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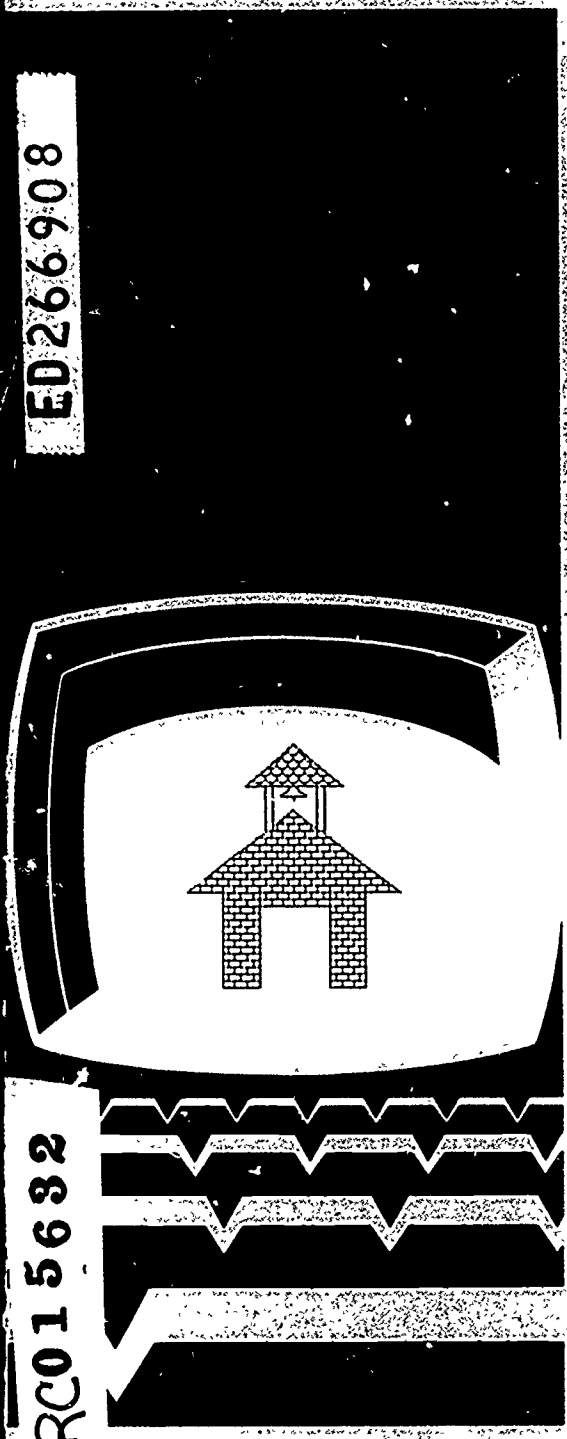
ABSTRACT

Directed primarily toward small school administrators and school boards, this publication describes a consortium of five rural school districts in central Missouri and how they used a traveling teacher to facilitate incorporation of microcomputer capabilities into the school systems' operation and curriculum. The paper describes the use of the consortium to provide teacher inservice training in each district and discusses curriculum applications of microcomputers. Topics include development of the training program, delivery system, methods of instruction, evaluation of the inservice program, and explanation of the post inservice use of computers in the consortium schools. A discussion of the suggested principles of consortium operation covers the need for a clear advantage to cooperation, optimal number of members, geographic proximity and size of member schools, leadership, organization, finances, and the use of outside resources. Background material includes a description of the roles to be played by small school consortia, a review of literature concerning the use of computer technology in rural schools, and a history of the Mid-Missouri Small School Consortium (MMSSC) with attention to features that made for successful sharing of services. Appendices contain tables showing participant ratings of inservice training topics, characteristics of schools and communities forming the MMSSC and a short list of references. (JHZ)

The Mid-Missouri Small School Computer Consortium



Training Teachers On Their Own Turf

THE MID-MISSOURI SMALL SCHOOL COMPUTER CONSORTIUM: TRAINING TEACHERS ON THEIR OWN TURF

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FOREWORD

America has a long history of sharing, particularly in times of economic hardship. Small rural schools face a long, up-hill battle in their efforts to offer their students comprehensive educational experiences in a time of dwindling fiscal resources. Sharing available resources and forming consortia are ways such schools can combine to accomplish what they cannot do alone.

The history of the Mid-Missouri Small School Consortium is an excellent example of how public schools, universities, state departments of education, and regional educational laboratories can collaborate to identify and solve problems. In the final analysis, however, it was the small schools that made the consortium work. The result was that several small rural schools had teachers and administrators more skilled in technology, computer equipment was more fully utilized, and students had greater opportunities to move into--and become participants in--the computer age.

This publication is offered in the belief that other small schools can learn from Missouri's example and use the same or similar strategies to accomplish their goals. Situations and needs may differ, but the concept of banding together to do what

one school cannot do alone is a viable concept and merits further exploration wherever needs cannot be met by more traditional solutions.

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ACKNOWLEDGEMENTS

Although there are only three authors listed for this publication, there are many whose combined efforts have contributed to the case study that is the focus of this publication. Of particular importance are the six school superintendents whose ideas and initiatives were responsible for the consortium described here. Their original ideas plus their continuing commitment have been fundamental to the successes the consortium has achieved.

In addition, three other persons have contributed very directly to producing this publication. These include Dr. Tom Weible, formerly of the College of Education faculty at the University of Missouri-Columbia, who assisted in evaluation of the Consortium's in-service training program; Tony Sander, the computer consultant whose work is largely the focus of this study; and Vicki Hobbs, who contributed significantly to analysis of the data and review of the literature.

INTRODUCTION

This publication describes the efforts of five rural school districts in central Missouri to incorporate microcomputer capabilities into their school systems' operation and curriculum. Like most small rural school districts, they wanted to enhance their instructional capabilities but were operating on a budgetary shoe string. The method they employed--a consortium to share services--is not new, but their use of the consortium concept to provide teacher in-service training and curriculum applications of microcomputers was innovative. The Mid-Missouri Small School Consortium (MMSSC) is also distinctive because of the cooperative support relationships established with the Missouri Department of Elementary and Secondary Education (DESE), the University of Missouri (UMC), and the Mid-Continent Regional Educational Laboratory (McREL).

Some of the technological approaches implemented among these small rural schools will be reviewed in an effort to learn from their experiences and draw relevant support for the methods of the Mid-Missouri Small School Consortium. Initiation and history of the MMSSC will be described in order to lay a foundation for its later collaborative efforts. From the MMSSC experience several conclusions will be drawn about necessary features of small school consortia that

contribute to the successful sharing of services. The computer in-service training program of the MMSSC will be outlined including its development, delivery system, and methods of instruction. The program description concludes with an evaluation of the in-service program, an explanation of the post in-service use of computers in the consortium schools, and an enumeration of the suggested principles of consortium operation.

This publication is directed largely toward small school administrators and school boards--those seeking to improve their curricula in cost-effective ways. It should also be of interest and relevance to those charged with assisting rural schools in meeting this objective--intermediate agencies, state departments of education, and the colleges and universities that provide professional education research and consulting.

ROLES A CONSORTIUM CAN PLAY

The experience of the Mid-Missouri Small School Consortium suggests that a consortium is an effective way of expanding the capabilities of small rural schools and that the consortium is strengthened with the active involvement of other resource agencies.

What is a Consortium?

As applied to education, the formation of a consortium involves the banding together of a small number of usually, but not necessarily, adjacent school districts for the purpose of pooling resources--financial, conceptual, instructional, or personnel--in an effort to address a common problem or initiative. The organization of such a consortium can range from a formalized legal entity with a hired staff to a totally informal agreement among superintendents (or others) to work together to a common end. Purposes for formation may range from a single problem that any one district by itself cannot adequately handle, usually because of financial constraints, to a generalized goal such as improving the instructional capabilities of the schools. Joint involvement may span any length of time--the lifespan of a consortium may be only long enough to realize an immediate common goal or a consortium may address multiple problems or initiatives simulta-

neously or consecutively over an extended period. Consortium members may enter or leave the informal arrangement at any time or member districts may band together in different combinations depending upon the problems currently identified.

A consortium usually operates under the joint direction of the superintendents of member districts. The agenda may call for the joint hiring of staff to carry out the intentions of the consortium or it may entail the joint allocation of specific duties to each member district. Consortium meetings are usually dictated by the periodic need to "work things out" or decide on the next steps.

In the Missouri experience, the role of intermediary that has been assumed most often by area college or state university personnel and/or state department of education and regional education laboratory staff usually involves initiation of the consortium concept and the offer of resource staff from which consortium members may draw. Because it is not yet a common occurrence for districts still gun-shy from consolidation battles (or the threat of them) to collaborate in a way that may again stir up old wounds, an intermediary has been necessary in the birth of many consortia. As more consortia emerge and rural districts--as well as rural communities--see the benefits of educational collaboration for the small school, an intermediary may no longer be needed to initiate the consortium concept.

An Alternative to Consolidation: Transporting Education Instead of Students

There are some educational problems and approaches that are unique to small rural schools. Small schools have followed the lead of the nation's urban schools for years. Conventional wisdom among earlier educational leaders and planners leaned strongly in the direction of consolidating rural schools to make them large enough to economically justify a comprehensive school program. Consolidation was viewed as a way of eliminating one feature--small size--that made rural schools unique.

However, there are practical limits to consolidation and in many parts of rural America--especially the Midwest, West, and Southwest--these limits have largely been met. The costs of further consolidation generally outweigh any potential benefits from larger student numbers. Even in places where further consolidation might be feasible there is little public support; few communities having a school are enthused at the prospect of losing it. Previous consolidations demonstrated to many rural Americans that losing a school was a blow from which many communities didn't recover. Whether for economic or social reasons, then, school consolidation seems to be an idea whose time has passed. Thus many small rural schools will continue to exist, either because they are "necessarily existent," or because of public preference.

