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ABSTRACT

Prepared for rural school teachers and administrators, the guide asserts that problems associated with smallness (costs, range and quality of existing programs, and special services to special populations) can be overcome by utilizing various electronic technologies in rural schools. Following an introductory section, Section 2 discusses the history of technology usage and defines and/or describes current utilization of computers, instructional television, video discs, audio tapes, radio, telecommunications systems, programmed instruction, video tapes, and interactive video. Section 3 summarizes observations by rural school practitioners regarding planning, implementing, and maintaining the utilization of technologies under the topics of board and administrative perspectives, teacher involvement, student acceptance and instructional effectiveness, cost factors, and assistance of agencies beyond the rural school. Section 4 describes, in detail, successful uses of technology with 12 single school/district and 6 multi-district examples, selected because of geographical and technological balance, local education agency support, program longevity, technology utilization in instruction rather than in administration or support services, collaboration/cooperation with rural schools/districts, and amount of information provided. Section 4 also provides a descriptive list, by state (35 represented), of 86 projects which includes project title, grade(s) served, type(s) of technology utilized, and name/address/telephone number of each project contact person. (NEC)

A GUIDE ON SUCCESSFUL USES OF TECHNOLOGY IN RURAL SCHOOLS

A Project on Uses of Technology in Rural Schools

SUBMITTED TO:

NATIONAL INSTITUTE OF EDUCATION

WASHINGTON, D.C.

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A GUIDE

ON SUCCESSFUL USES OF TECHNOLOGY

IN RURAL SCHOOLS

A Project
on Uses of Technology
in Rural Schools
(RFQ. No.: NIE-Q-81-0183)

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FOREWORD AND ACKNOWLEDGEMENTS

America's rural elementary and secondary schools in general encounter unique challenges in providing instruction, because of their smaller size, their lower funding levels and their geographic isolation. Their diverse student bodies and limited numbers of staff pose challenges in designing and providing comprehensive programs. Yet, one-fourth of the nation's students and most of the local education agencies are rural. Analysts have been suggesting that technology offers a potential solution, that there is evidence of success in some areas, and that rural school districts have been purchasing instructional technology hardware of various types.

The Rural Team of the Program on Educational Policy and Organization, National Institute of Education, determined during 1981 that there was a need to examine the potential for technology to assist rural schools, particularly in the instructional processes. There also was determined a need to assess how technological capabilities are being introduced within rural schools, as well as how they are being utilized and with what results. For purposes of the proposed project efforts, "rural schools" were defined loosely and flexibly, since "rural" has different meanings in different states. "Small schools" were also included within the scope of the effort.

The major product of A Project on Uses of Technology in Rural Schools is A Guide on Successful Uses of Technology in Rural Schools, which has been prepared for and is dedicated to, teachers and administrators in America's rural schools and school districts.

Educational Operations Concepts, Inc. (EOC) is pleased to have performed this Project for the National Institute of Education (NIE). We are grateful for the help and assistance of Tom Schultz and Stuart Rosenfeld, the Rural Team, Program on Educational Policy and Organization, National Institute of Education. We also appreciate the support of Joyce E. Calloway and staff of Contracts and Grants, National Institute of Education. The use of the Controlnet wide area telephone system at Control Data Corporation's World Headquarters, Minneapolis, Minnesota, was a needed and valuable contribution to the project's performance, and we are grateful. We appreciate the efforts of Dr. Walter G. Turner, Associate Executive Director, American Association of School Administrators, and of Dr. Everett Edington, Director, ERIC Clearinghouse on Rural Education and Small Schools, New Mexico State University. Finally the efforts of some 275 information source persons, and the eighty-nine respondent sites are particularly appreciated, since they are the source of the information contained in the Guide.

We hope that the Guide will be found to be useful and an encouraging source of information to those who may wish to adopt/adapt technology for instructional purposes in rural schools.

Fred C. McCormick,
President and Project Director

Eileen R. McCormick,
Corporate Officer and Project Associate

TABLE OF CONTENTS

SECTION		PAGE
•	FOREWORD AND ACKNOLWEDGEMENTS	ii
I.	INTRODUCTION: PROBLEMS AND ISSUES TO BE ADDRESSED	1
II.	STATE-OF-THE-ART OF TECHNOLOGY UTILIZATION	4
	2.1 THE COMPUTER	6
	2.2 INSTRUCTIONAL T.V.	8
	2.3 VIDEODISC	9
	2.4 AUDIO TAPES	9
	2.5 RADIO	10
	2.6 TELECOMMUNICATIONS SYSTEMS	10
	2.7 PROGRAMMED INSTRUCTION	11
	2.8 VIDEO TAPES	11
	2.9 INTERACTIVE VIDEO	12
III.	PRACTITIONER OBSERVATIONS REGARDING PLANNING, IMPLEMENTATION AND MAINTENANCE	15
	3.1 BOARD AND ADMINISTRATIVE PERSPECTIVES	15
	3.2 TEACHER INVOLVEMENT	17
	3.3 STUDENT ACCEPTANCE AND INSTRUCTIONAL EFFECTIVENESS	18
	3.4 COST FACTORS	19
	3.5 ASSISTANCE OF AGENCIES BEYOND THE RURAL SCHOOL	20
	3.6 SUMMARY RECOMMENDATIONS FOR PLANNING, IMPLEMENTATION AND MAINTENANCE	22
IV.	EXAMPLES OF SUCCESSFUL USES OF TECHNOLOGY	24
	4.1 SINGLE SCHOOL/DISTRICT EXAMPLES	24
	4.2 MULTI-DISTRICT EXAMPLES	48
	4.3 RESPONDENT SITE DESCRIPTIONS	61
V.	ADDITIONAL RESOURCES	79

I. INTRODUCTION: PROBLEMS AND ISSUES TO BE ADDRESSED

This Guide has been prepared in four major sections beyond this first introductory section: II. State-of-the-Art of Technology Utilization; III. Practitioner Observations Regarding Planning, Implementation and Maintenance; IV. Examples of Successful Uses of Technology; and V. Additional Resources.

About one-fourth of America's elementary and secondary school students reside in rural areas and rural school districts comprise about 75 percent (12,000) of the nation's operating school systems. Rural schools are typically small, geographically-isolated, and funded at a lower per-student entitlement than urban and suburban schools.

Rural America is extremely diversified. Where the rural area ends and the metropolitan or urban area begins is not always clear. Agencies gathering and reporting data on public school systems generally classify these data into metro (central cities and suburbs) and non-metro. The differences between urban and rural school districts are the consequences of contrasts between conditions in rural and urban areas. It is necessary to recognize that the unique characteristics of any community are critical factors in describing its educational resources, both human and otherwise. Each individual rural educational setting, not unlike other school settings, has certain problems to be recognized, and issues to be addressed, in designing and implementing optimum teaching/learning environments for its students and teachers.

Rural schools and rural local education agencies (LEAs) are often smaller than urban schools and agencies due to lower population density. However, size is also determined by either state policies and/or local choice. Therefore,

large regional and state variations exist; yet, size (smallness) has been identified as a major factor which has implications in at least four areas of problems/issues, as discussed by Dr. Jerry L. Fletcher, in his paper, "Applications of Electronic Technologies to Rural Education," prepared for the National Institute of Education in 1980. Practitioners in rural schools have identified problems associated with smaller schools, according to these four issue areas:

- Costs: In any small school the cost per pupil of providing any particular program or service may be higher because fewer pupils are served. Shrinking enrollments and reduced funding can further complicate costs and may lead to forced school district consolidations and loss of local school identities. The two major expenditures in all schools are for staffing and for transportation.
- Quality of Existing Programs: In some rural settings, isolation may make teacher peer contact difficult, resulting in fewer sources of new ideas and materials, or new ways of teaching. Teacher pre-service and in-service (or simply the opportunity to talk with another teacher in the same area of preparation) may require greater time and travel commitment. In addition, staffing configurations may be more difficult to effect (e.g. if a qualified higher math teacher is hired, how will all of that teacher's time be filled?)
- Range of Available Programs: Given that smaller schools tend to model larger schools, with specialists teaching courses in their disciplines, no small school can have the staff to offer the full range of courses a large school can offer. Even though very few students may, in fact, take advantage of any particular course, the lack of advanced mathematics

offerings, drama, music, art, or a number of vocational education offerings, gives the image of an inadequate program. Expanded curricular offerings appear to be needed, particularly at the high school level.

- Special Services to Special Populations: If the range of offerings to the general student body is limited, the problems may be compounded in attempting to serve students with special needs; e.g., the handicapped, the gifted, and vocational education students.

Fletcher and others contend that the smallness of rural schools, and the problem areas associated with smallness, can be overcome by utilizing various electronic technologies to provide education effectively to small groups. Further, it is asserted that rural schools are a unique laboratory for the development and testing of ways of providing comprehensive and effective education in smaller groupings of students. In addition, modern communications technologies are less constrained by geographic conditions than most other service delivery mechanisms, and thus are as viable and as inexpensive to install and to operate at a rural site as in any other area.

II. STATE-OF-THE-ART OF TECHNOLOGY UTILIZATION

This section of the Guide discusses briefly the history of technology usage and defines and/or describes the present utilization of the major technologies as outlined in this project (subsections 2.1 to 2.9).

Technology, per se, is simply the application of knowledge. Science and technology tend to progress together because the scientist discovers a principle and the technologist applies that knowledge to design a tool to solve a practical problem. Throughout the history of civilization, some of these tools have been linked with learning. Generations of students have been taught using clay tablets, pen and ink, chalkboards, books and pictures. The instructional tools, however, have been only a small part of the total educational system that included learners, teachers, curriculum, goals and objectives, and administrators.

Recently, the instructional tools have become more sophisticated and complex. Learners in today's world are receiving instruction via radio, telephone, television, satellites, computers, and a host of other "complex tools." As the instructional tools become more numerous and complex, it is useful to examine each type of available instructional technology from time to time, to determine its present state-of-the-art and its potential utilization in the educational system.

The following Figure 1, developed by Lawrence P. Grayson for the 1982 edition of the Encyclopedia of Educational Research, categorized existing technologies used in education according to their capability (audio, video, or computer) and their accessibility (used locally or over distance).

CAPABILITY	ACCESSIBILITY			
	USED LOCALLY		USED OVER DISTANCE	
	HARDWARE	TYPICAL APPLICATIONS	HARDWARE	TYPICAL APPLICATIONS
Audio and Audiographic	Audio tapes	Stored lectures and discussions; Instructions	Radio Telephone Dial Access Electronic blackboard Slow-scan television Facsimile	Pre-produced and edited programs; Lectures, seminars and discussions; Retrieval of audio information; Transmission of documents, still images and hand-written information; Audio conferencing
Computer	Mini-computers Personal computers	Computer-assisted instruction; Computer-managed instruction; Computer-aided testing; Problem solving	Central computers; Remote terminals; Time-shared computing	Information retrieval; Computer-assisted instruction; Computer-managed instruction; Computer-aided testing; Problem solving; Electronic message delivery; Computer conferencing
Video	Videotape Videodisc	Stored lectures and presentations Interaction instructional programs	Instructional Television Fixed Service (ITFS) Cable Satellites Broadcast television	Pre-produced and edited programs; Lectures, seminars and discussions Video conferencing

Figure 1. Classification of various technologies used in education.*

*Source: Lawrence P. Grayson in 1982 Edition of Encyclopedia of Educational Research.

2.1 THE COMPUTER

Until a few years ago, most computers found in schools were essentially terminals linked by telephone lines (on-line) to large centrally located main-frame computers that served a variety of users by means of an arrangement called time-sharing. Main-frame computers are capable of storing large amounts of information and performing complex calculations at high speeds. However, time-sharing arrangements are expensive because they require open lines to the computer. Additional problems included: downtime due to "crashes" during peak use; busy signals when attempting to access the system; long distance charges; and limited adaptability to the learning of programming itself.

Minicomputers are mid-range (in size and cost) between microcomputers and main-frame computers. They are characterized by integrated circuits connected together on a printed circuit board. Minicomputers have higher performance than microcomputers, with richer instruction sets, and a proliferation of high-level languages, operating systems, and networking methodologies.

Microcomputers, also known as personal computers or home computers, refer to complete tiny computing systems. The main processing blocks in a microcomputer are made of semiconductor integrated circuits. Although somewhat similar to the minicomputer, the main differences are in price, size, speed and computing power. In addition to the microcomputer itself, a variety of secondary or "peripheral" equipment expands its capabilities and can make input and output arrangements compatible with user needs. Microcomputers can be connected to one another or "networked" by means of telephone transmission.

The major educational uses of computers are as follows:

. Computer-Assisted Instruction (CAI) - an on-line, interactive process between learner and computerized delivery system in which the computer

assumes a direct instructional role. The major types/methods of interactive computer instruction are: drill and practice, tutorial, simulation modeling, problems analysis and instructional games.

- Computer-Based Education (CBE) - a computerized educational delivery system. The hardware and software in an educational environment provide instruction, testing, record keeping, and information resources.
- Computer-Managed Instruction (CMI) - a computerized method of testing, record keeping and decision making that supports the instructional system and provides diagnostic feedback on student performance.

