AN EXAMINATION OF THE IMPLEMENTATION, OPERATION, AND BENEFITS OF A MOBILE COMPUTER CLASSROOM FOR BUSINESS AND INDUSTRY TRAINING

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CHAPTER I

INTRODUCTION

Changing Needs in the Workplace

Technology has created the need for new skills in the workplace. Even though workers realize that technology is affecting their jobs, they often do not understand what is happening, or why. In an effort to cope with change, these workers are seeking training programs to provide needed skills. Fields (1987) hinted at the wide variety of programs being offered to provide employees with answers: upgrade training, specialized training, advanced training, retraining, and on-the-job training. In response, employees are taking advantage of nearly every type of training offered. Meierhenry (1982) included the following information on adult education courses provided by the National Center for Education Statistics from 1980 which reported that most adult courses are taken for job related reasons:

> When the percentage of adults engaged in taking adult education courses to advance in a current job (38.9 percent) was added to the number enrolled to get a new job (10.5 percent) and to other job related reasons (3.3 percent), it is evident that more than 50 percent of all adult education is related to jobs and work (p. 62).

Sbaratta (1986) proposed that adult education go a step further and establish a priority to be concerned with reshaping skills, developing new skills and sharpening existing skills of workers to

meet the changing times and challenge of technology. Fields (1987) added that even though a multitude of programs exists, there is a wide gap for continuing education to bridge between the kind of instruction available and the training required by employers.

Technology has brought with it a high price tag for training in the workplace. According to Hauge (1986), eight million adults annually seek some form of continuing education at a cost of $40 billion to employers. In addition, Fields (1987) placed the federal budget for continuing education in some 300 federal programs at $30 billion a year and attributed another $20 billion a year to state and local programs. In fact, Fields continued, considering the multi billions of dollars spent on continuing education, improving the overall efficiency of the investment by even two percent would be like creating a new billion dollar program.

Computers, one of the forms of technology, have been a major source of changes in the workplace. As Lawton and Gerschner (1982) stated: "Computers are not just becoming more and more a part of our world. To a great degree, they are our world" (p. 54). Heermann (1986) reflected the widespread use of computers by including a statistic from InfoWorld, 1985, revealing that $1.3 billion was expended worldwide for software in 1984. Burns (1987) quoted a United States Department of Labor statistic reporting that about two million new computers were put into use in 1984, meaning that about two million workers had to learn how to use them. Burns (1987) compared the 2 million figure to being roughly equal

to the number of high school graduates per year in this country.

What lies ahead? Looking toward the year 2000, Sbaratta (1986) quoted Irwin Leveson, economist for the Hudson Institute, who predicted that in 50 years, 80 percent of the workforce will be employed in either manufacturing computers, providing services or providing information to society. Corbett (1983) estimated that 40 million adults in America will be making a career change in the next 10 years. Fields (1986) cited the U.S. Assistant Secretary of Labor who said that in the future, many people will need to be retrained six to ten times in the course of their working lives. Semerad (1987) discussed two studies.

One study by the United States Department of Labor showed that between now and 2000, almost all new jobs will be in high technology, information and service areas.

The second study by the Hudson Institute showed that all new jobs between 1985 and 2000 will be in nongoods-producing industries and that there will be a decease of 400,000 skilled and unskilled production jobs and an increase of 9.4 million professional, marketing and sales positions. The study concluded that the workforce of 2000 will be older and include more women and minorities.

As Semerad (1987) observed, with society's shift from an industrial to an information base and with the large numbers of people needing retraining, never before has the need for education been so abundantly clear. Semerad, a former executive vice president of the Brookings Institute who worked on the White House Domestic Policy Council in the Nixon and Ford administrations, was

quoted by Fields (1986):

> The technological age is going to be different, with different pressures, different demands, and the assumption that just by magic America will maintain this great standard of living is a dangerous attitude. It's pretty clear that dislocation is going to be much more common, a regular part of work life in this country. The nation may face continuous changes in the kinds of industries and businesses that can be profitable. What is needed are systems that assure people that they will do a particular job for a few years, and then enter an orderly process where they are trained by companies, by government, by vocational - technical schools, and by communities (p. 7).

The Future of Training in Industry

Now more than ever with changing technology, it is imperative that companies maintain an interest in keeping employees current in their skills. According to Charner and Rolzinski (1987), this problem can be handled in many different ways, one being for industry to provide training. They found that many corporations are currently resorting to operating basic skills and remedial courses in increasing numbers. They go on to predict that due to changes in the economy, there will be a shift in philosophy which will require education to interface with business and become involved in economic and human resource development.

Sbaratta (1986) agreed and proposed the following:

> Upgrading human capital should become a theme for the 1990's. An area of fruitful expansion is the development of relationships with business and industry as an extension of continuing education (p. 16).

The only way to provide retraining and upgrade training at the accelerated rate needed for the future may be through another solution of using education and business partnerships. Carrier

(1987) indicated that big business is looking at new technologies to help industry provide the necessary training to "speed up training to make it more flexible and to reduce costs associated with travel and time away from the job" (p. 56). Rolzinski and Charner (1987) concluded that the integration of education and work is not easy, and that partnerships between education and companies, unions, and government agencies are not a natural condition at this point in time. They continued with the following:

> Despite enthusiasm about expected benefits and mutual respect, educators and employers are most likely to abandon partnerships of this type because of differences in customary approaches to work. Each organization has its own distinct pattern of behavior. In entering a partnership each organization faces challenges to its long standing traditions and accepted behavior (p. 77).

A part of the solution, according to Rolzinski and Charner (1987), is flexibility. This would include such things as sharing personnel, information, and responsibilities. They also believed that a feeling of shared ownership could be obtained only in an open and flexible atmosphere with partners "who can agree to go back to the drawing board as often as is necessary" (p. 78).

Within a very short span of time, this country has moved from an industrial society to an information society. Computers, particularly microcomputers, have made a major impact on the workplace and the need for training and retraining people to use them has become more intense. Computer literacy is emerging as a necessity for employees to function successfully in their jobs. Because of foreign and national competitiveness, business and industry must stay on the cutting edge in keeping up-to-date

skilled employees. This requires that many employees develop a knowledge and understanding of microcomputer application in their work.

Statement of the Problem

Businesses are looking at new methods for providing training, making it more flexible, and reducing costs associated with time away from the job. Traditionally, vocational schools have provided training and retraining at the school site as opposed to delivery of training at industrial locations. As the need intensifies for providing training on-site for industry, alternative ways for delivering training are being pursued.

The problem is to determine if it is feasible for a vocational-technical school to operate a mobile computer classroom to provide computer training on-site for business and industry.

Purpose of the Study

The purpose of this study was to review the implementation, operation, and benefits for an area vocational-technical school to provide computer training in a mobile computer classroom to individuals at industry-specific sites.

Research Questions

The information gathered to complete this study was controlled by seven research questions:

1. What are the benefits to a vocational-technical school in

implementing and operating a mobile computer classroom?

2. Is computer instruction in a mobile computer classroom cost-effective for a vocational-technical school?

3. What coordination is being done to work with the private sector?

4. What criteria was used in the selection of an instructor?

5. What types of hardware and software are being used?

6. What is the design of the curriculum and how is it arranged?

7. What types of students are being served?

Assumptions

For the purpose of this study, the following assumptions were accepted:

1. The questionnaire developed was valid and reliable.

2. The instrument provided the necessary information for this study.

3. The respondents were able to give their answers in an unbiased and honest fashion.

Scope and Limitations

This study was limited to all known vocational-technical schools in the United States which currently operate or plan to operate mobile computer classrooms for the purpose of contracting and providing computer instruction to business and industrial organizations.

Definition of Terms

These terms were used in the study:

Area Vocational-Technical School (AVTS): A vocational-technical school established in a specific geographic district to provide training programs in vocational-technical education for students of participating high schools and for adults within that district (Oklahoma State Department of Vocational and Technical Education, 1980).

Computers: For the purpose of clarity, the term computer and microcomputer will be used synonymously.

Computer literacy: This term encompasses a basic understanding of microcomputers including: (1) microcomputer components, (2) microcomputer applications, (3) types of software packages, and (4) microcomputer operation.

Computerphobia: Computerphobia is: (1) a resistance to talking about computers or even thinking about computers; (2) fear or anxiety towards computers; and, (3) hostile or aggressive thoughts about computers (Jay, 1981).

Industry-specific training: Industry-specific training is provided for the need and benefit of one particular business or for a group of like businesses.

Information society: A new society succeeding the industrial and technical societies in which it is predicted that a large percentage of occupations are involved with gathering, compiling, manipulating, and providing information for decision making.

Mobile computer classroom: A mobile computer classroom is a self-contained computer classroom complete with computers, printers, instructional equipment, and an independent power supply. This

type of facility would be used to provide on-site training away from the school campus.

On-the-job training: On-the-job training is similar to apprenticeship; the employee is hired and trained as he/she is involved in production.

Retraining: When a person can no longer perform in an area for which he/she is trained due to health reasons, job obsolescence, reduction-in-force lay off, or business closings, that person requires retraining to be gainfully employed at a comparable level of income.

Upgrade training: The process of raising a person's skill level to allow advancement, usually within the organization where the person is employed. In many cases, the employer will pay the cost of training to retain an employee and increase that person's productivity.

Organization of the Study

Chapter I has introduced the study, presented the problem, purpose, research questions, assumptions, scope and limitations and definitions to clarify terms used in this study. Chapter II reviews literature on computer training as it relates to industry needs. Chapter III explains the methodology used in this study. Chapter IV presents the findings. The findings, conclusions, and recommendations are set forth in Chapter V.

CHAPTER II

REVIEW OF LITERATURE

Technology has created a need for new skills in the workplace (Vernon and Young, 1986). The shift from an industrial to an information society has brought microcomputers to the forefront, and the need for training employees to use them has become a source of concern for employers (Semerad, 1987). Training has also become big business. The amount of training needed in the workplace cannot be supplied fast enough by employers; consequently, they have begun to look elsewhere for help (Carrier, 1987). One innovative approach has teamed education and business with vocational schools providing site-specific training (Charner and Rolzinski, 1987). The efficiency and effectiveness of this type of training are the subject of this study with research specifically applied to computer training in mobile computer classrooms.

Employers' Needs for Computer-Trained Employees

Employers are developing a new respect for training in their desire to employ more efficient and productive workers. Sbaratta (1986) quoted Peters and Waterman's (1986) In Search of Excellence in reporting that:

> Excellent companies have a tough-minded respect for the individual and the willingness to train him, to set reasonable standards and clear expectations for him,

> and to grant him practical autonomy to step out and contribute directly to the job (p. 21).

In addition, Hunter and Aiken (1987) observed that employers are currently not as interested in hiring new employees as they are in retraining their own employees, particularly for data entry and computer operator positions.

Employers are also looking for convenience and cost-effectiveness in a training program. Meierhenry (1982) suggested that accessibility to the location of the microcomputers is important. Hollowood (1986) measured the importance of accessibility in terms of the value of keeping employees on site. Meierhenry (1982) cited statistics from the National Center for Education Statistics (NCES) in reporting that more than one-eighth of adult learners who drop out of courses do so because the time and/or location are inconvenient. Ewing, Ewing, London and Ramirez-Ponce (1986) advocated on-the-job computer training as opposed to training on the learner's own time. The former helps the student relate what he or she is learning to real-life circumstances. They also believed that such a program of intensive-guided training would, in the long run, save the companies money.

Scott (1986) further explained the importance of training when measuring business results by saying that business results are measured in effectiveness changes (the same number of people performing the task with increased revenues) and efficiency changes (the same revenues being performed with fewer people). Training, according to Scott, is an investment because of its ability to reduce staff with the same revenue or increase revenue with the same staff. He advocated "corporate-centered training"

or training which, "directly related to job requirements with specific outputs that will impact corporate objectives and profits" rather than person-centered training which resulted in personal growth which "may or may not be relevant to corporate directions" (p. 32).

