A PROFILE OF MICROCOMPUTER TRAINING IN SELECTED OKLAHOMA BUSINESSES

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The purpose of this study was to obtain information on microcomputer training in businesses in Oklahoma. The three main areas covered were who received training, who provided training, and what training methods were used. An analysis of the types of microcomputers used and the brands of software used was also examined.

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CHAPTER I

RESEARCH PROBLEM

Introduction

Computers have been a part of large organizations since the late 1950s. Until recently, however, only those people who were computer programmers or those who worked for data processing centers used computers. Small businesses and other individuals in businesses have just begun to use computers since microcomputers became available.

Microcomputers are a relatively new invention and have been accessible to a large population since about 1980. The reasons that microcomputers have become more available to the general population are that equipment has improved and the costs of purchasing microcomputers have dropped drastically. The software to run microcomputers has also improved considerably.

Patnode (1985) reported that an article recently published in the Wall Street Journal stated that sales of microcomputers for the office will approach 20 million units between 1983 and 1987. Patnode further commented that many executives and managers are so mesmerized by computers that misuse frequently offsets their many benefits.

Due to the decrease in prices, many businesses have given up on a formal justification process when purchasing microcomputers (Patnode, 1985). Patnode claimed managers should not ignore the intended use when purchasing microcomputers. He expressed a critical need to determine

what management functions can be displaced or improved by prudent use of the microcomputer before purchasing it.

Sullivan, Lewis and Clark (1983) wrote in their textbook that microcomputers have only been available for use by more than the computer expert for only the last five years. Since then, there has been an increase in the number and kinds of microcomputers available to a variety of individuals besides just the computer expert. More individuals and businesses are now purchasing microcomputers. Although more microcomputers are being purchased, many people find that once they get them home they do not use them (Young, 1984). Young stated that many of the salespersons underemphasize the intellectual effort that is required to learn this new technology.

Mossberg (1986) wrote that microcomputers require far more effort and special knowledge and expense to operate properly than any other popular home technology. Mossberg further stated that:

> It is still impossible for computer buyers to tap all but a fraction of the power they bring home without learning a whole lot more about how computers and software operate than most people need or want to know. It takes work, study, phone calls and letters, added purchases and lots of support from more experienced users to come anywhere near to getting the value from the computer that its makers led the buyer to expect. There are also plenty of frustrations along the way (1986, p. 4).

Hall-Sheehy (July, 1985 p. 24) stated that "personal computer training is a woefully neglected field." He conducted an informal study of 21 companies in the Houston area to find out more about how people use microcomputers. He asked them for information on who controls the arrival, placement, support and training for microcomputers in their organizations. His selection of companies was based on each having more than 1,000 employees and more than 25 microcomputers in the organiz-

ation. Results from his study revealed that out of the 21 companies in his study, ten offered no training to employees, three sent people out for training, four relied on software disk tutorials and four offered some form of instruction.

Hall-Sheehy (July, 1985, p. 24) mentioned that "education for personal computers is lagging far behind the arrival of the technology and available training has a narrow scope." He further commented that people look at advertising and think that learning to use the microcomputer is easy. People feel they don't need to worry about training because they think they can learn it themselves.

According to Hall-Sheehy, few people understand how much time it takes to get a system to do even the simplest of tasks that are shown in advertisements on television or in magazines. He claimed that it takes eight to twelve hours to learn enough to be comfortable with one of the spreadsheet packages.

Kneale (1986) pointed out that veteran users of microcomputers suggest 20 to 40 hours of perseverence are required to learn to use a microcomputer. A few hours of group training won't improve those prospects much. Kneale (p. 22d) stated that "learning to use a PC is an enormous sinkhole of time." He noted that the computer will not increase productivity for a long time; in fact in the beginning it will decrease productivity. One training manager (Kneale, p. 22d) said "whoever tells you these things are easy is lying."

Pepper (May, 1986) said that as microcomputers became more common and the market more competitive, managers were faced with a problem of underutilized personnel and equipment. He stated further that lack of training caused the underutilization of personnel and equipment. Merely

putting a microcomputer on someone's desk did not guarantee increased efficiency or productivity if the employee was not well trained.

Guimaraes (1984) listed several problems that are encountered by people who use microcomputers when there is no formal training. Those are:

1. Users of personal computers throughout the organization tend to "reinvent the wheel" by not sharing knowledge or access to tools, methods, vendors, etc.

2. Because of their isolation, many users learn through an expensive process of trial and error.

3. Since user experience about the managerial aspects of computing is cultivated through trial and error, exposure to major disasters is common.

4. Many technical problems require a substantial investment of user time for solutions. In many cases, it is in the organization's best interest that the problem be addressed by Management Information Systems (MIS) professionals who have more knowledge (p. 127).

Although microcomputers are being purchased more frequently by businesses, there are still several problems that must be considered before they can be successfully used by employees. Training is certainly one problem that should be addressed.

Statement of Problem

Microcomputers are a relatively new invention. Microcomputers have basically been available to the general public for only about five years. These new machines have taken on a certain appeal to many businesses who think that the microcomputer can solve many of their business problems and increase their productivity. Much of the advertising on television and in magazines has made using microcomputers look easy. Salespeople also emphasize the simplicity of using a

microcomputer. Now that microcomputers are cheaper and more software is available, more businesses are purchasing them.

However, the problem is that learning to use microcomputers is much more difficult than many businesses anticipated. It is time-consuming to learn to use microcomputers and in many cases the businesses or employees need training in order to learn how to use the equipment correctly and efficiently in order to be productive.

Adequate information is not always available when a business is trying to make decisions about microcomputers and their use for their particular business. This lack of information and lack of training causes underutilization of the microcomputers after they are purchased.

Purpose of Study

The purpose of this study was to gather information from a sample of Oklahoma businesses on who received training, who provided training, and what training methods were being used for microcomputers. A secondary purpose was to gather information about the types of microcomputers and types of software being used by businesses.

Research Questions

The major questions asked were:

1. Are businesses providing training for their employees after they purchase microcomputers?
2. Who is receiving training?
3. Who is providing the training?
4. What methods of training are being used?

Need for Study

Business educators, computer educators, and human resource training departments need to be aware of what businesses need in order to offer courses or training to better serve the needs of businesses. There are also implications for business and industry to learn from the study in order to fully utilize their new technology, increase their productivity and increase their company profits.

Scope and Limitations

The study was limited by the the fact that the study focused upon businesses in Oklahoma and may not necessarily be generalized to other states. A cross section of all types of companies in Oklahoma are included in the list. Those businesses included represent manufacturing, agricultural businesses, banks, newspapers and printing businesses, construction firms, petroleum related businesses, and other businesses of various sizes.

Definition of Terms

To provide guidance for the study, the following definitions are included:

Computer assisted instruction.(CAI) A form of educational instruction in which the computer prints textual information on a terminal. Students then follow directions and respond interactively to questions from the computer. Depending on the accuracy of the student's responses, the computer will advance to another topic or repeat material that was not learned (Stern and Stern, 1983).

Computer literacy. The general understanding of how a computer works, its capabilities and its limitations (Reiss, 1984). It also covers a reasonable understanding of computer terminology.

Data base. A group of logically related files of data that are stored on disk or tape for use in retrieval of data and for use in decision making (Schnake, 1985).

Data processing (DP). Procedures for selecting data, handling data, classifying and sorting, calculating and putting data into meaningful reports so people can use the information (Schnake, 1985).

Hardware. The physical equipment of a computer system such as central processing unit, terminal, keyboard, disk drives, printer (Schnake, 1985).

Human resource development department (HRD). A department within an organization charged with the responsibility to obtain, retain, and develop the human resources upon which any organization builds, grows, and prospers. The department helps to identify training needed in the company to make the employee a more productive worker (Strauss and Castino, 1981).

Management information system (MIS). A systems approach that considers each department in a business as integrated parts of one total system rather than as separate departments. The primary purpose is to facilitate the flow of information in an organization. It also provides management with greater decision making power (Stern and Stern, 1983).

Microcomputer (Micro). The smallest member of the computer family. It is about the size of a typewriter with a microprocessor and storage capabilities and input and output devices (Radlow, 1986). It can be used at home or in the office, schools or anywhere.

Personal computer (PC). Same as microcomputer.

Software. Programs that control the operation of the computer (Harold, 1984). These programs can be written by the individual or purchased from a company.

Spreadsheet. A program used in working with business problems, such as accounting budgets. It involves manipulation of columns and numbers (Reiss, 1984).

Word processing. A type of data processing that automates secretarial tasks performed in most offices. Instead of using a typewriter, a microcomputer is used to type documents, reports, and letters. These can be stored and later printed out on a printer (Stern and Stern, 1983).

Vendor. For purposes of this study, it is someone who sells computers or microcomputers to either businesses or individual users.

CHAPTER II

REVIEW OF RELATED LITERATURE

Microcomputers have only been available to the general population since about 1980. Many small businesses could not afford to purchase large computers. When microcomputers became available, small businesses became interested in them. They have become popular because they are cheaper and more businesses can afford to purchase them. Microcomputers are now easier to use than large computers. Software has also been developed to help businesses complete tasks more efficiently. The Grumman Corporation (Parker, 1986) purchased microcomputers to help control costs and to be more competitive. The manager of office automation of Grumman's stated that:

> Over 50 percent of the cost of doing business today is related to office costs, and the majority of that amount is people costs. The cost of technology has been going down rapidly-40 percent annually on memory chips, for example. What we must do is inject as much computer power as possible into the company and make our people more efficient (Parker, 1986, p. 39).

In order to utilize microcomputers more efficiently, sometimes training becomes necessary. Many people may be able to train themselves to use software on their own, but from a company's point of view, learning on their own may not be the most desirable course of action. It can be very time consuming for an individual to spend the necessary and sometimes lengthy time self-teaching himself or herself from a manufacturer's book of instructions. A training course can be a more

efficient way to train people to use their microcomputers (Parker, 1986).

Barbour (1987) wrote about a survey of school administrators and their use of microcomputers. The administrators said that their main reason for using microcomputers was the reduction in their paperwork. Fifty-four percent of the school administrators reported that the advantage of using the microcomputers was the amount of time it saved them which could be used to do administrative tasks. However, twenty five percent of the administrators said that neither they nor their staffs are adequately trained to utilize the computer's full potential.

A review of literature was undertaken in order to see if businesses were training their employees when they purchased microcomputers. If businesses had training of some type, three topics were considered. These were: 1) who received the training, 2) who provided the training, and 3) what training methods were used.

Who Receives Training

Literature was reviewed regarding who receives training in a business after microcomputers are purchased and installed. One reason for examining who receives training is to determine if the preparation and knowledge is different depending on who is receiving the training.

Pliniussen (Sept/Oct. 1984) stated that the increase in computerization and

> its growing sophistication due to advanced technologies that are being made available to all levels of an organization will require a stronger emphasis by both vendor and purchaser groups when assessing the training and development needs of users (p.55).

He further commented (p. 55) that "skilled staff such as management accountants require more specialized training and development since their 'non-productive' time is very valuable."

One study by McKibben (1984) suggested that:

> Almost without exception, MIS and DP managers agree that executives require different training procedures when it comes to the PC. The most important aspect of training executives appears to be showing them how PCs fit into the big picture, and in particular, showing the relationship between personal computing and productivity (p.40).

From a training perspective, there are different staff levels with different educational needs (Hall-Sheehy, 1984). It is critical that the trainer know the audience when training people to use microcomputers.

Zemke (Sept. 1983) also emphasized the importance of addressing the needs of the various audiences when planning training. Businesses must consider the heterogeneous functions that go on in the various departments. Not all areas will use the microcomputer in the same way. It is also important to recognize that there are varying skill levels of the learners. The beginning, intermediate and advanced users need to be treated differently. One way to do this is by testing their computer literacy knowledge through the use of questionnaires before setting up training. Zemke pointed out the importance of planning a business' needs for both computers and training before the computers are purchased and before training programs can be developed.

Gibson and Kosinar (1985) also emphasized that many businesses are discovering the importance of developing focused in-house programs that meet the direct needs of the workers and the business. They claimed (p. 27) that before the program is developed, "the first step is to identify the target audience's specific education needs."

Parker (1986) wrote that the Grumman Corporation found that even under the best of circumstances, many people are intimidated by the complexities of computers and software. The company found that in the early stages of adding microcomputers to the company, there were many people who were frightened and anxious over learning to use the microcomputers. They did not want the machines. This was a problem with secretaries as well as executives.

The Grumman Corporation (Parker, 1986) now has 17 computer-related courses, ranging from an elementary introduction to the microcomputer course to advanced seminars. However, all of their courses and equipment used to teach employees are directly related to the tasks employees are likely to do on their specific job.

Many computer learning centers in computer stores (Young, 1984) are finding that their typical student is a small business owner or individuals who want to educate themselves so that when they go into a computer store they will know what to request. Many of the classes that are offered on microcomputers demonstrate the use of spreadsheets, word processing, and file management. This meets the needs of many individual workers (Young, 1984).