Instructions for the computer are called programs, software, or in the case of instructional programs, course-ware. Binary code (0's and 1's) is actually used by the computer, and early programmers had to work with "strings" of this code. However, computer languages have been developed that allow a symbol or word to stand for one or more groupings (bytes) of binary code. The most familiar language to microcomputer users is BASIC, which is actually a family of languages since it has several versions. Instruction in programming using BASIC may be considered only an introduction because several recently-developed languages as LOGO, SMALL TALK, LISP, and FORTH promise easier use and greater flexibility. Some of the higher languages available for microcomputers and main-frame computers include: COBOL, FORTRAN, PASCAL, and PL-1.

At the present time conservative estimates suggest there are at least 100,000 computers in schools across the nation. If evenly distributed, this figure would mean there is roughly one computer for every 400 students; however, there are a large proportion in affluent suburban schools and rural schools have proportionally fewer. Creative Strategies International, a San Jose (California) market research firm, predicts that the total number of computers will grow to 270,000 units by 1985.

2.2 INSTRUCTIONAL T.V.

A distinction may be made between educational television, which is currently widespread, and instructional television. Educational television usually refers to any type of program aimed at informing its viewers. Educational television programs frequently appear on commercial channels as special reports and documentaries. Educational television programming is also made available on the National Educational Television network.

Instructional television, on the other hand, generally refers to a program designed to track specific subject matter as part of a formal course of study. (In this sense, the project examined only utilization of instructional television.) Instructional television, in turn, may have one-way or two-way transmission.

When small or localized audiences are to be reached, one-way instructional television may be an appropriate mechanism. This approach has been used regularly by institutions of higher education to provide graduate education to professionals located at plant or office sites. Several large consortia have also utilized one-way instructional television to provide programming for elementary and secondary classes, special needs students, and teacher inservice. The recent availability of satellite-based delivery systems for education has been used by such groups as the Appalachian Community Service Network. The network currently offers 65 hours per week of college courses, adult education and seminars.

Two-way instructional television systems are presently available and in operation, although some might consider this approach to be still in the experimental stages. Early users of two-way television mechanisms were located in Redding, Pennsylvania and Irvine, California. Presently three mid-western sites are utilizing two-way instructional television in multi-district configurations. The sites are utilizing three different transmission modes as follows:

low-power television and microwave; cable and microwave; and microwave only. (See subsection 4.2 for further detail.)

2.3 VIDEODISC

The videodisc is the most recent medium for storing and playing video materials. The disc is similar in appearance to a long playing record. A single side of the disc stores 54,000 frames or pictures, or approximately 30 minutes of viewing. The videodisc has two independent audio tracks to allow two levels of audio presentation.

Videodiscs presently exist in two basic types: 1) capitance, which uses a special stylus tracking arm to sense the disc information, and 2) optical, which uses a laser beam to recover electronically uncoded information, and, therefore, is considerably less subject to wear.

Videodiscs present very distinct advantages, but they have disadvantages as well. The major advantages are: 1) discs store a great deal of information in a small amount of space; 2) discs are ideal for random access; 3) large quantities of discs are inexpensive to duplicate; 4) some discs can be played at various speeds, even backwards, and can hold "stills" for extended periods of time. The disadvantages are: 1) disc player equipment is not standardized; and 2) the discs must be produced (pressed) and duplicated by commercial firms.

2.4 AUDIO TAPES

Audio tapes are recordings of sound made on thin magnetic tapes. The advent of the cassette tape and cassette recorder/player made usage of audio tapes inexpensive and easily accessible. High quality tapes are available with selection dependent upon usage (i.e. music or spoken word). Most commonplace uses include: book and tape combinations, tapes to accompany film strips,

stand alone tape presentations, and actual classroom tapings. Self-study courses via audio tapes and records have been available during the past 30 years, particularly in the areas of language instruction.

2.5 RADIO

Radio, a medium that first was applied to education in the 1920's and experienced peak usage in the 1930's and 1940's, continues today to have potential as an effective instructional tool. In some respects radio has been the forgotten medium with respect to instruction. Two possible reasons may be offered. Instructional radio has always been largely dependent upon commercial radio for transmission. As the commercial value of radio became apparent, stations became reluctant to broadcast instructional material during morning and afternoon "prime time." The second reason often offered for the demise of instructional radio was the inception of television. Its audio and visual capabilities attracted the attention of educators and students alike.

2.6 TELECOMMUNICATIONS SYSTEMS

Most broadly defined, Telecommunication refers to "the science and technology of communication by electrical or electronic means." In this sense telecommunications would encompass telegraph, telephone, radio, television, satellite communications, teletype, and electronic messenger services. Local practitioners have tended to restrict telecommunication systems to those systems related to the telephone line usage, i.e.: the telephone, teletype, "on line" computers, computer networking, and messenger services. Since computer-telephone interfaces were addressed with computers, telecommunication, as it is used in this project, refers to telephone (two-way audio) and teletype (one-way hard copy).

Teletype is one of the simplest means of transmitting written messages.

Its advantages include low cost and printed hard copy for permanent record purposes. Disadvantages include inability to receive feedback, control by the central transmitting location, and (potential) cost increases.

Two-way audio is more complex because it requires sending and receiving equipment at all locations. A two-way audio system can be as simple as a microphone and speaker, with amplifiers, at each location. Its greatest advantage lies in its potential for user response, questions, or feedback. Data, visuals or graphics may also be transmitted.

2.7 PROGRAMMED INSTRUCTION

Programmed instruction is solidly based on such principles of learning as repetition, reinforcement, and immediate feedback. Programmed instruction breaks down the learning elements into small units called frames. The learner is presented with a frame and is then asked to make a response. If the response is correct, it is reinforced. The objective is to reduce error rates and keep correct response rates high. If the learner gives an incorrect response the learner is directed to a frame designed to correct the error. After this information is reviewed, the learner is branched back to the frame where the error occurred.

Programmed instruction presented as printed material only, is very unexciting and requires true learner motivation to persevere. However, the very same theory provides the backbone for many computer-assisted instruction programs. The new medium makes the process much less tedious.

2.8 VIDEO TAPES

Video tape is a medium for storing and playing video materials. Each video tape recorder is known by the size tape it uses and the tape configuration.

There are five different tape sizes: 2-inch, 1-inch, $^{3}/_{4}$-inch, $^{1}/_{2}$-inch, and $^{1}/_{4}$-tape. Examples of tape configurations (which refers to the packaging) are: reel to reel or open reel, video-cassette, and videocartridge. The equipment associated with video tapes is as follows: videocassette player (VCP) - a machine that plays but does not record videocassettes; videocassette recorder (VCR) - a machine that can record and play videocassettes; video tape player (VTP) - a machine that can play but does not record videotapes; and video tape recorder (VTR) - a machine that can record and play a videotape.

2.9 INTERACTIVE VIDEO

Interactive video or computer-assisted video instruction is a new application of two already existent technologies. It is possible to use the videodisc or video tape in a dynamically-programmed format with the microcomputer. Until the present time, microcomputer courseware has included text, computer graphics, and occasionally, with difficulty, sound. Merging the capabilities of the video tape or videodisc with the computer provides the best of both technologies, the full color and sound of the video plus the learner control provided by the computer.

In order to utilize this capability the following equipment is needed: a microcomputer, a video recorder, a video monitor, and an interface board to connect the computer and the recorder. Several research and development projects are underway, including some educational applications at Utah State University. The Minnesota Educational Computing Consortium (MECC) has developed an economics course in this medium. An anticipated joint project between the Ortonville School District, Ortonville, Minnesota (microcomputer project) and Osseo School District, Osseo, Minnesota (videodisc development) in 1982-83 will hopefully further develop and test interactive video.

The foregoing subsections have served to describe the state-of-the-art of nine different types of technology utilized in instructional systems. An appropriate summary statement is provided by Dr. Jerry L. Fletcher in a 1980 paper, cited above. It is a discussion about what constitutes learning, and the role that electronic technologies can play:

While this question could be a book in itself, and the rapid development of the hardware capabilities suggests that not much is truly impossible, this paper takes the position that learning has two broad phases:

1. *There is the phase of taking in information. This has to do with assimilating the content of instruction through listening to presentations, reading, watching demonstrations, etc. and practicing exercises which have "right" answers: questions, tests, essays, etc. to make sure the information has been taken in.*
2. *There is the phase of working with the information in one's own way: talking with people about it, forming opinions based on it, trying it out in real life situations, comparing it with one's own experience and ultimately finding or creating one's own meaning out of it.*

Given ths present state of technology, the first phase might well be accomplished by some configuration of electronic technology, perhaps in a way substantially more effective and efficient than what teachers are able to do today. The second phase cannot be done by electronic technologies, and possibly never will be able to be. How one ultimately makes new knowledge a part of oneself is a human-interaction, life-living process, and machines are a long way from providing the full richness of human experience.

For the purposes of this paper, therefore, no expectation is present that electronic technologies will totally replace teachers. Rather, it is possible for technologies to take over much of the content presentation and accuracy of assimilation tasks that teachers presently perform. Done well this should increase the amount of time teachers can devote to planning and conducting the kinds of human interaction experiences necessary to really making any new knowledge one's own.

III. PRACTITIONER OBSERVATIONS REGARDING PLANNING, IMPLEMENTATION AND MAINTENANCE

The utilization of technology in rural schools involves three major phases, i.e. planning, implementation, and maintenance. The Project Team associated with A Project on Uses of Technology in Rural Schools made extensive contacts with personnel in local rural schools, in state agencies, in regional agencies (both within and beyond states) and with the Federal government. Responses to Requests for Information were received from numerous individuals in each of these sectors, and in-depth telephone interviews were conducted as well. A number of observations were made, in the course of the inquiries, by practitioners in rural schools, regarding planning, implementing and maintaining the utilization of technology(s). These observations are summarized in this Section of the guide, under the following major topics: Board and Administrative Perspectives (3.1); Teacher Involvement (3.2); Student Acceptance and Instructional Effectiveness (3.3); Cost Factors (3.4); and Assistance of Agencies beyond the Rural School (3.5). The final subsection (3.6) provides a brief summary of recommendations for planning, implementing and maintaining following these observations.

3.1 BOARD AND ADMINISTRATIVE PERSPECTIVES

The following observations have been made relating to school board and administrative perspectives regarding technology utilization:

- Technology utilization provides a rural school greater flexibility in curricular offerings and has the potential for improving the quality of education in the rural school district.

- Technology has been the basis of cooperative arrangements between/among a number of school districts, offering, together, what one rural school district could not afford, alone.
- Technology appears to help in overcoming distance and transportation barriers and costs in rural areas, as well as barriers related to weather conditions for travel. Thus, students do not need to be transported as frequently.
- Technology appears to ease the need for teacher layoffs (e.g, ability to maintain a Spanish teacher if shared with other districts utilizing instructional technology).
- Technology appears to help alleviate the need for consolidation among rural schools.
- Major problems in utilizing technology, common among all schools, but magnified in small and rural schools, appear to be:
  - Money for hardware/software;
  - Staff development;
  - Communications among developers and potential users;
  - Confusion (and some differential pricing) caused by myriads of vendors/salespersons in the field;
  - Lack of follow-up (servicing) by vendors/sales organizations, following installation;
  - The existence of many well-composed programs that are poorly-suited to classroom use or integration with existing curricula; and
  - Publicity efforts relating to new technologies which generate inquiries and result in additional time and expense for project operators, thus possibly detracting from the day-to-day effectiveness and efficiency of the projects.

3.2 TEACHER INVOLVEMENT

The following observations have been made relating to teacher involvement in technology utilization:

- Teacher-initiated utilization of technology(s) usually experience easier acceptance patterns than administratively-initiated utilizations. Teachers need to be involved in the planning and developmental processes, regardless who has initiated the utilization.
- Technology can be utilized effectively to supplement, not to supplant the teaching efforts of teachers. Even with the use of technology (e.g. two-way television) there is still a need for student and teacher to "meet first hand," at least occasionally.
- Use of new technologies must be "sold" to all school district persons, but particularly to adults (who have been educated in a "no hands-on" era) in order to overcome fears of technology.
- Many teachers tend to resist technology utilization; teacher training/re-training is necessary, and needs to be a greater priority with teacher trainers.
- Teachers ask:
    - Is technology usage instructional (i.e. in the mainstream) or is it an appendage?
    - Does technology create a lack of interaction between the teacher and student?
    - Are educators using technology as a "quick fix" rather than searching for quality as a permanent solution?
- Local enthusiasm in implementation and continuation of technology utilization is often due to the efforts of one individual teacher advocate. Administrative and Board advocacies are also helpful.

3.3 STUDENT ACCEPTANCE AND INSTRUCTIONAL EFFECTIVENESS

Student acceptance and instructional effectiveness is the "bottom line" relating to the utilization of technology(s) in rural schools. The following observations are associated with these areas:

- Technology appears to be most successful when used with students at the two ends of the high/low achievement scale. Technologies are being used successfully with special needs students, including the gifted.
- Technology utilization appears to be more effective and more easily accepted when it is made available in the classroom, rather than as a "pull out" activity.
- Technology has made it possible for rural school districts or groups of districts to provide curricular offerings to students which were not available prior to the utilization of technology on a "shared basis."
- Technology tends to save travel time for student learners, by reducing the need to transport students.
- Concrete, "hands on" evidence of technology utilization will usually result in a higher degree of student feedback and parent acceptance. An example is a (hard copy) computer printout which a student can take home to share with parents.
- Career and occupational implications of technology utilization (e.g. computer programming and its job-placement potential) are directly related to parent and student acceptance.
- The functionality and workability of the technology should be checked out and confirmed before it is linked into the instructional process(es). Failure to do this may lead to frustration and lack of confidence in the technology.

