DOCUMENT RESUME

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ABSTRACT

The proceedings from a 2 day 1982 conference on the use of technology in the education of handicapped students covers advantages, disadvantages, uses, available formats, costs, expertise needed, and suppliers for videotape technology, audio teleconferencing, educational television and radio, microcomputers, videodiscs, satellite technology, and instructional packages and modularized instruction. Each section includes a list of references. The report concludes with a list of 20 producers of special education materials. (CL)

Colorado Technology Workshop

Technology and Service Delivery

Implementation Training for Colorado-PAA CO-01-03

Developed by:

Intermountain Plains Regional Resource Center

Glenn Latham and Dennis Bahen

February, 1982

Contents

Welcome

This workshop on the use of technology to aid in the education of handicapped children is not intended to sell you on the use of technology or to sell you on a particular technology. Rather, the intent is to introduce you to technology that could be used to meet needs that exist in your area. The words "could be" are underlined to emphasize that technology, although it can serve needs in a unique way, has its limitations, and its needs, too. The question that must be answered is, "Is what I get out of the use of technology more than what I have to put into it?" If the answer is a resounding "Yes", then, of course, use it. If it is "Maybe", think twice and sharpen your pencil. If it is, "I'm not sure", think at least three times and have lots of sharp pencils handy. Remember, any technology that you employ must be used, managed, maintained, and amortized.

We don't want to discourage you from using technology, but we do want to caution you--and alert you -- to what must be carefully considered before stepping into the fascinating and remarkable world of technology. When properly prepared-- psychologically, economically, experientially, and professionally-- great things can accrue to you and your programs through the use of technology. And it's great things that we want to see happen.

Best Success,

Intermountain Plains
Regional Resource Center
Exceptional Child Center
UMC 68
Utah State University
Logan, Utah 84322

Schedule of Events

TUESDAY, FEBRUARY 9, 1982

1:00- 1:15	Welcome and Introduction- Glenn Latham
1:15- 2:45	Videotape (VTR)- Bob Lake
2:45- 3:00	Break
3:00- 4:30	Teleconferencing- Art Higbee
4:30- 5:30	Informal interaction with the presenters

WEDNESDAY, FEBRUARY 10, 1982

8:30- 9:30	Educational Television and Radio- Art Higbee
9:30- 10:30	Microcomputers- Kim Allard
10:30- 10:45	Break
10:45- 12:00	Videodiscs- Kim Allard
12:00- 1:30	Lunch (On your own)
1:30- 3:00	Satellite- Public Service Satellite Consortium
3:00- 4:00	Instructional Packages and Modules- Glenn Latham
4:00- 5:00	Informal interaction with the presenters

Needs That Could Be Served With Technology

Rank	Needs	BOCS: Northeast	South Platte	Mountain	Pikes Peak	San Luis	Southeast
1	Sp. ed. students assigned to regular classes need to have instructional programs that allow them to work independently.	✓*	✓	✓	✓	✓	✓
1	Reg. ed. teachers need practical help in how to serve sp. ed. students assigned to the regular programs.	✓	✓	✓	✓	✓	✓
2	There is need for better communication among everyone involved in a student's educational program: sp. ed. teacher, reg. ed. teacher, OT/PT, speech therapist, other agencies.	✓	✓	✓		✓	✓
2	Sp. ed. teachers need to be kept abreast of new ideas and information about sources of support such as instructional materials.	✓	✓		✓	✓	✓
3	BOCS administrators need to be able to more adequately communicate with the field.	✓		✓		✓	✓
3	Sp. ed. needs to be able to maintain adequate communication with the community.	✓	✓	✓		✓	
4	School equipment needs to be made more adequate.	✓		✓		✓	
4	Secondary level programs need to be structured, especially vocational training programs.	✓			✓	✓	
5	There needs to be more interaction between regular and sp. ed. teachers.	✓				✓	
6	Noncertified teachers need in-service training.	✓					
6	There is a need for a well-defined staff development program.	✓					

*A check in a cell indicates that the need was identified by that BOCS. The frequency with which it was identified varied according to the number of persons participating in the needs assessment activity. For example, four participants in the Northeast BOCS identified the need for instructional programs that special education students could use independently.

Technology Fact Sheets

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PRESENTER

Bob Lake, Media Services Coordinator, Exceptional Child Center, Utah State University; UMC 68, Logan, UT 84322, (801) 750-2011.