Employers are also looking for flexibility in scheduling. An abundance of inventive methods for meeting this need do exist. There are many alternatives to a 40-hour class which meets once a week. Clark (1986) proposed scheduling classes quarterly or on some fixed timetable and training employees as the classes become available even though they may not need the skill in the near future. Amador (1986) placed the total hours of necessary instruction in a computer course at from 15 to 30. He also observed that Friday and Saturday classes are very successful. Vernon and Young (1986) proposed a course of 16 sessions of one and one-half hours twice weekly for eight weeks or three hours of instruction per week for eight weeks for a total of 24 hours. Clark (1986) even suggested extending instruction beyond the classroom to follow-up training on the job.

Of utmost importance to the employer is that when the training is complete, the newly acquired skills are transferred to the workplace. Grabowski (1983) detailed twelve different methods to help ensure that learners will use their new skills. These included:

1. Personal action plans
2. Group action planning
3. Multiphase programming
4. The buddy system
5. Performance aids

6. Recognition systems
7. Training trainees as trainers
8. Contracting
9. Ample access to resources
10. Follow-up
11. Follow-up contacts
12. Follow-up sessions

Ewing, Ewing, London and Ramirez-Ponce (1986) stated that adult learners will practice only those skills that are satisfying, rewarding, and relevant in a social, cultural or vocational way.

Wolfson (1986) suggested that success in the transfer of skills will be more assured if certain guidelines for the selection of students for training are followed. In his screening process, students needed to possess the following attributes to be admitted to word processing training:

1. 9th grade math and reading levels,
2. a high school diploma,
3. general clerical skills (filing, message-taking),
4. the ability to follow written directions,
5. good concentration,
6. typing skills of at least 40 words per minute with few errors,
7. the ability to sit at a desk for up to six hours per day, 30 hours a week.

Wolfson (1986) estimated that success is highest with trainees who possess good verbal and written communication skills and rapid

typing ability.

Employees' Needs for Computer Literacy

Barnes (1986) stated that becoming "computer literate" evolves in three stages: "overcoming computerphobia; learning what the computer can do; and learning how to use it" (p. 312). According to Ewing, Ewing, London and Ramirez-Ponce (1986), many adults find it difficult to progress past the first stage. They stressed the difficulty adults have in performing tasks that are unrelated to their previous experiences, and they explained that adults often do not feel successful when using computers as opposed to the feelings of success that accompany doing tasks the old way. Ewing, et al. (1986) and Barnes (1986) reported that adults need to feel that what they are learning relates to real life circumstances. Lawton and Gerschner (1982) listed the following contributory factors to negative attitudes in adults or "computer illiteracy:"

1. the numerous terms used in computer instruction
2. the various methodologies used to assess the effectiveness of and attitudes towards projects
3. the variety of software described in the studies
4. the various aspects of implementation which contribute towards 'computerphobia' (p. 51-52).

Lawton and Gerschner (1982) also quoted Ringle who believes that adults learning about computers actually become subordinate to the technology and experience "frustration, helplessness, ill-founded contempt, blind trust, uncritical dependence on experts, and general technological alienation" (p. 53).

Selection of the Curriculum and the Instructor

As is apparent from the previous section, conducting a training program on computers in the workplace requires a delicate balance. On the one hand is the employer who needs more productive, highly-skilled employees. On the other hand is the employee who may feel intimidated, frustrated and resentful of the new technology. In the middle is the instructor with a curriculum designed to meet those divergent needs. It is a challenge which requires innovative people and methods.

Heerman (1986) placed high priority on the selection of the instructor in computer training classes. Ewing, Ewing, London and Ramirez-Ponce (1986) and Lockheed and Mandinach (1986) stressed the need for experienced teachers. Ewing, et al (1986) reported that it is the experienced teacher who reduces anxiety in the students and is more cost-effective for the employer. Ewing, et al. (1986) also recommended that the instructors be trained adult educators who understand the technology as well as what motivates adults to learn. Lockheed and Mandinach (1986) thought that instructors should be skilled in curriculum development. Heerman (1986) said that the instructor is the only force in the computer classroom capable of providing the motivation and personal dynamism necessary to guarantee that adults will achieve the desired learning outcomes.

In addition to the careful selection of an instructor, among the methods used to meet the computer literacy needs of the employer and employee in the workplace are the design and delivery

of the curriculum (Hunter and Aiken, 1987). Through experience, several educators have suggested guidelines for a structurally sound curricular base. Clark (1986) said that the organization should, first of all, demand that the course be instructionally valid. That is, "each course should prove that people who take it and invest reasonable effort will attain the objectives" (p. 87). Amador (1986) suggested that the best class structure for attaining that goal is hands-on experience with one adult to one computer in classes no larger than thirty students using lecture along with demonstration and lab components. Vernon and Young (1986) advocated courses consisting of sixteen sessions for a total of 24 hours of instruction per course. They also proposed units of instruction that were self-contained with no outside work required.

Over the years there have evolved two schools of thought about computer instruction. Originally all computer training included a section on programming. In many current curriculums programming has been eliminated; allowing training to focus on specific software applications. The curriculum of the past and the curriculum of the present lead Hunter and Aiken (1987), Amador (1986), and Lockheed and Mandinach (1986) to discussions about teaching programming versus teaching software applications. Hunter and Aiken (1987) observed that changes in the job market have changed the emphasis in computer education at vocational schools to a focus on broader more transferable basic skills. They said that in the past, valuable time had been wasted on viewing the computer as an object of study rather than as a tool. Amador (1986) agreed

and added that the need to teach programming becomes less and less as software programs become more readily available. Lockheed and Mandinach (1986) believed that a curriculum based on software applications would foster more positive affective responses (interest in and liking of computers) than a curriculum based on programming, and at the same time, it would be teaching the same higher cognitive skills learned in programming. They cited research to support the following two conclusions:

> First, learning to program and learning from various computer environments (e.g., applications software, simulations) more generally, is likely to stimulate the acquisition of higher-order cognitive skills.
>
> Second, skills identified as important in programming have analogues in and can be generalized to other computer-learning environments (p. 23).

The ideal curriculum for Amador (1986) included a short lesson on the differences between applications software and programming. Amador (1986) and Barnes (1986) agreed that the bulk of the course should emphasize experience with word processing, spread sheets and data-based management systems. Barnes (1986) further outlined the objectives for such a course:

> 1. To present a comprehensive overview of the computer: what it is, what it can and cannot do, how it operates, and how it may be instructed to solve problems.
>
> 2. To familiarize learners with the technology of data processing.
>
> 3. To examine the application of the computer to a broad range of organizational settings and social environments.
>
> 4. To prepare learners to understand the use of computers, specifically microcomputers, in both their personal and professional lives (p. 313).

Further definition of the curriculum content, according to Corbett (1983), should come from the community, the workplace, the educational institution and the learners. Niemi (1987) particularly emphasized the importance of planning systematically to consider the distinctive characteristics of each group in their interests, needs and motivations. Clark (1986) also proposed matching courses to group needs but said that the needs should be determined primarily from two sources: "(1) a validated analysis of current job tasks and the skills required to perform them; and, (2) a model of the future technological directions of the organization agreed upon by upper management" (p. 83). Ewing et al. (1986) said that computers are a particularly complicated subject matter to teach because the adult learner is forced to learn "computerese," a vocabulary much like a foreign language.

To implement a design, Carrier (1987) warned that certain feelings of isolationism and reluctance to learn will result in adults. Ewing, Ewing, London and Ramirez-Ponce (1986) favored reassurance in the form of rewards as evidence of success for adults who felt that the old ways of doing things were no longer appreciated by employers. Lawton and Gerschner (1982) reported that anxiety about computers is more prevalent in women. They also reported that one solution to reducing anxiety would be to use lessons "that produce low student error and thus lower student frustration" (p. 54). Vernon and Young (1986) and Wolfson (1986) recommended completion activities as a reward in the form of a certificate, grades awards and even ceremonies.

To further reduce the feelings of isolationism in computer instruction, Ewing, Ewing, London and Ramirez-Ponce (1986), Mintz (1986), and Clark (1986) recommended using the group process. Ewing, et al. (1986) defined the group process as a tool for problem-solving tasks in the workplace. Applied to the computer classroom, they said that one such problem to be solved by the group would be: "How can the computer help in the performance of certain tasks?" (p. 22). Mintz (1986) felt that the especially difficult tasks should not be assigned to individuals but completed in small groups to eliminate anxiety. Ewing, et al. (1986), and Clark (1986) agreed that the group process removes the barriers to learning in the computer classroom for adult learners by providing good morale through group support and facilitating recall of information at a later date.

Clark (1986), Grabowski (1983), and Ewing, Ewing, London and Ramirez-Ponce (1986) emphasized that the best way to retain the knowledge gained in the computer classroom is to make sure it is integrated into the workplace. Grabowski (1983) further cited sources which placed the following three conditions on the transfer of newly acquired knowledge to the workplace:

1. The training content must be (and must be perceived by the trainee as) useful and relevant to the job.

2. Trainees must acquire the knowledge and master the skills that constitute the training content.

3. Trainees must be sufficiently motivated to change their behavior by applying their new proficiencies to their work situations (p. 9).

The assumption that a training program has been effective and that the knowledge will be transferred into the workplace cannot

always be made. As Grabowski (1983) pointed out, Peter F. Drucker was correct in predicting that the "concern and demand for performance and accountability will be part of all educational endeavors, and especially of continuing education, throughout the 1980's and the 1990's" (p. 5). Clark (1986) proposed competency based training to provide a basis for evaluation.

Design of Conventional Computer Training Facilities

Selecting computer hardware and software is like the old adage: "Which comes first, the chicken or the egg?" Hollowood (1986) took the position that "while conventional wisdom suggests that we should determine software requirements before considering hardware, hardware decisions are often made prior to a full explication of software" (p. 18). He went on to suggest that there are many reasons why institutions make hardware decisions first: (1) hardware is selected based on the equipment being used by organizations which employ their graduates; (2) budgetary constraints may change the plan from what is wanted to what is affordable; and, (3) many institutions have aligned themselves with vendors who are willing to take trade-ins or who offer money-saving deals or arrangements.

When buying microcomputers the manufacturer of computers must be taken into consideration. Amador (1986) proposes that the costs of hardware can be kept to a minimum by using one brand of microcomputer. Hollowood (1986) maintains that priority should be given to manufacturers who will be able to provide continued

availability of hardware and provide hardware support and maintenance.

Even after the decision on the brand of microcomputer is determined, there is still the problem of determining which model is needed. Hollowood (1986) divided microcomputers for training into four categories based on size and power. The first category includes the so called "home computers" which would handle a few programming languages and a number of simple word processing applications. The second category includes a number of more sophisticated home computers that could double as equipment used by small businesses and could support a larger array of software including some graphics and statistical programs. Included in the third category are the large, fast machines which run all packages and include such extras as two floppy disk drives and expanded memory. The fourth category, the super minis, would cost from $4,000 to $7,000 per unit and have memory of one million bytes or larger, color graphics and hard disks.

Hollowood (1986) expressed several concerns, one on the selection of hardware by staffing:

> Business, industry, and service organizations should not be assumed to have superior hardware knowledge or solutions . . . Educators, true to their societal purpose, can and should question the claims of all hardware vendors. Through the educational process, research, and public service, educational institutions are expected to lead, not follow (p. 19).