- Students might participate more in utilizing technology(s) if made more available in the classroom or associated with greater student scheduling flexibility and awareness of the opportunities available.
- Generally, student discipline in a learning/technology situation has been no more (or often is less) of a problem than exists in more traditional learning situations.
- Generally, students enjoy their use of technology(s) in learning and believe that they learn and retain as much or more than they do in other (traditional) modes of instruction. Student testing, to date, (with experimental and control groups) tends to confirm this observation.

3.4 COST FACTORS

The following observations have been made relating to costs and cost factors in technology utilization:

- "Front-end" costs associated with the capitalization of instructional technology hardware (and some software) are the greatest share of total costs. Rental of telecommunications lines is also a major cost. The potential for higher costs of rental lines appears to be increasing.
- Ongoing costs are somewhat difficult to predict, since much of the equipment is new and its actual "useful life" and "track record" have not yet been determined. Longevity of equipment is yet to be determined in many instances.
- Federal and state grants (and some private foundation grants) have played a large part in initial start-ups of technology utilization.
- "Scrounging" of used and surplus equipment, and staff/student efforts in construction, have effected large cost savings in making technologies

available in some rural school situations.

- Ownership (copyright) guidelines, particularly for satellite receptions, are not yet clear. FCC regulations have not necessarily been developed to fit the rural school situation.

3.5 ASSISTANCE OF AGENCIES BEYOND THE RURAL SCHOOL

The utilization of technology(s) in rural schools has been a "grass-roots" development, responding to the problems and issues (discussed in Section I), and stimulated by federal dollars and marketing efforts. All of the projects which are described in Section IV following, have been funded, at least in part; with local resources at a minimum, with the dedication of teaching staff and administrative time. However, most of the projects which are described in Section IV (i.e. the respondent sites) have been able to adopt/adapt technologies only with the assistance of other agencies and/or organizations, public/private, state and Federal. Federal funding has played a part in a majority of the projects described in this Guide. Of the twelve single school/school district examples and six multi-district examples described in the next section (a total of eighteen projects), eleven, or about 61% were funded, via their state education agencies, with at least some Federal funding (generally ESEA Title IV funding). The remaining seven, or 39%, have been funded only by state, local and/or private foundation funding. Within the State of Alaska, a state-wide project involving 52 school districts has been developed and is functioning well in maximizing instructional resources for the largest state, with most of its schools located in remote and isolated areas. This project is entitled Educational Telecommunications for Alaska (ETA), a five-year project, the mission of which is to develop and implement educational uses of telecommunications

throughout Alaska. Participating organizations have included the Alaska Department of Education, Alaska Department of Transportation and Public Facilities, Alaska Department of Administration, Northwest Regional Educational Laboratory (as the design and implementation contractor) and the National Institute of Education (through a grant award to be matched by state funds). Components of the project include an Electronic Mail System (EMS) and Individualized Study by Telecommunications (IST).

The intermediate educational service agencies within many states have also been agencies beyond the rural school which have been instrumental in providing mechanisms for the utilization of technologies by rural schools. In New York State, the Superintendent of the Oswego Board of Cooperative Services (BOCES) has provided the leadership to initiate a New York State Instructional Computing Network. Six subcommittees have been created, as follows: software, hardware, inservice, computer literacy, political action, and dissemination. Also included is an office in the State Education Department. This is an effort to tie together all of the 726 school districts in New York State.

Another such intermediate educational service agency project is in Wisconsin, and is directed by Cooperative Educational Service Agency (CESA) 11 at Onalaska. This Title IV-C project provides telecommunication to 24 small rural schools, plus two high schools in La Crosse and the University of Wisconsin, La Crosse. Telecommunication is used for inservice and meetings and for instructional purposes. In school year 1981-82, 35 students in four districts took coursework with high success (students learned how to listen). It is anticipated that 200 students in ten districts will take coursework in 1982-83. Telephone costs appear to be about $1000 per month. The project utilizes a van to transport

materials between and among the sites.

The Region XVI Educational Service Center, Amarillo, Texas is providing orientation sessions and in-depth training sessions, assisting schools in implementing computer use in any type of classroom. The San Juan Board of Cooperative Services (BOCS), Durango, Colorado, provides a software library, a video taping project, and Test-Ease, a computer-assisted test and quiz program. It is evident, from the foregoing discussion, that many agencies beyond the rural school district have been instrumental in helping rural schools link technology with the instructional process.

3.6 SUMMARY RECOMMENDATIONS FOR PLANNING, IMPLEMENTATION AND MAINTENANCE

The following Summary Recommendations for planning, implementing and maintaining the utilization of technology(s) in instruction are based on the observations reported in sub-Sections 3.1-3.5 above. They are provided particularly for rural school practitioners who might wish to introduce technology applications within the teaching/learning situation.

- *Remember that technology can be utilized effectively to supplement, not to supplant, the teaching efforts of teachers.*
- *Try to organize and involve an interested and enthusiastic staff group (particularly teachers) in all stages of technology utilization.*
- *Seek to build staff skills in utilizing the technology(s) to be implemented. Support and provide pre-service and in-service sessions and retraining as necessary. This is time and money well spent. Express your needs to teacher trainers and teacher training institutions.*
- *Seek advice from other practitioners utilizing the same technology before adopting/adapting it in your instructional system. Seek the*

assistance of state and national organizations/agencies dedicated to the utilization of technology, including the vendors and sales organizations.

- Be certain to check out the functionality and workability of the technology before linking it to the instructional process. Be certain that it "works," and has a high probability of success.
- Seek ways to show "concrete" results in instructional effectiveness and student change as a result of implementing the technology(s). Show how students' involvement with technology can have effects on their future living, including careers and opportunities in the world of work.
- Look for ways to communicate and share with practitioners in other schools, both rural and non-rural. These are not good days for "reinventing the wheel."
- Try to make available the technology as near to the regular learning situation (e.g. the classroom) as is feasible and appropriate, rather than as a "pull out" activity.
- Avoid fragmentary approaches to curriculum development in introducing technology(s). Try to make the implementation a school-wide, if not a district-wide effort, and a part of orderly curriculum development.
- As Wells has so aptly written, "Start small. Build slowly. Incremental growth you can manage; instant sophistication is risky. Success, not glamour, is what counts." (Wells, 1979).
- Be prepared to change and to be flexible in any planning, implementation and maintenance strategies you may employ to utilize technology. Technology grows, changes and is not static.

IV. EXAMPLES OF SUCCESSFUL USES OF TECHNOLOGY

This section of the Guide describes in detail eighteen successful uses of technology in small, rural schools. Subsection 4.1 describes twelve single school/district examples, while subsection 4.2 describes six multi-district examples. Finally, subsection 4.3 includes site descriptions of all projects/programs that responded in the course of this project. Lack of inclusion in the expanded subsections is not in any way indicative of "less-worthy" projects. Selections were made on a number of different bases, as follows:

- Balance of geographical location and type of technology;
- Evidence of local education agency interest and support;
- Longevity of the program (with preference given to those programs beyond the first year of operation);
- Utilization of technology in instruction rather than in administration or support services;
- Evidence of cooperative/collaborative effort(s) involving more than one rural school/school district; and
- Amount of information provided by the site.

4.1 SINGLE SCHOOL/DISTRICT EXAMPLES

This subsection describes twelve single school/district sites utilizing the following broad groupings of technologies (in order): computers (8 sites); video (2 sites); radio (1 site); and telecommunications (1 site).

* * *

PROJECT: MICRO-C INHOUSE COMPUTERS

An "in-house" project run by students and teachers is utilizing a microcomputer center to study the feasibility of microcomputers for school management,

computer-assisted instruction, computer literacy, computer programming, and community service.

This project, which just completed its fifth year, is an instructional outgrowth of a project that initially used computers for administrative purposes. At this time, Ortonville Independent School District, with a total enrollment of 850 students, owns 35 microcomputers and 10 terminals, all available for use through the Microcomputer Center. Ortonville, Minnesota, with a population of 2500, is located near the Minnesota-South Dakota border. The local economy is based upon agriculture and tourism.

The instructional use of computers in this project developed because of teacher interest and demand. Two teachers began using some existing programs, other teachers became interested and usage spread. Teachers in this project are convinced that computer-assisted instruction must be integrated into conventional classroom instruction. Presently first through sixth grade classes are using student written programs for drill in arithmetic, spelling, and phonics. In addition, the computers are used in math, German, and model-office classes, for data processing, and for special education.

Project staff found that as awareness of computer instruction capabilities grows, teacher use accelerates along with a need to schedule equipment, provide special assistance in operating equipment, and write instructional programs requested by classroom teachers. In order to integrate microcomputers with the conventional curriculum, it is important to provide physical accessibility of hardware in the classroom and create computer-assisted lessons tailored to the needs of individual teachers. Consequently this project maintains a microcomptuer center staffed by a full-time teacher and four student aides.

The problems encountered by this project have been few, but are similar to

other projects attempting to use computers for integrated instructional purposes, that is the availability of appropriate software. Overall, teachers in this project have been dissatisfied with commercial software. Consequently much of the software has been developed in the school.

The project has been funded by the Minnesota Council on Quality Education at $40,000 per year for project salaries. Expenditures for equipment have been the responsibility of the local school board. Local support has been very good as evidenced by the financial commitment of the local school board and the interest expressed by parents during open-house events. Participant change has been monitored in only one area to date. Elementary students who participated in the computer spelling program showed higher gains in spelling than the non-computer users.

In summary, staff associated with this project think the use of micro-computers is new and exciting, has helped students, and has the potential of helping them even more in the future. Keeping pace with the rapidly changing technology is seen as a distinct challenge.

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* * *

PROJECT: ACADEMIC EQUITY FOR RURAL SCHOOLS

A variety of self-instructional resources are utilized in a learning center environment managed by a learning facilitator to provide expanded curricular offerings to students in grades 7 to 12.

Littlefork-Big Falls Public Schools is a consolidated school district serving several small communities in Koochiching County, in Northern Minnesota

near the Canadian border. The total district enrollment is 600 students in two elementary schools and one (grades 7-12) high school. The population of Littlefork proper is 800, the population of Big Falls is 500, and the surrounding rural population is estimated at 1,200. The economy of both communities is based predominantly on forestry and the logging industry.

The learning center itself is a small classroom that has been remodeled to fit the needs of its users. The "center" is equipped with 14 carrels, computers, and a conference table. In this center approximately 150 students are served per year, choosing self-instruction in some 50 different courses. The courses are delivered entirely by means of video tapes, traditional audio visual media, correspondence courses, and computers.

Coursework in the learning center is managed in a very systematic fashion. First the student chooses to use the center to satisfy a personal educational goal (i.e. special interest, remediation in basic skills, alternate learning methods). The next step is diagnostic, to determine the reading level, math skills, and preferred learning style. This is followed by training and orientation in self instruction and the development of a learning contract by the student. The information regarding the student is then matched as well as possible with the appropriate educational resource.

With course implementation the students are scheduled into the center as they are scheduled into regular classes. Daily records are monitored by the manager and formal weekly consultations are required. The final phase is an evaluation and data collection phase.

The project began in the school year 1978-1979 as the result of the efforts of a guidance counselor who found too few course choices available for the high school students. The project was funded for three years by the Minnesota Council

on Quality Education at $80,000 per year to test a program to provide academic equity for students in small secondary schools. Initially it was thought that technology alone would be able to provide the self-instructional resources. However, as the project evolved it became apparent that at the present time there is not enough appropriate software available. Consequently correspondence coursework augmented with a variety of technologies now forms the backbone of eighty percent of the offerings. While usual high school correspondence courses have a fifty percent completion rate, those at Littlefork have a ninety-five percent completion rate. Presently the project uses microcomputers for instruction and management, a PLATO off-line computer for basic skills, video tapes, audio tapes, and programmed instruction as appropriate.

For the school year 1981-82 the center was supported entirely by local funds with $38,000 budgeted by the local school board. Six to eight thousand dollars was needed for resource replacement, the remainder for staff and administration.

Local support for the project is evidenced by the financial commitment of the school board. In addition, the majority of the teachers now accept the project and utilize the resources for various purposes. (Initially approximately one-third of the staff opposed the project.) Community support is being developed by way of an advisory committee, and most importantly, the students themselves are very supportive of the project as was indicated by a student survey reported recently to the school board. All formal evaluations of student gains while taking coursework in the center indicate gains equal to or greater than anticipated, based on past performance of those students.

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PROJECT: COMPUTER ASSISTED INSTRUCTION (CAI)

Eight computer terminals, linked to a statewide time sharing system are bringing additional computer-assisted instruction in reading and language arts to approximately 140 students in grade 6 and to special needs/handicapped students in grades 6-8.

At Smyrna Middle School, Smyrna, Delaware, eight teletype computer terminals are linked to a time-sharing system, Project Direct, in Wilmington. Students are pulled out of their regular schedules for daily, ten-minute computer assisted instruction in basic skill areas of reading and language arts. The total K-12 enrollment of the Smyrna School District is 2,735. Smyrna, a rural community of about 5,000, has economic bases in agriculture, agribusiness and small businesses. Some residents commute to such larger cities as Wilmington and Dover for work.

The first computer terminal was installed at the Smyrna Middle School is 1974, but the CAI project has been in operation for two years. The implementation process was begun with a Title IVC grant proposal, initiated by local school personnel, and approved by the Superintendent of Schools and a funding request by the School Board. Current funding is fifty percent state and fifty percent Federal. Current costs to support the eight terminals in the Project are about $3,000 per terminal on a two-year leasing arrangement, including (time-sharing) telephone lines. The system will be expanded to thirty-two (32) terminals within one elementary school next year, reflecting a long-range goal to provide computer capacity such that every student will have one hour per day of computer usage by 1998.