A major impediment to further consolidation is what some have termed "the friction of space." Whatever rationale may have justified earlier waves of consolidation, that rationale ceases to make either educational or economic sense when children spend 3 or more hours per day on a bus going to and from school. New technology, however, provides possibilities for overcoming some of the friction of space. New telecommunication and computer technologies make it possible and feasible to gain access to some of the benefits of educational specialization without the need for further student travel.

Some educationally relevant technology, such as television, has been around for years, and has done little to alter traditional methods and concepts of education. The chalkboard still commands a more prominent role in most classrooms than television--even among those rural schools where television could supplement otherwise sparse curriculum offerings. So it is not the educational potential of technology alone that seems responsible for the current wave of innovation among smaller rural schools. For whatever reasons, there now seems to be a greater willingness among small rural schools to experiment with new educational methods and media. Perhaps the potential of video, telecommunications, and/or computer technology has excited creativity, or perhaps innovation in small rural schools is attributable to increased public attention to education in recent years. Perhaps it is a continuation of growing public expectations of schools coupled with

budgets that have generally stabilized or even declined in constant dollars. Perhaps it is attributable to more scholarly and policy attention to rural schools in recent years, or perhaps, when speaking of creative uses of computers, it is just a response to the question, "What do we do with them after we have 'em?"

MICROCOMPUTERS IN RURAL SCHOOLS-- PROBLEMS OR SOLUTIONS

The problem is not one of coaxing rural schools into the computer age; it's how to make use of the computers they've already bought. Whether donated by the bank, bought from PTA fund drive earnings, or purchased with "special ed" monies, most rural schools have one or more TRS-80, Commodore, TI, IBM, or Apple computers. Having computers, however, doesn't necessarily bring a school into the computer age. Even in those districts blessed with an innovative administrator, incorporating computers into the curriculum often falls short of potential.

Because of a steady decline in price, the easiest step toward entering the computer age is purchasing a computer. To some extent computers have become an educational fad--parents have got the message and are anxious to have their children "learn computers." To some extent computers have become a status symbol. While computers in schools are here to stay, we are generally still at the stage where the quantity of hardware, rather than the utility of it, conveys "progress."

As schools progress beyond the "acquisition of hardware" stage, rural schools may find more applications for computing capabilities than their larger

city counterparts. Computers have the capability of "extending" the instructional capacities of overloaded teachers and/or "extending" the curriculum offerings of schools whose size and budget do not allow for much instructional specialization. The National Commission on Excellence in Education in its report entitled "A Nation At Risk" (1983) calls for us to equip graduates "to understand the world of computers, electronics, and related technologies." How can rural schools successfully implement the technology of the "computer era" as they pursue this goal?

Computers are products of a unique technology--they are not quite like anything experienced before. Other electronic technologies like television, radio, etc. typically have only one application. In contrast, computers are being used for hundreds of very different applications, and the number of applications can only increase. Computers can serve administrative or instructional purposes; teachers can teach about computers or teach with them; computers are applicable to first grade writing or to calculus; students can "teach" (program) computers or be taught by them. The many ways in which computers will be used in education are still evolving although there are literally thousands of "educational" software packages now available. But how "educational" some of this software is and how the software, the classroom, and the teacher will interact is still very much in the experimental stage.

The Computer and the Rural School

We have implied that smaller, rural schools may be in a better position to take the lead in educational uses of microcomputer technology than their large school counterparts. Because the small school often does not have the economic means to provide as many and as varied curriculum opportunities for its students as the larger school, the small school must either be content to offer its students a narrow selection of courses or seek alternatives to the traditional teacher/classroom course in order to expand the curriculum. Microcomputer technology offers one viable curriculum alternative. A microcomputer and a telephone can combine to bring to the smallest community the information, references, and educational resources of a well-stocked library. Microcomputer technology offers the promise and potential that access to pertinent educational materials need no longer be denied because of remote location. Computer technology is a bridge to resources. It won't guarantee learning but it can contribute to an economical solution to one of the traditional problems of small schools--insufficient numbers of teachers and inadequate educational resources.

Computer applications for small schools are still evolving. Although there are many pertinent software applications, small school administrators and teachers generally have their hands full with existing work loads and don't have the time to acquire the technical competence necessary to pick out the "best" systems and apply them to the

educational needs of the school. Further, small schools may have need for applications of computer technology different than those of large schools (large schools with 500 employees may find a payroll program a valuable addition, but a district with 20 employees may find it more trouble than it is worth). There is nothing inherently beneficial in performing a task by computer--it depends on the size of the task and the alternatives for performing it.

Learning from the Literature

The application of microcomputers in education has become widespread and varied, extending beyond the bailiwick of urban schools. Indeed, Fletcher (1980) argues that the smallness of rural schools makes them a uniquely promising setting for developing electronic technologies, and further states that specialized programs offered through electronic technology could be ultimately more cost-effective than either consolidation or specialist staffing.

Through microcomputer use in the Educational Telecommunications for Alaska Project (1981), remote students use individual programming to learn native languages, legends, and traditions, as well as conventional subjects. Electronic mail service available through the Administrative Communication Network (ACN) helps to bridge the gaps between many remote and isolated districts. The Alaska Knowledge Base System (AKBS) provides teachers and administrators with rapid access to

information banks on a variety of instructional materials, research documents, and curricular development resources.

Both Pennsylvania and Arkansas have established electronic information networks which provide public schools with valuable and timely information on meetings, events, and pending education legislation. An electronic mail service has been set up in Kansas so that school districts across the state can deliver messages, discuss issues, and share ideas. National information services such as Newsline and ED-NET now serve many districts. The Alabama Association of School Boards uses an electronic mail service to send daily legislative information to members (Lloyd, 1983).

Hofmeister (1984) notes that many rural education problems are related to communication and may be overcome by electronic communication technologies. Electronic mail systems, electronic bulletin boards, computer conferencing, wire services, and database searches are several videotex applications which schools can use to their advantage. Hofmeister believes, however, that the notion of achieving universal excellence in instructional delivery through computer-assisted instruction has faded somewhat.

Educational Operations Concepts, Inc., in its Guide on Successful Uses of Technology in Rural Schools (McCormick and McCormick, 1982), concludes that the use of

various electronic technologies can overcome some of the financial, personnel, and curricular limitations of the rural school district. Among the kinds of electronic technology being effectively and efficiently used in rural school systems are computers, instructional television, videodisks, audio tapes, radio, telecommunications systems, programmed instruction, video tapes, and interactive video. The guide further states that organized and interested teachers and staff who are provided with specific technological pre-service and in-service training are essential to the effective utilization of technology in the classroom.

Conboy (1983), in reporting on the Charlton Country Education Pilot Project in Australia, describes the two-way audio contact initiated among seven rural secondary schools and other outside resource agencies. Achieved by way of an experimental terminal and teleconferencing system, the goals of the project were to increase the level of interaction among small rural school teachers, administrators, and outside information sources and to use communications technology in an educational setting. Difficulties encountered in this audio system, as Conboy reports, were the design of the remote terminals, the variable quality of the transmission reception, the inappropriateness of the instructional medium for some subjects, such as art, and the lack of opportunity for student participation in discussions. Teleconferenced lectures were found to be more effective.

The Educational Resources Information Center (ERIC) database contains approximately 130 items on rural technology that cover a variety of subjects related to rural education including new technologies, new uses of technology, and case studies. Technology applications described in ERIC materials include in-service training, international rural development, employment training, health education, career education, special education, gifted education, and adult education. Technical reports in ERIC cover communication satellites, mass media, educational television and radio, mobile classrooms, computer-assisted instruction, and computer-assisted testing.

Using computers for drill and instruction in the classroom has become relatively common. However, the instructional use of computers in rural or isolated schools sometimes lags behind that of their urban and suburban counterparts. Zakariya (1984) further points out that affluent schools get more computers than schools located in low socioeconomic areas and the ratio of students to computers is lower in more affluent districts. Poorer schools are more likely to use their computers for remedial instruction and for drill and practice in basic skills; little time may be allowed for enrichment activities via computer.

The development and/or implementation of technology specific to the needs of rural schools and the concomitant costs to those schools is an issue of vital concern. Three papers were commissioned for the National Institute of Education's 1980 "Workshop on

Telecommunications in the Service of Rural Education" (1980). Fletcher (1980) suggested using rural and small schools as developmental sites for rural education technology to ensure that this technology does meet the needs of rural school systems. Bransford (1980) noted that while rural education is often a focal point for government aid, projects seldom survive beyond their initial development funding largely because (1) money is usually provided for capital (hardware) expenditures and seldom for the software that makes the technology useful; (2) institutional and personal problems arise; (3) the need for individual programming develops in the face of economies of scale; and (4) institutional fears of telecommunications technology surface. Filep (1980) reviewed newer communications developments in his paper and described some rural education applications of technology. Workshop participants were offered several suggestions and outlined a practical strategy for implementing technology in rural education systems. Participants at the workshop defined the most immediate need as getting available information into the field as soon as possible, especially information on applications and potential funding resources.

With respect to the funding of technological innovations in the rural or small school setting, Monk (1982) feels that existing cost indices are flawed in a way that discriminates unfairly against rural/small school districts. He proposes that states use a service-specific cost index which takes into account the service cost

differentials as well as input cost differentials, thus providing a more equitable means of compensating for differences in the costs of providing educational services.

Filep (1980) notes that a variety of communications technology is both affordable and essential to the rural school district, especially if a sharing of technological costs and benefits between different groups in the rural community can be achieved. Filep provides a number of recommendations on planning, needs assessment, organizational aid, and potential funding sources.