The Houston Independent School District (Sturdivant, 1983) developed a plan to train people in the school area. All the principals in the district received at least 20 hours of training. Depending on the application, teachers who worked with computers received 24 to 296 hours of instruction. Training was also available to parents who wanted to keep up with their children.

The school district recognized (Sturdivant, 1983) that not all staff members needed the same set of competencies. Depending on the individual's position, computers skills were different.

Kanter (1985) pointed out the importance of recognizing that microcomputer users come from various backgrounds. He suggested that there are four microcomputer user categories: 1) managers, 2) professionals, 3) administrators, and 4) clerks. Managers use the microcomputers less than any of the other three groups. Managers seem to avoid the computer most according to Kanter.

Ropp (1986) reported that the main people who are most affected by office automation and microcomputer usage are the clerical workers. These are usually women and some older workers who resist retraining.

In many cases managers need to receive training with computers (Hollman and Cooley, 1984). Microcomputer literacy for managers should focus on the use of business software packages to help them do their jobs more efficiently. Even though managers appear to be one group, they also are diverse. Microcomputers are used in a variety of ways at different organizational levels and computer applications vary greatly in different functional areas of a business. Hollman and Cooley (1984) stated that:

> Managers in the upper echelons of the firm may enhance their performance by analyzing strategic decisions using decision support software that allows unstructured or ad hoc modeling and experimentation. Financial managers are likely to need spreadsheets, graphics, and financial modeling. Marketing managers often use database software to retrieve and summarize sales by region or salesperson. Graphics packages may be used by advertising people to draft layouts and by engineers to design products (p. 26).

United Technologies Corporation (Watt, 1984) purchased microcomputers for their executives. However, before the executives received

their microcomputers, they had to attend a three-day training program. United claimed that they wanted the equipment to actually be used once the course was completed.

The executive training at United (Watt, 1984) involved extensive hands-on experience with the IBM PC. Executives learned to use an integrated spreadsheet, database, word processing and graphics package.

Hall-Sheehy (July, 1984) emphasized that computer education cannot be solely aimed at the data processing professional. He said (p.39) "It must consider an entire new range of clients, from clerks to executives. Each will have unique needs requiring different instructional methods." The ability to communicate well will become increasingly more critical in the data processing community.

Resnick (1985) mentioned that many microcomputer vendors are doing training. There is no one customer category that dominates. But there is an increasing trend for training for office end users and managerial and white collar personnel.

When Metropolitan Life computerized the operations of all their offices (Feuer, 1984), they trained three major groups of employees: managers, salespeople, and clerical personnel. They discovered that the clerical staff was the easiest to train because the features were easy to use and of obvious benefit to them. The salesmen were the most difficult to train. Most of the salesmen had little or no experience with a typewriter, much less a computer. They needed a skill-based typing course before they could learn to use the computer.

The Data Systems Education Center is the main provider of information system education for all U.S. Bell Systems (EDP Analyzer, 1980). They develop and present their own education and training courses.

Initially, courses were developed for computing professionals only. They now have courses for the end user and end user management levels. These are aimed at managers of departments. The center found that their most effective courses are those that were designed for a specific audience.

Hall-Sheehy (March, 1985) mentioned that different curricula were designed for the various people with different levels of experience on microcomputers. Advanced students received different kinds of training from that received by the person who knew nothing about microcomputers.

Advanced and intermediate users (Coppolino, 1986) establish networks that later replace some formal training. Sometimes special seminars are held for these people once or twice a year.

It is not enough to consider the differences in ability levels when developing training programs. Another concern is to make sure that different peer levels are not mixed in the same training classes (Pliniussen, Nov-Dec, 1984). Pliniussen also suggested that trainers should be chosen who are the same level as the students--such as executives taught by executives and clerical staff taught by other clerical staff.

Who Provides the Training

Literature reviewed on businesses that had training emphasized that there is much diversity among businesses in their choices of who does the training. There appeared to be several solutions to this problem.

Cushing (1983) wrote about the problems of finding people who are able to train others to use microcomputers. He stated that those people who have computer knowledge do not necessarily have the skills to teach

others about computers. The problem is intensified by the fact that trainers who have computer skills typically go into computer-related jobs in industry because these jobs pay more.

Instead of having trainers in their own businesses, some larger companies send their executives to classes at other locations such as computer vendors or computer stores (Cushing). Others purchased microcomputers only from vendors who supplied training after the computers were installed.

McElwreath (1984) suggested that training may utilize the backgrounds of various groups in a business. The question is who controls the training. It usually resides with the computer department because the training is technical, and technical experts are required to do the teaching. But computer literacy is not difficult, and an education group could do this. In some companies, the computer and education departments work together to meet the needs of the users.

The Grumman Corporation (Parker, 1986) developed their training program by the manager of office automation teaming up with the manager of the career education and training department in their company. They assembled their own in-house training program because they perceived a need to keep the training relevant to Grumman operations. They hired two technically knowledgeable educators to help in the training. These were teachers who had taught mathematics and physics in high school.

The All-State Insurance Company (Godfrey, 1980) developed a training program by putting together a team of four people. This group consisted of one data processing expert, one accountant, and two operating professionals. This team worked with the training staff to develop

a training program. The technical group added the technical expertise and the training group the training expertise.

In August, 1985, Purdue University sent a questionnaire to 387 manufacturers employing more than 100 workers to find out if supervisors were using microcomputers. The main purpose was to find out what microcomputer training needs these supervisors needed. The university received a 33 percent response rate. For developing computer competency, supervisors responded that they preferred in-house training. Included as choices for training were training departments, self-study, and training by co-workers. Only 16 percent of the companies reported using outside consultants for trainers. When a supervisor needed training, using a trainer, even a trained co-worker, was easier and more effective than self-study (Bryan, 1986).

The Houston Independent School District (Sturdivant, 1983) recognized the importance of microcomputer training. In order to train teachers, administrators, students, and parents, a team of six computer specialists worked as full-time trainers to implement the training for the entire school district.

The school district (Sturdivant) developed a concentrated training program which placed one computer specialist teacher at every campus. This particular person had 296 hours of training in microcomputer knowledge. The teacher spent half of his or her day consulting with teachers and half the day with students. This technologist had to update skills yearly with 30 hours of additional training.

Sometimes microcomputer training is supplied by the microcomputer store where the equipment is purchased. One woman who was a salesperson at a ComputerCraft store realized that the documentation and books were

not adequate and developed some introductory classes for two or three hours of instruction. The purpose of these classes (Young, 1984, p. 106) was just to get the "first-time user over the psychological hurdle of being intimidated by computers."

ComputerCraft stores now have 22 teaching locations. The classes are taught by a contract teaching staff of about 60 instructors. When training first began, teachers were recruited from microcomputer user groups. Later, the teachers were experienced professionals who used specific software in their own work (Young, 1984). Half were full-time professionals, and some were consultants.

Vendors, who also manufacture the microcomputers, also provide training for new users who purchase their equipment. Resnick and Fuerst (1985) stated that customer support was a major differentiation of one product over another in the marketplace and was one reason why a customer may purchase one vendor's equipment over another vendor. This support was needed to help the customers fully utilize their purchase and gain satisfaction with their equipment. The vendors (Resnick and Fuerst, 1985) who do the training are either full-time managers/trainers or field personnel who provide training as part of their job.

John Pliniussen (Sept/Oct, 1984) suggested that management accountants are aware of the need for and use of microcomputer systems to support their jobs. But there is little mention (Pliniussen, p. 53) about the issues "of initial training and the on-going development of these professionals to ensure the optimum use of their systems."

Pliniussen indicated that user frustration comes from ineffective training. Frustration causes extra stress on users. This stress is

caused (p. 54) from the common "tendency to install first and worry about learning after--instead of doing both simultaneously."

There are several reasons why training and development issues are underemphasized. These are:

1. In the past, initial systems evaluation studies tended to ignore the training element. Only recently has the training, as an evaluation criterion, started appearing in the popular literature.

2. The skills and education required to develop effective training and development sessions and materials are just starting to be made available to large organizations. Yet they are usually less available in small companies because of the associated costs and the fact that the smaller business manager does not realize training is required.

3. Training and development techniques are in a constant process of rejuvenation due to the increased knowledge and research in areas of industrial psychology and human relations management. Typically people charged with this function were not required or trained to consider the computer related issues of their employees jobs. Unfortunately, however, evidence often suggests that the human resource or personnel manager in charge of training and development has not kept up to date with computer user needs.

4. If training is done, it is usually only "up-front" training given just before the use of a new or existing system. For reasons mentioned above, very little "on-going" consideration is given to the skills and systems utilization development areas (Pliniussen, p. 54).

McKibbin (1984, p. 37) commented that there are "no hard and fast rules for the MIS professional to obey when faced with launching a training program for the technically unsophisticated." Some businesses hire an outside trainer. Eric Vogt (McKibbin, 1984) was one person who went into the computer training business when he found the demand for educators to teach computing skills was so great.

Eric Vogt stated (McKibbin, p. 40) that a "trainer is someone who teaches the manager how to do the right key strokes, whereas an educator shows the user how to focus on solving business problems throughout the

right selection and proper use of a system." Vogt taught managers to use the microcomputer as a business tool.

Dube-Forten (1982) suggested that the training staff in the human resources development department should be involved in purchasing the software. Then the trainer will know what training needs must be met. The trainer also can look at the degree of difficulty and decide if the software is appropriate for the people who will be using it. She concluded that if software selection is not given careful consideration, training can become very costly.

Information centers are becoming popular in many businesses. They have become an extension of the data processing department. However, their main function is to train executives and other microcomputer users in the company so that the user can learn to use the microcomputer for his or her job responsibilities. The people who work in information centers have to be professionals who know business problems of executives as well as be technically knowledgeable (Zemke, Feb 1984). Communication skills are critical. Johnson (1984) also mentioned these same points about the information center. Goldfield (1984) also suggested that the information center is another means of training new employees to use the microcomputer.

Country Mutual Insurance Company (Rhodes, 1983) is one company that has taken advantage of an information center. There was a conscious decision to not bring technicians to the center. Two of the center's staff people are trainers.

Corning Company (Rhodes, 1983) felt that their information center staff must be able to understand business problems. Their staff has people with business skills and some understanding of solving business

problems. The staff also needs good interpersonal skills as well as teaching skills. Corning Company feels that it is important to talk to users in their language.

Goldfield (1984) said that most microcomputer training in large corporations is done by the Management Information Systems (MIS) department. Unfortunately, this is not always too helpful for the user because although the MIS staff is well versed in computer technology, it sometimes (p.60) is "short on person-to-person communication skills necessary to provide a positive training experience to the newcomer." Goldfield (p. 60) further stated that "fortunately MIS people are beginning to team up with traditional corporate training staffs to develop and deliver PC literacy courses."

Microcomputer training has been handled by human resource departments, data processing departments or the department using the computers with a unanimous lack of agreement on how to provide the most effective and efficient training. However, in a growing number of companies, the information center has started to provide the missing link. It has taken over the administration and coordination for much of the microcomputer training (Coppolino, 1986).

Coppolino stated that from an organization's perspective, effective microcomputer user training incorporates three important objectives. These are properly trained users, cost-effective and timely training and convenience. Who actually does the training and how it is delivered are not the primary considerations.

Training Methods Used

This last section examines the literature relating to training methods. These also vary depending on businesses and their needs.

Cushing (1983) suggested that vendors are producing many products to teach people about microcomputers. Workbooks and computer tapes are available to teach microcomputer usage. Seminars are offered by computer retailers. Vendors also offer classes on popular software packages such as Visicalc and dBase II.

Coppolino (1986) named seven microcomputer training tools and their advantages. The first one he mentioned was product documentation. He stated that even experienced users of major spreadsheet programs feel that publisher supplied documentation is not an effective and efficient way for beginners to learn to use microcomputers. Reasons for this are that the original manufacturer's documentation is an encyclopedia reference rather than an instructional tool. These manuals are very hard to follow and finding the answers that a user may need is difficult.

The next one mentioned by Coppolino (1986) was tutorial books, videos and diskettes. He claimed that the self-tutorial was an economical solution for training just a few or very large numbers of employees when money was not available to send them to instructor-led seminars. However, tutorials are best used for the very motivated learner and for reviewing seldom-used features. The majority of employees usually will not find the time to complete the tutorials on their own. The quality of these tutorials also varies.

The third training tool is the local computer store (Coppolino, 1986). An increasing number of retail computer stores are offering

training. These stores realize that they must do a good job in order to sell the microcomputers. The largest disadvantage to this method is the courses are usually generic in approach and may not fit individual needs.

A fourth training tool is user group training (Coppolino, 1986). These groups consist of loosely organized clubs of microcomputer users with common interests. They tend to be either highly technical in nature or broadly based. Usually, someone in the group will discuss the usage of a package they learned on their own. Groups share problems and interests with each other and learn from each other. The usefulness of this tool would depend on the individual and the amount of assistance the person needed with learning about microcomputers.

The fifth tool is outside seminars (Coppolino, 1986). These introduce a few employees to a new software program, sometimes before the software is purchased or to train new users or perhaps the trainers who will then come back to the company and train others. These can be an expensive solution. For groups of 10 to 20 users, they are neither cost effective nor convenient. For larger groups, a customized program that is done in the company would be better.