Another concern he expressed is in determining the size and power of the computer; the smaller computers may not be of sufficient size to run newer more powerful software. He also suggested the following:

> while small machines will handle some expansion, the more important question is price. By the time these machines are upgraded, they often result in a greater investment than having purchased a more powerful computer in the first place (p. 22).

The selection of hardware does not stop with the selection of the computer. According to Hollowood (1986), there are many other pieces of equipment to be considered: printers, plotters, electrical surge protectors, glare reduction screens, antistatic devices and more. Probably the most common piece of equipment is the printer or plotter. The question of what kind and how many is addressed by Hollowood (1986) who gave as a rule of thumb to provide one printer for every four computers. He suggested a process of elimination, asking questions about the need of color printers vs. color plotters or even if color is a requirement. Other kinds of equipment include networks and hard disk systems according to Amador (1986). He contended that these types of systems can create a cost savings when the software is purchased because network versions of software in most cases are less expensive per station than individual sets of the same software.

Hollowood (1986) and Amador (1986) both suggest that application-type software which has practical use in the classroom and software which is used in business and industry should be given priority. Amador (1986) stated the following:

> Program developers felt that students would be more attracted to the brands that were used at their workplace or that they personally had purchased because of effective advertising by the manufacturer. By using known brand names (Lotus 1-2-3, WordStar, Visicalc, DBase III, Apple MacIntosh, and IBM PC) in course descriptions and in program promoting, the college benefits from the association with the name brands (p. 85).

Another consideration pointed out by Hollowood (1986) is that an increasing number of students have access to equipment and software outside the school. He proposed that "the more popular the software and the more flexible the assignments, the lesser the load or demand for school computer use" (p. 22).

Additional suggestions proposed by Hollowood (1986) are:

> Software selections should include packages useful to the adult learner on the job; they should also expand the adult students understanding of information technology, immediate practicality notwithstanding. A third software issue is its ability to support the curriculum (p. 17).

The nNext consideration should be facilities. Hollowood (1986) includes several design factors to be included such as software storage and distribution, software demonstrations, traditional classroom needs and library activities. He addressed accessibility by asking: "Do the students have easy access to the facility and want to 'pop in' during lunch hours or will students use the facility chiefly during the evening and weekend hours (p. 18)?"

Planning the layout and design conditions is a key to the success of the facility. Myers (1986) mentions a number of items which must be taken into consideration such as lack of air circulation, air contamination, insufficient lighting and glare, along with extreme conditions of noise, heat and cold. Myers' position is that there are two aspects to design when it comes to humans: (1) individual space needs; and, (2) total space needs.

> The design of individual space, such as desks and chairs, is analyzed from the peoples' size as well as their visual and manipulating capabilities.

> Total space, such as light, sound, heat and cold, is analyzed from its environmental effect on people. In this area, it is important to avoid glare in lighting and to maintain a non-negative sound and thermal environment.
>
> When designing space to meet human needs, there are a few no-no's you must keep in mind. First, space must not threaten anyone's health and safety. Second, space must not inhibit one's performance, and third, space must not cause discomfort. Following is the order you need to follow with the process of design and design criteria to satisfy human needs.
>
> 1. health and safety
> 2. performance
> 3. comfort
> 4. aesthetic pleasantness
>
> As the criteria of designing space for people is met, so are its goals of lighting, sound and thermal conditions, color, and furniture size and placement. Therefore, good design meets several goals, while maintaining this order.
>
> Myers continued with:
>
> In addition, poor environment conditions may hurt performance. Bad lighting is an example. If lighting is adequate for performance, it will be adequate for safety. There are several "variables" in noise performance. Workplace design and floor planning are the keys that make the school spaces and classroom space significantly pleasant, and aid in increasing student performance (p. 36).

Hollowood (1986) presented very specific information on facility design. He proposed the following specifications:

> Two feet or so for the machine, another foot and a half for the printer, and an eighteen-inch work space for the student and his or her various manuals, books, and papers. The depth of each station should be about three feet with stations being placed back to back. The space between workstation rows should be about six feet to allow for both seating and circulation. Thus a school could comfortably put a dozen microcomputer workstations in a room of about 500 square feet having approximate dimensions of twenty feet by twenty-five feet (p. 25).

Design of Nonconventional Computer Training Facilities

Nonconventional computer training facilities tend to fall into two categories: (1) either self-powered vans, or (2) trailers. One of the first mobile computer training units, according to McClain (1975) was a converted mobile home shell in which computer graphics training was presented. He described a computer graphics laboratory with an IBM 1130 mainframe computer which operated a U.C.C. plotter and printer and received information from an IBM card reader. The unit was operated by the Oklahoma State Department of Vocational and Technical Education and served junior colleges and vo-tech schools across the state. In the mid 1980's several self-powered microcomputer classrooms were implemented. Amodeo and Martin (1982) presented information on a mobile computer classroom developed by several organizations. These included New Mexico State University, the International Space Center, the International Space Hall of Fame Foundation, and Texas Instruments. They reported that the primary target for the van was elementary and secondary schools within the state of New Mexico. Another van reported by Frye (1985) was a converted 36-passenger school bus used to provide computer orientation and hands on experience for elementary school students. He reported that the bus served educationally disadvantaged students in Modesto, California. The lab contained 18 microcomputers, two printers, and two 25-inch color monitors. Frye (1986) described the utilization to be to locate the lab at school for 18 days, providing a minimum of four hours and a maximum

of seven hours instruction and hands on experience for sixth grade students.

Use of the Case Study

training using a mobile facility requires insight into the problem by those now offering the training. Hamilton, et al. (cited in Spirer, 1980) recommended the use of case study to evaluate programs.

> We are not, of course, arguing here against the use of experiment, longitudinal, or survey research methods as such. Rather, for the reasons suggested, we submit that they are usually inappropriate, ineffective or insufficient for program evaluation purposes (p. 11).

Spirer (1980) attributes the growing acceptance of case study in vocational education to the disenchantment of researchers with the frequent finding, "no significant differences." She says researchers need a method to account for certain complex educational problems, and the case study method is now accepted as a viable means for that analysis.

Spirer (1980) also defines the case study method. She characterizes it in four ways: (1) it focuses on events in one particular setting; (2) it captures the totality of a phenomena and the interplay of its contributing factors; (3) it is a "slice of life" followed over a period of time; (4) it uses both quantitative and qualitative methods to gather information. Isaac and Michael (1980, p. 48) further define the purpose of the case study as studying "intensively the background, current status, and environmental interactions of a social unit: an individual, group, institution or community."

Summary

In summary, employers are setting a high priority on training. Their interest is in more efficient and productive employees. One of the concentrated areas of training is in data entry and computer literacy. Employees are also interested in training opportunities, primarily due to changing technology which is exemplified in the proliferation of microcomputers and microcomputer training.

In order to meet these demands, it is important to have flexible and creative curriculum and instructors who can relate to the current demand. Computer equipment must be similar or identical to equipment students will use on the job. It is also important to provide a learning environment in which adults are comfortable and can concentrate on learning In order to meet the variety of training demands at a variety of locations, both conventional and nonconventional delivery systems must be considered. Finally, the use of the case study method is warranted because of the complex nature of the study and the need for both quantitative and qualitative data.

CHAPTER III

METHODOLOGY

The purpose of this study was to review the implementation, operation, and benefits of providing computer training in a mobile computer classroom to individuals at industry-specific sites by an area vocational-technical school. The study asked those responding to the questionnaire about the development of the mobile classroom and its current use. In addition, the study asked respondents for an estimated time line of if and when the facility would show a profit and asked for recommendations to other institutions who might attempt to initiate a similar program. The study was essentially exploratory, attempting to collect information and possible variables which determined greater and lesser degrees of success in the implementation of the mobile computer classrooms and greater or lesser degrees of cost-effectiveness.

Spirer (1980) explains the steps in designing a case study: setting boundaries, defining the unit of analysis, selecting a site(s), establishing initial contacts, developing data collection systems, and defining fieldwork procedures. After figuring the logistics of fieldwork operations such as scheduling, selecting whom to interview, recording the responses and collecting the data, the case study is ready for analysis, verification and synthesis. In reporting the findings, Spirer recommends including the following information:

(1) evaluation purpose, (2) method, (3) time and length of the case case, (4) sites, (5) limitations of the case study, (6) relationships between the evaluators and persons at the case study sites, (7) checks on data, (8) presentation of findings and, (9) conclusions, and, recommendations.

Chapter III details the methodology of this study. It is based upon the criteria suggested by Spirer (1980).

Subjects

Three vocational-technical schools were using comparable mobile computer classroom facilities for training in business and industry, and their administrators and instructors were the sources of information gathered in the study. The three schools had been identified by the builders of mobile computer classrooms as being the only three sites in the nation using mobile computer facilities to provide training on-site to business and industry. These schools are: (1) Great Oaks Joint Vocational School District, Cincinnati, Ohio; (2) Francis Tuttle Area Vocational-Technical School, Oklahoma City, Oklahoma; and (3) Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma. Further research failed to reveal any additional sites.

Preliminary Contact with Subjects

The two institutions other than Tulsa County Area Vocational-Technical School were contacted by telephone initially by the superintendent of Tulsa County Area Vocational-Technical School, to determine the willingness of the other superintendents to participate in the study. Each superintendent was asked to contact

the instructor of the classes held in the mobile classroom since some of the questions would be answered by the instructors, and each superintendent was asked to designate the person administratively in charge of the mobile computer classroom to complete the questionnaire about the lab's development and use in the community. Included with the letter were a list of questions around which a telephone interview would be based and a set of questions to be answered in writing by checking appropriate responses. Each of the administrators and instructors was mailed a survey packet which included a cover letter with instructions, the questionnaire, and a copy of the telephone interview questions. Copies of the preliminary letter of contact and the questions are included in Appendix A. Copies of questionnaires and telephone surveys are included in Appendix B.

Follow-Up Telephone Call

The three institutions contacted by letter were then contacted by telephone to answer any questions which the administrators or instructors had about the study. During these calls, a schedule for the telephone interviews was completed. The interviews were to be held at a later time and at the convenience of the subjects. Also at this time, a deadline was established for the return of the written portion of the questionnaire.

The Telephone Interview

Data for all open-ended questions in the study were collected during the telephone interviews of the three administrators and

three instructors. The questionnaire sent to the three administrators were used as a framework for the interviews, but the researcher arbitrarily expanded or cut short sections of the interview based on the subject's pertinent knowledge, range of experience and willingness to disclose information. Whenever possible, an attempt was made to expand on information directly related to the questions in the study. Many of the questions for the telephone interview were based on responses to "yes" and "no" questions in the formal questionnaire.

This semistructured interview approach, built around a core of structured questions, allowed the subjects to respond in relative detail when they wanted to and allowed the interviewer to probe for underlying factors or relationships which were too complex or elusive to encompass in more straight-forward questions, a technique recommended by Isaac and Michael (1981). The leading questions in the telephone interviews were designed to avoid the indication of an appropriate response and to avoid limiting the subjects. Because the study was exploratory in nature, respondents needed to feel free to expand their answers with the possibility of raising issues which had not been identified by the researcher in advance as being relevant to the study. Such detail would have been difficult to elicit in written answers to open-ended questions.

Advantages of the Research Interview

The advantages of the research interview as outlined by Isaac and Michael (1981) are as follows:

1. Permits greater depth.
2. Permits probing to obtain more complete data.
3. Makes it possible to establish and maintain rapport with respondent or at least determine when rapport has not been established.
4. Provides a means of checking and assuring the effectiveness of communication between the respondent and the interviewer (p. 138).