The two case studies cited next have particular relevance to the project undertaken by the Mid-Missouri Small School Consortium.

In a rural school case study in Kansas (McDonald and Gibson, 1982), three microcomputers were initially purchased with no comprehensive plan for acquisition, training, or maintenance. Major problems encountered were the misuse of equipment by uninformed users and the hoarding of equipment by informed users. The school later provided in-service training to reduce the seriousness of the problems.

Kelly and Vanvactor's (1983) analysis of data from Project SPECTRE (Special Education Curriculum and Training for Regular Educators), a federal in-service training program for teachers in rural Nevada, cites several methods for training remotely located teachers including instruction by independent study, by

school district "master teachers," and by university instructors on campus or on site. On-site instruction by university personnel or by master teachers appeared to be both academically and fiscally more effective than instruction on the university campus or through independent study.

Several other sources cast the efforts of the MMSSC in an interesting and innovative light: Rottier, et al., (1983) found in a survey of 348 teachers in several small Minnesota school districts that significant numbers of teachers appeared to be personally dissatisfied with teaching. While certainly not an isolated finding, the impact of widespread dissatisfaction--especially among male and experienced teachers--may lead small school administrators to embrace technological advances in education as a way of reinvigorating frustrated teachers.

Brown and Jackson (1983) offer the U.S. Cooperative Extension Service as a model for cooperative activity between state universities and surrounding local education institutions, thereby linking the rural or small community to the larger resources of the university

Sher (1983) states matter-of-factly that small schools face higher per pupil costs unless resources are shared with other schools.

As these experiences show, the use of computer technology in the educational arena is not new, nor is the concept of in-service

training. Both, however, when applied to a consortium of rural school districts--such as the Mid-Missouri Small School Consortium--and with university and state department of education assistance, offer a new horizon to districts with limited resources and plagued by problems of restricted curricular range, financial contraints, and inadequate specialist staffing.

INITIATING AND MANAGING THE MID-MISSOURI SMALL SCHOOL CONSORTIUM

The important thing about forming a small school consortium is that it get started with a clearly defined purpose and sufficient support to enable it to achieve its purpose. The Mid-Missouri Small School Consortium is an example of how one such group identified a purpose and established a support system to achieve that purpose. This section includes elements of the MMSSC experience that may be useful to other small schools considering a consortium approach.

An important feature of the MMSSC experience was the role played by support organizations--notably the Mid-Continent Regional Educational Laboratory (McREL), the Missouri Department of Elementary and Secondary Education (DESE), and the University of Missouri (UMC). The role of each organization will be included in the account of the MMSSC experience.

Preliminaries

McREL has been involved in various small school projects in the Plains States for several years. Although Missouri is in the region served by McREL, there had not yet been a McREL-involved small school project in the state. In 1981 and 1982 a McREL representative discussed possibilities for a rural/small schools project initiative

with various DESE and UMC personnel. The participants in these discussions agreed to hold an exploratory meeting with a representative group of small Missouri schools to hear their problems and to determine if a project could be organized. During the summer of 1982, DESE and UMC personnel cooperated in selecting seven central Missouri small school administrators to attend such a meeting.

The initial meeting was held at the DESE offices in mid-August, 1982. During the first part of the day, the McREL representative met with officials of DESE and the seven administrators to explain McREL's purpose and how McREL had worked with other groups of small schools in the region. For the remainder of the day, discussion was devoted to problems unique to the seven small schools. Those participating in the discussions included the seven invited administrators, the McREL representative (Paul Nachtigal), the Director of Curriculum Supervision of DESE (Richard Phillips), and a rural sociologist (Daryl Hobbs) from UMC. Most of those superintendents and the resource agency representatives have continued to function as the core of MMSSC and its support group.

Although the McREL representative highlighted some of the problems of small schools in the region and some of the approaches being taken to address those problems, subsequent discussions failed to produce any interesting ideas. For the most part, discussion centered on regulations of the DESE irritating to small schools and

budgetary and teacher hiring problems. Near the end of the day the McREL representative asked if the group would be interested in another meeting to discuss further the possibilities of a project. Since the meeting up to that time had produced few fresh ideas, there wasn't much enthusiasm for another meeting. However, one of the superintendents volunteered that he might be interested in meeting to discuss small computers and their potential for the instructional programs of small schools. He stated that his school, like many others, had some small computers but was not making much use of them because few of the teachers or administrators knew much about them. That statement was the key! Since several other superintendents indicated that they had the same problem and interest, it was agreed to hold another meeting in October. During the discussion, the Director of Curriculum Supervision (Phillips) stated that the DESE also lacked computer experience and expertise. The UMC representative (Hobbs) volunteered to organize a program on small computers at the UMC campus if the group would be interested in meeting there.

The Beginning

All those in attendance at the August meeting met at UMC on October 20, 1982 to hear presentations by various UMC computer specialists on the state of the art and applications of small computers. As each presentation was made, it became clear that there was a great deal of interest among the superintendents. The presentations were

often interrupted with questions and inquiries about applications. These interruptions often served as an occasion for further discussion among the superintendents about problems unique to their small schools. As the combination of discussion and presentation continued, one problem kept surfacing--providing computer in-service training for teachers and administrators. As superintendents, they were keenly aware of their faculties' time limitations and their probable lack of enthusiasm for acquiring computer literacy on their own time. They knew also that they had few incentives to offer their faculty, but one superintendent asked, "Would it make sense for the schools to go together and generate a sufficient amount of money to hire a computer specialist on a full-time basis to provide the in-service training on location at each school?" That idea and lunchtime coincided, but when the afternoon session began, it was clear that the idea had grown rapidly. During lunch, the superintendents as a group had agreed to form a consortium to implement in-service training if a qualified specialist could be found and conditions of employment worked out. The afternoon presentation on classroom computer simulation exercises proceeded, but it was clear that most of the superintendents were preoccupied with thinking about the details of their soon-to-be consortium.

As soon as the presentation was completed, the new "consortium" got down to details. One of the details was finding a person who had the skills and might be willing to go to work for an as yet non-existent

organization. One school's former math teacher was working in a computer store and emerged as a possibility; one of the superintendents agreed to determine if he might be available.

The superintendents found little value in delaying the start of their "organization"; agreement was reached that they would begin operation as soon as a qualified and mutually suitable person could be found and employed. They informally agreed to an operational date of December 1, 1982. They roughed out what it might cost to hire a computer specialist and how much each school might need to contribute. They agreed that one school should serve as fiscal agent. They agreed that in-service training should be provided on location at each school. They agreed that their "employee" should divide his/her time equally among the schools, a full day at a time. They were uncertain about what kind of contract would be needed, what kind of insurance coverage would be required, how the in-service training program should be designed, how the training would occur, how much their "specialist" would be paid, etc. They did agree that each school would work out its use of the specialist on its own terms--the specialist would have to be an adaptable person. They also recognized that they would need to discuss the idea with their school boards, and that they needed another meeting to work out the details--providing approval had been obtained from each school board.

During the discussion, the McREL representative agreed to determine whether McREL could contribute to such things as travel expenses for the consortium employee. The Director of Curriculum Supervision encouraged the group to proceed and offered administrative support from his office. The UMC representative offered to provide meeting space at the University because of its central location in relation to the new consortium schools. Because of the potential need for technical support, he also offered to continue to work with the consortium in a support role. Feeling that they had accomplished a great deal for one day, the superintendents adjourned to accomplish their agreed-upon tasks.

After the superintendents left, the representatives from McREL, DESE, and UMC remained to discuss the accomplishments of the day. While there was considerable enthusiasm at the prospect of the new consortium, the Director of Curriculum Supervision expressed concern about the lack of expertise and emphasis on computer technology in the state department. He suggested that many of the schools were already well ahead of the state department in entering the computer age. The idea surfaced that perhaps the state department could become a "member" of the new consortium; if a specialist were employed, the state department could share in the time of the specialist to provide opportunities for the staff to acquire computer literacy. The idea seemed potentially workable, and the McREL representative agreed to look into the possibility that McREL could pick up

that share of the cost for the state department's participation; the state department lacked flexible funds at that time for such experimental activity.

The reaction of other consortium members to the possibility of having the state department participate as a member was obtained by telephone. There being no dissent, plans were made for a meeting on November 19 at UMC to work out procedures for the full consortium. The computer specialist (and former math teacher) who was discussed at the October 20 meeting was indeed interested in being employed by the consortium, assuming that satisfactory conditions of employment could be reached. He agreed to attend the November consortium meeting to "interview" for the position.

The consortium met November 19 at UMC along with the McREL, DESE, and UMC representatives and the applicant computer specialist. At that meeting the following events occurred:

(1) all districts reported that they had obtained consent from their boards to proceed;

(2) the participants agreed to jointly hire the computer specialist;

(3) although the district farthest away from the others reported that it had decided not to participate, the attendees agreed that DESE would become a member, bringing the

consortium back up to seven financially participating entities;

(4) participants agreed that one of the schools would serve as the fiscal agent for the consortium and would carry the contract of the specialist;

(5) the McREL representative reported that McREL would contribute to the consortium an amount sufficient to cover travel expenses for the specialist and to cover the DESE portion of participation;

(6) participants agreed that the superintendents would serve as a board and meet at regular intervals to review work of the consortium and plan future activities;

(7) participants agreed that each school would be individually responsible for how it made use of the specialist;

(8) they agreed that the consortium would be named the Mid-Missouri Small Schools Computer Consortium (the name would later be changed--leaving out the word "computer"--to allow for ideas of the consortium that went beyond computer applications); and

(9) they agreed that the consortium would become fully operational with the beginning employment of the computer specialist on December 1, 1982.