The sixth tool is the custom third-party training (Coppolino, 1986). These are people with specific knowledge on certain types of software or equipment. These people are well equipped to handle training problems and potential pitfalls.

The seventh tool suggested by Coppolino (1986) is internal technical experts. These may consist of the information center staff, data processing professionals and corporate trainers. Other employees who have an interest in teaching and are adept at presenting technical

information also should be used to conduct training. The largest problem with this is the amount of time that it takes to develop course material.

Zemke (Sept, 1983) stated that something that usually receives little consideration when planning a computer course is learning style. In the past, microcomputer training was designed by technical people for technical people and frequently taught by technical people.

Resnick and Fuerst (1985) claimed that some microcomputer vendors are using various teaching techniques. They have consolidated them to four steps. The steps are as follows:

1. Self-instructional materials and manuals. These are the materials bundled with the system and may include reference manuals, tutorial guides, and installation manuals and audiotapes.

2. Hotline support. As a second level of support, hot lines are provided to "walk the customer through" operational or application difficulties. Hot lines also serve as diagnostic tools for hardware or software malfunctions.

3. Seminars and classroom instruction. These formalized classes may be offered at a central or field office, or at the customer's site. They may be provided as part of the installation services, or may be offered to the customer at a course or daily rate.

4. On-site customized consultation and service. This service typically is offered at an hourly or daily rate. Depending on the needs of the customer, it may be training or applications support offered by a marketing support representative, or may be hardware or software support offered by field engineers or systems support specialists (p. 84).

Ogino (1983) suggested that there are three main types of computer training. These are vendor classroom training, in-house training and self-paced training. She suggested that the best methods are those in which there is human interaction with a teacher. This method gives opportunities for immediate feedback.

Other people suggested that some training methods used (Vogt, 1985, Resnick and Fuerst, 1983) were classroom instruction, audiovisual media, manuals, and computer-assisted instruction. Classroom instruction was used most frequently.

Coppolino (1986) said that classroom instruction is most effective because it helps alleviate fears and misconceptions in the learners. The need for someone who will answer questions and laugh with the class when they find out their fears were groundless is important. The instructor also can give encouragement to beginners. Also the use of hands-on practice is critical. The learner gains more from making mistakes and being able to ask for assistance. Training should be made available when the microcomputers are first installed so that the employees can then use the microcomputers on their job immediately.

A study by Resnick and Fuerst (1983) indicated that 53 percent of all training occurs in some field location. Classroom sizes are small with a minimum class size between five and ten students and a maximum of 15 students.

The Information Center (Zemke, Feb. 1984) is a source of in-house training. He said (p. 51) the "training should be flexible and needs oriented. Second, advice and assistance should be ongoing." Some may use small groups with video presentations or the use of computer-based training. Some use both. Review sessions are another key element to the success of training. Help should also be available after the formal training period since users need support and consultation for several months.

Sometimes it was not the method of presentation that was so critical (Pepper, May, 1986). The key factor in many cases was the

amount of "hands-on" work the students experienced during their training.

There are several people who have written about computer-aided instruction (CAI). CAI refers to the actual delivery of instruction through a computer terminal. Reasons to use it are (Zemke, May, 1984, Hollman and Cooley, 1984) that it provides individualized instruction and it takes into account individualized learning rates. Students are learning while doing. It also provides instant feedback for students. People can be trained when they need it and not just when a class is developed. People in remote locations can stay at their place and learn from the computer without traveling to another location. Usually, CAI training takes a shorter amount of time to complete than a regular class as students work at their own pace. Another feature (Schwade, 1985) is that if a teacher leaves, the same material is still available on the computer to be used again and there is no need to find a new teacher.

One disadvantage of CAI (Schwade, 1985) is that it depends on the type of training that is being done. Some programs require interaction of people and sharing of ideas. Another problem is the use of computer equipment. The ability to deliver training depends on the number of terminals available. Finding programs that are appropriate is also a problem. It may be that someone in the organization has to develop the program and this can be expensive and time consuming.

Reynolds and Davis (1983) also mention some problems with CAI. They mention that development of CAI material is expensive. The delivery costs are less and the biggest savings is in training time. However, choices of programs available are very narrow (Heck, 1985).

Another newer type of training that is becoming popular is competency based training (Pepper, Sept. 1986). This is marked by three characteristics:

> The people know ahead of time what they will do and learn in the course, even to the extent that some of the training companies will not charge management for trainees who fail to master the designated skills. Second, learners must have access to one-on-one coaching if necessary to accelerate their learning process. Third, people must be able to move through the material at their own pace (p. 59).

Vogt (1985) suggested that in order to decide on the right computer training, there are a few issues to address. He provided the following:

1. Who will be trained? The program's structure, curriculum and duration should be suitable for the employees being trained.

2. What do they need to learn? The curriculum should be based upon the parameters of the job description and the way the computer will be used day-to-day.

3. How much discretionary time is available to learn? Training courses range in length from half a day to one semester and there are methods that can be used without any time limitations, at a person's leisure.

4. What is the budget available for training? Options vary from $12.95 for a variety of texts, to $2,500 per person for customized educational programs. The level of investment should be determined by the computer proficiency expected as well as by the time frame that is available (p. 59).

Parker (1986) mentioned that Grumman Corporation uses a team of about a dozen expert users within the company. These people are known as test pilots and test new products and provide the company with written evaluations of the software. If this group recommends a product, the training department will then offer classes on its use. This company also calls upon the network of in-house experts, the key experts. These are skilled operators who are able to give quick, informal help to their peers in the office and also report back to the training group about problem areas.

Although there are various training methods available, some people still have problems learning to use microcomputers. There are some reasons why some people have difficulty using computers. Poor typing skills (Geuelette, 1983) hinder the effective development or use of the computer for some people. Microcomputers require keyboarding skills even at a minimal level. It is difficult for a person who does not type to master the computer.

Some other problems are (Geuelette) that microcomputer programs are limited to intellectual and highly logical instructions. Few programs are able to convey affective learning objectives or encourage intuitive learning. Some research (Geuelette) has indicated that:

> One-half of the population has the sort of cognitive structure that resists learning from the highly linear and orderly process of the computer. These people tend to be extroverts who rely on "random", often intuitive learning, they gain far more in a typical classroom situation than when forced to sit in front of a video-screen for extended periods of time (p. 56).

Adult learning theory should be used to teach adults about computers. Zemke (Sept. 1983) suggested the use of classroom seminars, hands-on workshops, multimedia training techniques and computer-based training. User groups should also get together to share ideas and assist each other. These groups can also give support to each other after the training is over.

Scharer (1983) and Baxter (1984) stated that adults do not learn about computers by reading the manual. They learn best by demonstration and then hands-on experience when an instructor is present. After the initial training, the students need to be able to call the instructor for assistance for several months after the classroom training. Students very seldom used the manual to obtain answers to their ques-

tions. In most cases, manuals have been poorly written and difficult to follow for the average person.

Group training also has its advantages (Watt, 1984). These are that the training class develops a peer group of eight or ten people who can help each other and work together and give added support to each other.

Scharer (1983) felt that it was important to limit the scope of any single presentation. Students can only absorb so much at one time. She also emphasized the importance of finding the local user expert. Usually one person learns quickly and can help the other learners. That person is also available to the group after the instructor is gone. This expert in the group can also train other new employees later.

Summary

The review of literature suggests that there are diverse answers to the problems of introducing computers into an organization. The first issue investigated was who receives training. The literature suggested that there are several groups of people who need computer training in a business. The various groups need different knowledge about computers and different skills. Even within one group of users such as managers, there are diverse backgrounds with some people having some computer knowledge and some who know nothing about microcomputers. The training must meet the varieties of users.

The second issue also has several answers to who is doing the training. Training is now being done by vendors who are selling computers to individuals and also vendors who are selling computers to businesses.

Some businesses use the data processing center or the information center which is an extension of the duties of the data processing center. The information center works more with executives to help them learn to use their computers more effectively. There are some businesses who hire outside consultants to give classes to their employees.

Some schools hired teachers to work specifically with training other teachers and administrators about computers. A few businesses used both the data processing and the training departments as teams to develop courseware that was applicable for employees.

The backgrounds of the people who taught were also varied. In most cases, the people had good technical knowledge but the critical skills that were needed were good interpersonal skills and communication skills. The other skill that was critical was the trainer's need to understand business concepts.

The third problem reviewed is what methods are used to teach computer knowledge. Classroom instruction with hands-on training is one method. Another is computer-assisted instruction (CAI) where the course is taught on the computer. Some use a combination of classroom, video-tapes, and computer-aided instruction. The literature suggests that there is no one solution to the problem of methods. Each organization must study its needs and decide which fits their business best.

The literature did not refer to people obtaining microcomputer training through vocational-technical schools, junior colleges or universities. Many universities also offer computer courses through extension courses. This is certainly one solution.

Only a few human resource training departments were involved in training about computer usage in an organization. Certainly, human

resource departments know more about training and teaching theories for adults. They should be involved in the computer training. However, many of them will have to learn to use microcomputers themselves if they are going to be a part of this new technology.

Although the literature suggests that some training is done for microcomputers, it is evident that no systematic approach to solving the training problem for employees has been reported as yet. The research reported here addressed that situation.

CHAPTER III

RESEARCH DESIGN AND PROCEDURES

The following steps were used in researching the problem, planning the study, conducting the survey by mail of businesses in Oklahoma and presenting results of the study on microcomputer training.

1. Conduct review of related literature.
2. Development of instrument.
3. Preparation of cover letter and follow-up letter.
4. Selection of sample.
5. Collection of data.
6. Analysis and interpretation of data.

The study was designed to be a descriptive study. The purpose was to obtain data from various businesses in Oklahoma on microcomputer training, who received training, who provided training, and what methods of training were used. Businesses were asked first if they used microcomputers. They then were asked about their use of microcomputer training. If they had training, they were asked questions on who received the training, who provided it, and what methods were used for training. Data was also gathered on the types of microcomputers used and the brands of software used. There was also a short section on the company profile.

Survey of Review of Related Literature

Literature from various sources was reviewed. These included journals from business, management, computer, and training and development areas. Various newspapers were also reviewed. These newspapers were computer related and also business related. Dissertation Abstracts were also examined, however, there were no studies found that were comparable to this study.

Dissertations that had been completed for the Occupational and Adult Education Department and those from the Administrative Services and Business Education Department at Oklahoma State University were also reviewed to see if there were any studies that had been done on this topic. None were found.

An ERIC search by computer was also run using both journal entries and the special publications or speeches. There were 11 searches run in order to find studies that might be useful. The ERIC descriptors that were used for the search are listed in Table I.

Abstracts were run for all of the hits except computer literacy and microcomputers. Only the first 200 of each of these were printed. There were only 12 abstracts that were gathered from this search. An ERIC search for this particular study was only of minimal value because most of the articles and publications are related more to education than to business.

Most of the procedures found in reviewed studies used interviews with businesses. In some cases, only one company was interviewed. Usually four or five large companies were involved, and in-depth interviews were conducted. In many cases, businesses were computer manufacturing companies. One study used 21 large companies in the

Houston area with over 1,000 employees and had over 25 microcomputers in the organization.

TABLE I

ERIC DESCRIPTORS USED FOR SEARCH

SEARCH TOPICS	NO. OF HITS FOR JOURNALS	NO. OF HITS FOR PUBLICATIONS
Computers and industry	16	36
Microcomputers and training	14	3
Computers and training	14	11
Computers and training methods	11	14
Computer literacy and business	4	1
Microcomputers and business	17	11
Computers and industrial training	5	7
Computer literacy	642	636
Microcomputers	3,023	1,567
Microcomputers and industry	8	9
Microcomputers and training methods	26	17

From the review of literature, there were two large studies that were conducted. In 1985, Purdue University conducted one which emphasized how microcomputers were used by supervisors in organizations. The university sent questionnaires to a random sample of 387 manufacturers having specific Standard Industrial Codes and having 100 or more workers (Bryan, 1986). The study had a 33 percent response rate, and was particularly useful.

Another large study was completed by the Electronic Learning magazine (Barbour, 1987). This magazine is written mainly for school administrators. Questionnaires were sent to 2,000 subscribers who were identified as being most responsible for the use of microcomputers in the administration of their school or district. There were 328 usable responses or a 16 percent return rate from this survey. School administrators were asked about what types of microcomputers and software they used. They were also asked how they used them, how they felt about training and the need for training, and what were their problems with microcomputers.

Many of the other articles were opinion articles or articles on how some companies handled training for computer users. There were no studies done looking at different sized companies to see if there was a difference in the size of organizations that provided training for their employees.

The literature that was examined was mainly from 1980 to the present, as microcomputers have been generally available since then.

Development of Questionnaire

The research instrument designed for this study was developed from ideas in the literature and with the help of several people. After it was designed, it was tested by these people and revised based on their suggestions. Persons chosen to review and assist in the design of the questionnaire were asked because of their varying backgrounds and expertise. Others were chosen for their experience in structuring and using questionnaires.