Student interest in the project is high, while teacher interest is mixed. Student, teacher and parent interest have been enhanced with PTA presentations, Open House, newspaper articles, photos, essay contests, letters, a Computer

Fair, and monthly mailings. In addition, support among parents has been increased by using a computer paper terminal, which has allowed students to bring home the output associated with computer-assisted instruction. Advantages of the computer-assisted instruction, noted by students, include ability of a student to work at his/her own pace, ability to program the computer to teach what you want to learn, and ability to "shut off the computer when you are done." Other student comments include that the computer is very patient and never is angry, offers encouragement to try again, and provides a percentage point at the end of the lesson in writing which is always readable.

First year evaluation of student achievement was inconclusive, but is predicted that the current year's testing, utilizing the California Achievement Test and the Iowa Tests of Basic Skills, will document achievement in the basic areas of reading and language arts.

Major problems which have been encountered by the project related to its being too small scale, that CAI needs to be integrated with overall instruction and not as a "pull out" arrangement, and fear of change, reflected in the attitudes of adults within the school district.

Current plans are to continue and to expand the Project throughout the school district, working toward the (1998) long range goal stated above.

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PROJECT: LITTLE RED RIVER JOURNAL

A computer-based type-setting process is being utilized to publish the Little Red River Journal, a community weekly newspaper, as a School-Based

Development Enterprise.

Students in grades 9-12 at the Pangburn School, Pangburn, Arkansas utilize a computerized type-setting process to publish the Little Red River Journal, the first newspaper Pangburn has had in over sixty years. This School-Based Development Enterprise, a concept developed and supported by the Arkansas Community Education Development Association, was put in operation on September 16, 1981, with 100 subscriptions, and now has 500 subscriptions being mailed to the community as well as to several other states and countries. A twenty-person Advisory Council determined the need for the project. The Mott and Rockefeller Foundations have provided a $14,500 grant for three years. Expected subscriptions by the end of the first year of operation will be 750, and the project is expected to be self-supporting.

Pangburn is a community of 670 people, with an agricultural economic base and one factory. The project involves grades 9-12. Pangburn School, which serves an area of 131 square miles, has a K-12 enrollment of 630.

Presently, fifteen students are invovled in publishing the Little Red River Journal, which will continue to be published weekly year around. Students can receive credit in creative writing as part of their involvement in publishing activities. The computerized type-setting process is also a word processor, enabling a relatively simple paste-up operation, the making of a negative, and web-press printing, following the lithography process. There is also interest in expanding to include photography and photographic lithography. Students are also interested in conducting interviews, writing on school-related topics and technological topics, as well as in photography. The paper has been whole heartedly accepted by the general public both within and beyond the county. Pangburn School plans to continue and to expand the Project. The Superintendent

of Schools is the Project Overseer, and a Project Director/Editor works with the day-to-day operation.

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* * *

PROJECT: LIVING AND LEARNING WITH COMPUTERS

This Project is providing a computer literacy program for seventh grade, independent study in computer programming for grades 7-12 (with credit as a high school course), and a special enrichment program.

Students in grades 7-12 at Clinton Prairie Jr.-Sr. High School, Frankfort, Indiana are being offered learning opportunities in computer literacy, independent study (with high school credit) and special enrichment programs at the Junior High level. Clinton Prairie Jr.-Sr., High School has an enrollment of about 500 at the grades 7-12 level, with an enrollment of 1,000 students K-12 in the entire district. Frankfort, a community of 15,000 population in Clinton County (32,000 population) depends, for its economic base on agriculture (25%) and industry and business (75%). Clinton Prairie is one of four county and municipal school systems.

The project was begun in 1979 with the ideas and support of the Media Specialist, and now utilizes 15 computers. Factors in the growth of the project have been the recognition of the need for local improvement in teaching-learning capabilities, the involvement of teachers in the developmental activities, and hard work on the part of the Director of Media Services. Living and Learning

with Computers is a three-part program. It is:

1) A (computer literacy) nine-week mini-course for all seventh grade students;

2) An independent study program for beginning and advanced programmers; and

3) A teacher training program in use, programming and implementation of microcomputers in education.

In addition, informal instruction has been offered in music, social studies, math, English, science, agriculture, and business, to assist in instruction and for high achiever enrichment.

The nine-week mini-course covers general history and development of computers. past, present and future applications of computers in the home, business and industry, career opportunities in computer technology and related fields. Students also learn how to operate computers, run programs and write programming with a few BASIC commands and instructions. A locally-developed text is used to teach the course along with several commercial and locally-produced computer software items. The course is taught in a self-contained classroom equipped with computers. The computer lab is often utilized as well.

Independent Study is offered to all students regardless of whether they have had the Living and Learning with Computers course. Students having had the basic course take a mastery pretest and then proceed through a series of learning packets which explain and give examples of different programming instructions, editing features and special capabilities available on the computers. Students are allowed to learn about and use the many peripheral devices, which have been installed on the computers, during their independent study experience. Beginning in the 1981-82 school year, a computer science course that will earn credit has been offered for interested high school students.

The teacher training program recognizes that the successful integration of computers into educational processes mandates that the teachers be involved in

the implementation process. Through individual orientation and Saturday workshops, adult fears of this new technology are overcome. The teachers then get a crash course in computer operation as well as lessons in the basic BASIC programming. New software is designed for teachers' needs in the educational processes. Well over half of the staff members have attended the workshops and use computers in some aspect of their teaching. Uses thus far have included testing, drills, tutorials, record-keeping, class grade averaging and the preparation of mailing lists, activity sheets, and special forms.

Funding for the Project has been provided via the Indiana Department of Public Instruction, as an ESEA Title IV-C project. Yearly costs are about $50,000, including 15 computers, 6 printers and all peripherals. Four types of materials have been produced by the project for dissemination, as follows:

1) Living and Learning with Computers text;

2) Activities, tests to accompany text;

3) Independent Study Packets; and

4) Teacher Training Materials.

Students in the nine-week computer literacy course have been pre- and post-tested over general concepts and specific operations and programming terminology. The average increase in learning for these classes has been 38% with only a ten percent loss of knowledge over a year's time, as indicated by a sample group's additional testing. Teachers who have used the computer in their teaching have appreciated its availability in the classroom as an addition to other teaching activities, including the textbook. An example of a computer simulation used in a Social Studies course is the (decision-making) simulation, "Oregon Trail." Clinton Prairie Jr.-Sr. High School plans to continue the project next year, with increased staffing to be devoted to the

Computer Management Development System.

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* * *

PROJECT: PROJECT REACH (RAISING EDUCATIONAL ACHIEVEMENT BY CHANGING HORIZONS)

Various forms of educational technology are being utilized in a gifted students advanced studies program for grades 8-12.

Twenty-one gifted students, grades 8-12, at Calhoun County High School, Grantsville, West Virginia, are being introduced to computers, educational television, video/audio tapes, telecommunications systems, and programmed instruction, as they are scheduled, on a yearly basis, as part of advanced studies, as well as college and career preparation. Some elementary students, as well, are benefitting from the utilization of these technologies. Calhoun County High School has an enrollment of 750 in five grades, and Grantsville has a population less than 800, with an economy based upon timber, oil and gas production, owned and operated by large national corporations.

Project REACH began in 1979. The motivating force was a West Virginia mandate to serve gifted students. It has been financed by County school funds, West Virginia funding for the Gifted, Title IV-C Disadvantaged Grants, and a 95-561 Title IX Disadvantaged Grant. The total yearly grants received approximate $5,000. The Supervisor for Special Education has been a source of support, and a Teacher/Program Facilitator is also instrumental on a daily basis. Project changes have been based on experience in implementation and development.

Among the other facets of the project, gifted students are scheduled

"right in" to Project REACH activities, as an "Advanced Studies" class on a daily basis. Computers are used to teach programming, computer literacy, for computer assisted instruction and for classroom management. Educational television programs and video tapes are utilized in the curriculum, in daily modules, and in individual projects. Programmed instruction and audio tapes are used in group activities on related subject matters, e.g., a telelecture from N.A.S.A. In addition, a (one day per month) workshop/seminar/field trip, in such fields as photography and astronomy, sometimes using resource persons, is also provided.

Since Project REACH is a Gifted Program, total acceptance by other students and school staff does not exist. However, interest among parents and student participants is high. They are excited and the school administration is usually supportive in attempting to meet special needs of the gifted students. Its supporters recognize the project as vital in developing specialized programs to help gifted students develop their abilities, utilizing technologies for advanced studies. The project is viewed as an excellent source of opportunities not usually in the school program, and an effort which deserves to be continued. Major obstacles cited have been the high cost per student as well as lack of community/regular classroom teacher/peer support for the project.

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or
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* * *

PROJECT: Banks Electronics-Computer Program

This program is a coordinated junior high-high school electronics-computer

program that prepares students who complete the sequence to enter either the community college electronics-computer courses at an advanced level, or to enter the local electronics-computer industries at an advanced training level upon their graduation from high school.

Banks School District in northwest Oregon is a small, rural district of about 1000 students that is attempting to keep pace with the electronic age. Although Banks is a small agricultural-based town of about 500 people, it is located within easy commuting distance of such electronic companies as Intel, Tektronics, Hewlett-Packard, and many others. Thus it seemed appropriate to a junior high school science and electronics teacher to begin offering an elective electronics course to junior high students five years ago.

The first electronics class was small, but the following year enrollment was much larger, and the interest seemed to be growing. Several local electronics-computer industries suggested changing the scope and focus of the course to a computer-oriented program. A local foundation provided some grant money and in its third year the program added three computers and some support equipment.

At this point several high school teachers realized they would need to accommodate entering high school students who already had some computer skills. Consequently a coordinated junior high-high school program was developed. Assistance in planning the curriculum and the equipment choices came from the Portland Community College, the Oregon State Department of Education, Portland State University, the National Science Foundation as well as the electronics-computer industries.

Now completing its fifth year, the program has 17 desk top computers, 5 with disk drives, 3 printers and other related equipment, and appropriate audio and video tapes available in a single computer resource room. In addition, 4 computers are in use in the elementary school with 9 more on order.

The program, as it has evolved, begins in the junior high with two one-semester courses. The first quarter of the first semester introduces the student to a basic electronics course with the computer as one of several tools for learning electronics. In the second quarter students are exposed to binary notation, memory storage, computer construction and are then taught to program in BASIC. The second semester offers more advanced programming. The sequence continues in high school where students may enter a three-year electronics course and/or a two year computer programming course.

Financial support for the program thus far has been local, private and state funding. It is estimated that approximately $60,000 has been invested in the program. A long range (five-year) proposal, budgeted at $100,000, has been written to underwrite costs of further program software, and networking efforts.

Local interest in this program has been very high. Media attention has led to statewide recognition through television coverage. Student interest and demand has been the major factor in the growth of the program. (The junior high enrollment was 12 students in the first year and 80 students in 1981-82, just five years later.) Parents have expressed great interest in the program - and many have purchased home computers because of student interest. Presently the computers are also being used for computer-assisted instruction in math, science, business, journalism, and in the elementary classrooms.

Although the program is well-supported by the community and the electronics-computer industry, there have been some difficulties. The rapid advances and changes in computer technology require continual upgrading of curriculum and equipment, which in turn adds costs. Financial limitations and limited appropriate software have also been problematic. However, teacher acceptance has been good and continues to improve. The success of this program has

resulted from the effects of some tireless teacher advocates, supportive administrators, and the local school board.

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* * *

PROJECT: WILLIAMSTOWN HIGH SCHOOL COMPUTER PROJECT

Students in grades 11 and 12 are being provided a two-year course in computer programming, and Accounting III classes are learning to analyze data, utilizing the computer.

Microcomputers as well as an on-line computer are being utilized in grades 9-12 at Williamstown (Vermont) High School, as part of a two-year course in computer programming for juniors and seniors. The computer is also being used in an Accounting III class for analyzing data. The in-school accounts, reports and data processing are also generated, utilizing the same computers. Williamstown, a community of about 1,200 with agriculture and granite quarries as its economic bases, has a school enrollment of 350 in grades 7-12, and a total K-12 enrollment of about 800.

This program was initiated by a teacher who has involved other teachers, the community, and two other elementary school districts within the Orange North Supervisory Union #29. The program was started small (five computers) with a $1,500 Federal Title IVC Minigrant and $600 in local funding. At present, ten computers are being utilized, with 40-45 students participating daily, and a daily student-use capacity estimated at about 70. Most teachers report good acceptance of the project. There have been three successful workshops held, in cooperation with a junior college, which have increased the "computer

awareness" of the teachers, as they learn what technological adaptations are possible. The project has served the gifted and talented students and has been used in association with the school's work study program, with business and industry. Parents have become involved along with the students and are realizing the career and job-related potential(s) of computer literacy. An advisory committee has been formed to tap community resources and to form an Education/Business/Industry partnership for computer literacy and its positive impact on new and existing business ventures.

The Williamstown High School Computer Project has been designed as an exemplary site within the state of Vermont, and as such has received state funds to relieve teachers of part of their normal duties in order that they may help teachers in other school districts. Thus, the teacher who implemented the Project has become a Resource Agent in the Vermont Department of Education Resource Agent Program (RAP). He is bringing the microcomputer to other schools and leading workshop participants step-by-step through its use. He is able to demonstrate various applications of the computer for laboratory simulations, learning games and programming skills, particularly in the areas of mathematics, science, business and social sciences. Any school requesting a workshop only needs to provide the space and electrical outlet.