Consortium Funding

While brought together initially at the request of McREL, the superintendents involved were made well aware that financial support from McREL would be modest, covering only extraneous costs such as travel, meetings, etc. Any initiatives taken by the schools would require either their own financing or acquisition of other outside grant dollars. The participating school administrators decided that joint hiring of a computer specialist would be sufficiently cost-effective that each district could absorb its portion of the salary and expenses. Therefore, the schools sought no outside dollars to fund the in-service training program for their faculties. During the first semester each consortium member absorbed an equal portion of the consultant's salary and travel expenses. While one school served as the fiscal agent, each consortium member agreed to pay $1,000 at the beginning of the semester and another $1,000 on March 15th. A total of $14,000 was therefore budgeted for the first semester of operation, December 1, 1982 through May 31, 1983. Because the State Department of Education had no flexibility in allocating money for such purposes, McREL funded its portion of the cost. During the second year of operation, the consortium divided the cost six ways with McREL again funding the state department. Each consortium participant agreed to allocate $4,500 for consultant salary, benefits, and travel. The $4,500 was payable in four equal installments to the school serving as fiscal agent, thus totaling $27,000 for the

11-month contract from July 1, 1983 through May 31, 1984. Insurance costs as well as teacher retirement were covered by the contract with the fiscal agent. Travel expenses paid to the consultant for use of his personal car were limited to commuting between districts and the State Department of Education. Expenses associated with outside conference travel were not reimbursed.

Reflections on the Beginning

In the space of 1 month the MMSSC had progressed from an idea to a fully operational consortium. Little of what transpired had been planned. The reason for the initial meeting in August was to explore in general terms the possibility of some kind of "project" involving small schools in Missouri. No thought had been given to a computer project; there was no "up front" offer of money; there was no overt recommendation of a consortium approach. Everything that happened resulted from ideas coming out of that initial discussion. Since nothing that occurred was specifically planned, it seems pertinent to reflect on some of the factors that contributed to the fruition of the consortium idea. We suggest the following as some of the factors contributing to MMSSC's start:

(1) Official recognition that small rural schools may have unique educational problems AND potential--

In retrospect it seems pertinent that the initial meeting was held at the DESE and at the call of the DESE.

Regardless of what followed, this fact alone has important symbolic value--it suggests that it is legitimate and reasonable that small rural schools should have problems and interests different from schools in general.

(2) An outside organization (a neutral party) served as a catalyst for the exploratory meeting--

This freed either the districts or the state department from having to establish an "agenda" for a meeting. It would seem that such a setting is more conducive to the emergence of fresh ideas. It establishes the frame of reference for the meeting.

(3) Superintendents were present as the representatives of the schools districts--

Perhaps no single factor contributed more to the fast action of this group of schools in response to an important idea than the fact that the superintendents were involved from the very beginning and that the ideas around which the consortium was built came largely from them. Superintendents are the authority figures in schools--especially smaller schools--and they have the power to make decisions (with board consent). They can move very quickly from interest in an idea to active consideration and to adoption. The initial meeting could

not have accomplished what it did had the superintendents not been involved.

(4) Inside source of ideas--

The participants in the meeting came up with the idea around which MMSSC formed. Their personal contributions to the idea had a role in their rapid adoption of it. People tend to be more committed to projects, programs, and ideas that they have developed.

(5) The quality and pertinence of the idea, i.e., the purpose--

The idea of small computers, their educational potential, the problems of teacher in-service training, the incorporation of microcomputers into the curriculum, and the excitement of new technology contributed to the eventual outcome. The meetings among superintendents resulted in the definition of a problem--microcomputers and what to do with them--and a solution--jointly hiring a specialist to solve the problem. The problem was important (and somewhat exciting) and the solution--the consortium--was pertinent. The solution made sense, it was practical, it met local conditions, its cost was affordable, and it wasn't the product of some organization or agency that evoked suspicion or distrust.

(6) The active collaboration of outside resource organizations that had

something to contribute--

The active participation of McREL, DESE, and UMC added to the project but each organization also had something specific to contribute. McREL offered the catalytic seed money, DESE provided legitimacy for the project, and UMC acted as a resource base to which technical and other questions could be addressed (see Table 1).

Managing the Consortium, Spring 1983

After initial organization of the consortium, the superintendents agreed that meetings should continue to be held at frequent intervals--at least once every 6 weeks--to monitor the project, to attend programs on computer applications, and to develop further plans for the consortium. These meetings were most often held at the University of Missouri because of its access to resources and its central location. All meetings were attended by the DESE Director of Curriculum Supervision, the UMC representative, and the jointly hired computer consultant. Several of the meetings were attended by the McREL Rural Education Project Director as well. While the primary purpose of the meetings was to monitor progress of the in-service training program, discussion often led to consideration of other issues pertinent to the schools. Ideas being tried in one school were shared with the others. Information was shared concerning the acquisition of hardware and experience with software. Issues often surfaced which had a bearing

Table 1

Outside Agency Roles in the Development of the
Mid-Missouri Small School Consortium

Mid-Continent Regional Educational Laboratory	Department of Elementary and Secondary Education	University of Missouri-Columbia
Initiated contact with representatives of DESE and UMC regarding the establishment of a rural schools project in Missouri.	Selected districts and invited them to attend the initial exploratory meeting with McREL.	Office of Social and Economic Data Analysis provided data used in selecting districts invited to initial meeting with McREL.
Financially contributed to consultant travel and DESE's share of consultant salary.	Provided the organizational legitimacy for the consortium.	Organized and staffed workshop on UMC campus for school personnel on the state of the art and application of computers.
Met regularly with the consortium board.	Met regularly with other members of the consortium.	Provided meeting space at the University.
		Acted as a resource base into which the consortium could tap.
		Met regularly with the consortium board.

on DESE policies and the presence of the Director of Curriculum Supervision allowed for contructive discussion and sometimes resolution of these issues. Of special interest was the operation of Instructional Management Systems (IMS) since these had been promoted by the DESE; consortium participants saw small computers as a technology pertinent to IMS.

On several occasions during the spring of 1983 resource persons from the University were asked to make presentations or provide demonstrations to the consortium superintendents at their meetings. These presentations served to sustain the superintendents' interest in the technology and to keep them informed on the rapidity of new developments.

The last meeting of the consortium in the spring addressed specific plans for the 1983-84 school year. At this meeting, participants agreed to continue the consortium, to rehire the consultant, to continue meeting on a regular basis, and to begin discussions of other activities the consortium might pursue.

Managing the Consortium, 1983-84

The consortium began regular meetings shortly after school started in the fall of 1983. Having successfully brought computer literacy to a large proportion of their respective faculties, consortium members began discussions toward more effective implementation of computer technology in the instructional program. The consultant

reported that the demands on his time in each school were beginning to increase as individual teachers encountered technical problems or sought assistance in incorporating computers into their classrooms.

At the October meeting of the consortium, the McREL representative arranged for a visit from Stan Pogrow, a faculty member at the University of Arizona and a nationally known authority on instructional use of microcomputers in the classroom. The emphasis of this presentation/demonstration was on teaching writing/language skills with microcomputers. This presentation inspired a major supplemental activity of the consortium during 1983-84.

In late October, the McREL representative brought to the consortium's attention a Request for Proposal (RFP) from the Apple Foundation for projects that would emphasize creative use of computers in instructional programs in schools. Those submitting successful proposals would be awarded computer hardware and software necessary to implement the proposed idea. McREL suggested that the consortium might wish to submit a concept paper for the initial round of evaluation. Concept papers were to be evaluated and from these some were to be chosen to submit full proposals. The consortium agreed to devote effort to producing such a paper.

With the assistance of the representatives from McREL, DESE, UMC, and the computer consultant, the consortium produced a concept paper that was oriented toward

"writing across the curriculum" with an emphasis on word processing technology and accessing external databases for use in the classroom. The frame of reference for the writing portion of the concept paper was the Bay Area Writing Project which had been successfully implemented at the University of Missouri by Dr. Ben Nelms. Dr. Nelms met with the consortium to further develop their idea. The added wrinkle to this program was that teacher instruction and subsequent student instruction would be by microcomputers and word processing programs. An additional innovative feature of the paper was the implementation of the project by way of the consortium, an approach oriented toward enchancing the instructional capabilities of smaller rural schools.

The concept paper was submitted as required by the RFP to the Apple Foundation through the UMC College of Education in November 1983. Of the 1,400 concept papers submitted, the MMSSC was notified that its paper was one of 90 selected to prepare a full proposal. Work therefore began in earnest in early January 1984 to prepare the proposal. As a part of the proposal preparation, negotiations were undertaken with Dr. Nelms and the UMC College of Education to sponsor a writing project for the consortium in the summer of 1984. Since the grant would not provide for any expenses, it was necessary to obtain funding for the writing project from other sources. Dr. Nelms was sufficiently enthusiastic about

the potential of the project that he sought, and obtained, supplementary funding from other sources.

The consortium superintendents demonstrated their continuing commitment to the overall concept by agreeing to provide stipends to the participating teachers and to pay the tuition to the University for their participation in the course. The proposal (and the writing project) specified that six teachers from each of five consortium schools would be trained. In addition, each school would provide the microcomputers for the training and the writing project would involve preparation meetings with the teachers and follow-up meetings with them during the following school year. Prior to submission of the proposal in late January, all of the above commitments were obtained and the teachers to be trained were identified in each of the five districts.

If the proposal had been successful, the Apple Foundation would have added significantly to the hardware and software inventories of the consortium schools; however, the consortium was informed in March that its proposal had not been chosen for funding. A consortium meeting was called following receipt of this information and after some discussion the attendees agreed to proceed as planned. Arrangements had been made and both Dr. Nelms and the schools had made commitments to the project.