CATEGORY

Videotape Technology

BACKGROUND INFORMATION

While broadcast, ETV and Public Television have been with us for many years and most public schools and institutions of higher education have had access to some form of videotape recording and playback for over a decade, it is very likely that the practical and common use of videotape recorders (VTR's) has just begun. Advances in electronic and recording tape technology have rapidly decreased the size and cost of equipment necessary to produce and playback video programming to the point where local use, and even generation of good quality color video, is a reality for a growing number of institutions. Many commercial producers and publishers are offering instruction via videotape. Despite the fact that industry has generally led the way in videotape use, one recent study indicates that 40.6% of all current industrial users have been at it for less than 4 years (Brush & Brush 1981).

Perhaps the amazing growth in sales of home video recorders is the most significant new development. The trend is not slowing as retailers report a 93.5% increase in sales in 1982 over 1981 (Videography, August 1982). Much of these sales figures can be attributed to purchases by educational institutions and industry, in addition to those of private citizens. This proliferation of VTR technology is opening avenues of distribution for educational programming and video communication unthought of even a few years ago.

However, all that glitters is still not gold. While the cost of equipment is dropping, the cost of production is still a highly labor intensive effort requiring trained personnel. Furthermore, the viewing audience is increasingly sophisticated in its tastes and more critical of poor programming. Despite these drawbacks, video programming and communication may be the solution to many educational problems, with videotape technology leading the way as a distribution medium.

USES

Beginning with the most simple uses and working towards the complex, VTRs may be used in many ways. Delay and playback of educational programming, such as is provided by Public Broadcasters, can be used to augment classroom instruction. Programs rented or purchased from publishers may be similarly incorporated. With the addition of a video camera, a VTR can serve as a data gathering instrument set up to capture student behavior for later detailed analysis by the data gatherer or by qualified experts who cannot be physically present. VTRs may be incorporated into a feedback channel for individual improvement. Networks can be formed using videotape as a communications medium. "In class" or "in school" production leads

USES (Continued)

to an awareness of subject material garnered through active student participation. Social skills are attained through participation in the teamwork environment of a small scale production. Larger more polished productions are possible with the addition of more sophisticated equipment and trained personnel. These productions may provide either unobtainable programming or programming tailored to the unique needs of the producers. And last, but not least, interactive video is possible if certain sophisticated playback machines are teamed with microcomputers or other specialized controllers where fast, random access is not necessary.

ADVANTAGES

* VTRs can both record as well as playback video.
* Up to 6 hours of continuous programming can be stored on one $16 cassette.
* Videotape can be reused many times.
* Local production is possible with videotape.
* Some types of video formats are readily available in commercial outlets.
* Servicing for these machines is available locally.
* As more private citizens acquire VTRs, public acceptance and familiarity with their operation is growing at a rapid rate.
* A large amount of commercial and private programming is and will continue to be readily available.
* Existing programming can be easily transferred to these newer formats at a very modest cost.
* Some machines are extremely lightweight (14 lbs), battery operated and portable.
* Equipment need not be transported as it is easily rentable in video stores throughout the country.
* Newer models are incorporating useful features such as high speed visual search and slow motion.
* Mass tape duplication is a simple matter with organizations, like Fotomat, offering this service, or by obtaining another machine.
* There is no mastering cost as with videodisc.
* Relatively low cost for all its capabilities.

DISADVANTAGES

* Lack of technical expertise may cause users to overestimate low cost video capabilities, e.g. video produced on a home type VTR will not be useable by the local public broadcasting station.
* Videotape can be damaged and accidently erased if not properly cared for.
* Setup and operation of "systems" (camera, recorder etc.) requires some training.
* Full-scale production requires expertise, substantially more expensive equipment and lots of labor.
* VTRs need regular and careful maintenance to guarantee quality video recording and playback.
* In large-scale distribution schemes, videotape is more expensive than videodisc.
* Access time to any one given point is much slower than videodisc.
* Current availability of several different and incompatible formats may cause confusion and frustration on the part of purchasers and users.

AVAILABLE FORMATS

There are several formats used in broadcast video. These will not be discussed here. For institutional use there are 2 general types. The first is 3/4 inch cassette. It is available in only one format called U-Matic. The second type is a 1/2 inch cassette. It is available in 3 different and incompatible formats. There are VHS, Home Beta and Beta 1 (often called Industrial Beta). VHS and Beta are incompatible because the size of their cassettes and the machines that record and play those cassettes are totally different. There is some compatibility between Beta 1 and Industrial Beta (same cassettes), however, the machines which record these two formats are different.

The 3/4 inch U-Matic is by far the accepted format for production where editing or generations of duplicates will be required. Industrial Beta can be used as a production format and there are many of these compact machines currently being used in distribution systems. VHS is by far the leader in sales to private citizens and is rapidly becoming the format of choice for large scale distribution systems, public schools local use, such as in data gathering, limited production, etc. Home Beta is not even a close 4th to any of the other formats, and except for its discounted prices (it's in trouble!) should not be considered as a competitor.