The objective in developing the questionnaire was to obtain the information that was needed but also make the survey simple and easy enough so that people would answer it. Another objective was to make sure that it did not take much time to answer.

Although the questionnaire did not request identification of the company, there was an identification number on each questionnaire. This was for the purpose of knowing who returned their questionnaires so that they were not sent follow-up letters. This procedure was explained in the cover letter.

The questionnaire was divided into three sections. These were:

1. Microcomputer usage and training
    a. Does business have microcomputers
    b. Who received training
    c. Who provided training
    d. Training methods used
    e. Companies with microcomputers who had no training
2. Computer information
    a. Type of hardware
    b. Type of software used
3. General information--Company profile

The questionnaire was developed so that even those who did not have microcomputers answered questions on their company profile such as type of business and number of employees in the business. Those businesses that had microcomputers but no training also filled out information on the types of microcomputers and software they used.

After the questionnaire was completed, it was duplicated on light yellow paper so that it would stand out from the rest of the mail. The

questionnaire was duplicated on front and back and was six pages long. See Appendix A for the final questionnaire.

Preparation of the Cover Letter and Follow-Up Letter

The cover letter was developed to encourage businesses to respond. In this regard, the Department Head from the Computing and Information Sciences Department sent a letter to the businesses in the sample a week prior to the mailing of the questionnaire. The letter indicated that the questionnaire would follow and that the department fully endorsed the study and felt it would help the department serve the business community through outreach programs in the future. See Appendix B for a copy of the department head's letter.

The cover letter was prepared on letterhead of the Computing and Information Sciences Department at Oklahoma State University. Letters were individualized using the name of a person in the company and the company address. The signature of the researcher was individually signed on each letter. See Appendix B for a copy of the cover letter.

Return envelopes were included with the questionnaire. They were self-addressed and contained first class postage. The follow-up letter was written after some of the first questionnaires were returned. When some letters from the first collection of questionnaires were returned for postage due, it became apparent that some post offices were weighing the first mailing differently. Although the first letters were taken to the post office to see how much postage was needed on them, some of the post offices added a 17 cent charge to the mailing. Five letters were returned marked refused because of postage due. One respondent mentioned that he had to pay 17 cents for the questionnaire.

There was no way of knowing how widespread the problem was. A further check with the post office showed that the correct postage had been paid for the letters, but the weight was close to the maximum allowed and some of the scales from some of the post offices were not accurate. The error was also not from any specific post office so it was impossible to clear it up. Since the problem could have made a difference on the returns, the follow-up letter mentioned the problem and an apology was made for the mix-up. The follow-up letters contained a copy of the questionnaire and self-addressed and stamped envelopes. They contained more postage on the letter to the business in order to avoid the problem encountered on the first mailing. The follow-up letters were done according to the procedures followed on the first letter. See Appendix B for example of follow-up letter.

Selection of Sample

The businesses used in this study were from a list obtained from the Oklahoma State University Office of Business and Economic Research. This list is maintained by the Business and Economic Research Office for use in an economic forecasting model for the state of Oklahoma. The list was originally compiled by the research department from several sources including the Dun and Bradstreet's Million Dollar Directory. There are 6,370 different companies represented in the state of Oklahoma. They are from all towns and counties in the state. The list includes both small and large businesses. Businesses are represented from 336 different Standard Industrial Codes. There are 326 different cities or towns represented in the original list.

For this study, a random sample of 361 companies was chosen from this list. The sample size was statistically chosen to yield less than a .05 percent error (Issac and Michael, 1981). The random sample was obtained by using the Statistical Analysis System (SAS) computer program.

Collection of Data

There were three mailings. The first one was the letter sent out by the department head from the Computing and Information Sciences Department. This was mailed out a week before the first copy of the questionnaire was sent. The follow-up letter was mailed out two weeks later. The dates for the three mailings follow:

1. First letter by department head -- January 6, 1987.
2. Original mailing -- January 13, 1987.
   Date requested for return -- January 23, 1987.
3. Follow-up mailing -- January 27, 1987
   Date requested for return -- February 6, 1987.

A 49.04 percent usable return rate was obtained from the two mailings. A telephone follow-up to nonrespondents was done on a five percent random sample. The results were consistent with the results of the study. This return rate was significantly higher than that of other reviewed studies.

There were 179 total questionnaires returned from the two mailings. This was a 49.59 percent response rate. Two of the questionnaires were not usable because of lack of answers. There were also 53 returned because addresses were incorrect or the company was out of business. Another total of 129 did not respond to the two mailings. The total number of usable questionnaires for the study was 177 which was a 49.04

percent response rate. An analysis of the returns are found in Table II.

TABLE II

DISTRIBUTION OF RETURNS FROM THE SURVEY

CATEGORY	NUMBER OF QUESTIONNAIRES		PERCENT OF TOTAL (No. = 361)	
First Mailing	121		33.52	
Second Mailing	58		16.07	
Both Mailings		179		49.59
Bad Addresses	53		14.68	
Non-respondents	129		35.73	
TOTAL SAMPLE SIZE	361		100.00	
Unusable		2		.55
USED IN THIS STUDY		177		49.04

Analysis and Interpretation of Data

As questionnaires were returned, the responses were coded and entered into a data set in the computer. A Statistical Analysis Systems (SAS) program was used to tabulate the responses from each question. The program was used mainly to find frequencies and percentages of each response for each question. There were some comparisons of those

businesses that had microcomputers but offer no training to those that had training. Also the various training methods were compared to see which one people found most effective. Types of hardware and software were also examined. There were some comparisons of size and types of companies that had microcomputers with those that did not have microcomputers. The analysis and interpretations are presented in Chapter IV and Chapter V.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF THE DATA

Analysis of Business Respondents

This section presents an analysis of the types of businesses and the number of employees in those businesses that responded to the questionnaire. There were a total of 177 usable questionnaires for this study. From these 177 questionnaires, 87 businesses responded that they did not use microcomputers, 25 businesses responded that they had microcomputers but no training, and 65 businesses had microcomputers and training. A total of 90, or 50 percent, of the businesses in the study used microcomputers.

Table III contains the results of the types of businesses that responded to the questionnaire. This table is separated into three divisions; the first are businesses who do not have microcomputers, the second are businesses who have microcomputers but no training, the third are businesses with microcomputers but also have training.

First, businesses who did not have microcomputers were examined. Manufacturing businesses with 23 respondents or, 26.4 percent, accounted for the largest group of respondents in this division. Fourteen, or 16.1 percent, of the respondents answered the category "other" type of business. The category "other" was added for those businesses that did not fit into the categories of the types of businesses listed. Printing and publishing had 11 respondents, or 12.6 percent, in this division.

The three types of businesses (manufacturing, other, and printing and publishing) accounted for 55.1 percent of the total businesses in this first division that did not have microcomputers.

Retail businesses made up the largest group of the types of businesses that had microcomputers but no training with 6 respondents, or 24 percent, of the total for this division. The next group consisted of manufacturing with 5 respondents, or 20 percent. Printing and publishing, wholesaling, and "other" all had 3 respondents, or 12 percent each. These three categories account for 80 percent of the respondents in this division.

The third division consisted of those types of businesses that had microcomputers and training. Manufacturing businesses had the majority of respondents with 15, or 23.1 percent of the total respondents for this division. The next business type was "other" with 10 respondents, or 15.4 percent. Banking followed with 8 respondents, or 12.3 percent, of those with training. These three types of businesses totaled 50.8 percent of the types of businesses that had microcomputers and training.

Table IV contains a list of the "other" types of businesses that were part of Table III. Only frequencies of the types of businesses were used in this table because there were several types of businesses but none of them dominated so percentages would be difficult to use. The only type of business that had more than one respondent was trucking with two respondents. There were a total of 27 types of businesses who chose the "other" category.

TABLE III

NUMBER AND PERCENT OF RESPONDENTS USING MICROCOMPUTERS AND TRAINING BY TYPE OF BUSINESS

BUSINESS	NO MICROCOMPUTERS		MICROCOMPUTERS			
			NO TRAINING		TRAINING	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Agriculture	7	8.0	1	4.0	3	4.6
Banking	1	1.1	2	8.0	8	12.3
Computer Manufacturing and Sales	0	0.0	0	0.0	0	0.0
Construction	2	2.3	0	0.0	4	6.2
Insurance	1	1.1	1	4.0	1	1.5
Manufacturing	23	26.4	5	20.0	15	23.1
Petroleum	6	6.8	1	4.0	7	10.8
Printing and Publishing	11	12.6	3	12.0	4	6.2
Retailing	8	9.2	6	24.0	6	9.2
Wholesaling	5	5.7	3	12.0	2	3.1
Services	9	10.3	0	0.0	5	7.7
Other	14	16.1	3	12.0	10	15.4
TOTAL	87	99.6	25	100.0	65	100.1

Total Number = 177

Note: Percentages do not add up to 100 percent because of rounding.

TABLE IV

FREQUENCIES OF RESPONDENTS USING MICROCOMPUTERS AND TRAINING FOR "OTHER" TYPES OF BUSINESSES

BUSINESS	NO MICROCOMPUTERS NUMBER	MICROCOMPUTERS NO TRAINING NUMBER	MICROCOMPUTERS TRAINING NUMBER
Accounting			1
Canning Dog Food	1		
Cattle Transportation			1
Chemical Supplier	1		
Computer Software Development			1
Cotton Gin Repair	1		
Farm Supplies and Grain		1	
Holding Company			1
Importing and Distributing	1		
Industrial Sales-Air Compressor			1
Investments	1		
Jewelry	1		
Law			1
Natural Gas, Purchase and Sale			1
Newspaper		1	
Outdoor Advertising	1		
Private Exempt Charitable Business		1	
Property Management	1		
Ready Mix Concrete	1		
Real Estate	1		
Retail Automotive	1		

TABLE IV (continued)

BUSINESS	NO MICROCOMPUTERS NUMBER	MICROCOMPUTERS NO TRAINING NUMBER	MICROCOMPUTERS TRAINING NUMBER
Sheet Metal Fabrication	1		
Swimming Pool Sales and Manufacture	1		
Tax Preparation and Bookkeeping		1	
Transportation			1
Trucking	2	-	—
TOTAL	14	3	10

Total Number = 27

The next table, Table V, contains the results of the respondents by the number of employees in their business. These are also separated into three divisions; those with no microcomputers, those with microcomputers and no training, and those with microcomputers and training. Both number and percentages for each division are used in this table.

Analysis of Table V reveals that for those businesses who did not have microcomputers, the majority of the businesses had 10 or less employees. This group consisted of 54 respondents, or 62.1 percent, of that total division. Businesses with 11 to 50 employees had 23 respondents, or 26.4 percent. These two groups of numbers of employees added up to 77 percent of the respondents for this division. The other businesses with more than 50 employees only had 10 respondents, or 11.3 percent, of the total of this division.

Businesses in the second division that had microcomputers but no training had their highest concentration of respondents in the 11 to 50 employee group with 11 respondents, or 44.0 percent, of that total division. The businesses that had 10 or less employees had 9 respondents, or 36.0 percent. These two groups of employees accounted for 20 respondents, or 80 percent, of the total for this division. There were 5 respondents, or 20 percent, who had businesses with more than 50 employees.

Businesses in the third division with microcomputers and training also had their majority of respondents in the 11 to 50 employee group. There were 29 respondents, or 44.6 percent, in this total division. Those businesses with 10 or less had 22 respondents, or 33.8 percent. These two groups consisted of 51 respondents, or 78.4 percent, of the total respondents for this division. Other businesses with 51 or more employees included 14 respondents, or 21.5 percent of the total third division.

Businesses with microcomputers and more than 50 employees have almost two-thirds more of their respondents having microcomputers. Businesses with no microcomputers have only 10 businesses that have more than 50 employees, or 11.3 percent, of their total respondents. The two groups with microcomputers have a total of 19 businesses with more than 50 employees. There are 5 respondents, or 20 percent, in the division with no training while there are 14 respondents, or 21.5 percent, who have training. Businesses with microcomputers that have 50 or more employees account for 41.5 percent of the respondents as opposed to the 11.3 percent with more than 50 employees that did not have microcomputers.

TABLE V

NUMBER AND PERCENT OF RESPONDENTS USING MICROCOMPUTERS AND TRAINING BY THE NUMBER OF EMPLOYEES IN THE BUSINESS

NUMBER OF EMPLOYEES	NO MICROCOMPUTERS		MICROCOMPUTERS			
			NO TRAINING		TRAINING	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
10 or less	54	62.1	9	36.0	22	33.8
11 to 50	23	26.4	11	44.0	29	44.6
51 to 100	7	8.0	1	4.0	8	12.3
101 to 200	1	1.1	2	8.0	4	6.2
201 to 400	1	1.1	1	4.0	1	1.5
401 to 600	1	1.1	0	0.0	1	1.5
601 to 1000	0	0.0	0	0.0	0	0.0
1001 or more	0	0.0	1	4.0	0	0.0
TOTAL	87	99.8	25	100.0	65	99.9

Total Number = 177

Note: Percents do not add up to 100 because of rounding.