The summer writing project, carried out during the summer of 1984, proved to be

highly successful. One of the consortium schools was asked to present the writing project experience to the American Association of Schools Administrators Conference in July 1985. In addition, two other writing project courses were offered on the same basis and with the same concepts to other small rural schools during the summer of 1985.

From this overview, we turn now to a description of how the computer consultant worked with the Mid-Missouri Consortium and how methods of operation for the in-service training program emerged.

DEVELOPING THE COMPUTER IN-SERVICE TRAINING PROGRAM

Common interests and geographic proximity, more than homogeneity of districts, were the cohesive bonds bringing six districts of the Mid-Missouri Small School Consortium into a working partnership. Linked by a perceived need to educate their faculties in computer use, the districts decided that the highest-priority use of their jointly employed computer specialist would be to provide teacher in-service computer training. Decisions regarding method, scheduling, and content were left to the administration of each individual district and the computer consultant, Tony Sander.

The First Semester, Spring 1983

As a first step in his new job, the computer consultant contacted each school and set up a meeting with the superintendent and principals to work out an agenda for the semester. At the initial meeting with each school, the consultant asked the question: "What is it that you would like to accomplish with computers within the next few months?" Responses from five of the six initial schools were identical: to have as many computer literate teachers as possible, to make teachers familiar enough with computers to be able to use them in the classroom, to be able to use the computer for grading, and

to use computers in the Instructional Management System promoted by the Department of Education. The administration of the sixth school indicated interest only in programming. While the administrators' perceptions of specific needs in their own schools varied, the goals listed above became the basis for setting up training sessions with faculty in the member schools.

In dealing with the individual needs of participating teachers and districts, the consultant divided his time among technical assistance to teachers and district administrators, individual and group teacher instruction, computer introduction to elementary student classes, and regional conferences, workshops, etc. (as sources of computer hardware and software information).

For the spring semester of 1983, the five schools interested in the wider range of topics followed the following format:

(1) Computer literacy

Participants spent roughly 1 hour learning the terminology associated with computer usage: CPU, diskettes, disk drives, etc. Within 1 hour, participants were given hands-on experience in turning on the machine, inserting and removing diskettes, becoming acquainted with the keyboard, etc. The MECC (Minnesota Education Computer Consortium) demonstration disk was then used by participants. With its menu of introductory programs, participants learned to

respond to computer instructions, use the return or enter key, and move the cursor. Participants used the utilities disk to initialize/ format disks, copy diskettes, etc. Handouts were provided to participants to aid in their recollection of these processes.

(2) Software Use

The consultant discussed support materials provided with MECC, which included teacher utility programs, etc. He guided participants through the software and encouraged them to use the array of MECC programs in their classrooms.

(3) Software Evaluation

The consultant introduced software evaluation as a procedure similar to textbook selection. The consultant introduced five software evaluation instruments using various methods and degrees of evaluation. The first instrument he introduced was a forced-choice instrument; the other instruments allowed the faculty increasing options with the fifth instrument being completely open-ended. The consultant advised the faculty in defining its software needs and rating software available to meet those needs.

(4) Word Processing

Faculty participants had the opportunity to learn one of the

several word processing software packages available. The consultant assisted the faculty members individually or in small groups.

(5) Programming

Those faculty members interested in learning the rudiments of programming received introductory programming instruction. Those interested in further programming instruction were encouraged to enroll in a 5-day summer workshop provided by the computer consultant.

The rotating schedule set up with the six participating schools allowed the consultant approximately 13 days in each school during the spring 1983 semester and was handled on a rotating basis, with schedules being rearranged to accommodate varying days per month of consultant time. Time spent by the consultant attending conferences, workshops, etc., decreased by a small amount the total number of days of direct contact with the districts, but these activities were essential for accumulating information on hardware and software on the consortium's behalf.

The consultant held two 2-day workshops on the IMS Mastery Management Program and a 5-day workshop on programming at one of the schools. Faculty members in all consortium districts were invited to participate. A total of 45 faculty members/administrators were enrolled in the 2 IMS workshops; 27 were enrolled in the programming workshop.

In-service training with the faculty in the sixth district, whose administration had indicated an interest only in programming instruction, consisted of a necessary introductory session on computers, followed by small group sessions (of two to five teachers) on introductory programming.

Activities in which the consultant assisted the State Department of Education during the initial semester (spring 1983) included the following:

(1) Conducted six 1-day introductory classes for staff members in the State Department of Elementary and Secondary Education; these were held in microcomputer labs at the University of Missouri and in a public high school in Columbia. A total of 125 DESE staff members participated in these literacy-oriented introductory courses;

(2) Presented informational sessions on the computer consortium at three microcomputer conferences across the state; and

(3) Provided technical assistance to DESE staff already using microcomputers.

Delivery System

While the role of the computer consultant varied somewhat with the individual needs of each consortium district, there was greater variation in the in-service

training delivery system. While one district administrator had significant expertise in educational computer use, the others' knowledge was limited; commitment to the use of computers in schools ranged from a wary reluctance to genuine enthusiasm. The administrators' degree of willingness to free teachers for in-service time varied as well. Variations in the availability of hardware and software among the consortium schools dictated not only the delivery system used in reaching teachers but the extent to which teachers could continue the learning process on their own.

As the computer consultant began his scheduled visits with each district, it became obvious that a great degree of flexibility would be necessary in order for him to serve as many teachers as wished to participate. With the constraint of district budgets affecting the ability to hire substitute teachers to cover classes or to buy additional computer hardware and/or software, flexible scheduling was essential to the success of the training program. While some administrators were comfortable with providing substitute teachers for those faculty members interested in participating in the in-serivce training, this arrangement limited to some extent both the number of teachers involved and the amount of time devoted to in-service training. Other schools' faculties were asked to use conference hours for in-service training; some faculties were asked to attend in-service sessions before or after school

hours. Because participation of faculty members was voluntary--the districts felt they could not pay extra compensation to participating teachers if attendance were required--all faculty were not involved in the training program. Participation of faculty ranged from a low of approximately 60-65% in two districts to a high of 100% (plus a janitor) in another district. While the faculties' entusiasm (or lack of enthusiasm) for participation did not always mirror their administrators', administrative support seemed the critical issue in the success of the in-service program. In those cases where administrators gave vocal support for use of the computer for instructional purposes or for serious implementation of the Instructional Management System, faculty members actively sought assistance in computer use.

Method of Instruction

The method of instruction also varied by individual district need. Classes of 15 teachers, small groups of 2 to 5, individual assistance, and combinations of all 3 were used in providing faculty members with computer instruction. In all cases, however, the aim was for teachers to have hands-on experience with computers during each phase of instruction. Instructional methods emphasized putting the teacher in a position of operating the computer as soon as possible. While the consultant used handouts in some cases, instruction covering the five in-service topics was mostly verbal, accompanied by immediate application on the computer. The consultant geared individual instruction to

meet the specific needs of each teacher-participant within the parameters set by the administrators for the in-service topics.

The consultant adapted the level of sophistication of the in-service program to the individual teacher's experience with computers. As determined in a follow-up survey of in-service participants, 40% of participating teachers reported having no prior knowledge of computers, 10% reported having good or very good prior computer knowledge, and the remaining half reported either fair or poor prior knowledge of computers.

Again, because of the voluntary nature of the in-service program and because of class conflicts and time contraints, the number of actual hours of in-service training varied by teacher. Of the 235 participants across the 6 districts during the spring semester of 1983, 66 (28%) were involved in only 1 to 5 hours of computer in-service training; 101 (43%) in 6 to 10 hours; 33 (14%) in 11 to 15 hours; and 8 (3%) in 16 to 20 hours. (Twenty-seven participants (12%) did not report their attendance on the follow-up evaluation form.)

Perhaps as important as the amount of time the teachers spent in in-service sessions was the time they spent outside the training sessions practicing and perfecting their computer skills. More than two-thirds of the teachers reported spending additional time outside in-service hours. While 36% spent from 1 to 5 additional hours; 18%

spent from 6 to 10 extra hours. Approximately 15% (34 participants) spent more than 16 hours on the computer outside in-service training time.

Individual Instruction. Beginning with computer literacy and proceeding through software use and evaluation, word processing, and programming, the consultant met with each teacher who was interested in any or all phases of the in-service program. If any interested teacher could not participate in a particular group session or required additional individual assistance, the consultant arranged to meet with that teacher at any mutually convenient time, usually during scheduled conference hours of the school day. In one school this meant the informal replication of each workshop topic six to seven times during each of the consultant's scheduled weekly visits.

Group Instruction. Because of greater efficiency in the use of the consultant's time, group instruction was arranged wherever class scheduling, teacher substitution, mutual conference hours, or block time allowed. Further restrictions on group instruction included the number of computers each district had available and the restricted use of "special-purpose" computers, which eliminated their multipurpose use as training machines.

Technical Assistance

The computer hardware and software varied greatly in type and quantity by district. The consultant first inventoried

what computers, peripherals, and software each district had accumulated, where they were physically located, and how they were being used. Some districts had taken advantage of vocational agriculture and/or special education monies to purchase equipment. Others, seeing the coming of (or being caught in the middle of) the computer age, had purchased equipment for various other or multipurpose uses. After determining each district's availability of hardware and assessing both faculty and administrative hardware needs given the immediate goals of the district, the consultant recommended additional purchases to the superintendent. The computer consultant's knowledge of various systems and recommendations as to exactly which brand and model of hardware best fit the individual district's needs greatly simplified the selection process. The breadth of the computer consultant's knowledge and his ability to quickly acquire information also greatly aided participating districts in choosing software to meet their specific needs.