Disadvantages of the Interview Technique

A limitation of the interview technique is its "retrospective nature which introduces memory errors and contamination because of intervening events and biasing factors which increase with time" (Isaac and Michael, 1981, p. 139). Moreover, additional limitations are imposed because the data being obtained are reactive in nature. That is, "they directly involve the respondent in the assessment process by eliciting a reaction" (Isaac and Michael, 1981, p. 128). As with all reactive measures, there is a risk that the interview will make the respondent feel special or unnatural and thus elicit responses that are artificial or slanted. There is also the risk that characteristics of the interviewer (e.g. speech patterns, accent, sex, age) will interact with the attitudes or expectations of the respondent. Moreover, because of the interviewer's connection with the mobile computer classrooms which are the subject of the study, there may have been a tendency for respondents to be less than frank in their assessments. However, the interviewer tried to assure subjects that they should feel free to be frank in their discussions.

Pilot-Testing of the Questions

The list of questions to be used in the telephone interviews for the study was pilot-tested with three persons who had worked in the development and implementation of the mobile computer classroom at Tulsa County Area Vocational-Technical School but who were not designated as subjects to be interviewed in the study. One person was an administrator at Tulsa County Area Vocational-Technical School, the second was a computer consultant employed during the design, construction and implementation of the mobile classroom and the third was a part-time instructor in the mobile classroom. Pilot-testing the questions helped the interviewer identify necessary revisions in the questionnaire and better focus the telephone discussions. Pilot-testing also identified the most crucial questions for the purposes of this research, and the list of questions to be included in the study were subsequently revised based on the pilot-testing.

Tape-Recording of the Interviews

All of the subjects interviewed for this study gave permission for their interviews to be taperecorded. The interviews were taped so that the researcher could engage fully in the conversation with the respondents without the distraction of notetaking. The researcher later reviewed these tapes and took notes in outline form on the content of the interviews which were most relevant to the research questions posed by this study. The

pages of notes, which contain a substantial amount of comment by the participants, primarily in the form of direct quotations, are included in Appendix C.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to review the implementation, operation, and benefits for an area vocational school in providing computer training in a mobile computer classroom to individuals at industry-specific sites. This chapter sets forth the findings of the study. The data is divided into seven sections corresponding with the seven research questions.

A discussion of the procedures for this study has been included in Chapter III, and Chapter V contains a summary of the findings, conclusions, and recommendations.

Responses

Three schools were involved in the study: (1) Great Oaks Joint Vocational School District (GOJVSD), Cincinnati, Ohio; (2) Francis Tuttle Area Vocational-Technical School (FTAVTS), Oklahoma City, Oklahoma; and (3) Tulsa County Area Vocational-Technical School (TCAVTS), Tulsa, Oklahoma. Six sets of questions were mailed to the participants of the study. The participants included in the study were three administrators and three instructors responsible for the operation of the mobile computer classrooms at those schools.

The information was gathered through four sets of questions. The sets included: (1) the Administrator Questionnaire (AQ) Form 1; (2) the Instructor/Coordinator Questionnaire (IQ) Form 2; (3) the Administrator Telephone Survey (ATS) Form 3; and (4) the Instructor/Coordinator Telephone Survey (ITS) Form 4. It was determined that four mobile computer classrooms were put into operation between October, 1982 and November, 1987. All four mobile classrooms reviewed in this study were manufactured by Airstream International, Special Vehicle Division, Jackson Center, Ohio.

Reporting of the Data

Research Question #1

"What are the benefits to a vocational-technical school in implementing and operating a mobile computer classroom?"

One question in the Administrator Questionnaire and one question on the Administrator Telephone Survey were designed to address the first research question. The summary of the results produced by these two questions was as follows:

Administrator Questionnaire Question #5. The administrators were asked to "Rate the following indirect benefits for your district:" They were given a scale of 1 to 5 with 1 being the highest rank. Those results are shown in Table I.

TABLE I

ADMINISTRATOR RATING OF INDIRECT BENEFITS

Benefits	School	High Benefits 1--2--3--4--5 Low Benefits
a. service to industry -		
	Great Oaks Joint Vocational School District District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X
b. improved computer literacy		
	Great Oaks Joint Vocational School District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X
c. public relations with general public -		
	Great Oaks Joint Vocational School District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X
d. public relations with industry		
	Great Oaks Joint Vocational School District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X
e. on-site training		
	Great Oaks Joint Vocational School District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X
f. increased enrollments		
	Great Oaks Joint Vocational School District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X
g. high visibility in the community		
	Great Oaks Joint Vocational School District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X
h. media attention		
	Great Oaks Joint Vocational School District	X
	Francis Tuttle AVTS	X
	Tulsa County AVTS	X

Administrator Telephone Survey Question #1. "How was the decision to provide the mobile computer classroom reached?"

All three schools surveyed individuals in their respective school districts prior to implementing the labs. The surveys in all cases were informal, and in some cases, the responses were verbal. Francis Tuttle Area Vocational-Technical School and Tulsa County Area Vocational-Technical School concentrated on contacting business and industry. The outcome of the surveys for the Oklahoma schools was demonstrated by letters of support which were requested from various companies. Great Oaks not only included industry in their surveys but also solicited response from schools located in its disctict.

Research Question #2

"Is computer instruction in a mobile computer classroom cost-effective for a vocational-technical school?"

Six questions were designed to answer the second research question: one question from the Administrator Questionnaire, two questions from the Administrator Telephone Survey, and three questions from the Instructor/Coordinator Questionnaire.

Instructor/Coordinator Questionnaire Question #20. "Who pays the fees for training?"

Great Oaks Joint Vocational School District, Francis Tuttle Area Vocational-Technical School, Tulsa County Area Vocational-Technical School reported that the most common arrangement was for the company to pay all costs of training

associated with the mobile computer classroom. None of the three schools reported that the employees paid for the training. The Tulsa school indicated that with some companies the tuition assistance policy provided that the employee paid for the training originally and was reimbursed by the company upon completion.

Instructor/Coordinator Questionnaire Question #21. "How are tuition fees set?"

Great Oaks Joint Vocational School District set its tuition fees at $95.00 per hour for the mobile computer classroom and generator located at the company site. Tuition was lowered to $85.00 per hour when the company supplied the power and lowered again to $75.00 per hour when company employees used the mobile classroom on the Great Oaks Campus. Tuition charges for twelve students, for example, when the computer classroom with generator was located at a company site, equalled $1140.00.

Francis Tuttle Area Vocational-Technical School set its tuition fees at $95.00 per student for twelve hours of instruction. A 10 percent discount was given for more than ten students. Tuition charges for twelve students , for example, when the computer classroom with generator was located at a company site, equalled $950.00.

Tulsa County Area Vocational-Technical School set its tuition fees at $780.00 per class for twelve hours of instruction. An added charge of $10.00 per student covered the cost of materials. Tuition charges for twelve students, for example, when

the mobile computer classroom with generator was located at a company site, equalled $900.00.

Instructor/Coordinator Questionnaire Question #2. "How many students were served in each of the following years?"

The Instructor/Coordinators were asked to list the number of students served each year since the inception of their mobile computer classrooms. That data is shown in Table II.

TABLE II

NUMBER OF STUDENTS SERVED PER YEAR

		GOJVSD	FTAVTS	TCAVTS
July 1, 1988 to February 15, 1989	*	1100	516	361
July 1, 1987 to June 30, 1988	*	1382	844	402
July 1, 1986 to June 30, 1987	*	740	686	0
July 1, 1985 to June 30, 1986		N/A	284	
July 1, 1984 to June 30, 1985		N/A	0	
July 1, 1983 to June 30, 1984		N/A		
July 1, 1982 to June 30, 1983		N/A		
July 1, 1981 to June 30, 1982		0		

* Two mobile computer classrooms are considered here.

Administrator Telephone Survey Question #2. "In your opinion, has the lab been cost-effective?"

The administrators from Francis Tuttle Area Vocational-Technical School and Tulsa County Area Vocational-Technical School considered the mobile computer classrooms to be cost-effective. The administrator from Great Oaks Joint

Vocational Schoc did not consider the mobile classroom to be cost-effective and attributed that to two reasons: (1) both of the labs had been equipped with new computer equipment the previous year; and, (2) a significant percentage of time in those mobile classrooms was used to provide computer literacy to the feeder schools within that school district for which there was no revenue generated.

Administrator Questionnaire Question #2. "From implementation, what period of time will be required to retire the capital investment of the lab and equipment?"

The administrator at Great Oaks Joint Vocational School indicated that the retirement of capital investment in their mobile computer classroom would not be achieved. The administrator at Francis Tuttle Area Vocational-Technical School felt that it would take in excess of five years to retire the investment in that mobile classroom, and the administrator at Tulsa County Area Vocational-Technical County Area Vocational-Technical School indicated that she believed retirement of capital innestment could be achieved in four to five years.

Administrative Telephone Survey Question #3. "Has any consideration been given to the purchase of additional computer labs?"

No schools were considering an additional mobile computer classroom at the time of the interview. Francis Tuttle Area Vocational-Technical School had implemented a portable computer classroom. This included furniture and equipment which could be set up at a company site when an extended amount of training was requested.

Research Question #3

"What coordination is being done to work with the private sector?"

Two questions were designed to answer the third research question: one question from the Administrator Questionnaire, and one question from the Instructor/Coordinator Questionnaire.

Administrative Questionnaire Question #4. "Prior to implementing the lab, did you survey potential users on the following development and design topics?"

All three schools did survey potential users in their districts to allow input on various aspects of the development of the mobile computer classrooms prior to their implementation. The categories in which that input was received are shown in Table III.

Instructor/Coordinator Questionnaire Question #11. "Which of the following provided input that influenced the selection of software packages for training in your mobile computer lab?"

Each school surveyed various groups to determine what software would be selected to meet the training needs. The groups which each of the schools used as resources are listed in Table IV.

TABLE III

AREAS IN WHICH INPUT WAS RECEIVED
FROM POTENTIAL USERS

Topic	School	YES	NO
a. need for on-site training			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School	X	
b. design			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School		X
c. operation			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School		X
	Tulsa County Area Vocational-Technical School		X
d. selection of instructor			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School		X
	Tulsa County Area Vocational-Technical School		X
e. selection of software			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School	X	
f. curriculum content			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School	X	
g. scheduling of classes			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School		X
	Tulsa County Area Vocational-Technical School	X	
h. future needs for computer training			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School	X	

TABLE IV

RESOURCES USED IN DETERMINING SOFTWARE PACKAGES USED FOR TRAINING

Resource	School	YES	NO
a. community			
	Great Oaks Joint Vocational School District		X
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School		X
b. employers			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School	X	
c. learners			
	Great Oaks Joint Vocational School District		X
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School		X
d. your organization			
	Great Oaks Joint Vocational School District	X	
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School	X	
e. teacher research or preference			
	Great Oaks Joint Vocational School District		X
	Francis Tuttle Area Vocational-Technical School	X	
	Tulsa County Area Vocational-Technical School	X	

Research Question #4

"What criteria were used for the selection of an instructor?"

One question on the Administrative Questionnaire was used to gather information for the fourth research question.

Administrative Questionnaire Question #6. "Rank the following criteria for instructor selection from 1 (important) to 8 (least important):

In order to determine what characteristics were most desirable in the instructors being assigned to the mobile computer classrooms, the administrators were asked to rank each item in a list of criteria provided in the questionnaire. Details of those priorities are shown in Table V.

TABLE V

RANKING OF CRITERIA USED IN INSTRUCTOR SELECTION

Selection Criteria	Rating by School		
	COMPOS-ITE	GOJVSD	FTAVTS	TCAVTS
a. teaching experience	5.0	4	3	8
b. background in adult education	7.3	8	7	7
c. experience in curriculum development	6.0	7	5	6
d. personal dynamics	3.7	5	1	5
e. motivation skill	3.0	3	2	4
f. ability to operate current software packages	2.0	1	4	1
g. marketing skills	5.7	6	8	3
h. understanding of computer technology	3.3	2	6	2

Research Question #5

"What types of hardware and software are being used?"