The next table, Table VI, contains the results of the analysis of the length of time businesses with no training and businesses with training have had microcomputers in their businesses. The majority of businesses that do not provide training have had microcomputers for two years to four years with 11 respondents, or 44 percent, of the businesses in this division. Businesses with microcomputers for over four years accounted for 6 respondents, or 24.0 percent, of this first division.

Businesses who provided training for their employees had 26 respondents, or 40.0 percent, of their total respondents who had microcomputers for over four years. This group was followed by those who had microcomputers for two years or more with 20 respondents, or 30.8 percent, of this division. It appears that those businesses that provided training have had microcomputers for a longer period of time than those who do not have training.

TABLE VI

NUMBER AND PERCENTAGES OF LENGTH OF TIME BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING HAVE HAD MICROCOMPUTERS IN THEIR BUSINESSES

LENGTH OF TIME BUSINESSES HAVE HAD MICROCOMPUTERS	NO TRAINING	PERCENT	TRAINING	PERCENT
Less Than Six Months	0	0.0	2	3.1
Six Months to One Year	3	12.0	5	7.7
One Year to Two Years	5	20.0	12	18.5
Two Years to Four Years	11	44.0	20	30.8
Over Four Years	6	24.0	26	40.0
TOTAL	25	100.0	65	100.1

Total Number = 90

Note: Percentages may not total 100 percent because of rounding.

Analysis of Training

The major purpose for this study was to gather information about microcomputer training if businesses had microcomputers. The next three tables summarize the information gathered from the questionnaires on training. There were 65 businesses in the sample that had microcomputer training for their employees.

The three major questions asked of the respondents who had training were (1) who received training in the business, (2) who provided training, and (3) what training methods were used. On all three of these questions, the respondent could circle more than one answer. All of the tables have more than 65 responses and more than 100 percent due to the fact that the respondents could circle more than one answer. Respondents had a selection of a category of "other" also.

Table VII consists of the results stated by respondents about who received training in the businesses. According to the respondents, the majority of employees who received training in most businesses were the office supervisors. A total of 27 businesses, or 41.5 percent, responded to this selection. Secretaries had 26 responses, or 40.0 percent, followed by top managers with 23 responses, or 35.4 percent. Those least likely to receive training were clerks and middle managers, both with 13 respondents, or 20.0 percent of the respondents.

There were four businesses who chose the "other" category for those in their business who received training. One business stated that all employees in the business had been trained. Another business answered that their market analyst received training. Two of the businesses said that all who needed training in their business for various jobs that were computer related received training.

TABLE VII

NUMBER AND PERCENT OF RESPONDENTS REPORTING RECEIVING TRAINING BY CATEGORY OF EMPLOYEE

EMPLOYEES WHO RECEIVED TRAINING	RESPONSES NUMBER	PERCENT
Top Managers	23	35.4
Middle Managers	13	20.0
Operating Managers	18	27.7
Office Supervisors	27	41.5
Data Processing Personnel	21	32.3
Data Entry Personnel	22	33.8
Secretaries	26	40.0
Clerks	13	20.0
Others	4	6.2

Note: Businesses could choose more than one answer. Totals will be more than 65 and percentages will be more than 100.

The second area that respondents were asked to respond to consisted of questions on who provided the training to the employees in their business. This part of the questionnaire was divided into two sections. The first one mentioned people in the business who may have provided the training. The second section suggested people who usually were not connected with the business but were hired to provide microcomputer training to the employees.

TABLE VIII

NUMBER AND PERCENT OF RESPONDENTS WHO REPORTED THE PEOPLE WHO PROVIDED MICROCOMPUTER TRAINING TO BUSINESSES

PEOPLE WHO PROVIDED TRAINING TO BUSINESSES	RESPONSES NUMBER	PERCENT
In-House Training		
Data Processing Group in your Business	**15**	**23.6**
Information Center in your Business	3	4.6
Human Resource Training Personnel	4	6.2
Team Approach-More than one Group	6	9.2
Others in Business	10	15.4
Outside Training		
Vendors	**47**	**72.3**
Outside Consultants	8	12.3
Outside Classes	7	10.8
Regular University Classes	4	6.2
Short Courses on Specific Software	5	7.7
University Extension Courses	4	6.2
Vocational Technical Courses	1	1.5
Junior Colleges	4	6.2
Other	3	4.6

Note: Businesses could choose more than one answer. Totals will be more than 65 and percentages will be more than 100 percent.

Vendors provided the majority of training to businesses. There were 47 respondents, or 72.3 percent of the total responses, who chose vendors to provide at least part of their training. The data processing groups in the businesses' own establishment provided the next choice for training with 15 respondents, or 23.6 percent. According to the respondents who had training offered in their business, those people chosen the least to provide training were the information centers in businesses with 3 responses, or 4.6 percent. Information centers were probably not used often because usually only large businesses can afford to have information centers in their businesses and most of the businesses in the sample were small with 50 or less employees.

Vocational technical courses were chosen the least with only 1 respondent, 1.5 percent, choosing this way to provide employees with training. Regular university classes, university extension courses, and junior colleges were also used infrequently with 4 respondents each, or 6.2 percent each, as a means of providing employees with training.

Table IX consists of the results of "other" people who provided microcomputer training to businesses. These are reported with only the frequency because none of the groups of other people who provide training are large. The owner in the business was mentioned by 3 respondents. There were 10 different people who provided training in the business and 3 different people who provided training from outside the business. Those people who provided training to businesses that were from another business all were other businesses that provided special training for equipment specialized for the business.

Because a number of the businesses were small, it appears that some of the businesses are obtaining training for a few of their employees

and then these employees are training the other employees who use microcomputers in the business.

TABLE IX

FREQUENCIES OF "OTHER" PEOPLE WHO PROVIDED MICROCOMPUTER TRAINING TO BUSINESSES

PEOPLE WHO PROVIDED TRAINING	FREQUENCY
In-house Training	
Owner	3
Office Manager	1
Others with Experience in Company	1
Classes Taught by Employees in Office	1
Owner and then Each Other	1
Corporation (Franchise)	1
Middle Managers	1
Programmer/Operator	1
Total	10
Outside Training	
Kwik Copy Corporation	1
Auditing Firm	1
Computer manufacturing training seminars	1
Total	3

The third area that respondents were asked to answer was what training methods were used by their businesses. Table X contains the results of the training methods used by the various businesses.

The most frequently used method of training mentioned by respondents was classes with hands-on experience. This method was used by 29 respondents, or 44.6 percent, of the businesses who responded to this question. In-house training by your staff with 26 respondents, or 40.0 percent, and by vendor at your location also had 26 respondents, with 40.0 percent. Computer-assisted instruction (CAI) was used as a method by 20 respondents, or 30.8 percent, of the businesses. There is some doubt that all the people may have understood what computer-assisted instruction meant. Its definition is that people learn from programs that are on the computer directly by following the directions on the computer. There is little intervention or assistance from people.

Those methods used least were video tapes and "other" methods both with only 2 respondents, or 3.1 percent each, using this method. Audio tapes and using a consultant at their location were the other two least used methods with both consisting of 4 respondents, or 6.2 percent. Seminars and taking an introductory computer course also were not popular methods with each having only 5 respondents, or 7.7 percent of people using these methods.

Those methods that were most popular were those that used methods where the employees were using microcomputers directly during the training. The literature tends to support this method of learning also.

There were two businesses who answered "other" to the question of what methods of training they used. One business said that they used instruction sheets and walk through steps until the employees understood

TABLE X

NUMBER AND PERCENT OF RESPONDENTS UTILIZING VARIOUS TRAINING METHODS

TRAINING METHODS USED	RESPONSES NUMBER	PERCENT
Workshops	17	26.2
Seminars	5	7.7
Lectures	8	12.3
Video Tapes	2	3.1
Audio Tapes	4	6.2
Computer-Assisted Instruction	20	30.8
Developed In-house	11	16.9
Developed by Outside Firm	13	20.0
College Course	7	10.8
Introductory Computer Course Only	5	7.7
Classes with Hands-On Experience	29	44.6
In-House Training by your Staff	26	40.0
By Vendor at their Location	16	24.6
By Vendor at your Location	26	40.0
By a Consultant at their Location	4	6.2
By a Consultant at your Location	7	10.8
Other	2	3.1

Note: Businesses could choose more than one answer. Totals will be more than 65.

how to use the microcomputer. The other business claimed that a franchise corporation at their site used the training methods necessary to teach the employees to use microcomputers for their jobs.

The next series of questions asked the respondents to answer questions about their satisfaction with the training and the length of training. These are analyzed in Tables XI and XII.

TABLE XI

NUMBER AND PERCENT OF RESPONDENTS WHO WERE SATISFIED WITH WHAT THEIR EMPLOYEES LEARNED IN TRAINING

SATISFACTION WITH TRAINING	RESPONSES NUMBER	PERCENT
Very Satisfied	22	33.8
Moderately Satisfied	28	43.1
Indifferent	7	10.8
Moderately Dissatisfied	3	4.6
Very Dissatisfied	2	3.1
Did not respond	3	4.6
TOTAL	65	100.0

Businesses were asked if they were satisfied with what their employees learned from training. Most businesses felt they were moderately satisfied with training with 28 respondents, or 43.1 percent

answering this question. Those businesses who were very satisfied with training had 22 respondents, or 33.8 percent. Only 3.1 percent or 2 respondents were very dissatisfied with their training that they had chosen. There were three who did not respond to this question. Table XI reviews the responses to this question.

The next table consists of the length of training respondents said they used. The most frequent answer was more than one day to two days with 18 respondents, or 27.7 percent response rate. Four hours to one day had 11 respondents, or 16.9 percent for the next largest group. Respondents chose less than four hours the least with 4 respondents, or 6.2 percent. Table XII contains the analysis of the answers by respondents for length of training.

TABLE XII

NUMBER AND PERCENT OF LENGTH OF TIME SPENT ON TRAINING BY BUSINESSES

LENGTH OF TIME OF TRAINING	RESPONSES NUMBER	PERCENT
Less Than 4 Hours	4	6.2
4 Hours to 1 Day	11	16.9
More Than 1 Day to 2 Days	18	27.7
More Than 2 Days to 3 Days	6	9.2
More Than 3 Days to 5 Days	6	9.2
More Than 5 Days to 10 Days	10	15.4
Other	10	15.4
TOTAL	65	100.0

There were 10 businesses who used the "other" category when answering the question on length of training. Two answers used by three businesses were that length of training varied with the classes being taught and on-going consultation and frequent phone calls were used after the initial training. Other replies to this question were; two college semesters, one college semester, four hours to one week, some training lasted six months.

The next table, Table XIII, contains the responses to the question about if their employees had the opportunity to use their newly learned microcomputer skills immediately on the job after they were trained. The results were an overwhelming 61 respondents, or 93.8 percent of the respondents used their skills immediately.

TABLE XIII

NUMBER AND PERCENT OF EMPLOYEES WHO WERE ABLE TO USE THEIR NEWLY LEARNED MICRO-COMPUTER SKILLS IMMEDIATELY

USE OF SKILL	NUMBER	PERCENT
No	4	6.2
Yes	61	93.8
TOTAL	65	100.0

Another question asked was to determine if training classes were tailored to different groups of employees who had different amounts of computer knowledge. The purpose of this question was obtain information on how many businesses considered that some employees already knew something about microcomputers and others did not and was this taken into consideration when training courses were developed for employees. The results of the responses to this question are in Table XIV. The responses were split on this question with 50.8 percent answering yes to the question and 49.2 percent answered no.

TABLE XIV

NUMBER AND PERCENT OF TRAINING COURSES THAT WERE TAILORED TO EMPLOYEES WITH VARYING AMOUNTS OF COMPUTER KNOWLEDGE

DIFFERENT AMOUNTS OF MICRO-COMPUTER KNOWLEDGE	RESPONSES	
	NUMBER	PERCENT
No	32	49.2
Yes	33	50.8
TOTAL	65	100.0

The other question asked was if training was given to separate groups of employees at different times. The purpose of this question was to obtain information on if businesses were considering the needs of the various employees when they had training. Forty-two of the respon-

dents, or 64.6 percent, of the respondents answered no to this question. The results are contained in Table XV.

The purpose of this last section was to obtain information on training in their businesses. The three major areas that were emphasized were; who received training, who provided training, and what methods were used. Other questions were asked to further knowledge about how businesses reacted to training and if they found it worthwhile.

TABLE XV

NUMBER AND PERCENT OF BUSINESSES WHO GAVE TRAINING TO SEPARATE GROUPS OF EMPLOYEES AT DIFFERENT TIMES

SEPARATE GROUPS OF EMPLOYEES IN DIFFERENT CLASSES	NUMBER	PERCENT
No	42	64.6
Yes	23	35.4
TOTAL	65	100.0

Analysis of Businesses with no Training

The respondents who had microcomputers but did not have any training were asked questions on the reasons why they did not have training. Their responses are contained in Table XVI.