The consultant also offered technical assistance to those few teachers who had some programming capabilities but needed help in overcoming programming barriers, debugging programs, perfecting programs, etc. He served as a ready resource person to anyone using computers in the participating districts.

The consultant offered advice in setting up computer labs for both teacher and student use. He stressed the mobility

of machines as a prerequisite for classroom use and recommended that machines be set on mobile carts. He suggested check-out procedures be established for equipment stored or located in libraries or other centralized locations.

He provided technical assistance to teachers on special-purpose computer programs--such as vocational agriculture's spreadsheet and accounting programs--and to secretarial and administrative staff on computerized class scheduling, student attendance, library circulation, achievement test analysis, student databanks, sports data, student records, fiscal accounting, payroll, budget planning, bus scheduling, and special-purpose word processing.

Introducing Computers to Elementary Classrooms

In one school, because of limited teacher interest in using computers in classroom instruction, the consultant scheduled time to bring one or more computers into each regular elementary classroom. Along with an introduction to the computer and a discussion of the rudiments of how computers worked, each class participated in a software program which allowed each student hands-on time with the computer. The consultant used programs such as "Lemonade" in which each student had a chance to input information into the computer and to see the results of his/her input.

By introducing elementary students to the computer, the consultant hoped to create teacher interest in using the computer for instructional purposes. The exercise served to challenge some of the preconceived notions the teachers had about difficulty of use, inappropriateness of computers to subject matter, durability of the machines, and quantities of hardware needed to allow all students access to the machines. Because the consultant carefully structured his demonstration to include the entire class in some portions of the exercise and set up "stations" that involved individual use during other parts of the exercise, many teachers quickly gained an appreciation for the "station" learning concept, which frees the teacher to devote time to specific individuals or small groups while others "self-direct" their computer work. The consultant used the classes to preview various MECC (Minnesota Education Computer Consortium) software programs for the appropriateness of subject matter and class level; again, these exercises contributed not only to students skill acquisition-- but perhaps more importantly-- also contributed to teacher awareness and acceptance. The consultant and elementary principal saw an attitude change among the elementary faculty with respect to computer use in the classroom; the number of teacher requests for computers in the classroom soon greatly outnumbered the computers available for use in the school.

Accumulating Hardware and Software Information

Being most familiar with Apple computer hardware, the consultant made an effort to gain specific information on other major brands of computer hardware. Some schools had previously made a commitment to a particular brand while others had several different brands and models on hand. The consultant found it necessary to become familiar with the different machines in order to serve the needs of all districts. While utilizing the considerable literature, manuals, journals, and trade magazines available, the consultant also found regional conferences, workshops, etc., to be a major source of information on computer use in the school and related topics. Taking advantage of proximity, the consultant also sought advice and assistance from various faculty specialists at UMC. While the small amount of time he spent attending conferences and following up on information leads outside the districts did not directly lead to improved district computer use, it was nonetheless considered an essential part of his role as consultant. Conferences attended by the consultant included the MECC Conference in Minnesota and the Rural Education Conference in Kansas, as well as other in-state workshops and meetings.

In-Service Training, 1983-84

Following the first semester's in-service training program and summer workshops conducted by the consultant,

the six consortium superintendents met to discuss their plans for the coming 1983-84 school year. Five of the six districts agreed to retain the consultant for an additional year to provide continued technical computer assistance and assist in implementation of a computerized instructional management system in the schools. The sixth district, which had earlier indicated interest in programming instruction only, felt that its needs had largely been served and--citing the distance between itself and the other consortium members--decided not to participate in the joint hiring of the computer consultant during the coming school year. The State Department of Education expressed interest in continuing as the sixth member of the consortium.

Goals for the 1983-84 school year for the remaining five consortium districts included:

(1) emphasis on use of the computer for instructional management purposes,

(2) word processing for teachers and office staff, and

(3) classroom computer use with an emphasis on MECC software programs.

The agenda with the Department of Elementary and Secondary Education (DESE) included:

(1) consultant presentations at microcomputer conferences,

(2) technical assistance to DESE staff using microcomputers,

(3) assistance in procurement of additional hardware, and

(4) computer training for secretarial staff in one DESE section.

The consultant's schedule during the 1983-84 school year was as follows:

Monday	--Ashland (switched with Glasgow mid-year)
Tuesday	--Hallsville
Wednesday	--Glasgow (switched with Ashland mid-year)
Thursday	--Fayette and Centralia (spent two consecutive days in alternating weeks)
Friday	--Fayette and Centralia (spent two consecutive days in alternating weeks)
DESE	--as needed basis

Time spent per day by the consultant in each district averaged from 7 1/2 to 8 hours.

EVALUATING THE IN-SERVICE TRAINING PROGRAM

As part of the evaluation of the consortium, a survey was conducted at the end of the spring 1983 in-service computer training program with those faculty members and administrators who had participated. Various faculty members from UMC provided assistance in design of the survey and analysis of the data. Two hundred forty-six teachers and administrative staff in the six schools of the MMSSC (more than 80%) responded to the self-administered questionnaire. Eleven of the 246 respondents were administrators who did not attend the in-service sessions.

Participant Characteristics

Of those responding to the in-service questionnaire, 26% were from Hallsville; 21% from Fayette; 21% from Centralia; 13% from Glasgow; 11% from Ashland; and 8% from St. Elizabeth, as shown in Table 2.

Table 2

Faculty Participation in
In-Service Training Evaluation

District	#	%
Ashland	28	11.4
Hallsville	63	25.6
Glasgow	32	13.0
Centralia	52	21.1
Fayette	51	20.8
St. Elizabeth	20	8.1
Total	246	100.0

Of the respondents, 44% were elementary teachers, 30% taught in high school, 20% were middle school teachers, and 5% were administrators or other staff, as shown in Table 3.

Table 3

Faculty Status of Respondents

Status	#	%
Elementary Teachers	104	43.5
High School Teachers	74	30.1
Junior High School Teachers	50	20.3
Administrative & Other Staff	11	4.5
(Missing Data)	(4)	(1.6)
Total	246	100.0

As shown in Table 4, 68% of the respondents reported having 10 years or less teaching experience.

Table 4

Years of Teaching Experience

Years	#	%
0-5 years	76	32.3
6-10 years	85	36.2
11-15 years	44	18.7
16-20 years	15	6.4
Over 20 years	15	6.4
Total	235*	100.0

*Non-teaching administrators were eliminated from this table.

Female respondents comprised 80% of the respondents as shown in Table 5.

Table 5

Sex of Respondents

Category	#	%
Male	48	19.5
Female	193	78.5
(Missing data)	(5)	(2.0)
Total	246	100.0

Obviously, participant characteristics varied somewhat by district. The variation in the number of participants reporting prior knowledge of computers by district was particularly important. Participants who reported having some knowledge of computers ranged from 10% in one district to 43% in another. Participants spending additional computer time outside in-service hours ranged from a low of 49% in one district to a high of 100% in another.

Participant Rating of In-Service Sections

The five major areas covered in the in-service sessions were evaluated separately, as shown in Table 6. The "Introduction to Computers" section was popular. Of the in-service participants responding, 85% rated the "Introduction" section as "good," "very good," or "excellent"; only 53% similarly rated the "Programming" section. Very little difference existed among the participants' evaluations of the "Software Evaluation," "Examination of Software," and "Wordprocessing" sections. They each received positive responses from roughly two-thirds of the participants.

Effect of Number of In-Service Hours Spent by Teachers on Level of Satisfaction

The positive rating of all in-service topics generally increased as the number of in-service hours spent by participants increased. The most marked increase was seen on Topic 5, "Programming"; only 40% of those spending 1-5 hours in training rated

Table 6

Participant Rating of In-Service Topics

Topic	Excellent	Very Good	Good	Fair	Poor
Topic 1: Introduction to Computers	16.0%	32.9%	35.6%	13.7%	1.8%
Topic 2: Software Evaluation	4.4%	18.6%	42.2%	28.9%	5.9%
Topic 3: Examination of Software	8.2%	24.1%	31.3%	29.7%	6.7%
Topic 4: Word Processing	12.7%	24.9%	29.5%	23.7%	9.2%
Topic 5: Programming	5.8%	16.0%	31.4%	32.7%	14.1%

the topic positively, while 88% of those involved in 16-20 hours training so rated it.

Spending additional computer time outside in-service training hours contributed to a greater satisfaction with all segments of the in-service training program with the exception of programming, in which there was a slight decrease in satisfaction among those spending a small amount (1-5 hours) outside training time over those who spent no outside time with computers. This may logically relate to a greater frustration level with initial use of the computer.

The peak satisfaction level for the topics of software and word processing came among those spending between 11-15 hours outside in-service time, perhaps indicating a lesser need for additional practice time in these areas.

For those who spent the time necessary to develop their programming skills, the evaluation shows that in-service training in this area met with a high level of satisfaction.

Effect of Years' Teaching Experience on Satisfaction with In-Service Training

Satisfaction with the "Introduction" and "Programming" topics increased with number of years' teaching experience. A positive evaluation of the "Introduction" topic was given by 80% of those with 5 or fewer years' teaching experience, while 93%

of those with over 20 years experience so rated it. While the satisfaction level with the programming topic was generally less across all categories of participants, nearly two-thirds of those with more than 15 years' experience rated it positively--"excellent," "very good," or "good."

It is of interest that those with 5 or fewer years' teaching experience were generally less likely to rate any topic positively than those with greater experience. An exception to this was the rating of the "Word Processing" topic in which approximately 70% of those with 15 or fewer years' experience rated it positively, while only slightly over half of those with more than 15 years' experience so rated it.

The participant evaluation of each in-service training topic broken down by number of hours spent in in-service training, number of hours spent outside training time, and number of years' teaching experience can be seen in tables B-1 through B-5 in Appendix B.