Eight questions were designed to answer the fifth research question. All eight questions were from the Instructor/Coordinator Questionnaire.

Instructor/Coordinator Questionnaire Question #16. Type of

computers:"

Great Oaks Joint Vocational School and Francis Tuttle Area Vocational-Technical School decided to use IBM equipment in the mobile computer labs. The decision at Tulsa County Area Vocational-Technical School was to use IBM-compatible equipment manufactured by Telex Corporation, a local manufacturing firm.

Instructor/Coordinator Questionnaire Questions #13, #14, #15, #17, #18, #19. One section of the questionnaire identified the types of computers and peripheral equipment used in each of the mobile classrooms. Table VI provides a breakdown of the equipment in each of the labs as outlined in the Instructor/Coordinator Questionnaire.

TABLE VI

COMPUTER CONFIGURATION AND PERIPHERAL EQUIPMENT

	* GOJVSD 1982-87	GOJVSD 1987-88	FTAVTS	TCAVTS
a. stand alone	YES	YES	YES	YES
b. local area network	NO	NO	NO	YES
c. 3 1/2 inch floppy drives	0	1	0	0
d. 5 1/4 inch floppy drives	2	0	1	2
e. amount of memory	384K	640K	512K	640K
f. brand	IBM	IBM	IBM	TELEX
g. model	PC	Mod 30	XT	1260
h. hard disk	NO	20MB	10MB	NO
i. processor chip	8088	80286	8088	80286
j. number of computer stations	16	16	12	12
k. number of dot matrix printers	2	2	7	3
l. number of laser printers	0	0	0	1
m. number of plotters	0	0	0	0
n. total number of square feet		300	280	280
o. power provided at training site		YES	YES	YES
p. portable generator travels with lab		YES	YES	YES

* Both mobile classrooms were reequipped in 1988.

Instructor/Coordinator Questionnaire Question #10. "For what type of specific software do you provide training?"

The purpose of this question was to identify the software packages used to support training in the mobile computer classrooms. Table VII displays a matrix indicating the various packages used and the schools which provided training for those packages.

Research Question #6

"What is the design of the curriculum, and how is it arranged?"

Six questions were designed to answer the sixth research question: one question from the Administrator Questionnaire, two questions from the Administrator Telephone Survey, and three questions from the Instructor/Coordinator Questionnaire.

Instructor/Coordinator Questionnaire Question #7. Estimate the percentage of class time dedicated to the following:"

To determine how instruction was delivered in the mobile classrooms, each instructor was asked to estimate the percentage of time spent in lecture, hands-on training, and demonstration. The results of that question are shown in Table VIII.

TABLE VII

SPECIFIC SOFTWARE FOR WHICH TRAINING IS AVAILABLE

Specific Software		Use by Site GOJVSD	FTAVTS	TCAVTS
a. spreadsheet Lotus	1-2-3	X	X	X
	Super Calc 4		X	
b. word processing	Wordperfect 5.0			X
	Wordperfect 4.2	X	X	
	Microsoft Word		X	X
	Displaywrite 4	X	X	
	MultiMate 3.22	X		
c. data base	dBase 3	X	X	X
	Q&A			X
	PC-File+	X		
d. integrated	Enable		X	
	Symphony	X	X	
	Smart		X	
	Framework		X	
e. desktop publishing	Wordperfect 5.0			X
f. graphics	Lotus 1-2-3			X
	PC Logo Programming	X		
	Generic CAD	X		
f. other	PC-DOS	X	X	
	MS-DOS			X
	BASIC Programming	X		

Instructor/Coordinator Questionnaire Question #8. "Estimate the percentage of course content dedicated to the following topics:

The amount of class time dedicated to a variety of curriculum components is shown in Table IX.

TABLE VI.

BREAKDOWN OF INSTRUCTIONAL DELIVERY
BY PERCENTAGE OF CLASS TIME

Method of Delivery	School	Percentage of time
a. lecture		
	Great Oaks Joint Vocational School District	20.0%
	Francis Tuttle Area Vocational-Technical School	20.0%
	Tulsa County Area Vocational-Technical School	7.5%
b. hands-on training		
	Great Oaks Joint Vocational School District	50.0%
	Francis Tuttle Area Vocational-Technical School	60.0%
	Tulsa County Area Vocational-Technical School	85.0%
c. demonstration		
	Great Oaks Joint Vocational School District	30.0%
	Francis Tuttle Area Vocational-Technical School	19.0%
	Tulsa County Area Vocational-Technical School	7.5%

Instructor/Coordinator Telephone Survey Question #3. "Do you do anything specific to help overcome computerphobia?"

None of the instructors expressed a great concern for student "fear" or "intimidation" of computers. The instructor from Great Oaks Joint Vocational School indicated that the students' comfort level was increased through a computer literacy course. The instructor from Tulsa County Area Vocational-Technical School felt that the students either screened themselves or the coordinator in the company screened out those who demonstrated reluctance to take the training. The instructor at Francis Tuttle Area Vocational-Technical School found that the

TABLE IX

BREAKDOWN OF CURRICULUM COMPONENTS BY PERCENTAGE OF CLASS TIME

Curriculum Components	School	Percentage of Time
a. knowledge of computer components		
	Great Oaks Joint Vocational School District	5.0%
	Francis Tuttle Area Vocational-Technical School	3.0%
	Tulsa County Area Vocational-Technical School	10.0%
b. knowledge of computer characteristics		
	Great Oaks Joint Vocational School District	5.0%
	Francis Tuttle Area Vocational-Technical School	3.0%
	Tulsa County Area Vocational-Technical School	10.0%
c. knowledge of computer applications		
	Great Oaks Joint Vocational School District	5.0%
	Francis Tuttle Area Vocational-Technical School	3.0%
	Tulsa County Area Vocational-Technical School	20.0%
d. attitudes about computers		
	Great Oaks Joint Vocational School District	0.0%
	Francis Tuttle Area Vocational-Technical School	5.0%
	Tulsa County Area Vocational-Technical School	2.5%
e. keyboarding skills		
	Great Oaks Joint Vocational School District	0.0%
	Francis Tuttle Area Vocational-Technical School	10.0%
	Tulsa County Area Vocational-Technical School	2.5%
f. terminology		
	Great Oaks Joint Vocational School District	5.0%
	Francis Tuttle Area Vocational-Technical School	5.0%
	Tulsa County Area Vocational-Technical School	5.0%
g. specific application software use		
	Great Oaks Joint Vocational School District	80.0%
	Francis Tuttle Area Vocational-Technical School	66.0%
	Tulsa County Area Vocational-Technical School	50.0%
h. homework		
	Great Oaks Joint Vocational School District	0.0%
	Francis Tuttle Area Vocational-Technical School	0.0%
	Tulsa County Area Vocational-Technical School	0.0%
i. programming		
	Great Oaks Joint Vocational School District	0.0%
	Francis Tuttle Area Vocational-Technical School	5.0%
	Tulsa County Area Vocational-Technical School	0.0%

problem was minimized through the use of class discussion of personal experiences with computers and by adding some "humor."

Instructor/Coordinator Questionnaire Question #9. "Please provide information about the length and size of training classes in the mobile computer lab:"

For the most part, classes operated in the mobile computer labs are short and condensed. Examples of the number of hours per day, the number of sessions per class, the total class length, and the number of students served are shown in Table X.

TABLE X

FORMAT OF CLASS SCHEDULES

Specific Software		Use by Site GOJVSD	FTAVTS	TCAVTS
a. class hours per day	shortest class	2	3	1
	longest class	8	6	3
b. number of sessions	shortest class	1	1	1
	longest class	5	4	4
c. total hours of training	shortest class	8	12	1
	longest class	12	24	12
d. maximum number of students	shortest class	16	12	12
	longest class	16	12	12

Instructor/Coordinator Questionnaire Question #22. "When contracting with employers, the classes for employees are scheduled:"

The three schools were asked to provide information about when classes were scheduled in relation to employee work hours. These results are shown in Table XI.

TABLE XI

SCHEDULING OF EMPLOYEES' TIME

Training Scheduled	Use by Site GOJVSD	FTAVTS	TCAVTS
a. after hours	OCCASIONALLY	YES	YES
b. during working hours	YES	YES	YES
c. part working hours, part employees' time	NO	YES	YES

Instructor/Coordinator Questionnaire Question #23. "What are the operational hours of the mobile computer lab?"

The class schedules for all three schools included regular working hours and evenings, Mondays through Fridays. The Oklahoma schools also operated classes to serve employees on weekends as shown in Table XII.

Instructor/Coordinator Questionnaire Question #12. "Do you issue certificates at the end of training?"

Great Oaks Joint Vocational School District, Francis Tuttle Area Vocational-Technical School, and Tulsa County Area Vocational-Technical School all replied that they did issue

TABLE XII

SCHEDULING OF TRAINING

Training Scheduled	Use by Site		
	GOJVSD	FTAVTS	TCAVTS
a. 8:00 A.M. to 5:00 P.M. Monday through Friday	YES	YES	YES
b. 5:00 P.M. to 10:00 P.M. Monday through Friday	YES	YES	YES
c. weekends	NO	YES	YES
d. school holidays when businesses are open (Spring Break and Christmas Break)	YES	YES	YES

certificates at the end of training.

Instructor/Coordinator Questionnaire Question #6. "Are evaluations collected from students when they complete training?"

Great Oaks Joint Vocational School District, Francis Tuttle Area Vocational-Technical School, and Tulsa County Area Vocational-Technical School all replied that they did collect evaluations from students upon completion of their training.

Instructor/Coordinator Telephone Survey Question #5. "Do you provide any customer support to clients after completion of training?"

Great Oaks Joint Vocational School District did not offer customer support after completion of training. Francis Tuttle Area Vocational-Technical School and Tulsa County Area Vocational-Technical School replied that they did provide customer support to clients after completion of training. Francis Tuttle Area Vocational-Technical School provided support on an hourly basis at a rate of $35.00 per hour, and Tulsa County Area

Vocational-Technical School provided the same service at a rate of $25.00 per hour.

Instructor/Coordinator Telephone Survey Question #4. "Do you conduct a follow-up study on students trained in the mobile computer lab?"

None of the schools conducted follow-up studies on students trained in the mobile computer labs.

Research Question #7

"What types of students are being served?"

To answer research question #7, five questions were used: one question from the Administrator Questionnaire, two questions from the Instructor/Coordinator Questionnaire , and two questions from the Instructor/Coordinator Telephone Survey .

Administrative Questionnaire Question #5. "Estimate the percentage of time the mobile computer lab is operated by your school district to provide training for:

Various sources provided students for training in the mobile computer labs. A breakdown of those sources is included in Table XIII.

Instructor/Coordinator Telephone Survey Question #1. "How are students selected?"

This question focused on how the selection of the students was accomplished. When dealing with companies, it was left to the company through their contact person to select the students

attending the training. The contact person was given guidelines either written or verbal to assist in the selection.

Instructor/Coordinator Questionnaire Question #4. "Do you have prerequisites for adult student admission?"

None of the schools surveyed had any formal prerequisites.

TABLE XIII

BREAKDOWN OF TYPES OF STUDENTS SERVED BY PERCENTAGE OF CLASS TIME

Types of Students	School	Percentage of Time
a. local business and industry employees		
	Great Oaks Joint Vocational School District	75%
	Francis Tuttle Area Vocational-Technical School	85%
	Tulsa County Area Vocational-Technical School	95%
b. local secondary school students		
	Great Oaks Joint Vocational School District	5%
	Francis Tuttle Area Vocational-Technical School	0%
	Tulsa County Area Vocational-Technical School	0%
c. local elementary school students		
	Great Oaks Joint Vocational School District	15%
	Francis Tuttle Area Vocational-Technical School	0%
	Tulsa County Area Vocational-Technical School	0%
d. local civic and government agencies		
	Great Oaks Joint Vocational School District	5%
	Francis Tuttle Area Vocational-Technical School	15%
	Tulsa County Area Vocational-Technical School	5%

Instructor/Coordinator Telephone Survey Question #2. "What are the prerequisites for adult student admission?"