COSTS

Because video systems require optional accessories (cameras, monitors, etc.), it is difficult to price out the average system. However, some generalities can be made. The basic VHS system with a receiver for recording off-the-air and playback can be obtained for about $1000 to $1500. Add $700 to $900 for a color camera. Industrial Beta VTRs costs about $1600. Add $2000 for a camera which is capable of providing high quality video for an Industrial Beta VTR if it is to be used for production. Editing Industrial Beta VTRs cost about $6000 which should be added to the cost of both the non-editing VTR and camera, if production is anticipated (it takes all three).

U-Matic or 3/4 inch equipment is available in a wide variety of configurations. Basic playback units cost about $2000. Playback and record units are about $2300 to $2800. Editing 3/4 inch VTRs cost about $6000. Also a playback unit and an edit controller are necessary to do editing, so an overall system for editing can cost up to $9000. This does not include the cost of a camera, microphones, lights, carts, and other necessary gear for production.

EXPERTISE NEEDED

* Teachers and support people trained in the use of video equipment.
* Video trained media specialist and instructional designer if production is anticipated.

SUPPLIERS

For VHS almost any local small appliance store will handle this equipment.

For Industrial Beta and 3/4 inch U-Matic equipment a large A/V supply house should be consulted.

REFERENCES

Private Television Communications: 1980 and Beyond, Brush, Douglas, and Brush, Judith, International Television Association, 1980

Videography, August, 1982

Video User's Handbook, Utz, Peter, Prentice-Hall, Inc., 1980

Technology Fact Sheet

PRESENTER

Dr. Art Higbee, Associate Director for Media Production, Utah State University, UMC 30, Logan, UT 84322, (801) 750-2656.

CATEGORY

Audio Teleconferencing

BACKGROUND INFORMATION

Audio teleconferencing is the use of telephone facilities to join geographically separated groups or persons for verbal interaction, discussion and learning. Audio teleconferencing makes use of existing telephones for individual participation, speakerphones or conference amplified units for larger groups, and long-distance telephone lines to connect the several locations.

USES

Audio teleconferencing can bring an outside resource person to meet with your group whether they are gathered in one central meeting place or scattered in several different locations. Teleconferencing also allows you to deliver your message to a group (or groups) assembled in a geographically separated location(s). With teleconference facilities you can easily conduct a committee meeting involving members from throughout the state without anyone having to leave their home or office to participate.

ADVANTAGES

* Reduces/eliminates travel costs
* Eliminates nonproductive travel time for busy people
* Encourages efficiently scheduled and conducted meetings
* Relatively low cost

DISADVANTAGES

* Reduces/eliminates personal, face-to-face contact between individuals
* Requires advance planning and preparation for efficiency
* Requires availability/installation of speakerphones or amplifier units when more than a single individual participates at a location
* Requires some knowledge of telephone equipment, telephone systems and procedures
* Most effective if program involves the use of some form of graphic, visual or printed materials

AVAILABLE FORMATS

Audio teleconferencing is a widely used technology that is familiar to most if not all telephone companies. In the simplest form, normal telephone handsets are used. A wide variety of add-on components can be rented or purchased to turn the normal handset into a hands-free instrument and provide for additional persons to hear and speak from that location. Most audio teleconferences make use of the Public Switched Network (PSN) provided by the telephone companies. Those who make frequent use of the technology may choose to install dedicated (full-time) telephone lines or utilize special hybrid networks.

COSTS

Audio teleconferencing costs include at least two factors: (1) voice transmission costs, and (2) any special equipment required. The cost of producing any graphic, visual or printed material used in the teleconference would likely have been the same if a conventional meeting were held. The cost of the voice transmission is based on the number of stations connected, the distance (mileage) between stations and the length of the program. (Examples)

Typical equipment costs are:

		Approximate Costs		
		Rental	Purchase	Installation
Speakerphone 4-A	Local Telephone Co.	$12.50	N/A	$15-$30
Conference Set 50A	Local Telephone Co.	$15.00	N/A	None
Telephone Amplifier	Electronics Dealer	N/A	$40-$60	None
Conference Set 50B	Precision Components	N/A	$600.00	None
Darome Convener	Darome Connection	N/A	$700.00	None

Typical telephone line charges for an operator assisted conference, lasting one hour, would be approximately:

Mileage between two most geographically separated points in the conference	Number of Stations in the Conference		
	Two Stations	Five Stations	Ten Stations
100 miles	$34.10	$108.50	$232.50
250 miles	36.58	120.28	259.78
500 miles	39.05	122.76	262.26
1,000 miles	40.92	124.62	264.12

Prices quoted above are according to telephone charges and formulas as of this date but are subject to frequent changes.