TABLE XVI

NUMBER AND PERCENT OF BUSINESSES WITH MICROCOMPUTERS WHO DID NOT HAVE TRAINING FOR EMPLOYEES

REASONS FOR NOT PROVIDING TRAINING	RESPONSES NUMBER	PERCENT
Thought Machines could be Learned without Formal Training	**16**	**64.0**
Thought Employees could Learn from Manuals	10	40.0
Was told by Salesperson Computer was easy to Learn	4	16.0
Employees Already had Microcomputer Training	8	32.0
No Special Training was Offered for type of Software Purchased	6	24.0
Did not have Personnel in Company Qualified to do Training	5	20.0
Employees could Obtain Training on own if Desired	1	4.0
Training was too Expensive	2	8.0
Other	1	4.0
Total Number = 25		

Note: Businesses could choose more than one answer. The total will be more than 25 and percents will be more than 100.

Most people who did not have training thought that the machines could be learned without formal training. There were 16 responses, or 64.0 percent, who responded to this answer. The next most frequent answer with 10 responses, or 40.0 percent, was to the question that

businesses thought the employees could learn from manuals. Eight respondents, or 32.0 percent of the respondents said the employees already had microcomputer training. One concern businesses did not seem to express as a reason for not having training was because training was too expensive. Only 2 responded, or 8.0 percent, used this as an answer. There was only one business who chose the "other" category. Their reason was because the quality of training was poor.

The next table compares businesses using microcomputers on the job that had no training to those that had training. Table XVII contains the results of the answers to this question.

TABLE XVII

NUMBER AND PERCENT OF BUSINESSES USING MICROCOMPUTERS ON ON THE JOB THAT HAD NO TRAINING COMPARED TO BUSINESSES WITH TRAINING

USAGE OF MICROCOMPUTERS ON THE JOB	NO TRAINING		TRAINING	
	NUMBER	PERCENT	NUMBER	PERCENT
All Employees Are Using Them	5	20.0	22	33.8
Most Employees Are Using Them	6	24.0	12	18.5
About Half Are Using Them	7	28.0	10	15.4
Most Are Not Using Them	6	24.0	8	12.3
No One is Using Them	0	0.0	0	0.0
No Reply to Question	1	4.0	13	20.0
TOTAL	25	100.0	65	100.0

From analysis of the data, those that had training had more people using microcomputers than those that had no training. Twenty-two, or 33.8 percent of the respondents who had training said that all their employees were using the machines while only 5 respondents, or 20 percent of those without training claimed that all their employees were using the microcomputers. More of the businesses that had no training said that only about half of their employees are using the microcomputers. Those without training had 7 respondents, or 28 percent, answering that only half of their employees used the microcomputers. This is compared to those with training in the same category who had 10 respondents, or 15.4 percent. Unfortunately, there were several people who did not respond to this question. The possible reason for this was the placement of the question on the questionnaire and many people who had training may have missed the question.

Analysis of Types and Numbers of Microcomputers Used by Businesses

All businesses that had microcomputers were asked to name the types of microcomputers they had and also the number of microcomputers that they had in their business. Table XVIII shows a comparison of microcomputers used by businesses with no training and those with training.

The IBM PC is the most popular brand for both those that had no training and for those that had training. The IBM PC was used by a majority of businesses. Fifteen respondents, or 60 percent, of those with no training selected the IBM PC; it was the choice of 32 respondents, or 40 percent, of those that had training. There were also many businesses that had "other" types of microcomputers. Those with no

training had 11 respondents, or 44.3 percent, of "other" types of microcomputers while those with training had 23 respondents, or 35.4 percent, in this category.

Those businesses with no training tended to use Apple microcomputers more than those that had training. Those with no training had 4 respondents, or 16.0 percent, and those with training had only 4 repondents, or 6.2 percent, of their employees using Apple microcomputers.

TABLE XVIII

NUMBER AND PERCENT OF BRANDS OF MICROCOMPUTERS USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF MICROCOMPUTER	NO TRAINING		TRAINING	
	NUMBER	PERCENT	NUMBER	PERCENT
Apple	4	16.0	4	6.2
AT&T	0	0.0	3	4.6
Compaq	1	4.0	8	12.3
Hewlett-Packard	0	0.0	5	7.7
Kaypro	1	4.0	3	4.6
IBM PC	15	60.0	32	49.2
MacIntosh	2	8.0	2	3.1
Radio Shack	3	12.0	10	15.4
Texas Instruments	0	0.0	4	6.2
Other	11	44.3	23	35.4

Note: Businesses could choose more than one answer

The next largest group of microcomputers that were used by those with training were the Radio Shack microcomputers with 10 respondents, or 15.4 percent of those in that group. Those that were used the least by those with training were the Macintosh with 2 respondents, or 3.1 percent, and the AT&T microcomputers with 3 businesses, or 4.6 percent.

Microcomputers that were not used by the group with no training were the AT&Ts, the Hewlett-Packard, and Texas Instruments. These all had no usage.

The next table, Table XIX compares the "other" types of microcomputers that were used by both businesses that had training and by those that did not have training. There is a large variety of different types of microcomputers that are used by businesses. There are no "others" that particularly dominate for those with training or those without training.

TABLE XIX

NUMBER OF "OTHER" TYPES OF MICROCOMPUTERS USED BY BUSINESSES WITHOUT TRAINING AND THOSE WITH TRAINING

TYPES OF MICROCOMPUTERS	NO TRAINING NUMBER	TRAINING NUMBER
Altros		4
Arc Turbo	1	
Burroughs B-920		1
Computer Automation	1	
Compugraphy		2

TABLE XIX (continued)

TYPE OF MICROCOMPUTER	NO TRAINING NUMBER	TRAINING NUMBER
Corona PC		1
Data General	1	3
Datapoint 1800		1
Eagle PC	1	1
Epson	1	
Five Star (IBM Clone)		1
IBM Clones	1	
ICAS		1
ITT	1	
Lanier Word Processor		1
Mitsuba Turbo XT		1
Mycro-Comp 1100+ Systems		1
NCR	1	
Olivetti	1	
Ohio Scientific	1	
PC Designs		1
Reynolds and Reynolds (Automotive)		1
Sanyo		1
Sperry	2	
Televideo (IBM Compatible)	1	
Wang PC		2
Zenith	1	

Note: Businesses could choose more than one answer.

Out of the group of "other", the only two that have more than one or two businesses using them are the Altros with four and also the Data General with four using them also.

The next table, Table XX, contains the number of microcomputers owned by businesses both with training and without training. Businesses with no training had 8 respondents, or 32.0 percent, that had only one microcomputer in the business. The next highest group were those businesses that had three microcomputers with 4 respondents, or 16.0 percent. The largest amount of microcomputers owned by one business that did not have training had 25 microcomputers.

Businesses with training had 21 respondents, or 32.3 percent, of their businesses with only one microcomputer. Their next largest group were those with two microcomputers with 15 respondents, or 23.1 percent. Only one business that provided training had 50 microcomputers.

It is interesting to note that both the group with training and the group with no training both had 32 percent of their businesses that had only one microcomputer.

Analysis of Software used by Businesses

This last section analyzes types of software used by businesses. These are divided into several categories. Word processing is first, followed by spreadsheets, data managememt software, graphics, and integrated packages (those that do several things at once such as both word processing and also spreadsheets and graphics). The last area contains the "other" kinds of software that are used. These are usually special software made specifically for the business or the type of microcomputer used by the business.

TABLE XX

NUMBER AND PERCENT OF MICROCOMPUTERS OWNED BY BUSINESSES WITH NO TRAINING AND WITH TRAINING

NUMBER OF MICROCOMPUTERS	NO TRAINING NUMBER	NO TRAINING PERCENT	TRAINING NUMBER	TRAINING PERCENT
1	8	32.0	21	32.3
2	3	12.0	15	23.1
3	4	16.0	7	10.8
4	3	12.0	4	6.2
5	3	12.0	2	3.1
6	0	0.0	6	9.2
7	1	4.0	0	0.0
8	0	0.0	3	4.6
10	0	0.0	2	3.1
15	1	4.0	2	3.1
25	1	4.0	0	0.0
50	0	0.0	1	1.5
Did not Respond	1	4.0	2	3.1
TOTAL	25	100.0	65	100.1

Note: Percents may not equal 100 percent because of rounding.

The first table, Table XXI, illustrates the analysis of word processing packages. The main word processing packages used by those with training were Wordstar with 10 respondents, or 11.1 percent, followed by Wordperfect with 6 respondents, or 6.7 percent. There was a large variety of "other" types of software used by those with training. The "other" group comprised 19 respondents, or 21.1 percent of the total group.

TABLE XXI

NUMBER AND PERCENT OF WORD PROCESSING SOFTWARE USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF WORD PROCESSING SOFTWARE	NO TRAINING		TRAINING	
	NUMBER	PERCENT	NUMBER	PERCENT
Displaywrite 3	3	2.2	2	2.2
Easy Writer	1	1.1	1	1.1
Macwrite	1	1.1	1	1.1
Microsoft Word	1	1.1	1	1.1
Pfs:Write	3	3.3	4	4.4
Wordperfect	1	1.1	6	6.7
Wordstar	6	6.7	10	11.1
Other	7	7.8	19	21.1

Note: Some businesses had more than one package and some did not use any word processing packages.

For those businesses with no training, the word processing package used most often was Wordstar with 6 respondents, or 6.7 percent using this package. The second was Pfs:Write with 3 respondents, or 3.3 percent, using it. The category of "other" had 7 respondents or a 7.8 percent response.

The "other" types of word processing packages that are used by businesses are contained in Table XXII. There are several different types of "other" word processing packages but there is no one single brand that dominates for either those that have training or for those who do not have training. It appears that there is a great proliferation of types of word processing software on the market.

Although all of these different groups of software areas are divided by businesses that had no training or by those businesses that had training, the people with training may not have been formally trained on each particular software package that was used in their business. The objective here was to find out what types of software packages businesses were using. It was also to determine if the types of software used by businesses with training differ from those businesses that do not have training.

The next type of software that businesses were asked if they used were spreadsheets. These seemed to be used by more businesses than word processing or any other type of software. Table XXIII illustrates the spreadsheet usage.

TABLE XXII

NUMBER OF "OTHER" TYPES OF WORD PROCESSING SOFTWARE USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF WORD PROCESSING SOFTWARE	NUMBER NO TRAINING	NUMBER TRAINING
Appleworks	1	1
Bank-Street	1	
Compugraphic		2
Deskmate		1
Eaglewriter		1
Executive Writer	1	
IBM-Writing Assistant	2	2
Lanier Word Processing		1
Leading Edge		2
Moore		1
Multimate	1	1
PC Write	1	
Q & A		1
Quiry 36		1
Scriptsit		2
Spellbinder		1
Wangwriter		1
Xywrite III		1

TABLE XXIII

NUMBER AND PERCENT OF SPREADSHEET SOFTWARE PACKAGES USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF SPREADSHEET SOFTWARE PACKAGES	NO TRAINING		TRAINING	
	NUMBER	PERCENT	NUMBER	PERCENT
Lotus 1-2-3	12	48.0	24	36.9
PC-Calc	0	0.0	3	4.6
SuperCalc 3	1	4.0	2	3.1
Other	8	32.0	15	23.1

Note: Businesses could answer more than one or they could have chosen no spreadsheets.

Lotus 1-2-3 was the spreadsheet used most often by both groups. Those without training had 12 respondents, or 48.0 percent, and those with training had 24 respondents, or 36.9 percent, used Lotus 1-2-3.

Both groups showed that they used many "other" types of spreadsheets. Those without training had 8 respondents, or 32.0 percent, of their group using "other" types of spreadsheets. Those with training had 15 respondents or 23.1 percent of their group using "other" types of spreadsheets.

Table XXIV contains the results of the "other" distribution for spreadsheets. Although there were several selections of spreadsheets, two other brands dominated.

One brand that dominated was Multiplan with four businesses with no training and four businesses with training using this particular package. The other package that was used more often was Visicalc. This

particular spreadsheet package was used by those with training more than those without training. There were three businesses who had training that used it and one without training that used it.

TABLE XXIV

NUMBER OF "OTHER" SPREADSHEET PACKAGES USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF SPREADSHEET SOFTWARE	NUMBER NO TRAINING	NUMBER TRAINING
Appleworks	1	
Calc Star		1
Customized for company		1
Eaglecalc		1
Flex		1
Multicalc		1
Multiplan	4	4
Number Works	1	
Sanyo Accounting		1
Smart		1
SuperCalc 2	1	
Visicalc	1	3

The next group that was analyzed were the data management software packages. These were not used as often by businesses. Table XXV contains the data management software used by those that did not have training and those that had training.

For those that had no training, the "other" category had the most respondents with 6 businesses, or 24.0 percent, in this category. The next largest group used PC-File with 4 respondents, or 16.0 percent, and then the next group used dBase III with 3 respondents, or 12.0 percent.

TABLE XXV

NUMBER AND PERCENT OF DATA MANAGEMENT SOFTWARE PACKAGES USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF DATA MANAGEMENT SOFTWARE PACKAGE	NO TRAINING		TRAINING	
	NUMBER	PERCENT	NUMBER	PERCENT
dBase III	3	12.0	8	12.3
PC-File	4	16.0	3	4.6
R-Base	1	4.0	2	3.1
Other	6	24.0	9	13.8

Note: Businesses could choose more than one or they may not use any data management packages.