IMPACT OF THE MMSSC

The ultimate goal of the in-service training program, of course, was to have the districts utilize the computers and software that they already had, as well as the items that were purchased during the training phase.

Computer Use in the Classroom

One measure of success of the in-service training program is the extent to which those involved subsequently used the computer in the classroom. Table 7 shows that of the survey respondents, 179 (73%) reported that they had already used or had plans to use the computer in the classroom.

Table 7

Teacher Use
Microcomputers in the Classroom

	Have already used computers in the classroom		Plan to use computers in the classroom	
Responses	#	%	#	%
Yes	5	24.1	123	72.8
No	176	75.9	46	27.2

After elimination of the 15 administrators and nonteaching staff from the 246 respondents, the rate of past or planned usage rises to 78%.

The likelihood of use of the computer in the classroom increased with the number of hours spent outside training time. Only 5% of those having spent no computer time in addition to in-service training reported having used a computer in the classroom, while 65% of those spending more than 15 hours outside training time reported having already used the computer in the classroom. Similarly, the percent of teacher-participants planning future use of the computer in the classroom ranged from 67% among those spending no time outside in-service training to 81% of those spending more than 10 hours additional computer time. It can be inferred that virtually all of those involved in more than 10 hours computer time outside in-service training had used or planned to use computers as a teaching tool. Cause and effect cannot be clearly weighed here--those teachers having a prior commitment to computerized instruction would be more likely to spend additional time in polishing their computer skills for use in the classroom; conversely, those teachers spending additional time would likely be more comfortable with the computer and therefore more likely to use it in the classroom.

Extent of Post In-Service Computer Use Among Participating Districts

While all participating districts had a small amount of hardware at the beginning of the in-service training--indeed use of that equipment was their reason for hiring a collective consultant--use of that hardware was very limited in all but one school. Table 8 shows, by district, that computer usage at the end of the 1983-84 school year ranged from instructional use in the classroom to widespread administrative use; from out-of-class teacher use to computerizing library holdings; and from formatting school newspapers to recording sports statistics.

Instructional Uses

Instructional use of the computer in the classroom varied from district to district but a significant increase in the number of teachers using a computer in the classroom across all districts was attributed to the teacher in-service training. Courses in BASIC programming language or introductory computer literacy classes were offered in all five high schools; PASCAL or FORTRAN programming classes were also offered in two schools.

Teacher Uses Out of Class

Teachers made ample use of the computer in other areas as well. Teacher use of computers for word processing and for grade record keeping was extensive across all districts. Vocational agriculture teachers in each district used the computer for

Table 8

Post Inservice Use of Computers--
Mid-Missouri Small Schools Computer Consortium

COMPUTERS USED FOR	Ashland	Hallsville	Glasgow	Centralia	Fayette
Classroom instruction	X	X	X	X	X
BASIC/computer literacy class in high school	X	X	X	X	X
PASCAL/FORTRAN programming class		X			X
Teacher Word Processing (tests, etc.)	X	X	X	X	X
Teacher grade books	X	X	X	X	X
Teacher programming	X			X	
Ag. dept. spreadsheet/ data base management	X	X	X	X	X
Library --circulation					X
--overdue notices	X				
Administrative office use --word processing		X	X	X	X
--mail merge		X			
--accounting	X	X		X	
--payroll		X			
--budget planning		X			
--activity accounts				X	
Class scheduling		X		X	X
Class attendance		1984-85		X	1984-85
Student data files	X	1984-85			
Student permanent records			X		
Computer-printed grade cards				X	
Instructional Management	X	X	X	X	
Bus scheduling		X			
Inventory control					Ag. Shop only
IEP records		X	X		
Achievement test analysis		X			X
School newspaper	X			X	
School sport statistics	X			X	X

spreadsheet or database management applications, or both. Teachers in two schools used the computer for programming. Teachers in four of the schools began to use Mastery Management Software in conjunction with the Instructional Mangagement Program promoted by the State Department of Education.

Library Uses

One school computerized its library holdings and circulation activities; another used the computer to keep track of and print overdue notices.

Administrative Uses

Administrative use of the computer for word processing was widespread in four districts; three districts computerized their accounting procedures. One district made use of the computer for mail merge, payroll, and budget planning; a second district handled activity accounts and printed grade cards via computer. Three districts implemented computerized class scheduling and recorded class attendance via computer; one district used the computer to assist in bus routing and scheduling. Student data files were handled by computer in two of the schools; one school maintained student permanent records on the computer.

Other Computer Uses

One or more of the schools also put the computer to work tracking the vocational agricultural inventory, maintaining Invididualized Educational Program (IEP)

records, analyzing achievement tests, formatting and printing the school newspaper, and recording school athletic statistics.

Effect of In-Service Training on Hardware and Software Acquisition

Computer hardware has increased greatly since the beginning of the program both in type and quantity, showing a substantial commitment to educational computerization. Starting with a combined inventory of 28 central processing units (CPUs) in December of 1982, the seven schools had 97 CPUs by the end of summer 1984, a period of only 1 1/2 years. This 350% increase in hardware was accompanied by increased acquisition of software and peripherals as well.

Diffusion of the Consortium Concept

Based on the success and enthusiasm for the MMSSC consortium concept and program, the DESE Director of Curriculum Supervision arranged for a discussion of the concept at a state meeting of school administrators in August 1983. Interested schools were invited to attend an informal discussion of the concept. Approximately 50 small school administrators attended the meeting which included presentations by the Director of Curriculum Supervision, the Director of the UMC Office of Social and Economic Data Analysis (the consortium's UMC representative), and the consortium's computer consultant. Those in attendance were encouraged to consider the idea further and to let DESE know if they would like

additional information. The Director of Curriculum Supervision intended to use a part of the computer consultant's time commitment to DESE to follow up with any nascent consortia.

By late fall 1983 two other clusters of rural schools in central Missouri had communicated an interest in organizing a computer consortium. Subsequent meetings were scheduled among those districts in January 1984 to begin the process of consortium formation. The focus in both groups was on instructional applications of computer technology. Both clusters organized themselves into consortia, employed computer specialists, and became operational during the spring of 1984. The two new consortia were composed of four and six member schools respectively and included schools with similar enrollments and community sizes to those involved in the MMSSC. As in the case of the MMSSC, some assistance in consortium formation, operation, and funding was provided by McREL, UMC, and the DESE.

One of these newly formed consortia indicated an additional interest in a broader range of adaptive technologies for smaller rural schools. These schools were essentially concentrated in one highly agricultural county. All schools were small and had severe curriculum constraints as a result of their small number of students and teaching faculty. Following up on this interest, representatives from McREL and UMC spent 2 days in February 1985 visiting these schools and holding subsequent meetings with

administrators. Several innovations, mostly involving shared services, were discussed and some--including a videotaped/independent study Spanish course--were implemented during the 1984-85 school year.

SUMMARY

We have drawn certain conclusions about factors pertinent to the operation of a consortium of small schools from the experience of the Mid-Missouri Small School Consortium. We offer these in a general form although there are specific experiences from the MMSSC that reinforce each of them.

Principles of Operation Suggested From Experience With School Consortia

1. PURPOSE--A consortium may be organized for any purpose where there is a clear advantage to cooperation and/or pooling funds. Consortia are also an effective means of attracting supplementary funding. Some kinds of consortium arrangements such as athletic conferences have been a standard method of operation for many years.

2. NUMBER OF MEMBERS--Consortia seem to work best with at least three, but no more than seven or eight member districts.

3. MEMBER LOCATION--The geographic proximity of cooperating districts facilitates more frequent meetings and makes it easier to share a service or program.

4. MEMBER SIZE--Consortia seem to work best if the member schools are of similar size. Schools of approximately the same size in the same region tend to have similar problems that might be effectively addressed by cooperation. Even if large schools have similar problems, they tend to have different methods and resources than small schools.

5. ORGANIZATION--A consortium does not require any formal organization; in fact, it seems to work best when it remains informal.

6. LEADERSHIP--A consortium does not require a formal leader, but it seems to work best when the superintendent represents each member school in the consortium. One superintendent might be "elected" to serve as chair or convener.

   Even if other school personnel are involved in the consortium, the success of consortium activities seems to be enhanced when the superintendent takes an active role and represents the school at consortium meetings.

7. FINANCES--If the consortium pools funds from each school to hire a specialist, purchase equipment, etc., it seems to work best if one school agrees to serve as fiscal agent, employing district, etc. Under that agreement each district contributes an agreed amount to the fiscal agent school, which then takes

responsibility for paying consortium bills, accounting for funds, etc.

If the consortium hires personnel, it seems to work best if one district officially employs the person with an agreement about how the person's time will be allocated among districts.

8. FREQUENCY OF MEETINGS--Consortia seem to work best if there are frequent meetings (especially in the formative stage) of the superintendents of the consortium schools. Frequent meetings--providing there is an agenda to deal with--tend to reinforce support for the consortium activity and maintain the cooperative working relationship essential to consortium effectiveness.

   Meetings not only tend to keep the consortium idea on track but also lead to new ideas and areas of collaboration.

9. OUTSIDE RESOURCES--While not essential, experience with several consortia suggests that the consortium tends to be more effective if it takes advantage of outside resource persons from colleges, the state department of education, public agencies, etc., who can work with the consortium toward accomplishing its objectives. Experience has also shown that such resource persons are often willing to work with a consortium whereas they might be less willing to work with an individual school.

Developing an ongoing relationship with resource persons or organizations seems to also contribute to consortium longevity and better access to pertinent information, programs, materials, services, etc.