This was a follow-up question to determine what criteria were actually used in the screening of students if the respondent had answered "yes" to Question #4 on prerequisites. The response was unanimous that none of the schools had formal prerequisites such as a certain typing speed. However, all three instructors strongly suggested that students taking intermediate or advanced classes should take the previous course or have significant experience with that particular software program.

Instructor/Coordinator Questionnaire Question #5. "Estimate the percentages of adult students taking the training to:

Student background included students who had previous experience and were interested in expanding that knowledge as well as students who had no previous training.

TABLE XIV

BREAKDOWN OF STUDENT PURPOSE BY PERCENTAGE OF CLASS ENROLLMENT

Types of Students	School	Percentage of Time
a. learn a new skill		
	Great Oaks Joint Vocational School District	80%
	Francis Tuttle Area Vocational-Technical School	76%
	Tulsa County Area Vocational-Technical School	60%
b. enhance existing skills		
	Great Oaks Joint Vocational School District	20%
	Francis Tuttle Area Vocational-Technical School	24%
	Tulsa County Area Vocational-Technical School	40%

Instructor/Coordinator Questionnaire Question #3. "What percentage of those students completed the training?"

The instructors from Francis Tuttle Area Vocational-Technical School and Tulsa County Area Vocational-Technical School estimated the completion rate of students attending training in the mobile computer classrooms at 99 percent and 99.5 percent. At Great Oaks the instructor estimated the completion rate to be 100%.

CHAPTER V

FINDINGS, CONCLUSIONS, RECOMMENDATIONS

This chapter has five parts: (1) summary, (2) findings, (3) discussion of findings (4) conclusions, and (5) recommendations. A discussion of the procedures for this study has been included in Chapter III, and Chapter IV contains a presentation of the findings.

Summary

The problem is to determine if it is feasible for a vocational-technical school to operate a mobile computer classroom to provide computer training on-site for business and industry. The purpose of this study was to review the implementation, operation, and benefits for an area vocational-technical school in providing computer training in a mobile computer classroom to individuals at industry-specific sites. It was the objective of this study to provide a body of information which could be of value in assisting vocational-technical schools in making decisions relative to the implementation and/or operation of a mobile computer classroom.

This study was designed to answer the following major questions:

1. What are the benefits to a vocational-technical school in implementing and operating a mobile computer classroom?

2. Is computer instruction in a mobile computer classroom cost-effective for a vocational-technical school?

3. What coordination is being done to work with the private sector?

4. What criteria were used in the selection of an instructor?

5. What types of hardware and software are being used?

6. What is the design of the curriculum, and how is it arranged?

7. What types of students are being served?

To obtain the information, the case study method was used. One administrator and one instructor from each of three vocational-technical schools using comparable mobile computer classrooms were selected to complete written questionnaires and participate in follow-up telephone interviews.

Findings

The following is a summary of the findings:

1. All three schools in the study coordinated with the private sector in determining the need for on-site training, selection of software, curriculum content, and future needs for computer training.

2. All three schools based instruction around "hands-on" training. The curriculum in all cases was structured around specific application software from 50% to 80% of the time.

3. The classes were very focused and ran a maximum of 24

hours per course with the average course length being 12 hours. All schools made the mobile computer classrooms available for training from 8:00 A.M. to 5:00 P.M. Monday through Friday and on school holidays with little reservation. The two schools in Oklahoma reported that a significant amount of training was being provided in the evenings and some training was being done on Saturdays.

4. The cost of the training for business and industry was paid for by the employer in all cases.

5. The majority of the students being served were employees of local business and industry seeking to learn a new skill. The students were selected by the employer to attend the training.

6. The student completion rate ran an estimated 99% to 100%.

7. The criteria used for the selection of instructors were ranked as follows:

1. ability to operate current software packages
2. motivation skills
3. understanding of computer technology
4. personal dynamics
5. teaching experience
6. marketing skills
7. experience in curriculum development
8. background in adult education

8. All three schools equipped their mobile classrooms with IBM or IBM compatible equipment. The configuration of the equipment was similar and appeared to be state-of-the-art equipment at the time that the mobile classrooms were equipped or

re-equipped.

9. The software fell into three categories: (1) "big name" major software which seemed to be identical in all three mobile computer classrooms; (2) well-known packages which were available at each school but did not have much commonality among the three facilities; and (3) a variety of company-specific packages which were available at each school.

10. Computer instruction for business and industry in a mobile computer classroom was cost-effective.

11. A number of positive indirect benefits related to the operation of a mobile computer classroom were reported by all three administrators.

a. service to industry

b. improved computer literacy

c. improved public relations with the general public

d. improved public relations with industry

e. on-site training

Discussion of the Findings

Three factors were taken into consideration by the schools before selecting the software: (1) input from employers, (2) the software currently used in training programs at that institution, and (3) teacher preference. All three schools used some type of advisory group in the decision-making process after it had been determined that the mobile computer classrooms were going to be implemented. The criteria used in the selection of the instructor included eight items. The ability to operate current software

packages was ranked most important by two of the schools. All three schools gave very high ratings to motivational skills as being important in selecting an instructor. Two schools rated understanding computer technology as third most important. In Chapter II, The Review of Literature, it was suggested by Ewing, Ewing, London, and Ramirez-Ponce (1986) that the instructors be trained adult educators but all three schools indicated that this factor was a low priority the selection of their respective instructors. In the selection of hardware, all schools chose equipment which was either IBM or IBM-compatible. An interesting aspect was the evolution of the equipment in the mobile computer classrooms. Both Great Oaks and Francis Tuttle Vo-Tech selected stand-alone IBM equipment. Tulsa County AVTS chose to use Telex equipment and a Local Area Network (LAN) system. The decision to use the Telex equipment was influenced by two external factors: (1) the equipment was manufactured by a Tulsa-based firm, and (2) that equipment was provided by the manufacturer free of charge.

The maximum size of classes accommodated by the mobile classrooms ranged from 12 to 16 students. All three schools did an extensive amount of surveying prior to implementing the mobile computer classrooms. Potential clients of the mobile classrooms were surveyed to determine the following: (1) need for on-site training, (2) selection of software, (3) curriculum content,and (4) future need for computer training.

The research indicated that there were a number of indirect benefits identified in operating a mobile computer classroom. The highest rated indirect benefit was the service provided to

business and industry. It was selected unanimously as the most valuable indirect benefit. Other indirect benefits which were ranked high by two of the three schools surveyed were improved computer literacy, public relations with the general public, public relations with industry, and on-site training. The two schools which used their mobile computer classrooms exclusively for industry considered their respective mobile classrooms to be cost-effective. One indicator of this was that both facilities were scheduled for industry training from four to six months in advance. The third school provided training for both industry and schools within its district and found it not to be cost-effective due to the number of classes provided free-of-charge to local schools.

All schools surveyed their respective areas prior to implementing the mobile computer classroom(s). All surveys were very informal and produced positive reactions from the business communities.

The fees charged for training were paid by the company contracting for the classes. The tuition charged in all cases was set by a different method. At Great Oaks the tuition was set by the hour and the amount varied based on whether or not the generator was provided with the mobile classroom. At Francis Tuttle AVTS, the fees charged were per student including all materials with a minimum of six and a maximum of twelve students. Francis Tuttle also provided a 10 percent discount for ten or more students. At Tulsa County AVTS, the fees were set per class with an add-on charge of $10 per student for materials. The cost for

twelve students trained in the mobile computer classroom ranged from $900.00 per class to $1,140.00 per class.

Conclusions

Based on the findings the following conclusions were made:

1. There are great benefits for operating a mobile computer classroom for training for business and industry.

2. Training in a mobile computer classroom for business and industry is cost-effective.

3. If the mobile computer classroom is going to be effective, it must have input at the developmental stages by the private sector.

4. Specific criteria were used in the selection of the instructor and ranked in the following order:

    1. ability to operate current software packages
    2. motivation skills
    3. understanding of computer technology
    4. personal dynamics
    5. teaching experience
    6. marketing skills
    7. experience in curriculum development
    8. background in adult education

5. Wordperfect, Lotus 1-2-3 and dBase 3, well-known commercial-produced software packages, are being used in all three of the mobile computer classroom along with a variety of lesser-known packages

6. All three schools were using hands-on instruction centered around software applications in the mobile computer classrooms

7. The students being trained in the mobile computer classrooms are employees from business and industry and 72% of those students are there to learn a new skill.

8. It is concluded that no single factor contributed to the successfulness of the implementation, operation, and benefits of a mobile computer classroom, but rather multiple factors. These multiple factors included:

a. selection of software

b. selection of hardware

c. selection of instructor

d. coordination with business and industry

9. The following related conclusions were drawn:

a. The factor most closely related to operational cost-effectiveness was using the mobile computer classroom for training in business and industry.

b. The design of the curriculum and selection of software and hardware must be compatible with the needs of business and industry.

10. The advanced bookings are evidence that training provided by the mobile computer classrooms is in demand.

Recommendations

The following recommendations are based on the findings and conclusions of the study.

1. Administrators of vocational education should survey business and industry to determine their needs before implementing

a mobile computer classroom.

2. Administrators of vocational education should survey other administrators of existing mobile computer facilities before implementing a mobile computer classroom.

3. Administrators and instructors of vocational education should consider the factors identified in this study as contributors to the success of the facility when planning a high quality, cost-effective mobile computer training lab.

4. The operation of a mobile computer classroom in a large metropolitan area can meet the training needs of business and industry and provide positive public relations with both business and industry and the general public.

5. Further studies should be conducted to determine if other types of mobile computer facilities can deliver the same quality training with the same benefits to the school in a more cost-effective manner.

6. Further studies should be conducted to determine the successfulness of the implementation and operation of the mobile computer classroom from the employer's point of view and/or the student's point of view.

7. Further studies should be conducted to determine the successfulness of the implementation and operation of a mobile classroom for other training such as reading or computer aided training for technical skills.

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APPENDIXES

APPENDIX A

LETTERS TO ADMINISTRTORS AND INSTRUCTOR/ COORDINATORS

TULSA COUNTY AREA VOCATIONAL-TECHNICAL SCHOOL DISTRICT NO. 18
3420 South Memorial Drive Tulsa Oklahoma 74145-1390 Telephone (918) 627-7200

Tom Ray, Director
Business & Industry Training Services

February 8, 1989

Ms. Karla Shields
Instructor/Coordinator
Mobile Computer Lab
Tulsa County Area Vocational Technical School
3420 South Memorial Drive
Tulsa, Oklahoma 74145

Dear Ms. Shields:

Your superintendent has selected you to participate in a project to compile information on the implementation and operation of mobile computer labs in the United States. In order to gather this information, survey forms are being distributed to administrators and instructors who are responsible for the operation of the mobile labs. This data will be gathered through two methods; a questionnaire and a telephone survey.

Instructor Questionnaire - Form 3 (blue)

Please complete and return the Instructor Questionnaire, Form 3, no later than February 17, 1989 (a return envelope is included). A copy of the Form 3 survey, with your responses, should be retained for reference during the telephone interview.

Instructor Telephone Survey - Form 4 (pink)

The Instructor Telephone Survey, Form 4, will be expanded to include more detailed information based on your responses on the Form 3 questionnaire. The telephone interview will be scheduled at your convenience. This interview will be scheduled between the time the Form 3 questionnaire is returned and February 24, 1989.