EXPERTISE NEEDED

* Conference coordinator trained in group dynamics and leadership
* Operator or coordinator familiar with telephone technology, procedures and prices
* Physically separated persons (or groups) who need frequent contact, but are limited in attending conventional meetings

SUPPLIERS

Local telephone office. Contact the Business office or Conference Operator
Precision Components, 1110 W. National Ave., Addison, Illinois 60601
The Darome Connection, 711 E. Diggins St., Harrard, Illinois 60033
Local Electronics Dealers

REFERENCES

Bridging the Distance: An Instructional Guide to Teleconferencing. Mavis Monson, University of Wisconsin-Extension, Madison, 1978.

Electronic Meetings: Technical Alternatives and Social Choices. Johansen, Robert, et al. Addison-Wesley, Reading, MA., 1979.

Establishing a Telephone Conferencing System: The Dynamics of Doing It. Eileen Connell. Alternate Media Center, New York University, School of the Arts, New York, N.Y., 1980.

1981 Audio Conferencing Handbook. Paul D. Rowan, principal author. Alternate Media Center, New York University, School of the Arts, New York, N.Y., 1981.

Teletechniques. Lorne C. Parker and Mavis K. Monson. Educational Technology Publications, Englewood Cliffs, N.J., 1980.

Technology Fact Sheet

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CATEGORY

Educational Television and Radio

BACKGROUND INFORMATION

Educational television and radio are a part of the general broadcast industry known as noncommercial television and radio broadcasting. That is, these services are not supported by advertisers. Instead, educational television and radio depend on funds contributed by public-spirited viewers and listeners and some "matching monies" furnished by the federal government under a complicated formula administered by the Corporation for Public Broadcasting. Under these conditions, their budgets are rather limited, and their programs are designed for smaller, more specific audiences than are those of the commercial broadcasters who always seek to reach the largest numbers possible.

USES

Educational television and radio has the primary objective of teaching those who view/listen. In recent years, however, both educational television and educational radio have put more emphasis on the delivery of cultural or enrichment programs than on providing programs that are specifically designed to "teach" a specific subject or skill. This shift in emphasis is due at least partially to a change in the system of funding these services.

ADVANTAGES

* Effective method of carrying an educational message to interested persons who are geographically separated
* Can effectively utilize several senses in teaching. (i.e.: teacher's voice, sound effects, dramatic appeal, music (and visual appeal of color, motion, etc. in TV)
* Generally lower in cost than alternative delivery methods of reaching geographically scattered audience(s)

DISADVANTAGES

* Requires more preparation time and effort (especially for TV) than is normally devoted to face-to-face teaching
* Relatively more expensive delivery system (especially for TV)
* Mass media may not be an effective method of reaching a particular (fairly small, yet important) audience. (If a majority of the potential audience will not be interested in your message, you should consider using a medium of more specific appeal)
* Requires considerable skill and experience on part of the teacher to make effective use of radio or television

AVAILABLE FORMATS

Educational Television: requires preparation of your lesson material in regular broadcast format. This means 1-inch or 2-inch videotape which meets all engineering standards for broadcast. Small format videotapes, 1/2-inch or 3/4-inch videocassettes made for classroom use cannot generally be used on a broadcast station without expensive and time-consuming "upgrading" to meet broadcast standards.

Educational Radio: like commercial radio, can use simple audio recordings or live production. However, recorded material furnished for broadcast should be single-track monaural for most radio stations unless specifically requested otherwise.

COSTS

Educational television and radio stations generally do not charge for broadcast time furnished. However, all production costs are handled by the user. These costs can be relatively high for high quality TV production. Educational materials will be accepted and used by most stations according to their perceived needs and interests of their audience.

EXPERTISE NEEDED

* Teachers skilled in the design and production of effective educational messages/programs
* Production facilities for radio and/or television messages/programs, or funds to rent same
* Skilled and experienced production personnel
* Coordinator to make and maintain personal contact with broadcast stations to assure effective scheduling and use

SUPPLIERS

Local educational radio and television stations
Corporation for Public Broadcasting, 111 16th St., N.W., Washington, D.C. 20036 (202) 293-6160
National Public Radio, 2025 M St., N.W., Washington, D.C. 20036 (202) 785-5400
Public Broadcasting Service, 475 L'Enfant Plaza West, S.W., Washington, D.C. 20024 (202) 488-5000

REFERENCES

Broadcasting Yearbook 1981. Broadcasting Magazine, Washington, D.C. 1981.

