

Technological Options for Rural Schools

Rural schools alert to political obstacles and the advantages of simplicity can expand student opportunities by sharing resources.

Rural school policymakers have access to an increasing variety of technologies to expand high school curriculums through cooperative arrangements with other high schools, colleges and universities, and state departments of education. Fortunately, a growing number of models demonstrate how various technologies are currently being used by school districts. Running the gamut from low-cost, readily available technologies through high-cost, high-risk delivery systems, these models provide a valuable starting place for any school district interested in learning from current practice.

In Eagle Bend, Minnesota, for example, the high school is connected with four other schools via low-power tele-

vision and is considering hooking in two more with ultramodern fiber optics. Two-way audiovisual simultaneous connection makes it possible for a teacher in any of the schools to instruct classes in any or all of the others, and students and teacher can see and hear one another during the class. The program was initiated to expand foreign language opportunities, but has since grown to include a variety of other subjects, including advanced mathematics, composition, business shorthand, and career education.

In Nebraska, high schools are meeting new foreign language requirements for accreditation through a University of Nebraska-Lincoln program known as TeleLanguage, which combines traditional independent study by correspondence with telephone conference calls. Twenty high schools are taking part, and students at each of them are scheduled into a regular classroom daily, where a teacher not trained in foreign language monitors the study atmosphere. The university-employed foreign language teacher calls the class and by conference phone answers questions and critiques pronunciation.



Students at Norris (Nebraska) High School gather around the speakerphone as they begin another conference call with their teacher at the University of Nebraska-Lincoln, Department of Independent Studies.

Photograph courtesy of the University of Nebraska

Much more ambitious delivery systems, using satellites and reception dishes, are being developed and tested in Texas and Utah, and computer networks are being used in Kentucky and a number of other states.

Here is a breakdown of the more common categories of educational and information technologies.

Audio Teleconferencing

Teleconferencing means the capability of having a conference using telephone or other audio technologies. A two-way conversation is as simple as making a long distance call and hooking up speaker phones. Dedicated networks can be connected to a number of sites by use of a teleconferencing bridge, which allows the user to set up long distance conference calls just as a long distance operator would.

Expenses for audio teleconferencing include the rental of the lines, as well as purchase of inexpensive speaker phones or conferencing microphones.

Videotape Lessons

Distribution of videotape lessons to learners at remote sites is a cost-effective method of upgrading curriculum offerings. Video lessons may be pre-produced, which allows for high standards of content and presentation but also increases developmental costs and adds time for production. Or they may be "candid" tapes of classes taught in a regular classroom setting. Candid programs are much less expensive to produce, and the instructional quality is as good as the instructor whose class is being recorded.

Major expenses are the production facilities (obviously less for candid lessons) and distribution costs of getting the tapes to the learners in a timely manner.

Interactive Television

Real-time two-way audio and visual contact between instructor and student is becoming more common because of current technology. Carriers of the television signal can be microwaves, cable television systems, satellites, or low-power broadcast, or they may be sideband signals carried on a regular broadcast signal.



*Connie Wier, University of Nebraska-Lincoln
Telanguage teacher of Spanish, engages in
one of her once-a-week conference calls with
students at a distant, rural high school.*

All such systems increase costs significantly over use of existing audio networks or videotape playback.

Interactive Video

Blending microcomputers with a video storage unit allows the learning sequence to be controlled by student performance. Either videodiscs or videotapes can be controlled by the computer program. Videodiscs have the advantage of total storage capacity, since they can store 54,000 frames per disc. Videotapes are less expensive to produce and the equipment is more readily available, but individual bits of information cannot be accessed as easily or accurately.

Costs for equipment are dropping rapidly, and student stations may soon become affordable for most schools. But not many programs are available due to high development costs and the confusion of competing technology standards.