Those that had training also used "other" types of data management packages the most frequently with 9 respondents, or 13.8 percent, in

this group. They then used dBase III with 8 respondents, or 12.3 percent, using this brand of software.

Table XXVI examines the "other" types of data management packages used. There was only one data management package that seemed to be used more frequently by businesses than others. This was Pfs-File with three with no training and one business with training using this package. The only other data management package that had more than one business using it was Profile with two businesses with training naming this particular package.

TABLE XXVI

NUMBER OF "OTHER" DATA MANAGEMENT SOFTWARE PACKAGES USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF DATA MANAGEMENT SOFTWARE	NUMBER NO TRAINING	NUMBER TRAINING
Appleworks	1	1
DataStar		1
dBase II	1	
Krmour-Plus		1
Microsoft-File	1	
Nutshell		1
Pfs-File	3	1
Profile		2
Q & A		1
Radio Shack Cobol GL		1

Graphics software packages were analyzed next. No specific brand names were given in the questionnaire and businesses were to write in the name of any graphics package they used. Information for this software is listed by the frequencies of the types of graphics used for those who had no training and for those that had training.

The results on graphics used by businesses is analyzed in Table XXVII. There were no particular graphics packages used. In fact, most businesses did not utilize graphics packages. Apparently, graphics packages are not popular yet with businesses.

TABLE XXVII

NUMBER OF TYPES OF GRAPHICS PACKAGES USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF GRAPHICS SOFTWARE	NUMBER NO TRAINING	NUMBER TRAINING
Autocad		1
CAD-HP Graphics		1
Dollar and Sense		1
Lotus 1-2-3		1
Mega Graphs	1	
Newsroom	1	
Paint Brush		1
Picture Perfect		1
Sales		1

Businesses were then asked about the types of integrated software that they used. These are software packages that do more than one thing such as they can be used for word processing, spreadsheets and also may be capable of data management or graphics. Respondents were asked to name the specific type of integrated software that they used if they used any.

Table XXVIII consists of the results of integrated software usage. The main integrated software package used was Symphony. It was used by three businesses with no training and by two businesses with training. The other brands only had one business that used them. Integrated software does not seem to be used much by businesses yet.

TABLE XXVIII

NUMBER OF INTEGRATED SOFTWARE PACKAGES USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF INTEGRATED SOFTWARE	NUMBER NO TRAINING	NUMBER TRAINING
Electronic Desk		1
Excel		1
ICAS		1
Smart	1	
Symphony	3	2

Table XXIX consists of the results from the last area of software which was called "other". Respondents seemed to use a variety of different kinds of "other" types of software.

When the "other" software was carefully analyzed, most of these different kinds of software packages related to accounting in some form. There was a variety of "other" software packages used by the businesses in the study.

TABLE XXIX

NUMBER OF "OTHER" SOFTWARE PACKAGES USED BY BUSINESSES WITH NO TRAINING AND THOSE WITH TRAINING

TYPE OF "OTHER" SOFTWARE USED	NUMBER NO TRAINING	NUMBER TRAINING
Accounting Programs	2	6
Accounting Written by Company	1	
ASCII-Pro	1	
BPI-Accounting	1	2
CPAIDS		1
Custom Designed Accounts		1
Custom Estimating		1
CYMA		1
Fixed Assets		1
Flexware System		1
General Ledger	1	1
Great Plains	1	1
Investments		1

TABLE XXIX (continued)

TYPE OF "OTHER" SOFTWARE USED	NUMBER NO TRAINING	NUMBER TRAINING
KOMS		1
Kwik Copy Accounting		1
Managing Your Money	1	
Official Pipeline Guide		1
Ohio Software F & I		1
Porte Pub		1
Prophet		1
PS Mail	1	
Real World	1	
Safe Deposit Box		1
Solomon III		1
Supplies Inventory		1
TCS Client Ledger	1	
Tax Preparer	1	
Time Line	1	
Wrote All Own Software	1	

Summary

This chapter has presented an analysis of the responses received from the respondents who answered the questionnaire. The responses were tabulated and reported using tables and discussion to present and

explain the information gathered from the responses to the questionnaires.

The questionnaire had space for comments from the respondents on their experiences with microcomputers or any information they felt would be useful. The comments are contained in Appendix C. The summary, conclusions, and recommendations for further study are presented in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to gather information from a sample of Oklahoma businesses on who received training, who provided training, and what training methods were being used for microcomputers. A secondary purpose was to gather information about the types of microcomputers and types of software being used by businesses.

In order to collect data for this study, a questionnaire was sent to a random sample of businesses in Oklahoma. The sample was designed to include all types and sizes of businesses. There were 361 businesses in the sample. A total of 177 questionnaires that were returned were usable for the analysis. The responses were then analyzed by the use of a computer program.

Results of the Study

The results of the study are summarized in five sections. They are: 1) the business respondents, 2) training, 3) no training, 4) types of microcomputers used by businesses, 5) types of software used.

Business Respondents

Of the total of 177 respondents used in the analysis, 87 businesses that responded to the study did not have microcomputers and 90 businesses had microcomputers. The last group consisted of 25 businesses that had no training and 65 that had training. Manufacturing

businesses with 26.4 percent were the largest group of businesses who did not have microcomputers. Retailing businesses dominated with 24.0 percent of the types of businesses that had microcomputers but no training. Those businesses that had microcomputers and training that dominated were manufacturing businesses with 23.1 percent.

At least 62 percent of the businesses that did not have microcomputers had 10 or fewer employees. Forty-four percent of those businesses that had microcomputers had 11 to 50 employees. This was true for both those with training and those without training. Thirty-three percent of those that had microcomputers and training had 10 or fewer employees and 36 percent of the businesses with microcomputers but no training had 10 or fewer employees.

Businesses with microcomputers were asked how long they had microcomputers in their businesses. Forty percent of the businesses that had training had microcomputers for four years or more. Forty-four percent of the businesses that provided no training had microcomputers for two years or more.

Training

The questions in this section of the questionnaire were directed at those businesses that had training. The three main areas of emphasis included: 1) who received training, 2) who provided training, and 3) what training methods were used.

In 41 percent of the businesses, those who received training most often were the office supervisors. Secretaries were a very close second with 40 percent. Thirty-five percent of the top managers also obtained training.

The vendors, those that sell the microcomputers to the businesses, were identified most frequently by businesses as the person or persons who provided training. Vendors were chosen by an overwhelming 72 percent of the respondents. Approximately 23 percent of the respondents chose to obtain their training from data processing people in their own business. Some businesses used more than one type of provider for training.

The training method that was used most frequently was classes with "hands-on" experience. This method was mentioned by 44 percent of the businesses. In most cases, the vendor went to the location of the business to train employees. Many of the businesses used their own staff to train their employees using "hands-on" training methods.

Those that had training were asked about their satisfaction with training. Forty-three percent of the businesses answered that they were moderately satisfied with training. Over 33 percent were very satisfied with training. Only two answered that they were dissatisfied with training received.

When asked the length of time of training, businesses responded most frequently with more than one day to two days of training. An overwhelming majority of 93 percent said that their employees were able to use their training immediately.

No Training

Sixty-four percent of businesses that did not have training answered that they thought the machines could be learned without formal training. The next most frequent reason was that they thought the

employees could learn from the manuals. Only two businesses stated that they did not have training because it was too expensive.

Types and Numbers of Microcomputers used by Businesses

The IBM PC was the most frequently used brand of microcomputer for both those with no training (60 percent) and those with training (49 percent). There were also several varieties of microcomputers used by both groups; however, no other brand dominated.

Thirty-two percent of the sample owned only one microcomputer. Those businesses that had training also had 23 percent of the businesses that owned two microcomputers compared to only 12 percent of the businesses with no training. One reason for this may be that more businesses with training also had more employees.

Software used by Businesses

Software was categorized into five different areas. The categories were: 1) word processing, 2) spreadsheets, 3) data management, 4) graphics, and 5) integrated packages.

A large variety of word processing software packages were used. There was no particular brand that dominated for either businesses that had training or those that did not have training. Wordstar was the only package that had any consistent usage by both groups, with only 6 percent of those with no training and 11 percent of those with training using this particular package.

Spreadsheets were used by businesses more than any other type of software. Lotus 1-2-3 was the spreadsheet mentioned most often by both

groups with 48 percent of those with no training and 36 percent of those with training using this package.

Although some businesses used data management packages, they were not used frequently. The main brand that was used was dBase III. If a data management package was used, it was used by those without training about as frequently as those with training.

Graphics packages were not used by many businesses. There were very few brands used and all of them were different.

There were a few companies that used integrated software. Integrated software combines more than one feature, such as word processing mixed with graphics or spreadsheets. Symphony was the main package used. Other types of software that were mentioned were almost all related to accounting.

Conclusions

The following conclusions were drawn after analyzing the results of the study and the review of literature.

1. According to the study, over half of the businesses that answered the questionnaire were using microcomputers. There were 87 businesses that did not have microcomputers, but there were 90 businesses that had microcomputers. Out of those businesses that had microcomputers, 65 of the businesses provided training for their employees. It can be concluded that most businesses that have microcomputers provide their employees with training.

2. This study revealed that those that received training most often were the office supervisors and secretaries. There were several top managers that also received training. Since the office supervisors

and secretaries were trained most often, one might think that the microcomputer has taken the place of the typewriter. However, the main use of microcomputers by most businesses was to perform some type of accounting work. It can be concluded that microcomputers are mostly used for clerical, and accounting and support activities.

3. This study identifies vendors as the main providers of training to businesses. College courses, extension courses, or vocational educational courses were not often used.

4. This study showed the training method used most often was "hands-on" training which was done by either the vendor or by in-house staff. The literature reviewed supports this method as one of the best methods for learning how to use microcomputers. Learning by doing or the "hands-on" method is also a basic principle of occupational education.

5. This study revealed that an overwhelming number of the businesses in this study had IBM PC microcomputers. There were several other brands mentioned, but no other brand dominated. It can be concluded that a company wishing to be directly compatible with a majority of other businesses in the state of Oklahoma might be advised to select an IBM PC or equivalent.

6. The results of this study revealed that there was a great variety of software being used by businesses. At this point in time, there is no clear consensus on specific software packages.

Recommendations for Further Research

1. Although over 50 percent of those who responded to the study had microcomputers, there were no questions in the study asking those

that did not have microcomputers why they did not have them or if they planned on purchasing them in the near future. A few people who did not have microcomputers mentioned that they did not know how to choose the proper type of microcomputer for their business. Other problems encountered by these people also were an inability to find the proper software to do what they needed. It is recommended that a study be developed to gather information on the businesses that do not have microcomputers to find out how they are different and if there were ways to help them obtain the information they need to make decisions about microcomputers for their businesses.

2. The list used to obtain names of businesses was somewhat limited in the information that it contained. One of the largest problems was that the original list did not contain the sizes of the businesses on it and so there was no way to stratify businesses into small, medium and large businesses in equal proportions.

It is recommended that a study using a stratified sample based on size of the business be developed to correlate the size to use, training, types of microcomputers used, and satisfaction from the different size businesses.

3. Businesses that had microcomputers but provided no training had microcomputers for two or more years. However, a majority of the businesses that provided training had microcomputers for four years or more. A question for further study is did those people who had microcomputers for a long time have training first when they obtained their microcomputers or did they later obtain training after they had microcomputers for some time and realized they needed assistance in order to use the equipment more effectively.

4. Although many articles refer to increased productivity savings by using microcomputers, not many studies address this question. A further study should be developed to determine if microcomputers do save time and increase productivity for businesses.

5. When respondents were asked questions about training methods used, both computer-aided instruction and "hands-on" training were given as options. Although there were several businesses that chose computer-aided instruction, there is some question in this researcher's mind as to whether the respondents understood the differences between the two types of training methods. A further study emphasizing the differences between the two should be conducted to provide more information on this point.

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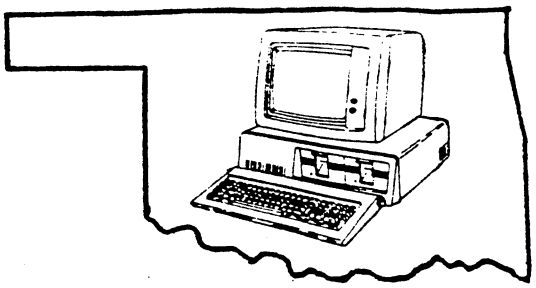
APPENDIX A

FINAL QUESTIONNAIRE



Return Questionnaire to:
Judith J. Edgmand
Computing & Information Sciences
Math Sciences 210
Oklahoma State University
Stillwater, OK 74078

Return by January 23, 1987

A PROFILE OF MICROCOMPUTER TRAINING IN SELECTED OKLAHOMA BUSINESSES

The purpose of this questionnaire is to gather information about microcomputer usage and training in businesses in Oklahoma. Please answer this questionnaire even if your business does not have microcomputers or does not provide training for its employees in the use of microcomputers.