Educational Telecommunications, Don N. Wood and Donald G. Wylie. Wadsworth Publishing, Belmont, California, 1977.

Technology Fact Sheet

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CATEGORY

Microcomputer Technology

BACKGROUND INFORMATION

The microcomputer is being looked at by many educators as a potentially valuable tool in both easing the paperwork burden of teachers and in providing more individualized instruction. Using a computer for educational applications is not a new concept. It is, however finally becoming feasible based on rapidly decreasing computer costs combined with rapidly increasing microcomputer capabilities. Microcomputers and accessory equipment are generally referred to as hardware. Programs which can be written or purchased to make the computer perform certain tasks are called software. Microcomputer hardware is only as good as the software supporting it.

USES

Microcomputer applications in the school setting can generally be broken into these areas:

1) Computer awareness
2) Computer-assisted instruction
3) Computer-managed instruction

Computer awareness refers to what is often called computer literacy. With the impact computing is having on society as a whole, an understanding of computers and how they are used is expected to be required of all individuals. Computer-assisted instruction includes drill and practice programs, tutorial programs and simulations. Computer-assisted instruction programs actually interact with the student either teaching him/her a new skill or concept or practicing a concept or skill presented by the teacher. Computer-managed instruction involves using the computer to assist in managing student data. This can range from using computerized testing to storing data banks of objectives. Other more general uses of the microcomputer in education include word processing, data base management and other general record keeping functions, and to a more limited extent, telecommunications.

ADVANTAGES

* Instruction can be individualized for each student.
* Computer can present instruction in a non-threatening, non-judgmental manner.

ADVANTAGES (continued)

* Computer can help prepare the student for the computerized society he/she will be a part of.
* Record keeping and other administrative tasks can be simplified.

DISADVANTAGES

* Cost.
* Lack of validated software.
* Teachers must be trained in the use of the microcomputers.
* Teachers may mistrust or even be fearful of using a microcomputer in their classroom.

AVAILABLE FORMATS

A microcomputer system usually consists of the microcomputer with a keyboard, some type of video display, i.e., television, monitor, cathode ray tube (CRT), a disk drive or cassette recorder for data storage and possibly a printer. After this, a plethora of optional devices are available and often necessary for the computer to run certain programs or perform certain tasks. These optional devices, called peripherals, include a variety of circuit boards, graphic tablets for creating computer graphics, modems for telephone line transmission of data or hard disk drives for storing massive amounts of data.

Microcomputer software is usually available in either cassette tape or floppy diskette format. The tape format requires standard audio cassette player to be interfaced to the microcomputer while the disk format requires a specially designed floppy disk drive for the microcomputer. Although disk drives are considerably more expensive than cassette recorders, the disk format is quickly becoming the standard. Programs stored on diskettes can be stored, accessed, and executed much faster than on tape. Most software commercially available today is being distributed on diskette.

Microcomputer software is incompatible across machines. This means that a spelling program purchased for an Apple microcomputer will not run on Atari or Radio Shack microcomputers even if they both use the diskette format. In purchasing any software program, it is important to know what type of hardware configuration is necessary, i.e., How much memory is required? How many disk drives are needed? Is it necessary to have an 80 column video display?

COSTS

Microcomputer costs vary greatly based on manufacturers as well as peripherals desired. A standard system including the microcomputer with keyboard, a video display, one floppy disk drive and a printer will cost $2,000 - $3,000. Microcomputer software is often a forgotten expense. While some teachers have the time and expertise to program the computer themselves, most teachers will be using commercially available programs. These programs also vary in cost based on target population, distribution and developer. Refer to your local computer dealership for prices on commercially available software.

EXPERTISE NEEDED

Teachers and media center staff should be trained in the evaluation and selection of instructional software.

All teachers need computer literacy training and to be able to at least use commercially available software with the microcomputer. Some teachers or media center staff should be provided training on writing their own instructional software and on microcomputer maintenance.

SUPPLIERS

HARDWARE (Available through local computer stores)

Includes Apple, Atari, Commodore, IBM, Radio Shack, and Texas Instruments.

SOFTWARE

Leading publishers now offering microcomputer software include Holt, Reinhart, and Winston; Addison Wesley; Borg-Warner; Milliken Publishing; McGraw Hill; and Science Research Associates. Directories of software and suppliers are available from most computer stores.

REFERENCES

Guide to Microcomputers, Frederick, Franz J., Association for Educational Communications and Technology, Washington, D.C., 1980.

The Computing Teacher, Published seven times annually by the International Council for Computers in Education. For further information, contact The Computing Teacher, Computing Center, Eastern Oregon State College, La Grande, Oregon 97850.