Computer Networks

Either individual microcomputers or mainframe computer terminals may be linked in a variety of ways. Most frequently, a mainframe is surrounded by a swarm of terminals. A series of microcomputers may be substituted for terminals, however, with the advantage of on-desk storage capacity.

Statewide systems can be linked via microwave systems, or even the dedicated lines of a telephone network could be used. Most frequently, however, the link is accomplished through regular telephone lines and a modem. Satellites can also carry the signals from one computer to another.

Cost of establishing new systems is high, as is use of some already available networks. But innovations in the

field promise to drop costs into the range of affordability for many schools. Software availability remains a problem.

While the options available to rural schools are increasing rapidly, and the number of models in use is expanding, the potential for making poor decisions also expands. Therefore, rural school districts interested in using technology to solve current educational problems need to keep in mind three cautions.

1. The most appealing technologies are not necessarily the most practical for immediate use.
2. Resource sharing is essential.
3. The major roadblocks are usually political, not technological.

Appeal vs. Practicality

Educators are attracted to such appealing technologies as videodisc-microcomputer interfaces and satellite conferencing. The videodisc, especially, interests educators because it represents the cutting edge of educational technologies and a meshing of video, programmed instruction, and text. The potential instructional power is obvious.

Unfortunately, perhaps, the most appealing technologies are not necessarily those most in reach of rural schools. The most readily available technologies are older, more affordable, and easier to implement:

- audio and video lessons played back in the local school,
- telephone conferencing systems or networks,
- independent study by correspondence, combined with local supervision and perhaps on-site visits by the instructor,
- some combination of these delivery systems.

A growing number of rural school districts are linking their high schools through interactive TV systems (ITFS, cable, or microwave). The distribution system itself, however, can be quite expensive, though consortiums may find the cost per district—amortized over several years—a defensible expenditure when compared with the costs of highly labor- or travel-intensive strategies.



High tech? No, but the rural school mailbox is still a persisting link in the delivery system for rural students, an increasing number of whom are using high technology to enhance their curricular options.

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Resource Sharing

Resource sharing is an essential element to successful use of delivery systems available to rural schools. Schools interested in use of certain technologies—interactive television is the premier example—will have to employ resource sharing to make affordable their access to distribution equipment.

State departments of education and colleges and universities often are the managers of instructional television systems, audio teleconferencing bridges, and computer networks—all offering means to enable resource sharing. In any resource-sharing arrangement, it is important to establish a structure that:

- clarifies roles and expectations of the partnership as a whole and of each of the partners individually,
- establishes an ongoing communications mechanism, which forces the partners to share information regularly,
- provides for periodic evaluation and assessment—even if relatively informal—to make sure that effectiveness is assessed and that alterations based on common data are acceptable.

Problems with Sharing

It is important to remember that most of the problems with resource sharing will be political and not technological.

Questions about what technologies might be employed, how they might be employed, and at what cost can be answered by the technical experts. The policymakers will have to deal with such questions as:

- Who pays how much?
- Who leads and who follows?
- Who offers what courses and when?
- Who is in charge and who is not?

Fortunately, there are increasing examples of satisfactory answers. Many of the model projects thrive because of the willingness of partners to agree on the political issues as well as the technological ones.

A Footnote

A positive side effect of resource sharing is that there is power in numbers and that numbers may make a significant difference in solving some of the problems attending use of technology in education. A common complaint among educators, for example, is lack of excellent software. School districts that combined their interests and demonstrated the existence of larger markets for software developers would be in a better position to (1) speed development and (2) exert influence on what is developed.

Grant support more likely will flow to those areas or regions where many districts are speaking with one voice and where the numbers involved indicate the potential for greater impact from the investment.

And, finally, local or state sources of assistance—universities, state education departments, telecommunications agencies—will more willingly invest time and money in new programs if they see the potential for widespread and continuing use of the product or service. More important, combining resources to wield greater influence on other partners or potential suppliers enhances the possibility of expanding opportunities for students. □

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