a barrier-free learning environment for students with disabilities. In the process of implementing computer conferencing to enhance its telecourses, RIT discovered that these same delivery system technologies could be used to transcend some of the learning difficulties experienced by persons with physical handicaps. This realization fitted in well with the Institute's long concern for the needs of so called 'non-traditional learners'.

Implementing Computer Conferencing

Since 1985 RIT has offered productivity grants to its faculty which focus on developing new strategies for distance learning. For the most part, the target audience live in the greater Rochester area. They work full time, and coming to campus after work creates a hardship . The commuting uses much of their valuable 'free' time. Consequently, I submitted a proposal to explore the uses of computer conferencing in education.

I am totally blind and have been using a computer and speech synthesizer for the last four or five years. In 1985 I began requiring my students to submit their term papers through electronic mail which permitted me to drastically reduce my need for human readers. Most faculty I knew who used computers did not think of them as a communication tool. They used them for word processing, calculations and for programming. Realizing their potential in communication alerted me to the educational possibilities inherent in computer conferencing.

The RIT Productivity Committee awarded a grant to me to adapt the course, Modern American History, to include a teleconference component and package it for distance delivery. The course was a College of Liberal Arts lower division core requirement for all students and already included a video component. Some tapes were viewed in class, and others were seen by students independently in the library media center. As the course content was gained through watching videos and reading texts, the classroom was primarily used for group discussion. This format was easily taken off campus and designed for distance learners. I ran a pilot study in 1986 with 13 students. The television series is 'America:The Second Century', which RIT broadcasts in the greater Rochester area, and there is a textbook which accompanies it. The RIT VAX computer system provides direct contact between class and professor. Electronic mail is used to replace office visits and the conferencing functions in place of the classroom discussion.

The largest portion of the productivity funds were used to purchase a computer conferencing system. After investigation, the Instructional Support and Computing personnel recommended VAX Notes, produced by the Digital Equipment Corporation, to run on one of the Institute's VAX computers. The grant also supported the development of user manuals explaining how to use electronic mail, the Eve editor and the Notes conferencing system. These funds also purchased two dozen modems which could be loaned to students with access to a PC at home or work. The others would have to come on campus to access the VAX from a computer lab, but they would still have the advantage of scheduling flexibility.

What was most widely appreciated about the computer conference was that, while providing many of the elements of a classroom, it permitted scheduling flexibility because of its asynchronous nature. The students themselves evaluated all aspects of the computer more favorably than they did either the videos or the texts. They rated the conference discussion very positively. One student said he doubted whether he would take another telecourse unless it had a computer component. The conference discussion enabled him to evaluate his progress alongside the others in the class. Another said the conference made the telecourse more like a real class and that he enjoyed the computer aspect in spite of the fact that he knew almost nothing about computers prior to enrolling.

One of the other intriguing benefits of the computer conference is that, because of its relative anonymity, many people feel freer to share personal items. Several class members, in a discussion about the impact of the Great Depression, shared amusing an d intimate stories from their family history which I have never had students do in the classroom. The grandmother of one made and sold bootleg whiskey, and people still wished they could get her recipe. The mother of another still keeps two freezers in the basement full of food in case of unexpected scarcities. Many found using electronic mail and computer conferencing to be fun as Mason (1988a) has noted.

Computer Conferencing and Physical Disabilities

Before beginning my involvement with computer conferencing and distance learning, I found that a PC with speech synthesizer was a communication aid for the visually impaired. One of the first students to submit a term paper to me on electronic mail was, coincidentally, a hearing impaired computer science major. She was in one of my history classes and there was an interpreter who sat at the front translating my lecture into sign language (signing). After receiving her grade by return mail, she sent another mailing with some questions related to the class. Next, she wrote another mail message filled with amazement and exclamations as she explained that this had been the first time in her life that she had 'talked' with a teacher without needing a human intermediary. What was even more ironic was that the teacher in question, myself, was visually impaired. As gratifying as that event was, the full potential of computer communication for the disabled had not yet occurred to me.

Almost a year later, after concluding the computer conference pilot course, another deaf student came into my office and wanted to enroll in the teleconference version of Modern

American History. She had only recently become deaf and therefore had very good English language skills. However, her ability to understand American Sign Language was still poor. A course which involved captioned television, text readings and a written discussion on a CRT was suited to her situation. However,the computer version of the course was not scheduled for that quarter,so I found a few volunteers from the classroom section who liked the schedule flexibility that it could provide and created a section to fill her request. She stated at the conclusion of the class that it had been her best learning experience at RIT. She had found it the only place where she could participate in group discussion. Because the group never met in person, her disability was invisible to her classmates. The conference began with a topic where members introduced themselves, and she mentioned her deafness at that time. However, as the discussions progressed, it became irrelevant. Distance learning technology had helped a hired student participate in class discussions and, at the same time, enabled the visually impaired instructor to handle written materials without a reader.

Early in 1987 I submitted a proposal outlining the concept of utilizing computer conferencing, captioned video and text readings as a delivery system for a larger group of hearing impaired students (Coombs, 1987). The RIT project in 1986 was designed to facilitate direct communication between the instructor and students and, therefore, not depend on the traditional support services provided by interpreters, notetakers or special tutors. It envisioned the system as only suited to a few courses, interested faculty and some students. The intent was to conduct an experimental course for a few hearing impaired learners. At most, if successful, it would be one system operating within a larger educational context. In no sense was it seen as replacing the support system. In fact, it was designed to have a computer instructor with signing skills introduce the students to the VAX Notes and VAX Mail systems.