If you have questions or need any clarification, please call me collect at (918) 665-1617. Thank you for your assistance.

Sincerely,

Tom W. Ray
Director
Business & Industry Training Services

pc: Dr. Gene Callahan

TULSA COUNTY AREA VOCATIONAL-TECHNICAL SCHOOL DISTRICT NO. 18
3420 South Memorial Drive Tulsa Oklahoma 74145-1390 Telephone (918) 627-7200

Tom Ray, Director
Business & Industry Training Services

February 8, 1989

Dr. Mary Ellis
Assistant Superintendent
Business & Industry Development
Tulsa County Area Vocational Technical School
3420 South Memorial Drive
Tulsa, Oklahoma 74145

Dear Dr. Ellis:

Your superintendent has selected you to participate in a project to compile information on the implementation and operation of mobile computer labs in the United States. In order to gather this information, survey forms are being distributed to administrators and instructors who are responsible for the operation of the mobile labs. This data will be gathered through two methods; a questionnaire and a telephone survey.

Administrator Questionnaire - Form 1 (green)

Please complete and return the Administrator Questionnaire, Form 1, no later than February 17, 1989 (a return envelope is included). A copy of the Form 1 survey, with your responses, should be retained for reference during the telephone interview.

Administrator Telephone Survey - Form 2 (yellow)

The Administrator Telephone Survey, Form 2, will be expanded to include more detailed information based on your responses on the Form 1 questionnaire. The telephone interview will be scheduled at your convenience. This interview will be scheduled between the time the Form 1 questionnaire is returned and February 24, 1989.

If you have questions or need any clarification, please call me collect at (918) 665-1617. Thank you for your assistance.

Sincerely,

Tom W. Ray
Director
Business & Industry Training Services

pc: Dr. Gene Callahan

APPENDIX B

QUESTIONNAIRES - FORMS, A, B, C, AND D

FORM 1

Return to: Tom Ray, Director
Business & Industry Training Services
Tulsa County Area Vo-Tech
3420 South Memorial Drive
Tulsa, OK 74145-1390

Phone: (918) 665-1617

Name _____
School _____
Phone Number (____) _____

MOBILE COMPUTER LAB SURVEY

ADMINISTRATOR QUESTIONNAIRE

IMPLEMENTATION

1. When was your district's mobile computer lab put into operation?

   date_____

2. From implementation, what period of time will be required to retire the capital investment of the lab and equipment?
   (check one)

   _____ a. one to two years
   _____ b. two to three years
   _____ c. three to four years
   _____ d. four to five years
   _____ e. over five years
   _____ f. retirement of capital investment will not be achieved

PURPOSE/USE/OBJECTIVE

3. Estimate the percentage of time the mobile computer lab is operated by your school district to provide training for:

   _____% a. local business and industry employees
   _____% b. local secondary school students
   _____% c. local elementary school students
   _____% d. local civic and government agencies
   _____% e. other _____
   100 % Total

4. Prior to implementing the lab, did you survey potential users (employers) on the following development and design topics:
   (check any that apply)

yes	no		
_____	_____	a.	need for on-site training
_____	_____	b.	design
_____	_____	c.	operation
_____	_____	d.	selection of instructor
_____	_____	e.	selection of software
_____	_____	f.	curriculum content
_____	_____	g.	scheduling of classes
_____	_____	h.	future needs for computer training

FORM 1

5. Rate the following indirect benefits for your district:

		High Benefits				Low Benefits
a.	service to industry	1	2	3	4	5
b.	improved computer literacy	1	2	3	4	5
c.	public relations with general public	1	2	3	4	5
d.	public relations with industry	1	2	3	4	5
e.	on-site training	1	2	3	4	5
f.	increased enrollments	1	2	3	4	5
g.	high visibility in the community	1	2	3	4	5
h.	media attention	1	2	3	4	5
i.	other _____	1	2	3	4	5

SELECTION OF INSTRUCTOR

6. Rank the following criteria for instructor selection from 1 (most important) to 9 (least important):

_____ a. teaching experience
_____ b. background in adult education
_____ c. experience in curriculum development
_____ d. personal dynamics
_____ e. motivational skills
_____ f. ability to operate current software packages
_____ g. marketing skills
_____ h. understanding of computer technology
_____ i. other

FORM 2

Name_____
School_____
Phone Number (____) _____

MOBILE COMPUTER LAB SURVEY

ADMINISTRATOR TELEPHONE SURVEY

QUESTIONS

1. How was the decision to provide the computer lab reached?

2. In your opinion, has the lab been cost effective?

3. Has any consideration been given to the purchase of additional computer labs?

FORM 3

Return to: Tom Ray, Director
Business & Industry Training Services
Tulsa County Area Vo-Tech
3420 South Memorial Drive
Tulsa, OK 74145-1390

Phone: (918) 665-1617

Name _____
School _____
Phone Number (____) _____

MOBILE COMPUTER LAB SURVEY

INSTRUCTOR/COORDINATOR QUESTIONNAIRE

STUDENT INFORMATION

1. Estimate the percentage of time the mobile computer lab is operated by your school district to provide training for:

_____% a. local business and industry employees
_____% b. local secondary school students
_____% c. local elementary school students
_____% d. local civic and government agencies
_____% e. other _____
100 % Total

2. How many students were served in each of the following years:

_____ July 1, 1988 to present
_____ July 1, 1987 to June 30, 1988
_____ July 1, 1986 to June 30, 1987
_____ July 1, 1985 to June 30, 1986
_____ July 1, 1984 to June 30, 1985
_____ July 1, 1983 to June 30, 1984
_____ July 1, 1982 to June 30, 1983
_____ July 1, 1981 to June 30, 1982

3. What percentage of those students completed the training?

_____%

4. Do you have prerequisites for adult student admission?

_____ yes
_____ no

5. Estimate the percentages of adult students taking the training to:

_____% a. learn a new skill
_____% b. enhance existing skills
100 % Total

6. Are evaluations collected from students when they complete training?

_____ yes
_____ no

FORM 3

CURRICULUM

7. Estimate the percentage of class time dedicated to the following:

_____% a. lecture
_____% b. hands-on training
_____% c. demonstration
_____% d. other _____

100 % Total

8. Estimate the percentage of course content dedicated to the following topics:

_____% a. knowledge of computer components
_____% b. knowledge of computer characteristics
_____% c. knowledge of computer applications
_____% d. attitudes about computers
_____% e. keyboarding skills
_____% f. terminology
_____% g. specific application software use
_____% h. homework
_____% i. programming
_____% j. other _____

100 % Total

9. Please provide information on the length and size of training classes in the mobile computer lab:

	shortest class	longest class
class hours per day	_____	_____
number of sessions	_____	_____
total hours of training	_____	_____
maximum number of students	_____	_____

10. For what type of specific software do you provide training:
(check all that apply and provide names of software packages)

_____ a. spreadsheet - brand(s) 1._____ 2._____

_____ b. word processing - brand(s) 1._____ 2._____ 3._____

_____ c. data base - brand(s) 1._____ 2._____

_____ d. integrated - brand(s) 1._____ 2._____

_____ e. desktop publishing - brand(s) 1._____ 2._____

_____ f. graphics - brand(s) 1._____ 2._____

_____ g. other - brand(s) 1._____ 2._____ 3._____

FORM 3

11. Which of the following provided input that influenced the selection of software packages for training in your mobile computer lab?

_____ a. community
_____ b. employers
_____ c. learners
_____ d. your organization
_____ e. teacher research or preference
_____ f. other _____

12. Do you issue certificates at the end of training?

_____ yes
_____ no

FACILITY DESIGN

Please answer the following questions as they relate to your particular lab:

13. Number of computer stations:

_____

14. Number of printers:

_____ a. dot matrix
_____ b. laser
_____ c. plotters
_____ d. others

15. Total number of square feet:

_____ sq. ft.

16. Type of computers:

_____ a. IBM or IBM compatible
_____ b. other _____

17. Computer configuration:

_____ a. stand alone with hard disk
_____ b. local area network
_____ c. 3 1/2 inch floppy disk drives
_____ d. 5 1/4 inch floppy disk drives
e. amount of memory _____
f. brand _____
g. model _____

18. Type of processor chip:

_____ a. 8088
_____ b. 80286
_____ c. 80386

19. Type of power supply:

_____ a. power provided at training site
_____ b. portable generator travels with lab
_____ c. other _____

OPERATION

20 Who pays the fees for training:

_____ a. company pays all
_____ b. employee pays all
_____ c. shared by employer and employee
_____ d. other _____

21. How are tuition fees set:

_____ a. per student - amount $ _____
_____ b. per class - amount $ _____
_____ c. per day - amount $ _____
_____ d. other - _____ amount $ _____

22. When contracting for training with employers, the classes for employees are scheduled: (check any that apply)

_____ a. after hours
_____ b. during working hours
_____ c. part working hours, part employees' time

23. What are the operational hours of the mobile computer lab? (check any that apply)

_____ a. 8:00 am to 5:00 pm Monday through Friday
_____ b. 5:00 pm to 10:00 pm Monday through Friday
_____ c. weekends
_____ d. school holidays when businesses are open (Spring Break and Christmas Break)
_____ e. other _____

FORM 4

Name_____
School_____
Phone Number (____) _____

MOBILE COMPUTER LAB SURVEY

INSTRUCTOR/COORDINATOR TELEPHONE SURVEY

QUESTIONS

1. How are students selected?

2. Do you have prerequisites for students?

3. Do you do anything specific to help overcome computerphobia?

4. Do you conduct a follow-up study on students trained in the mobile computer lab?

5. Do you provide any type of customer support to clients after completion of training?

APPENDIX C

SELECTED QUOTES FROM THE TELEPHONE INTERVIEW

SELECTED QUOTES FROM THE TELEPHONE INTERVIEW

SCHOOL: GREAT OAKS JOINT VOCATIONAL SCHOOL DISTRICT

QUESTIONNAIRE: ADMINISTRATOR TELEPHONE SURVEY

TITLE OF PERSON INTERVIEWED: SUPERVISOR OF ADULT EDUCATION

DATE OF INTERVIEW: MARCH 2, 1989

LENGTH OF INTERVIEW: 14 MINUTES

1. How was the decision to provide the computer lab reached?

"I have to preface my remarks by saying I was not involved in that (the decision). That preceded my involvement with the project. But my understanding was our administrative staff wanted to provide assistance to our affiliate schools and business and industry by developing labs (computer labs) for their use. Originally they were located at each of our four campuses and much to our surprise, although there was some indication that the students could be transported over to our campuses to use the equipment, that never really worked out. It became apparent that we had to take the equipment to them. There were several approaches studied including hauling around a trailer rather than a self- propelled vehicle. But there were so many conflicting regulations what one entity would approve a setup that another would not. And trying to get some sort of consensus among the regulations, they found it easier to go with a recreational vehicle that could be outfitted for use along those lines."

"I think it was clearly an informal process. I could find no record of an institutional survey being conducted."

"Our purpose was to not serve just the high schools but the entire affiliate school districts including some of their subordinate schools. By that I mean Ohio is structured so that the parochial schools inside of a K-12 district are due some sort of services, and since we pull from those students as well, sooner or later I guess, we also provide the same service to the parochial institutions, elementary and middle schools of or affiliate schools, so it is not strictly secondary in terms of our educational purposes."

"We wanted to get out into the business community. Another function of that is that it is a good PR tool for lack of a better term, and you can never measure that."

2. In your opinion, has the lab been cost effective?

"No."

Interviewer Question: "Do you feel it pays its own way as far as operational expenses?"

"No it doesn't."