The project will be continued, since continued support from the Superintendent, School Board, teachers, parents and community appears to result in increased interest and participation.

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* * *

PROJECT: MEDIA NOW

Students in Media Now classes are producing a weekly radio news spot, developing an educational channel on Cable TV, and are producing videotapes, films, slide presentations and radio programs.

Thirty students in two classes per semester (sixty students per year) are experiencing their first year of Media Now offerings at Placer High School, Placer Union High School District, Auburn, California. Placer High School has an enrollment of 1,700 students in grades 9-12, while the entire high school district has an enrollment of approximately 3,000. Auburn, about thirty-five miles northeast of Sacramento, is a community of 7,500, in a rural area of small ranches and fruit-growing agriculture.

Media Now is a production-centered laboratory course of study in mass media knowledge and production techniques that helps students understand and cope with the influence of the mass media. The course is built around the concepts of individualized instruction and "learning by doing." Students are motivated to evaluate, interpret, analyze and better appreciate media forms, and learn how to communicate through them. The Media Now Program has been approved for nationwide dissemination by the Federal Joint Dissemination Review Panel and is listed as an "Educational Program That Works" by the National Diffusion Network, U.S. Department of Education. The Program has a fourfold set of Goals and Objectives:

1) Students will improve their knowledge of mass-media terminology and techniques;

2) Students will demonstrate increased production abilities;

3) Students will decrease their susceptibility to persuasion by the mass media;
and

4) Students will increase their positive attitudes toward media (through increased awareness and understanding of media).

At Placer High School, the emphasis is on media production related to local radio news, an educational channel on local cable television, and on instructional technology. Students are able to acquire immediate practical experience in filming, which appears appropriate, since three national television networks are active in the area. Initially, a student selects two projects on which he/she receives guidance, and ultimately each student completes four different projects, choosing from television, video tapes, films, slide presentations and/or radio programming. Placer High School has accredited the Media Now course for English in association with its three-year English requirement.

The cost of the project for the current year is $6,150 and includes course materials and consummables. An application for a Title IV-C grant has been submitted, to supplement local funding for the project. The project, in its first year, has not yet collected data on local interest and/or participant response or change. However, the attitudes of the media coordinator, administrators and teachers appear good regarding continuation of the project. In-service training of staff, through Chico State College, has been well-regarded by participants. Funding is the only impediment to the continuation and further development of the program. It is being recognized as a unique source of experiences for students, based on a validated national model. Three other schools in the area are also showing interest in the Program.

Contact: Geraldine A. Paulsen
Media Coordinator
Placer High School
275 Orange Street
Auburn, California 95603
(916) 885-4581, Extension 32

or: Ron Curtis
Director
Media Now - Experience Education
401 Reed Street
Red Oak, Iowa 51566
(712) 623-4913 or
(800) 831-5886

* * *

PROJECT: MEDIA NOW

A number of technologies, including educational television, audio tapes, radio, and film making, are being utilized in a course designed for learning about ways in which media are actually produced.

Eleventh and twelfth grade students at Turkey Valley Community School, Jackson Junction, Iowa are learning about media production(s) by actually becoming producers of audiovisual materials and other media forms. Turkey Valley Community School has an enrollment of 350 (grades 9-12), and serves seven rural communities ranging in size from 50 to 600 in population. The local economy is based nearly entirely on agriculture. The program began eight years ago as an experiment with twelve students in one class. One stimulus for growth of the program was increased requests by teachers to utilize the various forms of media produced by the class. Presently, a maximum of five classes, with 10-15 students per class, are being taught. Motivating forces for continuation and expansion of the program have included student interest and enjoyment, as well as the usefulness of the media presentations produced.

Utilizing learning activity packages, students are assigned ten media presentation projects to be produced in a semester, and are left "on their own" to participate in a "hands-on" form of learning, with guidance provided by the Media Now teacher. Modules of the learning activity packages include hardware, production, genre, evaluation, message interpretation, aesthetics, and, finally, presentation.

The yearly costs for the project now total about $800, and are provided by the school's general fund. State and Federal funding has been provided in past years, particularly by way of Title IV B monies, through the Iowa Department of Public Instruction. Other sources of support (particularly for equipment

acquisition) have been from community donations (including former students) and from "scrounging."

Local interest among parents and the community has continued to grow, as evidenced by the increasing numbers of participants in the annual Media Show and increasing enrollments in the adult education Media Now course.

Among student participants, significant gains (as compared with control students) were scored on "awareness of mass media" measures. Teachers in the school report that it is exciting to see students utilizing skills not formerly used, enjoying the experience, and being creative in another form of communication (other than oral). Many "least verbal" students are most successful in alternate forms of communication and media presentation. The program allows independent work, and confers trust and responsibility upon students in a non-classroom learning situation. In summary, the program is viewed as one which recognizes "tremendous areas of untapped creativity and individual differences" among its participants.

The only problems encountered in introducing and implementing the project were in obtaining funding for the purchase of capital equipment, and in the school's and community's becoming accustomed to student use of expensive equipment outside the classroom and school. Plans and predictions are for the project to continue in future years as long as the modest costs for expendable supplies are available on an annual basis.

Media Now - Experience Education, a National Diffusion Network (NDN) validated project, located at Red Oak, Iowa, has provided background materials and "Media Now" Components, including the Teacher Activities Book, the Student Learning Activities Book, the Student Learning Activities Guide, and approximately fifty packages of mediated learning activities.

Contact: Odell Overgaard
A. V. Director
Turkey Valley Community School
Jackson Junction, Iowa 52150
(319) 776-7496

or: Ron Curtis
Director
Media Now - Experience Education
401 Reed Street
Red Oak, Iowa 51566
(712) 623-4913
or
(800) 831-5886

* * *

PROJECT: COMMUNITY RADIO (WOAS-FM)

Community radio is being provided by way of a school's low power, Class D, FM station for a large geographic area by 9-12 grade students, some elementary students, and other community resource persons.

Ontonagon Michigan Area Schools has developed and is operating a community radio broadcasting service, WOAS-FM. Ontonagon is located on Michigan's Upper Peninsula and is a rural community of 1,500 population which is dependent on logging, copper mining, a paper mill and a shipyard as its economic bases. Ontonagon Area Schools, with an enrollment of 328 in the High School, serves a large geographic area, requiring extensive transporation. The Superintendent of Schools was the motivating force for the development of a community radio station, which was actually developed and operationalized by the school's Special Projects Coordinator, and its students. In 1977, the feasibility of constructing an FM station was investigated and an application was filed with the Federal Communications Commission (FCC). In 1978, an FCC construction permit was granted and program testing was initiated. ESEA, Title IV-B, funding was also secured, a tower was donated by the community, and other used broadcasting/transmitting equipment was obtained. WOAS-FM operates as a low-power FM station, with coverage throughout 90% or more of the school district. At present, about 200 students, as well as other school and community persons are involved in the broadcasting operation. The station can be "on

and off" at will, but generally operates during the hours 7:00 A.M. - 4:00 P.M. Monday through Friday during the school year. The station broadcasts local news, public service/public meeting broadcasts, sporting events, and programs in the Finnish language. Learning recipes developed for the Home and School Institute and other parenting/learning programs are also presented. Advantages of the school-owned/operated community radio include: its low cost (about $2,000 per year for insurance, utilities, maintenance and recording subscriptions); its flexibility; its being self-contained; its networking potential; and its ability to reach all areas of the school district. Ontonagon Area Schools has been encouraged to continue the operation of Community Radio - WOAS-FM, with support from the general fund, as an example of a valued "electronic learning" technology.

Community radio is only one of the Special Projects, utilizing technology, in Ontonagon Area Schools. Other technologies include: "Media Now" (A National Diffusion Network program for teaching mass media which utilizes the WOAS-FM facilities); speaker phones; "The Electronic Classroom", a weekly column on technology; the "Electronic Newsletter", a telephone information system; extensive use of microcomputers; and electronic networking.

Contact: Tom Lee
Special Projects/Media Services
WOAS-FM
Ontonagon Area Schools
701 Parker Avenue
Ontonagon, Michigan 49953
(906) 884-4163 or 884-4950

* * *

PROJECT: USING AN ASSOCIATED PRESS (AP) TELETYPE IN ELEMENTARY LANGUAGE ARTS INSTRUCTION

An Associated Press (AP) Teletype is utilized to teach reading skills to students in grades 4 to 6 by means of a daily five-minute radio news broadcast.

Students at Central Elementary School in Caldwell Parish, Louisiana are practicing their reading and language skills and enjoying every minute of it. Central Elementary School enrolls approximately 300 students, with 150 of these students participating in the project. The school enrollment for the entire Parish is about 2,000 students while the total population for Caldwell Parish is approximately 10,000 people. The local economy is based upon soybean and cotton farming as well as logging operations.

In addition to using an AP Teletype, the project utilizes telecommunications, the school intercom, and the single local radio station. Students daily form a news team consisting of anchor, weather, and sports newscasters. Using the information provided by the teletype, they gather, classify, summarize, and prepare for broadcast a five-minute news program. This is presented on the school intercom as a practice and then broadcast on the local radio station. The benefits of the project have exceeded anyone's expectations. Some of the benefits have been: students have worked to improve their reading skills and speech so they will "sound good" on the radio, the daily AP pronunciation guides have stimulated an interest in phonics, and students are interested in current events, the newspaper, and daily national television news broadcasts as an affirmation of their own news selection. In addition, the information has been successfully used in other subject areas such as math and science and the reverse side of the teletype paper is used for art-work in the lower grade levels.

The project was begun in 1981 at the suggestion of a creative writing teacher. The elementary supervisor for Caldwell Parish obtained funding from the State of Louisiana's Special Project Upgrading Reading (SPUR) for a three-year period. The present cost for the rent of the teletype is $2,000 per year. (Project personnel are concerned about a possible increase to $3,000 due to

proposed AT&T rate changes.) Other than the cost, the project operators have experienced no problems in introduction or implementation.

Understandably, parent response has been very enthusiastic since they are able to hear their children broadcasting over the local radio station. In addition, there is evidence of change in the participants as well. Reading test scores have improved since the advent of the project, and an interest inventory indicates that students are doing more reading. The teachers involved think that the students have improved their ability to summarize information, have a greater awareness of the world around themselves and are therefore more informed, and are reading more than in the past because they have immediate motivating feedback. Finally, the enthusiasm of the students has motivated the teachers to be involved and to provide the additional work needed to maintain the success and excitement of the project.

Contact: Clarice Kenney
Elementary School Supervisor
Caldwell Parish School Board
P.O. Box 128
Columbia, Louisiana 71418
(318) 649-2689

* * *

4.2 MULTI-DISTRICT EXAMPLES

This subsection describes six multi-district sites utilizing technologies as follows (in order): video (5 sites); and telecommunications (1 site).

PROJECT: SATELLITE TELEVISION IN THE CLASSROOM

A student built satellite receiving station is used to receive video materials and make them available to eight member high schools either on the air or video taped for supplemental classroom usage.

In early 1981, twenty-four vocational education students and science club members constructed a satellite television receiver at Hall Township High School in Spring Valley, Illinois. The receiving station became operational in the fall of 1981. In order to disseminate the benefits of the added video materials, a voluntary association of eight area high schools, entitled the Illinois Valley Satellite Television Consortium, was formed. Hall Township High School enrolls 500 students in grades 9 to 12. Spring Valley, a small business and agriculture-based community with a population of about 6,000 people, is the largest community and has the largest high school associated with the consortium.

The project is presently utilizing the original satellite-receiving station in operation. Instructional television offerings for supplemental use in foreign languages, vocational education, science, social studies, and the humanities can be used on the air or video taped. It is estimated that the availability of resource materials has multiplied fifty times with the utilization of the station. Much of the material is of excellent quality making it difficult at times to select material for video taping.

The project originated when teachers and students began looking for an idea for a project for the science club. A teacher had read an article in "Popular Science" magazine on building receiving stations using surplus parts. The school purchased two radar outfits, including two transmitters, two receivers, and four satellite dishes, for a total of $100 from a federal surplus agency. The equipment was tube-type while those involved in the building preferred to use printed circuits and solid-state equipment. Consequently a good deal of equipment modification was needed. Ultimately the entire station cost approximately $4,000 plus about 150 hours of student and teacher time.

Teachers, local administrators, and students have been very enthusiastic about the project. French and Spanish teachers have been particularly enthusiastic because they have access to foreign language broadcasts that make it possible for students to have the "next best thing" to being in the country where the foreign language is spoken. French programs are received from Canada and Spanish programs from Mexico. Statewide and national publicity has been extensive and has heightened local support.

Area teachers are currently involved in a joint project funded by Title IV-C and Title II of Public Law 94-482 to improve the utilization of the materials available. Anticipated outcomes include: teaching staff inservicing, resource guides, refinement of programming materials, procedures for implementation elsewhere, and an evaluation of the project.

Contact: Walter Westrum
Superintendent
Hall Township High School
800 West Erie Street
Spring Valley, Illinois 61362
(815) 664-2100

PROJECT: TWO-WAY CABLE TELEVISION INTER-CONNECTING EIGHT RURAL SCHOOL DISTRICTS FOR EDUCATIONAL PROGRAMMING AND PROJECT CIRCUIT

The Western Wisconsin Communication Cooperative (WWCC), a two-way cable television network that interconnects eight rural school districts and Project CIRCUIT (Curriculum Improvement Resulting from the Creative Utilization of Instructional Television) are attempting to expand and enhance curricular offerings.