Technology Fact Sheet

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CATEGORY

Videodisc Technology

BACKGROUND INFORMATION

The first videodisc player was available for purchase in 1978, making videodisc a relatively new entry in the video technology field. A 30 minute videodisc contains 54,000 individual video frames. When the disc is played at 30 frames per second, it produces high quality audio and video. Some videodisc players contain a microprocessor which can execute computer programs stored on the disc. This allows the user to interact with the disc. Some systems combine a videodisc player with an external computer. The computer "tells" the videodisc what to play, when to ask the user questions, and how to treat user responses. This type of system can provide computer-assisted instruction utilizing both high quality audio and video. Various private and public research projects around the country are investigating the potential of interactive videodisc. General Motors, Ford, the U. S. Army and the American Heart Association are a few of the organizations now using interactive videodisc systems for training.

USES

Videodisc players can be used to play commercially available videodiscs. Most videodiscs presently available are entertainment oriented, but educators and trainers are using the videodisc as an instructional tool. When used in an interactive mode with either programmed discs or an external computer, videodisc systems provide an interactive learning environment more dynamic than any computer-assisted instructional system previously developed. In addition, librarians, museum staff and others involved in information storage and retrieval are investigating using the videodisc as an archival storage medium.

ADVANTAGES

Videodiscs are much more durable than videotape. Indications are videodiscs will provide the best archival system for video yet devised.

Videodiscs provide a "rock steady" freeze frame or pause image. Videotape in the pause mode produces a jittery often unclear image.

Because of the disc format, a videodisc player can search from the first video frame on the disc to the last in less than 5 seconds. Videotape may take several minutes to accomplish the same task.

ADVANTAGES (Continued)

In mass production, videodisc becomes less expensive per unit than videotape because of the lower volume production cost of discs.

Combined with a microcomputer, the videodisc can provide computer assisted instruction utilizing both high quality video and audio.

DISADVANTAGES

Videodisc availability--Because of the newness of the technology, videodisc production has not kept up with demand. Popular discs, such as the First National KIDISC, are virtually impossible to find. In addition, emphasis has been placed on entertainment discs, not instructional programs. As the mass market entertainment demand is met, major videodisc producers have pledged to provide more instructional videodisc programming.

Videodisc production--The videodisc is a "read only" medium. Unlike videotape which is a "read and write" medium, you cannot record audio and video with a videodisc player. You may only playback material on an existing videodisc. The process for producing a videodisc is complicated and costly. First, a high quality (no less than 3/4" format) videotape must be produced. This videotape then must be pressed on a videodisc for approximately $2,000.00. Only 27-30 minutes of audio-video material can be placed on a disc.

AVAILABLE FORMATS

Presently, three incompatible videodisc systems exist.

1. Laser-optical videodisc system. Also known generally as Laser-Vision. This system was developed jointly by Phillips of the Netherlands and the Music Corporation of America (MCA). In this system the videodisc is read by a laser beam reflected off the surface of the disc. There is no physical contact with the videodisc.

2. Capacitance videodisc system. Also known as CED. In this system, the videodisc is "read" by a stylus which makes contact with the surface of the videodisc much the same as a needle "reads" a phonograph album.

3. Video High Density videodisc system. Also known as VHD. This is the newest entry to the videodisc format contest. Matshushita of Japan (the same people who gave us the VHS videotape format) plan to have the VHD system available early in 1982.

COSTS

Videodisc players vary dramatically in price based on the capabilities of each. The laser optical players are the most sophisticated and have the most user options. The consumer version laser player is available for approximately $750.00. The industrial version laser videodisc players sell for $2,000-$2,500. The capabilities of industrial players lend themselves to use with microcomputers.

COSTS (Continued)

Capacitance players were designed as a low cost inflexible system. The consumer version CED players retail for approximately $500.

The Video High Density players were designed to compete with the price of CED players so they will be available for approximately $500. While these players do have a few more functions than the CED player, an optional box is available to further increase the capabilities of the player.

Commercially available videodiscs retail for $15.-$30.

EXPERTISE NEEDED

To use the videodisc player as a playback unit is easier than most videotape playback units and requires little training.

Using an interactive videodisc system requires a certain degree of training. Most interactive videodisc systems being developed include extensive training in system use.

SUPPLIERS (Available through local video suppliers.)

Laser-optical systems: DiscoVision Associates, Pioneer, Sony, Thompson--CFS, MagnaVision.