The first task was to find a suitable American history telecourse and obtain permission to open caption it. America: The Second Century was chosen and captioned. I prepared a set of discussion questions to be posted in the conferences, as VAX Notes displays its material in a window of 15 lines. Rather than having a set of questions that required several screens, one after another, to present the week's content, I restricted each topic to one screen and usually posted 3 to 6 topics per week. This meant that when replying, the questions were still visible at the top of the monitor. This format itself forced me to make my questions brief and to the point. Short direct sentences were congenial to the linguistic skills of most hearing impaired students. In fact, a computer conference tends to encourage a discussion style that is part way between colloquial and formal writing. This was better for the deaf student than long, cated intellectual discourse. Captioned , too, tends to automatically produce a sparse, direct style of presentation. Both formats, without having to make any patronizing concessions helped the hearing impaired student to function more efficiently than in many face-to-face academic settings.

From the beginning, the course was haunted by frustrations. Due to poor promotion of the course, only 4 students enrolled and this was not enough to conduct a lively exchange. The next frustration was that these students did not log on the VAX system often if at all, during the first weeks of the course. Discussion questions were waiting for their

contributions. Personal mail from the instructor, eagerly wanting to be of assistance went unread. Finally, Some students had a rude awakening when they realized they had fallen behind. They were permitted to write an extra paper to improve their grades, which most of them did, and their involvement in the conference began to improve. By the end of the quarter, after much struggle by instructor and students, all achieved a passing grade. The major lesson drawn from this experience is that any system to succeed must adequately take human factors into account and adequately prepare them for its use.

If captioned videos, text readings and computer conferencing provides an opportunity for personal independence and advancement as the author believes, the nagging question is why then did so few students select this option? If the problems experienced were not with the technology, what human factors need more careful consideration?

It is my opinion that there are two explanations for this phenomenon. First, the widespread computer phobia contributed to the skepticism of both the students and advisors. I believe this played a role in preventing the hearing impaired students from recognizing the opportunity before them. Second, while I do not have enough data to be certain, I suspect that some hearing impaired students have become dependent on the support system and that may have inhibited their developing the degree of self direction demanded by distance learning. As Mason (1988a) had noted, distance learning techniques usually require a degree of self-directed learning. The one negative comment by a student in the original pilot study said: "I want to say that this course would be excellent for someone who has more self discipline...". Students who have become accustomed to the prompting and encouragement of a support system may not do well in a system requiring self discipline unless some program of encouragement and support is provided to bridge the early weeks. Computer conferencing still seems to hold special potential for communication and education for persons with physical disabilities whether that impairment be hearing, seeing or mobility. Computer phobia is a problem to be overcome whether discussing the able-bodied or disabled. Time and familiarity will gradually eliminate that roadblock.

The underlying challenge of how to make computer conferencing useful to the physically disabled actually springs from its innermost strength and potential. In a computer conference, participants function on an unusually equal footing. The very anonymity which many find blocking their trying the system, allows the physically handicapped to go unnoticed. The handicapped, once having learned the basic technologies, can participate equally with their disability being invisible.

Therein lies a dilemma. On one hand, we want to tailor these systems to be of maximum use to persons with physical disabilities. On the other hand, the technology permits genuine mainstreaming because physical appearance, handsome, ugly or handicapped, becomes insignificant. Discussants are judged by their contributions and not by external indications of status or success. Physically disabled persons who are equipped and ready to compete in an educational or social setting my become computer conference participants and be unknown to the system managers. Handicapped persons who are reasonably literate and at home using a PC can use The Source, Compuserve or other

services without special help. Their disability may be invisible both to other users and to the managers. The more such technologies succeed in meeting these special needs, the less will we be aware of their achievements.

Conclusion

Computer conferencing and electronic mail have been used at RIT to lessen some communication barriers for persons with physical disabilities. They have permitted a blind teacher to communicate written material with seeing students and have also facilitated his interactions with the hearing impaired without requiring the services of an interpreter. They have similarly facilitated the communication between a recently-deafened faculty member and his hearing students. Utilizing these systems with a phone line and modem could be of benefit to mobility impaired persons as well.

Because this system is a distance education technology, it has the potential to reach persons with physical disabilities far beyond the urban area of Rochester. First, institutions with specialized facilities and trained personnel could share their facilities. Funding specialized resources can be expensive and finding ways to share them would be a step towards cost effectiveness. Secondly, students on campuses with little specialized assistance could also utilize these resources and transfer credits back to their home school. Finally, there is a potential for adult education reaching individuals who are not located on any campus but who want to study independently.

Although the potential for increased independence and a fuller participation in the community are exciting, our attempts at RIT to expand the use of this system to include many more persons have been halting and slow. In addition to the common fear of computers which is bound to decrease with their increased use, independence itself can be intimidating. If more extensive use of computer communications with the physically disabled is to occur, there will have to be a support system provided to nurture and encourage many of them to overcome their initial resistance. Helping handicapped persons to learn course content is one benefit of these communications systems; another is increasing their independence and self reliance. These distance education technologies contain the possibility of affecting positively the physically disabled person's sense of self confidence. This is their most exciting potential.