Students in grades 9 to 12 in Trempealeau County, Wisconsin have increased curricular offerings today because of a commitment made by eight school

districts in 1972. In that year the Western Wisconsin Communication Cooperative was formed and plans begun for the building of a two-way cable televison network. Two-way broadcasting for instructional purposes began in 1979. The districts involved in the network are: Arcadia, Blair, Eleva-Strum, Gale-Ettrick-Trempealeau, Independence, Osseo-Fairchild, Taylor, and Whitehall. The districts range in enrollment size from 250 students to 1400 students, with a total of 2,000 students in grades 9 to 12 in the entire County. Trempealeau County is about 60 miles long and 26 miles wide, has a rugged topography, and is almost entirely agriculturally based (it is estimated that the cattle to people ratio is 6:1).

The project was inspired by a desire on the part of the schools to improve the quality of life in a very rural area through improved school offerings. In addition, the area already had many successful applications of cooperative efforts in operation, and thus the concept of a cooperative for two-way instruction was readily acceptable.

Funding for the project has come from three major sources. The cooperative contracted with the FmHA for a long term (15 year) loan. The districts are presently in their third year of payback on the loan at $9,000 per district/year. The second source of funding was a sizeable grant over a four year period from the W.K. Kellogg Foundation. The third major source has been a Title IV grant totaling $200,000 over a three year period for Project CIRCUIT. Major goals of Project CIRCUIT relate to improving the utilization of the television technologies that are now in place.

The WWCC system consists of 133 miles of trunk cable for its television system. The cable system connects the schools in an east-west mode on the width of the County. The cable system is augmented by microwave transmission

from three points along the north-south length of the county. Of the 36 channels available on the system, 19 channels are presently in use. Ten entertainment channels, along with a community access channel from the Whitehall Court House Studio, are available to WWCC subscribers. The eight remaining channels are used by the eight school districts to provide a full two-way cable television service between them. The WWCC is owned and operated by its cooperative members. Equipment on-site at each school is owned by that school district.

In the school year 1981-82, four complete courses were offered via instructional television. It is anticipated that the number of course offerings will increase to seven in the following school year. Foreign languages have been the major additional classes.

The major problem encountered by the project was the great length of time needed to put the technologies in place. Many teachers became discouraged and lost interest in the seven years between inception and completion of the installation. Teachers who teach via television are voluntary and self selected. They find that teaching somewhat more demanding and suffer some anxiety associated with being "on the air." Present evidence would indicate that students are learning as well as in regular classes. Ability to learn pre/post tests indicated students continue to do as well with instructional television. Project officials think four to five years will be needed to determine if the project is cost effective.

Contact: Ellworth Beckmann
Director Project CIRCUIT
Osseo-Fairchild High School
13th and Francis Streets
Osseo, Wisconsin 54758
(715) 597-3141

* * *

PROJECT: COMMUNICASTING FOR EDUCATIONAL PURPOSES

Two-way simultaneous live instructional learning via low power television (LPTV) is used to provide students in several school districts expanded high school course offerings.

This project, which became operational in the Fall of 1980, is in effect one of the smallest working television networks in the nation. The three school districts involved operate under Standby Temporary Authority from the FCC to broadcast low-power television (LPTV). The three school districts involved are Eagle Bend, Bertha-Hewitt, and Clarissa, Minnesota. School enrollments for the three districts in grades 8 to 12 range from 175 to 210 students, the community populations range from 550 to 600. All the communities are largely agriculturally based.

The primary-site studio and broadcast equipment is located at the Eagle Bend School. Each school site is equipped with a broadcast tower, color monitors, and the equipment necessary to both send and receive television signals. Eagle Bend utilizes an Ultra High Frequency (UHF) channel with a broadcast range of approximately twenty miles. The UHF is transmitted to a local translater which picks up and retransmits or boosts the signal. The remote sites (Clarissa and Bertha-Hewitt) receive the transmission as they would any commercial station. Students in the remote sites can see and hear the primary site; the primary site teacher is able to see and hear each of the remote sites plus the image being broadcast on classroom monitors. If a class originates from one of the remote sites, it is broadcast via microwave, converted back to UHF at the primary site, and rebroadcast simultaneously. Thus teachers at the remote sites must depend upon the judgement of the station operator in Eagle Bend to switch from one location to another or must ask for a particular image.

Remote site teachers can hear what is occurring in all three sites but can only see the image currently being broadcast.

The project began in response to three motivating forces: limited curricular offerings for the high school students, the threat of forced district consolidations, and economic conditions, particularly those associated with expensive transportation. A Joint Powers Board, comprised of two elected school board members from each district, was established as the project's governing board. In addition, the three superintendents serve on an advisory committee designed to provide advice and counsel to both the Joint Powers Board and the Project Director.

During the 1981-82 school year, four classes were taught via LPTV: German I, Art, Mass Communications, and advanced math, and served a total of 42 students.

The problems encountered by the project have been largely "people" problems rather than equipment problems. All programming, including the two-way televised classes, is theoretically available to anyone with a television within the station's broadcast range. This potential alone has created a great deal of teacher anxiety. In addition, teachers report they would welcome involvement if their concerns were considered and if they were allowed to provide input regarding the way the project is run. Administrative staff in the three districts have been unanimously supportive of communicasting, and the student participants have seemingly adjusted quickly and easily to the televised instruction. Because of FCC regulations, the station must also provide some standard one-way broadcasting. Normal broadcasting hours during the school year are 12 hours of programming and 6 to 8 hours per day during summer vacation. The project utilizes some educational tapes for a portion of this time, but has come to

depend largely upon many local adult volunteers to provide much of the programming. A recent recognition credited 240 people, both adults and students, who had helped with broadcasting in some manner in the past year.

It is estimated that hardware to equip the three sites cost approximately $125,000. Title IV-C program funds have supported the project for three consecutive years at an aggregate amount of $118,000, and the Minnesota Council on Quality Education has provided funds over two years totalling $115,000. In addition, grant support has been generated from a variety of private sources.

Contact: Richard Lundgren
Project Coordinator
Eagle Bend School District
Eagle Bend, Minnesota 56446
(218) 738-6261

* * *

PROJECT: TWO WAY INSTRUCTIONAL TELEVISION

Two-way instructional television via microwave closed circuit transmission is used to provide courses or classes in four small rural schools for which the schools could not afford staff.

Interactive television is helping four southeast Iowa school districts maintain a diverse curriculum for their high school students. The school districts involved are Wapello, Morning Sun, Winfield-Mt. Union, and Wayland-Crawfordsville-Olds (WACO). The K-12 enrollments of these school districts range from 890 students in Wapello to 260 students in Morning Sun. Wapello is the largest community (population 3,500) and Morning Sun the smallest (population 1,300). The area is largely agriculturally based; however, some residents commute to larger industrial communities as well.

This project was conceived by the administrators of the four districts as an alternative to further consolidation and prohibitive transportation costs

in a broad geographical area. Two-way television was perceived to be the "next best thing to being there," and microwave transmission was chosen since it was less expensive than cable. Construction took place in 1979-80 and Two-Way Instructional Television (TWIT) became operational in October of 1980.

The project was basically funded by a $250,000 Title IV-C Grant through the Iowa Department of Public Instruction. The engineering firm responsible for the construction estimated that costs could vary from $25,000 to $60,000 per school depending upon the number of schools involved, the distances between schools, wiring and cable requirements, ancillary equipment, and site variables. The TWIT equipment transmits about 15 miles with a power of 50 milliwatts. Each school is capable of broadcasting a class or receiving a class. When broadcasting a class, the instructor will see the other three classes on a split screen monitor and has live audio. Each school is also equipped with facsimile machines for movement of tests and paper. The same modems will soon be used for connecting microcomputers to the microwave system. Most audiovisual equipment, such as projectors and record players, are used on the air just as they would be used in any other classroom. Even motion picture projections transmit well.

Despite all its capabilities, TWIT has had problems, both "people" problems and technological problems. Acoustic feedback, room echo noise, and antiquated wiring systems were some of the early technical problems. More recently, lack of spare parts for repairs and lack of readily available technicians have caused some schcols to be "down" for long periods of time. This in turn has caused teacher discouragement. In addition, this project was an admitted "top down" project with teacher involvement and inservicing a late development. Initially teachers were fearful of the technology, particularly as they perceived

it as impersonal teaching and as a potential replacement for teachers. More recently, those directly involved with the project have been enthusiastic and have developed a small student handbook describing the technology to the students, as well as the potentials and limitations of taking a class via television.

The effectiveness of the project is probably best measured by the fact that some schools are receiving classes they never offered before. This past year (1981-82) 125 students were enrolled in precalculus, creative writing, anatomy and physiology, and four levels of Spanish. No formal evaluation of participants has been conducted. GPAs have not suffered because of student participation in the program. The students are self-selected and are assumed to be independent and responsible.

Currently all indicators would strongly suggest continuation of the project. The upkeep costs have been very minimal. The cooperation among the four districts has been excellent and one of the major reasons for success thus far. Finally, the parents and public have been very supportive as a result of good publicity efforts such as open house events.

Contact: Francis R. Davis
Superintendent
Morning Sun Community School
Box 129
Morning Sun, Iowa 52640
(319) 868-7701

* * *

PROJECT: THE LETTER SHOP

The Letter Shop is designed to help kindergarten and first grade children develop pre-reading skills in the areas of alphabet readiness, auditory discrimination, and visual motor coordination.

Vincennes Community School Corporation has developed an Indiana Title IV-C Project which is being used in 65 other Indiana School Corporations, serving about 16,000 students. Most of the communities being served vary in population from about 2,000 to 10,000, with K-12 enrollments varying in size from 900 to 11,540. Most of these school corporations are in rural communities which have an agricultural and/or industrial economic base.

The Letter Shop's target area is beginning reading and its target group is all students, grades K-1. The Letter Shop can be integrated with other letter programs and act as a reinforcement skills program, or it may stand on its own as a total letter program, using puppets, music, dramatization and drill using 32 half-hour video tapes, including 26 tapes on the alphabet, 5 readiness tapes, and one parent introduction tape. Also included in the Letter Shop Kit are a Teachers Guide (one per teacher); games; cassette of Letter Shop music, hand puppets; and a special learning packet.

Adopting school corporations must be willing to release teachers for in-service training. The Letter Shop is intended as a supplemental program for use with existing kindergarten curricula. Teachers may use the program to reinforce those programs already being used. Adopting school corporations should be committed to regular Letter Shop usage in order to gain the high student achievement results made possible by the program. Adopting schools need a video tape recorder and a television monitor or need to make arrangements with a local PBS television station for broadcast of the tapes.

Costs to produce a Letter Shop Kit are $600, with an optional $2.25/student replacement cost. The Project is in its seventh year. Effectiveness testing results, utilizing the Iowa Basic, have documented significant gains. The children relate well to the material both in small and large groups (e.g.

15-20 students or greater than 60 students). The tapes provide humor for both children and adults and hold the interest of participants. The Letter Shop is flexible and may be used in more than one setting, both for initial reading and/or for supplementary reading. The tapes may be used and enjoyed by classes beyond the first grade, and in learning disabilities/special needs areas.

The project was presented an Award in 1980 for most outstanding achievement by the Indiana Council, International Reading Association, has Indiana State validation and is seeking national validation. Additional Title IV-C monies in Indiana have been provided for replication/adoption for 100 additional Letter Shop Kits, which will increase the school population to be served to 25,000. The only potential problem now or in the future appears to be the funding needed to replicate and to adapt the project for target groups both within and beyond Indiana.

Vincennes Community School Corporation has also developed another Indiana Title IV C Project, called Featherby's Fables, which is designed to help first and second grade teachers in motivating children during the initial teaching of science. It is currently being field-tested within learning situations, impacting about 200 students, in a group of Indiana School Corporations.

Contact: William Hopper
Project Director/Principal
Vincennes Community School Corporation
2116 North Second Street
Vincennes, Indiana 47591
(812) 882-8458 or 882-9256

* * *

PROJECT: MONTANA EDUCATIONAL TELECOMMUNICATIONS SYSTEM (METS)

This project involves a statewide audio teleconferencing network, using both dedicated and Meet-Me (Pots) lines, to interconnect educational providers

and receivers in isolated, rural areas.

Live interactive audio with occasional computer networking is being utilized to provide programming to small, rural, isolated educational institutions and communities in Montana. The project is housed at Eastern Montana College, Billings, Montana and presently serves 47 sites, both schools and other community agencies. Sites are subscribers on a voluntary basis; the site must be furnished and financially supported by the local community. Programming can originate from any site on the network and networking can accommodate 5 to 45 sites simultaneously.

Planning for this project began in 1977-78 when administrators at Eastern Montana College viewed telecommunications as the only feasible means of providing educational programming to a large portion of Montana as had been mandated. The project became operational in 1979. Project staff have worked with communities that elected to participate.

Educational offerings are available at all levels including junior-senior high school courses, college courses, both graduate and undergraduate, and inservice coursework for teachers K-12. Video tapes and printed material are used as supplements to instruction. In addition, statewide educational meetings are being held via the system, thus eliminating expensive and time consuming travel. The only major problem encountered thus far has been occasional poor quality of telephone service.