Capacitance videodisc systems (CED): RCA, Hitachi, Toshiba

Video High Density (VHD): Matshushita

Technology Fact Sheet

PRESENTER

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CATEGORY

Satellites

BACKGROUND INFORMATION

Satellite communications has evolved to be one of history's greatest technological achievements. The launch of the first satellite, Sputnik, by the Soviet Union in 1957 ushered in a new era in space communications, but the development of domestic communications satellites and the realization of their full potential has only occurred over the past few years.

Satellite communications has gained widespread use as a delivery system in both the domestic and foreign markets. Because they are distance insensitive, they have made distribution of programming to geographically dispersed locations more economical than the terrestrial alternatives. Satellite-based delivery systems are used daily by broadcasters, cablecasters, common carriers, hotels, etc., and applications of the technology are almost unlimited.

The supply of both space segment and ground segment continue to proliferate in an effort to meet the growing demand; yet access to satellite systems and hardware can still be difficult. Particularly in rural areas where ground systems are limited, access may only be obtainable through costly installation of user-owned facilities and yet new developments in the technologies continue to emerge. Worthy of further investigation and study are DBS (Direct Broadcast Satellites) services and Low Power Television, both relatively new means of program distribution particularly suited for rural applications.

USES

There are certain classes of telecommunications needs that lend themselves well to satellite interconnection. They are:

* Those requiring wider bandwidths (video and high speed data transmission)
* Those needing transmission over long distances
* Those requiring multi-point distribution
* Those whose need is at locations uneconomical to be served with alternative facilities
* Those for which the required signal quality cannot be economically obtained otherwise

Services which have been provided by satellite include:

* Program distribution (entertainment, sports, news, weather, etc.)
* Facsimile
* Teletext
* Medical imagery/diagnosis
* Telephone services
* Radio broadcasting
* Teletype
* Electronic mail
* Computer conferencing
* Data base acquisition
* Video teleconferencing
    * continuing education
    * training
    * management communication
    * information gathering

ADVANTAGES

* Geography/distances
* Economical in multipoint distribution
* Versatile/expandable
* Possible convenience (proliferated receive facilities)
* Immediate

DISADVANTAGES

* Economics
    * start up costs
    * function of volume
* Limited availability
* Limited accessibility
* Limited signal security (privacy)

AVAILABLE FORMATS

Satellites are easily capable of transporting video, audio, data, and facsimile. Services are provided in both full broadcast or narrowcast (closed-circuit) modes, and can range from full motion to slow scan, from high to slow speed, depending on the requirements of the organization.

COSTS

Costs for use of satellite services vary depending on the nature of service and the type of facilities required, and specific costs cannot be addressed until specific requirements are determined. Costs associated with a dedicated network might include construction of a production facility, transmission and receive earth stations, supplemental terrestrial interconnects (such as microwave or translator services) and purchase or lease of time on the spacecraft.

Occasional services may be acquired from suppliers of existing facilities, and associated costs vary depending on the type of facilities required and the rates charged by the individual suppliers.

EXPERTISE NEEDED

Using the video technology that will probably be available in a rural community requires little in terms of expertise by the user organization. Much of what is available today in terms of video receive-only hardware is relatively simple to operate, and the user only need have access to someone competent to maintain the hardware from a technical aspect (this can be subcontracted). Whether the user elects to install a dedicated system or arrange for occasional use of existing facilities and hardware, the majority of services that may be required--i.e., consulting, systems design, procurement, installation, networking, etc.--are available on a subcontract basis from telecommunications experts in the field. It is reasonable to expect that very little video production would emanate via satellite from a typical rural community, yet some origination for local distribution may be feasible in conjunction with the low power television option.

SUPPLIERS

Suppliers of the technology are divided into four major categories: spacecraft, ground segment (facilities and equipment), technical services, and program services (software). A whole new industry has evolved that produces and distributes program services via satellite for redistribution on cable. The proposed DBS will offer a full complement of both technical and program services for subscribers.

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Technology Fact Sheet

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CATEGORY

Instructional Packages and Modularized Instruction

BACKGROUND INFORMATION

Instructional packages and modularized instruction come under the broad category called "multi-media". Multi-media is the sequential use of a variety of instructional materials for presentation to groups and/or for self-study programs.

Instructional packages and modularized instruction have their roots in the works of learning theorists or so-called "training psychologists". One of the most well known of these psychologists, B. F. Skinner, pioneered work in programmed instruction.

The use of these instructional materials are useful for group presentations and for individual self-study. The materials are produced in the United States by over 200 commercial producers and most educational institutions.

USES

Instructional packages and modularized instruction bring together many types of media in a coordinated manner to accomplish specific instructional objectives. The use of these vehicles can utilize the strengths of each medium to reach a desired goal, whether it be for self-study, small group presentations, large group presentations, minicourses or full curriculum.