Other Observations

A consensus in the literature and the favorable experiences of the MMSSC tend to support some of the following basic tenets of the Mid-Missouri model: (1) the size of the districts involved--their relative smallness--may have contributed to their success in implementing electronic technology; (2) the banding together of individual districts in a mutually beneficial, collaborative effort made the undertaking more financially and programmatically feasible; (3) teacher in-service training, as a first step in making teachers comfortable and knowledgeable about computers in an educational setting, seems to be a prerequisite to the successful use of technology in schools; (4) the joint hiring of a staff person to conduct the in-service training onsite further contributed to the extended use of computers in the classroom; (5) while a small amount of outside monies was used by the consortium, it was the consortium districts which undertook the financial obligations and technological commitments, therefore increasing their commitment to the project's "success"; and (6) the availability and use of university and other outside agency personnel allowed the consortium widespread access to valuable information and other resources.

Costs in Relation to Benefits

In the end, determining educational costs in relation to benefits most often must be reduced to a subjective analysis of the degree of satisfaction among the recipients. Was it worth what it cost? While we did not undertake a formal analysis of this question, one can point to the continued satisfaction of the districts with the concept and methods employed, and the continued existence of the consortium. As can be seen from the evaluation and post in-service use of the computer, a demonstrable change certainly occurred both in the capabilities of the faculties and in the acquisition and use of computer hardware and software. While we can't say that no one district could or would have undertaken the financial obligation of hiring a full-time computer specialist, the collaboration of multiple districts made the endeavor much more affordable to districts of limited means and allowed a much more timely entry into the world of educational computer technology.

APPENDIX A

CHARACTERISTICS OF SCHOOLS AND COMMUNITIES FORMING THE MID-MISSOURI SMALL SCHOOLS CONSORTIUM

The seven schools represented at the original meeting which formed the consortium are located in the central Missouri area. The two most prominent towns in central Missouri are Columbia--home of the University of Missouri (62,000 population)--and 30 miles to the south, Jefferson City (34,000 population), the state capital. The Missouri DESE is located in Jefferson City. Jefferson City and Columbia are the two major centers of employment in the region as well. Interstate 70 crosses the state from St. Louis to Kansas City and runs through Columbia. Columbia is 125 miles from both Kansas City and St. Louis. Agriculture is prominent throughout the region although the regional economy is fairly mixed.

The region is not sparsely populated, although with the exception of Columbia and Jefferson City, it is predominantly rural. Small towns that once primarily served the needs of farmers are located about 8 to 10 miles apart throughout the region. There were once many more small towns but a large number of these have diminished into small villages with hardly any local services. School consolidation 20 years ago was one of

the factors that led to the decline of these small communities.

Detailed information on characteristics of the six schools that combined to form the consortium appears in Tables A-1 and A-2. The towns in which the schools are located range in population from 302 to 3,537. Among the communities, only Centralia and Fayette have populations in excess of 1,500. The schools are all a result of past consolidations and range from 326 to 1,157 in K-12 enrollment. The number of teaching faculty range from a low of 23 in St. Elizabeth to a high of 70 in Centralia. Students per teacher range from 10 in Glasgow to 16 in Hallsville and Centralia.

Among the communities, Glasgow and St. Elizabeth are best described as farming communities. Centralia is a mixed farming and manufacturing community. Hallsville and Ashland are surrounded by farms but depend heavily on commuting to employment in Columbia and Jefferson City. Fayette is also a farming community, but is the county seat and has a small liberal arts college. According to 1980 census data reported by school districts, per capita income in each of the communities is slightly below the state average.

It has been emphasized elsewhere that proximity can be a factor in the successful operation of a consortium. That has proven to be the case for MMSSC. Of the seven original schools, the one which did not become a consortium member--Macks Creek--was located 60 miles to the south and west of

Jefferson City and was at least that far from St. Elizabeth, the next closest consortium member. Aside from St. Elizabeth, which is 20 miles south of the state capital, the only other school south of Columbia is Ashland, which is halfway between Columbia and Jefferson City--15 miles from each. The remaining four schools are much more concentrated north of Columbia. It is understandable for distance reasons that Macks Creek chose not to participate in the consortium and that St. Elizabeth did not continue beyond the first year. The five schools that continued into the second year were in much closer proximity, their athletic teams often competed although they were not all of the same size, and they had often coordinated activities in the past.

Table A-1

Populations and School Enrollments of Consortium Communities

Community	Population*	School Enrollment			
		Elem.	Jr. High	Sr. High	Total
Centralia	3,537	443	332	382	1157
Hallsville	453	405	260	257	922
Fayette	2,966	249	217	243	709
Ashland	1,028	361		324	685
Glasgow	1,337	220		138	358
St. Elizabeth	302	164		162	326

*Based on 1980 Figures

Table A-2

Number of Teachers and Student-Teacher Ratio in Consortium Communities

Community	Teachers Grades K-12	Ratio of Students Per Teacher
Centralia	70	16
Hallsville	58	16
Fayette	59	12
Ashland	45	15
Glasgow	35	10
St. Elizabeth	23	14

APPENDIX B

PARTICIPANT RATINGS OF IN-SERVICE TRAINING TOPICS BY OTHER VARIABLES

Table B-1

Participant Rating of "Introduction to Computers" (Topic 1) by Other Variables

	------Participant Rating------ "Excellent," "Very Good," or "Good"	"Fair"	"Poor"
Hrs. spent in in-service training	%	%	%
1 - 5	81.5	13.0	5.6
6 - 10	84.8	14.1	1.0
11 - 15	84.4	15.6	0.0
16 - 20	100.0	0.0	0.0
Hrs. spent outside training time			
0	69.5	25.4	5.1
1 - 5	84.8	13.9	1.3
6 - 10	100.0	0.0	0.0
11 - 15	83.3	16.7	0.0
Over 15	96.2	3.8	0.0
No. years teaching experience			
0 - 5	79.7	17.4	2.9
6 - 10	86.5	12.2	1.4
11 - 15	81.6	15.8	2.6
16 - 20	92.9	7.1	0.0
Over 20	92.9	7.1	0.0

Table B-2

Participant Rating of
"Software Evaluation" (Topic 2)
by Other Variables

	------Participant Rating------		
	"Excellent," "Very Good," or "Good"	"Fair"	"Poor"
Hrs. spent in in-service training	%	%	%
1 - 5	61.4	25.0	13.6
6 - 10	69.1	28.7	2.1
11 - 15	66.7	27.3	6.1
16 - 20	75.0	25.0	0.0
Hrs. spent outside training time			
0	54.0	32.0	14.0
1 - 5	70.1	27.3	2.6
6 - 10	67.5	30.0	2.5
11 - 15	100.0	0.0	0.0
15 - 20	66.7	16.7	16.7
Over 20	65.0	35.0	0.0
No. years teaching experience			
0 - 5	57.8	34.4	7.3
6 - 10	68.1	24.6	7.2
11 - 15	68.6	28.6	2.8
16 - 20	61.5	38.5	0.0
Over 20	71.4	28.6	0.0

Table B-3

Participant Rating of
"Examination of Software" (Topic 3)
by Other Variables

	------Participant Rating------		
	"Excellent," "Very Good," or "Good"	"Fair"	"Poor"
Hrs. spent in in-service training	%	%	%
1 - 5	58.5	26.8	14.6
6 - 10	64.8	30.8	4.4
11 - 15	62.5	31.3	6.3
16 - 20	85.7	14.2	0.0
Hrs. spent outside training time			
0	50.0	32.6	17.4
1 - 5	68.4	30.3	1.3
6 - 10	75.7	18.9	5.4
11 - 15	83.3	16.7	0.0
16 - 20	60.0	40.0	0.0
Over 20	55.0	35.0	10.0
No. years teaching experience			
0 - 5	51.7	36.2	12.1
6 - 10	73.9	23.2	2.9
11 - 15	64.7	26.5	8.8
16 - 20	58.3	41.7	0.0
Over 20	58.3	41.7	0.0

Table B-4

Participant Rating of
"Word Processing" (Topic 4)
by Other Variables

	------Participant Rating------		
	"Excellent," "Very Good," or "Good"	"Fair"	"Poor"
Hrs. spent in in-service training	%	%	%
1 - 5	66.7	19.4	13.9
6 - 10	63.6	27.3	9.1
11 - 15	72.4	17.2	10.3
16 - 20	71.4	28.6	0.0
Hrs. spent outside training time			
0	57.1	31.4	11.4
1 - 5	64.7	23.5	11.8
6 - 10	73.0	18.9	8.1
11 - 15	83.3	16.7	0.0
16 - 20	75.0	25.0	0.0
Over 20	77.8	16.7	5.6
No. years teaching experience			
0 - 5	68.6	21.6	9.8
6 - 10	69.4	21.0	9.6
11 - 15	70.4	18.5	11.1
16 - 20	54.5	45.5	0.0
Over 20	56.3	33.3	8.3

Table B-5

Participant Rating of
"Programming" (Topic 5)
by Other Variables

	------Participant Rating------		
	"Excellent," "Very Good," or "Good"	"Fair"	"Poor"
Hrs. spent in in-service training	%	%	%
1 - 5	40.0	36.0	20.0
6 - 10	44.9	36.2	18.8
11 - 15	61.3	29.0	9.7
16 - 20	87.5	12.5	0.0
Hrs. spent outside training time			
0	46.9	34.4	18.8
1 - 5	42.1	43.9	14.0
6 - 10	59.5	27.0	13.5
11 - 15	60.0	40.0	0.0
16 - 20	50.0	0.0	50.0
Over 20	88.2	5.9	5.9
No. years teaching experience			
0 - 5	50.0	39.1	10.9
6 - 10	47.1	37.3	15.7
11 - 15	57.1	21.4	21.4
16 - 20	63.6	18.2	18.2
Over 20	63.6	36.4	0.0

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