The Control Center with station and networking capacity is owned by the project and staffed by three full-time positions. The dedicated system was designed, implemented, and maintained by Mountain Bell. Community support and enthusiasm for the project has been very good. State support will undoubtedly be needed in the future, as in the past, because user fees cannot cover the costs.

Contact: Maureen Jewell
M.E.T.S. Director
Eastern Montana College, Box 32
Billings, Montana 59101
(406) 657-2254

* * *

4.3 RESPONDENT SITE DESCRIPTIONS

Following is a descriptive list, by state, of all projects/programs which responded to a Request for Information in the performance of A Project on Uses of Technology in Rural Schools. Included for each respondent site are a project title, elementary/secondary grade(s) served by the project, type(s) of technology utilized, and name/address/telephone number of the Project Contact Person. The following key indicates the type(s) of technology utilized at each site, included in parentheses on the third line of each description.

1 = Computer
2 = Educational T.V.
3 = Radio
4 = Videodisc
5 = Audio Tape
6 = Telecommunications System
7 = Programmed Instruction
8 = Other (specified)

ALABAMA

STAT SAT
Post-Secondary
(8: Satellite TV Receiver)
Glen Gleaves
Director of Foreign Language Lab
322 Humanities Building
University of Southern Alabama
Mobile, Alabama 36688
(205) 460-6292

ALASKA

INDIVIDUALIZED STUDY BY TECHNOLOGY
(7-12)
(1, 5, 8: video tapes)
Ed Obie/Paul Berg
ETA Program Manager, Alaska Dept. of Ed.
ETA Project, Pouch F, State Office Bldg.
Juneau, Alaska 99811
(907) 465-2887

EDUCATIONAL TECHNOLOGY PROGRAM
LEARN ALASKA NETWORK
K-12
(1, 2, 5, 6, 7)
William J. Bramble
Office of Ed. Technology & Telecommunications
Alaska Department of Education
Pouch F
Juneau, Alaska 99811
(907) 465-2887 or 465-2886

ARIZONA

COMPUTER LITERACY
Grades 4-12
(1)
Bruce Eldredge
Project Director
Prescott Unified School District No. 1
P.O. Box 1231
Prescott, Arizona 86302
(602) 445-5400, Extension 251

ARKANSAS

LITTLE RED RIVER JOURNAL
Grades 9-12
(1)
Jerome Browning/Ray Raines
Pangburn School District
P.O. Box 68
Pangburn School
Pangburn, Arkansas 72121
(501) 728-3513 or 728-4511

RADIO BROADCASTING
Grades 10-12
(3, 5)
Pat Sullens
Cave City School District
P.O. Box 8
Cave City, AR 72521
(501) 283-5331

CALIFORNIA

TELEMATH
Grades 3-6
(1)
Terry Kneisler
West Side Union School District
1201 Felta Road
Healdsburg, CA 95448
(707) 433-3923

BASIC SKILLS LEARNING CENTERS PROJECT
Grades 1-6
(7)
Vivian Orange, Project Manager
Division of Resource Services
SWRL Educational Research and Development
4665 Lampson Avenue
Los Alamitos, California 90720
(213) 598-7661
(714) 821-7790

MEDIA NOW
Grades 9-12
(2, 3, 5, 6, 7, 8: individualized)
Geraldine A. Paulsen
Media Coordinator/Project Director
Placer High School
275 Orange St.
Auburn, California 95603
(916) 885-4581, Ext. 32

COLORADO

TEST-EASE
SOFTWARE LIBRARY
VIDEO TAPING PROJECT
ACTIVATED CURRICULUM DEVELOPMENT
K-12
(1, 2)
R.W. Bill Brown
San Juan Board of Cooperative Services
201 - 12th Street
Durango, Colorado 81301
(303) 247-3261

COMPUTERIZED CARD CATALOG
Grades K-6
(1)
Betty Costa
Library Media Specialist
Mountain View Elementary
12401 N. Perry St.
Broomfield, Colorado 80020
(303) 466-1791

CONNECTICUT

NATIONAL COMPUTER CAMP
Grades 5-12
(1)
Michael Zabinski
Director
National Computer Camp
P.O. Box 624
382 Hitching Post Drive
Orange, Connecticut 06477
(203) 795-3049 or 795-9089

REGIONAL IN-SERVICE EDUCATION (RISE)
Grades K-12
(1)
Peter H. Martin
Director, Project RISE (Regional Inservice Education)
Project RISE
Halls Hill Road
Colchester, Connecticut 06415
(203) 537-2117

MATH DRILL AND COMPUTER LITERACY
Grades K-6
(1)
Beverly B. Tappan
Principal
Scotland Elementary School
Brook Road
Scotland, Connecticut 06264
(203) 423-0064

DELAWARE

COMPUTER ASSISTED INSTRUCTION (CAI)
Grades 6-8
(1, 6)
Larry Koppenhaver
Supervisor of Special Programs
Smyrna School District
22 South Main Street
Smyrna, Delaware 19977
(302) 653-8586

FLORIDA

PRE-VOCATIONAL COMPUTER EDUCATION
Grades 6-8
(1)
Elaine Lane
Curriculum Coordinator - North Marion M.S.
Route 1, Box 192
Citra, Florida 32627
(904) 622-3111

GEORGIA

MOBILE EDUCATION PROGRAM
Pre-Service Post-Secondary
(2, 8: video tapes)
Anita Garner
Coordinator
Mobile Education Program (Gainesville Junior College)
Mundy's Mill Road
Gainesville, Georgia 30501
(404) 536-5226

IDAHO

COMPUTER SCIENCE
Grades 8-12
(1)
Nolan D. Mecham
Principal, Snake River High School
Route 5, Box 14
Blackfoot, Idaho 83221
(208) 684-3061

MATH INSTRUCTION IN BASIC SKILLS (MIBS)
Grades 4-6
(1)
Dale B. Golis/Cindy Moore
Principal/Director
McDonald Elementary School
2323 East D Street
P.O. Box 8459
Moscow, Idaho 83843
(208) 882-0228 or 882-1120

RETRIEVAL SYSTEM OF IIP's
Grades K-12
(1)
Lois E. Boyd Samuelson
Consulting Teacher
Moscow School Dist. #281
410 East Third St.
Moscow, Idaho 83843
(208) 882-1120

ILLINOIS

SATELLITE TELEVISION IN THE CLASSROOM
Grades 9-12
(2)
Walter Westrum/Sherwood Dees (Alternate)
Superintendent, Hall High School
800 West Erie Street
Spring Valley, Illinois 61362
(815) 664-2100 or 664-2291

RURAL HEALTH OCCUPATIONS PROJECT
Grades 11-12
(5, 8: slides)
Arch Lugenbeel
School of Tech. Careers, SIU
STC Bldg., Room 18E
Carbondale, Ill. 62901
(618) 536-6682 Ext. 252

MICROCOMPUTER CARAVAN PROJECT
K-12
(1)
Jack Teal
Region 18 Career Guidance Center
Illinois Central College
E. Peoria, IL 61635
(309) 694-5151

COMPUTER ASSISTED INSTRUCTION IN K-12
Grades K-12
(1)
John Lowey/Millard Gobon
Arcola District
Arcola C.U. Dist. 306
351 W. Washington, Arcola, IL 61910
(217) 268-4963 or 268-4962

FIVE COUNTY REGIONAL VOCATIONAL SYSTEM
Grades 10-12
(1)
Curtis Miller/Linda Curtis (Alter)
Director/Instructor
2nd and Washington
Tamms, IL 62988
(618) 747-2703

PRESCRIPTION LEARNING
Grades 3-8
(1, 5, 7)
Marie Dunphy
Sullivan Comm. Unit #300
P.O. Box D, 816 North Worth St.
Sullivan, IL 61951
(217) 728-4952 or 728-8381

GIFTED PROGRAM
Grades 4-12
(1)
Martin Getty
Chrisman Grade School
Box 447
Chrisman, IL 61924
(217) 269-2022

INDEPENDENT STUDY USING COMPUTERS
Grades 5-6
(1)
Alden Nay
Principal, Washington School
1016 S. 23rd
Mattoon, Illinois 61938
(217) 234-3462

INDIANA

MARKETING LABORATORY
Grades 11-12
(1, 3)
Jack E. Voelz
Teacher - Delta High School
Rural Route No. 1, Box 225
Muncie, IN 47302
(317) 288-5597

THE LETTER SHOP AND FEATHERBY'S FABLES
Grades K-2
(2)
William Hopper
Vincennes Comm. School Corp.
2116 North Second Street
Vincennes, IN 47591
(812) 882-8458 or 882-9256

PROJECT CENT
Grades K-12 (1)
Peggy Pfeiffer/Joann Troutner (Alter)
Lafayette School Corp.
Box 5849
Lafayette, IN 47904
(317) 448-4640

LIVING AND LEARNING WITH COMPUTERS
Grades 7-12
(1)
Nancy A. S. Miller
Clinton Prairie Jr.-Sr. High School
Box 307, R #5
Frankfort, IN 46041.
(317) 659-3305

IOWA

TWO WAY INSTRUCTIONAL TELEVISION (T.W.I.T.)
Grades 9-12
(8: Microwave television)
Francis R. Davis
Supt., Morning Sun Community Schools
Box 129
Morning Sun, Iowa 52640
(319) 868-7701

MEDIA NOW
Grades 11-12
(1, 2, 3, 5)
Odell Overgaard
A.V. Director
Turkey Valley Community Schools
Jackson Junction, Iowa 52150
(319) 776-7496

MEDIA NOW (NATIONWIDE PROGRAM)
Grades 9-12
(2, 3, 5, 6)
Ron Curtis
Media Now
401 Reed Street
Red Oak, Iowa 51566
(712) 623-4913 (800) 831-5886

- KANSAS

MICROCOMPUTERS AT THE ELEMENTARY AND SECONDARY LEVEL
Grades K-12
(1)
Denis L. Brown
Computer Instructor
Lakin Grade School, Unified Dist. #215
Lakin, Kansas 67860
(316) 355-6191

- LOUISIANA

USING AN AP TELETYPE IN ELEMENTARY LANGUAGE ARTS INSTRUCTION
Grades 4-6
(3, 6, 8: Teletype)
Clarice Kenney
Caldwell Parish School Board
P.O. Box 128
Columbia, Louisiana 71418
(318) 649-2689

- MARYLAND

CALCULATING AND COMPUTING COMPUTER PROGRAMMING IN BASIC
Grades 7-8
(1, 8: Programmable Calculator)
Robert Kersey/Larry Houser
Carroll County Board of Education
55 North Court Street, Box 500
Westminster, MD 21157
(301) 848-8280 or 876-2208*
*Balto Tie Line

- MASSACHUSETTS

PROJECT OUTREACH
Grades 7-12 and Adult
(8: Video tape)
Roland Besaw/Richard Salinetti
Lee School System
Lee Central School
Lee, Massachusetts 01238
(413) 243-0336

COMPUTER LITERACY AND PROGRAMMING
Grade 6
(1, 7)
Charlotte Lynch
Teacher
West Elementary School
Beacon Street
Andover, Massachusetts 01810
(617) 470-1700

MICHIGAN

THE MICHIGAN PROJECT
Grades 11-12
(1, 8: video tapes)
Arthur B. Neiger/Marilyn Robert (Alter)
Director, Bureau of School & Comm. College Services
Room 410-B, Cohodas Ad. Center, Northern Michigan University
Marquette, Michigan 49855
(906) 227-2693

COMMUNITY RADIO AND OTHER PROJECTS
Grades 9-12
(1, 3, 6, 7)
Tom Lee
Special Projects/Media Services
WOAS-FM
Ontonagon Area Schools
701 Parker Ave.
Ontonagon, Michigan 49953
(906) 884-4950 or 884-4163

MINNESOTA

MICRO-C IN HOUSE COMPUTERS AND SCHOOL MICROS
Grades K-12
(1)
Burton L. Nypen/Curt Johnson (Alter)
Supt., Ortonville Public Schools
200 - 6th Street N.W., Box 247
Ortonville, Minnesota 56278
(612) 839-6181

ACADEMIC EQUITY FOR RURAL SCHOOLS (AERS)
Grades 7-12
(1, 2, 5, 6, 7)
Michael B. Clay/Roger Neunsinger (Alter)
Littlefork-Big Falls High School ISD #362
Box 312
Littlefork, Minnesota 56653
(218) 278-4511

COMMUNICASTING FOR EDUCATIONAL PURPOSES
Grades 8-12 (equipment use); grades 10-12 (instruction)
(2)
Rinchard W. Lundgren/Will James
Eagle Bend Schools
Eagle Bend District 790
Eagle Bend, MN 56446
(218) 738-6261 or 738-6442

COMPUTER MODIFICATIONS FOR THE HANDICAPPED UNIVERSE
Pre-School-Grade 12
(1, 1, 8: Portable Skylab)
Laurie S. Satre
West Central ECSU
120 South Vine Street
Fergus Falls, MN 56537
(218) 739-3273

MINNESOTA TELEMEDIA
K-12
(2, 6)
Gerrit Groen
Southwest State University
Marshall, Minnesota 56258
(507) 537-6251

EDUCATIONAL TELECONFERENCING
All Grades
(6)
Ed Gershich/David Kingsbury (Alter)
Bemidji State University
Bemidji, MN 56601
(218) 755-2068 / 755-2739