ADVANTAGES

* Can bring unavailable expertise into a learning program.
* Brings together the strengths of each medium used into an organized learning situation.
* Acts as a vehicle for individualizing instruction.
* Helps teachers deal with large classroom numbers in an effective manner.

DISADVANTAGES

* Requires teachers that have been trained in the use of instructional materials and equipment.

DISADVANTAGES (continued)

* Often considered "frills" by those in charge of the budget.
* Often considered extra headaches and work by teachers.
* Rely on students self-motivation to learn.

AVAILABLE FORMATS

The number and variety of different instructional packages is large. Some of the more common packages consist of: (1) slidetape/workbook(s), (2) videotape/workbook(s), (3) microcomputer/text/audio-visual, (4) filmstrip/worksheet, and (5) instructional games. One of the newest instructional packages is in the form of interactive microcomputer/videodisc programs.

COSTS

Because instructional packages vary in their media content, it is not realistic to give cost breakdowns. The "Product Catalog" of the Exceptional Child Center at Utah State University has a variety of packages ranging from $3.00 to $350.

When considering costs it might be important to consider the words of Wilbur Schramm in his book, Big Media, Little Media, "We sometimes lose sight of the fact that direct teaching costs money, and, because we have teachers in the school anyway, think of instructional media always as an add-on cost. But when it is possible to revise the use of classroom teachers--for example, when it is possible to replace local lectures and some practice, so as to make use of the classroom teacher for other duties or larger classes--it may be possible to deliver additional services at an appropriate cost."

EXPERTISE NEEDED

* Teachers trained in the use of instructional media hardware and software.
* Curriculum development team consisting of media technologists and teachers.
* Media resource center and staff.

SUPPLIERS

Outreach, Exceptional Child Center, Utah State University, UMC 68, Logan, UT 84322.

The National Information Center for Educational Media, University of Southern California, University Park-RAN, Los Angeles, CA 90007: publish the NICSEM Master Index to Special Education Materials, Special Education Index to In-Service Training Materials, and the NICSEM Special Education Thesaurus.

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Special Education Media Resources

SPECIAL EDUCATION MEDIA RESOURCES: The following listing includes various producers of special education materials.

1. The National Association of Secondary School Principals (NASSP) produces a publications listing. Write to NASSP, 1904 Association Drive, Reston, Virginia 22091.
2. The Council for Exceptional Children (CEC) produces a catalog of available media. Write to The Council for Exceptional Children, 1920 Association Drive, Reston, Virginia 22091.
3. Campus Film Distributors Corporation, 14 Madison Avenue, P.O. Box 206, Valhalla, N.Y. 10595.
4. The Lexington School for the Deaf has a film library. Write to Lexington School for the Deaf, 26-26 75th Street, Jackson Heights, Queens, N.Y. 11370.
5. K&H Publishing Company produces books for "people with very special needs". Write to K&H Publishing Company, 3300 West Pacific Coast Highway, Suite F, Newport Beach, Calif. 92663.
6. Lakeshore Curriculum Materials Co., 2695 E. Dominguez St., P.O. Box 6261, Carson, Calif. 90749.
7. Southwest Educational Development Laboratory, 211 East Seventh St., Austin, Texas 78701.
8. Teaching Resources Corporation, 50 Pond Park Road, Hingham, Mass. 02043.
9. The Exceptional Child Center of Utah State University produces a wide range of special education materials. Write to Outreach, Exceptional Child Center, Utah State University, UMC 68, Logan, Utah 84322.
10. Paul H. Brookes, Publishers, P.O. Box 10624, Baltimore, Maryland 21204.
11. Hawkins & Associates, Inc., 804 D Street, N.E., Washington, D.C. 20002.
12. Grune & Stratton, 111 Fifth Ave., New York, N.Y. 10003.
13. Research Press, Box 317750, Champaign, Illinois 61820.
14. B.L. Winch & Associates, 45 Hitching Post Dr. Bldg. 20, Rolling Hills Estates, Calif. 90274.
15. C.C. Publications, Inc. P.O. Box 23699, Tigard, Oregon 97223.
16. Steck-Vaughn Company, P.O. Box 2028, Austin, Texas 78768.
17. Developmental Learning Materials, P.O. Box 4000, One DLM Park, Allen, Texas 75002.
18. American Guidance Service, Publisher's Bldg., Circle Pines, Minn. 55014.
19. University Park Press, 300 North Charles, Baltimore, Maryland 21201.
20. Teaching Research Curriculum for Handicapped. Write to Teaching Research, Monmouth, Oregon 97361.