"Basically I don't take it down to the penny because I don't think I have to when you are giving away training to affiliate schools. The figures I quoted in terms of the breakdown is probably approximate because it fluctuates from year to year. This year, for example, since July, we had a great summer, September it fell off, October was busy, November fell off, December was mixed. Then we have had affiliate schools since the beginning of the year which will carry us up through the lion's share of April, so you just can't make any money like that."

3. Has any consideration been given to the purchase of an additional computer labs?

"No we have not."

SELECTED QUOTES FROM THE TELEPHONE INTERVIEW

SCHOOL: GREAT OAKS JOINT VOCATIONAL SCHOOL DISTRICT

QUESTIONNAIRE: INSTRUCTOR/COORDINATOR TELEPHONE SURVEY

TITLE OF PERSON INTERVIEWED: INSTRUCTOR - MOBILE COMPUTER LAB

DATE OF INTERVIEW: MARCH 2, 1989

LENGTH OF INTERVIEW: 20 MINUTES

1. How are the students selected?

"It is usually up to the company to determine who is going to be included in the training. In some cases the company requires it (training). There is one company with whom we do ongoing training, (whose policy is that) anybody who is getting a PC for the first time needs to go through the classes that we offer. In other cases, it may be department managers that determine there is a need for an employee to know a particular piece of software. It is all determined by the company. In the case of schools (K-12), some administrator or teacher is usually making the decision that their students need computer literacy."

2. Do you have prerequisites for students?

"No, we just ask the companies to offer a computer literacy course first if the students have not worked on computers before, and we have a ten-hour intro course. If they are real intent on getting right into a software package, we might have them include a three-hour modified literacy before we go into the software package so we can get everyone to the same point as far as knowledge of the keyboard and working with disks."

" We do ask that the students have some computer literacy before we will actually teach a specific software package."

"Yes we do (have various levels of training in specific software packages), and we require that course or knowledge of the material in that course. So if they have been working with the basics in Lotus, they can come into the advanced or the intermediate class."

3. Do you do anything specific to help overcome "computerphobia?"

"We find that fear usually in the adults more so than the children, but the whole idea we emphasize in the literacy course is for them to become familiar with the machine and just feel comfortable with pressing the keys and realize that it is not going to blow up or that they won't ruin it if they press the wrong key."

"I would say that there are probably more people that are just more intimidated than they are fearful. They overcome it quickly, and I think if the class is kept in a relaxed atmosphere, that helps them. They can joke about their errors....so I think the atmosphere of the training helps a lot."

"By the end of the week they are ready to take on something else."

4. Do you conduct a follow-up study on students trained in the mobile computer lab?

"Not really. We will call the contact person at the company to find out if there is a need for further training. On our evaluation form there is a question about what other training do you think you might need, and normally most people think they want the next level of the class. That information is shared with the contact person."

"We don't usually go back and make contact with the students that were actually in the class."

5. Do you provide any type of customer support to clients after completion of training?

"Not really. In most cases I have found that the company has a person they can contact to provide them that support."

SELECTED QUOTES FROM THE TELEPHONE INTERVIEW

SCHOOL: FRANCIS TUTTLE AREA VOCATIONAL-TECHNICAL SCHOOL

QUESTIONNAIRE: ADMINISTRATOR TELEPHONE SURVEY

TITLE OF PERSON INTERVIEWED: COORDINATOR OF MICROCOMPUTER TRAINING

DATE OF INTERVIEW: FEBRUARY 21,1989

LENGTH OF INTERVIEW: 21 MINUTES

1. How was the decision to provide the computer lab reached?

"They had visited Great Oaks Vo-tech School in Cincinnati and had seen that one operate. Of course, that one was built mostly to take to their surrounding schools that had no computer equipment at that time and provide computer literacy to the students, but they had also started working with industry up there. Since we already had our adult programs providing computer literacy, and we were working already with industry through the High Tech Center providing industry some training, they decided that this would be a good way - as they explained it to me - a door-opener to a lot of industries to introduce them to Francis Tuttle Vo-Tech via the mobile lab and talk about some other programs.

2. In your opinion, has the lab been cost effective?

"Yes."

Interviewer Question: Has it been a priority to have the lab operate and pay its own way and recoup any of the initial investment?

"Let me put it this way. It has not been a high pressure concern. I believe they (the administration) think it would be nice if we could recoup the investment, but it is not a top priority.

3. Has any consideration been given to the purchase of an additional computer lab?

"There was thought given to it last year due to the fact it was so booked, usually six months in advance. What we did decide to do instead -- not to have such a big investment -- was to buy another set of equipment that we put in casses that we could set up in industry if they have a training room.

We do that (move in the equipment) if they have a schedule that demands two weeks or more of training.

We try to leave the lab for training a week at a time. If a company has a hundred employees to be trained or two weeks to eight weeks worth of training that needs to be done, then we go the route of bringing the equipment into their facilities if they have the space available to set it up. We bring in the tables, chairs, electrical strips - everything that is needed to set up a class.

SELECTED QUOTES FROM THE TELEPHONE INTERVIEW"

SCHOOL: FRANCIS TUTTLE AREA VOCATIONAL-TECHNICAL SCHOOL

QUESTIONNAIRE: INSTRUCTOR/COORDINATOR TELEPHONE SURVEY

TITLE OF PERSON INTERVIEWED: SOFTWARE TRAINING SPECIALIST

DATE OF INTERVIEW: FEBRUARY 28, 1989

LENGTH OF INTERVIEW: 22 MINUTES

1. How are the students selected?
"The students are selected by the company."

2. Do you have prerequisites for students?
"We don't have prerequisites per se as academia - "if you do not have the class you cannot take the class" -- which I guess is the true definition of prerequisite -- but we do say the "recommended" prerequisite, and we do say if you're taking an Advanced Lotus Class, you must be proficient in Lotus and can do these things. Some students take the class anyway and aren't (proficient), and we wind up having some problems during class, but we do have recommended prerequisites."

"It is tied more to tasks than previous training. Although we say that if you have completed this training, you should have had these tasks.

3. Do you do anything specific to help overcome "computerphobia?"

"We have that type of person very frequently. Last year I had a lady from Southwestern Bell who said she wouldn't touch a computer or have anything to do with it. By noon she was doing very well, asking where she could buy a computer and when she could take the next course."

Interviewer Question: "What is your technique for dealing with this type of student."

"I am a follower of Malcolm Knowles. Iuse a lot of humor and try to get people to relax. We talk befor starting class and discuss peoples interests and backgrounds."

4. Do you conduct a follow-up study on students trained in the mobile computer lab?

"Any follow-up is done by the training coordinator."

5. Do you provide any type of customer support to clients after completion of training?

"Yes, we provide consulting services for companies for which we do training."

Interviewer Question: "Do you charge for this service?"

"We charge on an hourly basis at approximatly $30.00 per hour, but we don't have much opportunity to do this dur to our schedule."

SELECTED QUOTES FROM THE TELEPHONE INTERVIEW

SCHOOL: TULSA COUNTY AREA VOCATIONAL-TECHNICAL SCHOOL

QUESTIONNAIRE: ADMINISTRATOR TELEPHONE SURVEY

TITLE OF PERSON INTERVIEWED: ASSISTANT SUPERINTENDENT FOR BUSINESS AND INDUSTRY DEVELOPMENT

DATE OF INTERVIEW: FEBRUARY 13, 1989

LENGTH OF INTERVIEW: 31 MINUTES

1. How was the decision to provide the computer lab reached?

"Staff members which work with business and industry felt that there was a real opportunity to work in the community if we would put together a mobile computer lab comparable to the ones that exist at Francis Tuttle and Great Oaks."

"We began an investigation by checking with Francis Tuttle and also with Great Oaks to see what they were doing in providing training on-site. After numerous conversations and numerous meetings at which time we looked at the pros and cons, and the need for training, we ultimately looked at the cost and what the benefits would be."

2. In your opinion, has the lab been cost-effective?

"I think it has. Initially it involved an extensive outlay. I don't think there is any question that it has been a cost-effective investment, and we can probably write it off in the next five years. At this time our lab staying booked at least four months in advance."

3. Has any consideration been given to the purchase of an additional computer labs?

"Yes. There seems to be support for a second lab within the district; however, we are not sure that the demand from industry is at a level to support an additional lab."

SELECTED NOTES FROM THE TELEPHONE INTERVIEW

SCHOOL: TULSA COUNTY AREA VOCATIONAL-TECHNICAL SCHOOL

QUESTIONNAIRE: INSTRUCTOR/COORDINATOR TELEPHONE SURVEY

TITLE : INSTRUCTOR/COORDINATOR - MOBILE COMPUTER LAB

DATE OF INTERVIEW: FEBRUARY 13, 1989

LENGTH OF INTERVIEW: 30 MINUTES

1. How are the students selected?

"By the employer."

"Once the employer makes the selection, they are in the class."

2. Do you have prerequisites for students?

"The only type of prerequisite would be DOS for Lotus and Introduction to Lotus before the student can take Intermediate Lotus."

"The coordinator that is coordinating the activity on the employer's site has a description of each course being taught, and it is his or her responsibility to promote that class for the individuals who basically need that class. There is some variety (of abilities), but in any class that you teach, you can not get away from variety of individuals."

3. Do you do anything specific to help overcome "computerphobia?"

"I would say maybe one percent of all the students that have been trained have some type of fear or some intimidation on the computers. Although the employer will select students, it is on a volunteer basis or whether the students want to attend or not."

"So the people that are attending the classes have a great interest, so their interest overcomes their fear or intimidation."

"The way the lab is set up they can always compare what their screen is with the instructor's screen, so that gives them a little more confidence in what they are doing."

4. Do you conduct a follow-up study on students trained in the mobile computer lab?

"No, not at this time."

5. Do you provide any type of customer support to clients after completion of training?

"We are currently offering that as an additional service. We will provide telephone support, and if need be, we will provide on-site support if the student feels that he or she needs some additional help."

"At this time we are not charging for telephone support for one year after the person has been trained."

"On-site support will be charged at $25.00 per hour."

"As far as telephone support, what they have been told by both instructors is that we are normally not in the office and cannot be reached, but we call in for messages every day. So it is more or less on a return call basis. As far as on-site support, they schedule that time with the other instructor or me."

VITA

Thomas Walter Ray

Candidate for the Degree of

Doctor of Education

Thesis: AN EXAMINATION OF THE IMPLEMENTATION, OPERATION, AND BENEFITS OF A MOBILE COMPUTER CLASSROOM FOR BUSINESS AND INDUSTRY TRAINING

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Oklahoma City, Oklahoma, February 14, 1947, the son of Walter and Ivia Ray.

Education: Graduated from Classen High School, Oklahoma City, Oklahoma, in May, 1965; earned the Bachelor of Science degree in Education from Central State University, Edmond, Oklahoma in May, 1970; earned Master of Science in Trade and Industrial Eduction from Oklahoma State University, Stillwater, Oklahoma in May, 1973; completed requirements for Doctor of Education degree at Oklahoma State University, Stillwater, Oklahoma in May, 1989.

Professional Experiences: Technical Drafting Teacher, Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma, 1970-1979; Private Training Consultant, Tulsa, Oklahoma, 1973-1976; Adult Training Specialist, Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma, 1979-1981; Coordinator of Special Programs, Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma, 1981-1983; Adjunct Professor, Tulsa University, Tulsa, Oklahoma, 1980-1989; Industrial Coordinator Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma, 1983-1985; Director of Adult Education Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma, 1985-1988; Director of Business and Industrial Training Services Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma, 1988-1989.

Professional Organizations: Oklahoma Vocational Association, American Vocational Association; Oklahoma Education Association, National Education Association; Phi Delta Kappa; American Society of Training and Development.