MINNESOTA LIVING HISTORY
K-12
(1, 2, 8: video tapes)
Brian Doyle
Osseo Public Schools
11200 - 93rd Avenue North
Maple Grove, MN 55369
(612) 425-4131 Ext. 414

SCRAM (SUPPLEMENTARY COMPUTERIZED MATH-AND READING)
Grades K-12
(1)
Richard Quast/Marilyn Rothmeier
Morgan Schools
Morgan High School
P.O. Box 188
Morgan, MN 56266
(507) 249-3188

MISSISSIPPI

PROJECT PEAK
Grades 6-9
(1, 2)
Mary Shelton
Federal Projects Coordinator
Starkville Public Schools
Starkville, MS 39759
(601) 323-6774

THE ELECTRIC COMPANY POWER STATION PROJECT
Grades 2-4
(2)
Ollye B. Shirley
Regional Administrator
Children's Television Workshop
Community Education Services Division, Southern Region
2775 Delta Drive, P.O. Box 11220
Jackson, Mississippi 39213
(601) 362-5391 or 362-5392

MONTANA

SOFTWARE PACKAGE FOR MONTANA'S SMALL SCHOOLS
Grades 9-12
(1)
Calvin Wahl
Superintendent, Bridger Public School
Bridger High School
429 W. Park
Bridger, Montana 59014
(406) 662-3533

CAREER EDUCATION VIA VIDEO COMPUTERS IN THE CLASSROOM
Grades 9-12
(1, 8: video)
Walter N. Scott
Superintendent, Chinook Public Schools
P.O. Box 1059
Chinook, Montana 59523
(406) 357-2236

K-12 COMPUTERS IN SCHOOLS
Grades K-12
(1, 5, 8: video tapes)
Sue Dolezal
Math Department Chair, Stevensville School Dist. No. 2
300 Park St., P.O. Box 137
Stevensville, Montana 59870
(406) 777-5481

COMPUTER PROGRAMMING COURSE AND OUTLINE, RESOURCE FILE AND CENTER
Grades K-12 (Teachers)
(1, 6)
Bill Chalgren
Math Department Chairman, Libby Senior High School
Route 3
Libby, Montana 59923
(406) 293-6204

INTRODUCING MICROCOMPUTING TO RURAL MONTANA SECONDARY SCHOOLS
Grades 7-12
(1)
W.A. Stannard
Math Department
Eastern Montana College
Billings, Montana 59101
(406) 657-2230 657-2228

MONTANA EDUCATIONAL TELECOMMUNICATIONS SYSTEM (METS)
Grades 7-12 and Adult
(1, 6)
Maureen Jewell
M.E.T.S. Director
Eastern Montana College
Box 32, Billings, Montana 59101
(406) 657-2254

NEBRASKA

VIDEO DUPLICATION CONSORTIUM
Grades K-12
(8: video tapes)
Dan Mook (Alt. Ivan Stern)
Media Director, ESU #5
R.R. #2, Box 36
Beatrice, NE 68310
(402) 223-5277

PROJECT COMPUTER
Grades K-12
(1)
Joan Kollars
Project Director
E.S.U. #12, 114 East 4th St.
P.O. Box 539
Alliance, NE 69301
(308) 762-1430

NEW MEXICO

ACTIVE SOLAR HEATING
Grades K-12
(8: Solar Heating)
James P. Miller
Superintendent, Carrizazo Municipal Schools
P.O. Box 99
Carrizazo, NM 88301
(505) 648-2451

NEW YORK

EDUCATIONAL TECHNOLOGY COMMITTEE: A COMMUNITY BASED MODEL
Grades K-12
(1, 2, 3, 4, 5, 6)
Don Bartalo
Elementary Principal
Dansville Elementary School
North Main Street, Dansville, NY 14437
(716) 335-3646

NEW YORK INSTRUCTIONAL COMPUTING NETWORK
K-12 (1)
Burton Ramer, Superintendent
Oswego County BOCES
Box 488, County Route 64
Mexico, New York 13114
(315) 963-7232 Ext. 220

MICRO SEED
Grades 4-12
(1, 4)
E.Q. Carr
Planetarium Director
Herkimer BOCES Planetarium
Herkimer, NY 13350
(315) 894-3958 or 866-6040

NORTH CAROLINA

COMPUTER ASSISTED INSTRUCTION
Grade 6-8
(1)
Thomas W. Transou
Project Coordinator
William Lenoir Middle School
332 Greenhaven Dr., N.W.
Lenoir, NC 28645
(704) 758-2500

OREGON

BANKS ELECTRONICS COMPUTER PROGRAM
Grades K-12
(1, 5, 7, 8: video tapes)
Ronald Beaulieu or Bob Hamel
Teacher/Dept. Head, Banks Jr. High School
P.O. Box 38, Banks, Oregon 97106
(503) 324-3111 or 324-2281

ALSEA BUSINESS OPEN LAB
Grades 9-12
(1, 7)
Jim T. Hagler
Business Ed. Chairman
Alsea High School, Box B
Alsea, Oregon 97324
(503) 487-4305

REGIONAL SOFTWARE LIBRARY
Grades K-12
(1)
Mary Rhodes/Howard Bailey (Alter)
Computer Center
EOSC
La Grande, OR 97850
(503) 963-2171 Ext. 346 or Ext. 282

TAG (TALENTED AND GIFTED)
Grades 4-6
(1, 2, 4, 5)
Lynne Gissel
Teacher, TAG
Milwaukie Elementary School
2302 S.E. Willard
Milwaukie, Oregon 97222
(503) 653-3877 or 653-3681

RHODE ISLAND

GIFTED AND TALENTED PROGRAM
Grades 9-12
(1)
Lawrence Miller
Ponaganset High School
RFD #2, Box 498
North Scituate, R.I. 02857
(401) 647-3777 or 647-3378

TEXAS

MIDDLE SCHOOL COMPUTER MATHEMATICS PROJECT
Grades 7-12
(1, 6)
William R. Welch
Computer Math Teacher
T.J. Rusk Middle School
411 N. Mound
Nacogdoches, Texas 75961
(713) 564-8774

MEDIA SERVICES
K-12
(1, 5, 8: 16 mm films, video tapes)
Virgil Young
Coordinator, Media Services, Region XVI ESC
Region XVI ESC
P.O. Box 30600
Amarillo, TX 79120
(806) 376-5521

VERMONT

WILLIAMSTOWN HIGH SCHOOL COMPUTER PROJECT
Grades 9-12
(1, 7)
Geroge Bernier
Contact/Teacher
Williamstown Jr/Sr High School
Brush Hill Road
Williamstown, VT 05o79
(802) 433-5359 or 433-5350

VIRGINIA

VIDEOCASSETTE DELIVERY
K-12
(8: video tapes)
Ed. L. Kaufman, WVPT Public Television
Director of Instructional Programming
Port Republic Road
Harrisonburg, Virginia 22801
(703) 434-5391

COMPUTER-ASSISTED DIAGNOSTIC PRESCRIPTIVE PROGRAM IN READING AND MATEHMATICS
Grades 1-12
(1)
Debra Glowinski
Title I Office
Box 292
Dillwyn, VA 23936
(804) 983-2714 or 983-2863

WASHINGTON

COMPUTER ASSISTED INSTRUCTION
Grades 4-12
(1)
Gary A. Fendell/Jim Beichler
Principal/Instructor
Mt. Adams School District No. 209
P.O. Box 361
White Swan, Wash. 98932
(509) 874-2324

WEST VIRGINIA

MINI-CAP (MINI-COMPUTER ASSISTED PROGRAM)
Grades 10-12
(1)
Judy Graham
Point Pleasant High School
2312 Jackson Avenue
Point Pleasant, West Virginia 25550
(304) 675-1350

PROJECT REACH
Grades 8-12
(1, 2, 5, 6, 7, 8: video tapes)
Niki Wenger or Roscoe Gainer
Calhoun County High School
P.O. Drawer J.
Grantsville, WV 26147
(304) 354-6148

WISCONSIN

TWO-WAY CABLE T.V. INTERCONNECTING EIGHT RURAL DISTRICTS
Grades K-12, Major Emphasis 9-12
(1, 2, 6, 8: video tapes)
William M. Urban
Superintendent, Blair Public Schools
219 South Main
Blair, Wisconsin 54616
(608) 989-2881

MEDIA NOW
Grades 7-12
(2, 3, 4, 5, 8: off-set press)
Charles Voight/Marion Peacock
School District of Benton
Alma Street, Benton, WI 53803
(608) 759-4002

WISCONSIN

COMPUTERS ARE ELEMENTARY COMPUTER SUMMER CAMP FOR TEACHERS
Grades: Elementary Teachers/Students
(1)
Michael Burke
Mukwonago Area Schools
423 Division Street
Mukwonago, WI 53149
(414) 363-4990

VIDEO VIEWS
Grades 7-12
(2, 3, 4, 5)
Hollis L. Beede, II
New Berlin School District
4333 S. Sunny Slope Road
New Berlin, WI 53151
(414) 786-1330 Ext. 28

COMPUTER-ASSISTED INSTRUCTION MUSIC CENTER
Grades 6-8
(1, 5, 7)
Brian R. Moore
Verona Area School District
Verona Middle School
400 N. Main St.
Verona, WI 53593
(608) 845-6451 Ext. 37

PROJECT CIRCUIT
Grades 8-12
(Expansion to K-12)
(1, 2, 6, 8: video tapes)
Ellworth Beckmann, Jr.
Osseo-Fairchild School District
13th and Francis Streets
Osseo, WI 54758
(715) 597-3141

CHETEK COMPUTER SCIENCE PROGRAM
Grades 7-12
(1, 2, 5, 7)
James C. Adams
Computer Service Instructor
School District of Chetek
P.O. Box 6, 1001 Knapp St.
Chetek, Wisconsin 54728
(715) 924-3136

TELECONFERENCE NETWORK
Grades K-12
(6)
Judy Aakre
Coordinator
CESA No. 11
205 Main Street
Onalaska, Wisconsin 54650
(608) 785-9373

V. ADDITIONAL RESOURCES

Following is a listing of additional resources relating to rural education, rural schools, and/or the utilization of technology in the instructional process.

Anderson, F., Bransford, L., Hellar, B., and Maglaras, T., Satellite Technology Demonstration, Federation of Rocky Mountain States, Inc., Technical Report. National Institute of Education, Washington, D.C.

Appalachian Education Satellite Project, Executive Report. National Institute of Education, Washington, D.C.

Ballas, Marilyn,"Computer Drill and Practice Make the Grade." ETS Developments, 1982, 28, 5-8.

Bransford, L.A., "Telecommunications in Rural America: Special Populations, Special Problems." National Institute of Education, Washington, D.C., 1980.

Brosnan, W., "What You Need to Know About Microcomputers." The School Administrator, 1981, April, 32-33.

Creative Ideas for Small Schools. American Association of School Administrators: Arlington, Virginia, 1981.

Edington, E.D., Rural Education Directory. ERIC/CRESS, New Mexico State University, Las Cruces, New Mexico.

Educational Programs That Work. National Diffusion Network, Department of Education, Washington, D.C., 1981.

Expanding Educational Opportunity Through Telecommunications: Educational Telecommunications for Alaska Project. National Institute of Education, Washington, D.C., 1979.

Fletcher, J.L., "Applications of Electronic Technologies to Rural Education." National Institute of Education, Washington, D.C., 1980.

Filep, Robert, "Telecommunications and the Rural American, Today and Tomorrow." National Institute of Education, Washington, D.C., 1980.

Golden, F., "Here Come the Microkids." Time, 1982, 119, 50-56.

Grayson, L.P., "New Technologies in Education." Encyclopedia of Educational Research, 5th Edition, 1982.

Hall, G.E.,"Issues Related to the Implementation of Computers in Classrooms: Where to Now?" A synthesis of papers and discussions during the NIE Conference on Issues Related to the Implementation of Comptuer Technology in Schools, Washington, D.C., February, 1981.

Hall, Keith A., "Computer-Based Education, The Best of ERIC, June 1976-August 1980." ERIC Clearinghouse on Information Resources, Syracuse University, Syracuse, New York, 1980.

Hands On: A Forum for Science and Technology Educators. Technical Education Research Centers, Cambridge, Massachusetts.

*Joiner, L., Vensel, G., Ross, J., Silverstein, B., Microcomputers in Education: A Non-technical Guide to Instructional and School Management Applications. Holmes Beach, Florida: Learning Publications, Inc., 1982.

Microcomputer Directory: Applications in Educational Settings. Graduate School of Education, Harvard University, 1981.

Nachtigal, Paul M., Improving Rural Schools. National Institute of Education, Washington, D.C., 1980.

Quinsaat, Marilyn, "Implementing Computer Technology in a Classroom Setting: An Anecdotal Report of Long Term Use." Oceanside Unified School District, 1981.

Rosenfeld, Stuart, A Portrait of Rural America: Conditions Affecting Vocational Education Policy. National Institute of Education, Washington, D.C., 1981.

"School Computers Score at Last." Business Week, July 27, 1981, 67-68.

Stakenas, R., and Kaufman, R., Technology in Education: Its Human Potential. Phi Delta Kappa Educational Foundation, Bloomington, Indiana, 1981.

Wells, R., "Planning and the American Computer Machine." Paper presented at the Harvard Graphics Week Conference, Cambridge, Mass., July 1979.

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*Appendices include lists of microcomputer vendors, printers and video displays, peripherals, software sources and software reviews, newsletters, magazines, journals, directories, organizations and resource centers pertaining to microcomputers.