Training is defined as ranging from learning to use a microcomputer in a classroom setting to learning from a computer itself (computer-assisted instruction). Training does not include trying to learn by oneself from the manual or the training disks that accompany the microcomputer.

Please complete the questionnaire by circling the appropriate response and when necessary, filling in the blanks. Thank you for your cooperation. If you feel that someone else in your business could better answer the questions to this questionnaire, please pass it on to that person.

SECTION 1. MICROCOMPUTER USAGE AND TRAINING

A. Does your business presently use microcomputers?

1 No **IF NO, PLEASE GO TO SECTION 3 ON PAGE 6.**
2 Yes If yes, how long have you used them in your business?

a. Less than six months
b. More than six months to one year
c. More than one year to two years
d. More than two years to four years
e. More than four years

B. Does this answer above represent the entire business or just your department or unit?

1 Entire business
2 Department or unit

PLEASE RESPOND TO SUBSEQUENT QUESTIONS USING EITHER YOUR ENTIRE BUSINESS OR DEPARTMENT OR UNIT AS YOU HAVE RESPONDED TO THIS QUESTION.

C. When your business or unit obtained microcomputers was training provided for the employees?

1 No **If no, please go to QUESTION L ON PAGE 4.**
2 Yes

WHO RECEIVED TRAINING?

D. What group of employees in your business received formal training? Please circle <u>all</u> that apply.

1 Top managers
2 Middle managers
3 Operating managers
4 Office supervisor
5 Data processing personnel
6 Data entry personnel
7 Secretaries
8 Clerks
9 Other, specify _____

WHO PROVIDED TRAINING?

E. Who provided the training? Please circle <u>all</u> answers that apply.

Internal training (training by your own personnel)

1 Data processing group in your business
2 Information center in your business
3 Human resource training personnel
4 Team approach--such as data processing and human resources dept.
5 Other, Specify _____

External training

6 Vendors (people from whom you purchased microcomputers or software)
7 Outside consultants
8 Outside classes
   a. Regular university or college classes
   b. Short courses offered for specific software use
   c. University or college extension courses
   d. Vocational technical schools
   e. Junior colleges
   f. Other, specify _____
9 Other, specify _____

F. How long was the training? For this question, a day is 8 hours.

1 Less than 4 hours
2 4 hours to 1 day
3 More than 1 day to 2 days
4 More than 2 days to 3 days
5 More than 3 days to 5 days
6 More than 5 days to 10 days
7 Other, specify _____

G. Did the employees have the opportunity to utilize their newly learned computer skills on the job immediately after their training?

1 No
2 Yes

TRAINING METHODS USED

H. What methods were used? Please circle all relevant answers.

1 Workshops
2 Seminars
3 Lectures
4 Video tapes
5 Audio tapes
6 Computer-assisted instruction
   a. Developed in-house
   b. Developed by outside firm
7 College course
8 Introductory computer course only
9 Classes with "hands on" experience
   a. In-house training by your staff
   b. By vendor at their location
   c. By vendor at your location
   d. By a consultant at their location
   e. By a consultant at your location
10 Other, specify _____

Besides answering the choices above, would you please write a short explanation of what you do in your business to train employees to learn to use their microcomputers.

_____

_____

_____

I. Was the training tailored to the different groups of employees who had different degrees of computer knowledge?

1 No
2 Yes

J. Was training given to separate groups of employees at different times (Such as were managers taught in different classes than secretaries, etc.)?

1 No
2 Yes

K. Were you satisfied with how much your employees learned about microcomputers through their training?

1 Very satisfied
2 Moderately satisfied
3 Indifferent
4 Moderately dissatisfied
5 Very dissatisfied

PLEASE GO TO QUESTION M.

COMPANIES WITH MICROCOMPUTERS WHO PROVIDED NO TRAINING

L. If your business or unit did not provide training, what are the reasons why you did not? Please circle all answers that apply.

1 Thought machines could be learned without formal training
2 Thought employees could learn from manuals
3 Was told by salesperson computer was easy to learn on own
4 Employees already had microcomputer training
5 No special training was offered for the type of software purchased
6 Did not have personnel in company qualified to carry out training
7 Employees could obtain training on own if desired
8 Training was too expensive
9 Other, specify _____

M. To what extent are the employees using their microcomputers to help them do their jobs more effectively?

1 All employees are using them
2 Most are using them
3 About half are using them
4 Most are not using them
5 No one is using them

SECTION 2. COMPUTER INFORMATION

A. What type(s) of microcomputers do you have in your business or unit? Please circle all that you presently have in your company.

▲ TYPE
1 Apple
2 AT&T
3 Compaq
4 Hewlett-Packard
5 Kaypro
6 IBM PC
7 Macintosh
8 Radio Shack
9 Texas Instruments
10 Other, specify

_____

B. What software packages are used in your business or unit. Check only those packages that are used in your business or unit. Satisfaction rating goes from 1 to 5 with 1 meaning most satisfied.

Type of Software	Have you or your staff used in past year (✓ if use)	Used manual for software package (✓ if use)	Satis-faction with manual (1=Sat)	Received training on software when purchased (✓ if use)	Satis-faction with training (1=Sat)
1 WORD PROCESSING					
a DisplayWrite 3			1 2 3 4 5		1 2 3 4 5
b Easy Writer			1 2 3 4 5		1 2 3 4 5
c MacWrite			1 2 3 4 5		1 2 3 4 5
d Microsoft Word			1 2 3 4 5		1 2 3 4 5
e Pfs:Write			1 2 3 4 5		1 2 3 4 5
f WordPerfect			1 2 3 4 5		1 2 3 4 5
g WordStar			1 2 3 4 5		1 2 3 4 5
h Other, Specify					
_____			1 2 3 4 5		1 2 3 4 5
2 SPREADSHEETS					
a Lotus 1-2-3			1 2 3 4 5		1 2 3 4 5
b PC-Calc			1 2 3 4 5		1 2 3 4 5
c SuperCalc 3			1 2 3 4 5		1 2 3 4 5
d Other, Specify					
_____			1 2 3 4 5		1 2 3 4 5
3 DATA MANAGEMENT					
a dBase III			1 2 3 4 5		1 2 3 4 5
b PC-File			1 2 3 4 5		1 2 3 4 5
c R-base			1 2 3 4 5		1 2 3 4 5
d Other, Specify					
_____			1 2 3 4 5		1 2 3 4 5
4 GRAPHICS, Specify					
_____			1 2 3 4 5		1 2 3 4 5
5 INTEGRATED PACKAGE, (Such as Symphony), Specify					
_____			1 2 3 4 5		1 2 3 4 5
6 OTHER Specify					
_____			1 2 3 4 5		1 2 3 4 5

C. How many microcomputers do you have in your business or department?

_____

SECTION 3. GENERAL INFORMATION -- COMPANY PROFILE

A. What is the primary business activity of your firm? Circle only one.

1 Agriculture
2 Banking
3 Computer manufacturing or sales
4 Construction
5 Insurance
6 Manufacturing
7 Petroleum
8 Printing and Publishing
9 Retailing
10 Wholesaling
11 Services
12 Other, specify _____

B. How many employees do you have in your firm at this location (address)?

1 10 or less
2 11 - 50
3 51 - 100
4 101 - 200
5 201 - 400
6 401 - 600
7 601 - 1000
8 1001 or more

C. What is <u>your</u> position in the firm?

1 Top management
2 Middle management
3 Operating management
4 Office supervisor
5 Data Processing personnel
6 Data entry personnel
7 Secretarial
8 Clerical
9 Other, specify _____

COMMENTS

If there is anything else you would care to comment on about microcomputers and training or the satisfactions or frustrations that you have encountered in learning to use microcomputers, please feel free to express yourself here.

_____

_____

_____

_____

_____

_____

Thank you for your cooperation. We really appreciate it.

Firm ID No. _____

APPENDIX B

DEPARTMENT HEAD'S LETTER

COVER LETTER AND FOLLOW-UP LETTER

January 6, 1986

Mr. John Smith, President
Smith's Manufacturing Company
21222 N. Main Street
Norman, OK 73070

Dear Mr. Smith:

In approximately one week, you will receive a letter and a questionnaire from our academic counselor, Ms. Judith Edgmand. I encourage you to respond to her questionnaire since the results will be most valuable to personnel at Oklahoma State University.

Ms. Edgmand has the cooperation of the Computing and Information Sciences Department for her study. I expect her results to tell us how we can serve the business community of Oklahoma through OSU's outreach programs better.

Sincerely,

G. E. Hedrick, Ph.D.
Professor and Head

GEH/alv

January 13, 1987

Mr. John Smith, President
Smith's Manufacturing Company
21222 N. Main Street
Norman, OK 73070

Dear Mr. Smith:

We want to learn from you if your business is now using microcomputers and if you are, how are your business and others in Oklahoma are learning to use their microcomputers. Your assistance is needed in filling out the enclosed questionnaire to gather information about microcomputer training. The name of your company was chosen from a random sample of companies in the entire state of Oklahoma. Even if you do not have microcomputers or do not have training for your employees, your answers to this questionnaire are very important.

You may be assured of complete confidentiality. The questionnaire has an identification number only for mailing purposes. This is so that we may check your name off the mailing list and not send you another questionnaire when your questionnaire is returned. Your name will neither be placed with the questionnaire nor identified in any of the results.

Please complete the questionnaire and return it in the enclosed postage-paid envelope by January 23. This information will be part of a dissertation and will also serve to tell us how we can better serve the business community through outreach programs as indicated by Dr. Hedrick in his introductory letter to you last week. If you are interested in how other businesses are coping with training their employees on microcomputers, you can obtain a summary of the results by writing "copy of results requested" on the back of the return envelope. Please <u>do not</u> put this information on the questionnaire itself.

I would be very happy to answer any questions you might have. Please write or telephone. The telephone number is (405) 624-6471 or (405) 624-5668 (messages only). Thank you for your assistance. It is really appreciated.

Sincerely,

Judith Edgmand
Academic Counselor

January 27,1987

Mr. John Smith, President
Smith's Manufacturing Company
21222 N. Main Street
Norman, OK 73070

Dear Mr. Smith:

A few weeks ago, I sent you a questionnaire on how businesses in Oklahoma are learning to use their microcomputers. I realize that you may have been busy or may not have received the first mailing, but I would very much appreciate your participation in this project. At the time that this letter was mailed, a response had not been received from your business. If the questionnaire has since been completed and returned, I sincerely thank you for your assistance.

In case you received the first copy of the questionnaire with a postage due on it, you have my sincere apologies. The letter was weighed at the post office before it was mailed out and I was assured that it would be mailed for the regular postage. However, after receiving some of them back for postage due, I realized that some of the post offices were adding extra postage to them. Obviously, this was not my intention and I have no way of knowing which post offices did this and how many received them with postage due.

In case you have misplaced the questionnaire, another copy is enclosed. Would you please take a few minutes and fill it out and return it in the self-addressed envelope by February 6, 1987. Your assistance will be greatly appreciated. Thank you.

Sincerely,

Judith Edgmand
Academic Counselor

APPENDIX C

COMMENTS MADE BY RESPONDENTS

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At the end of the questionnaire there was a space for respondents to make any extra comments about their experiences with microcomputers. There were some businesses that added comments. These are as follows:

"We have encountered frustration with operating system bugs, software people blame it on hardware and vice versa. We have had to make conference calls to discuss the problem."

"Most students are taught to program. They should be taught how to run software already written. We could care less about a student knowing how to program in our business, but they do need to know how to run different programs."

"DOS manuals should be simplified."

"We have a Basic Four or MCI which is the simplest and easy access. We have a special person who is familiar with software. The software has been used approximately 18 years in Hydrolics and the package works great for air compression with a few modifications for rental and fabrication."

"Oklahoma State University has helped our company in many ways in the development of our computer use."

"My wife and I own an insurance agency and have an IBM 4995 supplied by State Farm Insurance. My wife and I and two secretaries use it daily in our operations. We can double our production with it."

"I stand amazed at the power and capacity of the microcomputer. An an engineer in Aerospace from 1957 to 1971, I saw mainframes from LGP-30 to 7090. Some early mainframe computers were almost comparable to today's minis and micros."

"I have been fooled by software sales people about its simplicity and answer to all problems."

"In general, low priced software manuals are useless."

"Through the efforts of a friend who has given his time and effort, we are making progress. Vendors of hardware and software have promised much and given little assistance in the use of their products. They are thieves and bandits."

"We need a toll free number to call when we have a problem and not have to go through the distributor. They don't understand and do not know the programs they sell. They want to charge you by the hour to call Apple or the program company. They have a toll free number but will not give it to you. They want to be the middle man and charge for their service. Problem I had when we first started using the computer. I never got the problem solved that way. I had to take the manual and work with the computer to figure out how to make entries to get the results I needed."

"Once I mothballed four microcomputers and proudly stepped up to a mini Burroughs B-900. Within a year, I stepped up again by getting my micros out of storage."

"There is definitely a lack of training opportunities locally for many of the popular software packages."

"Some documentation is well done, most have a lot to be desired. Even when a phone number is provided if questions come up, I have been trying solid for three days to get thru and get a busy signal. Regarding usage of micros, the biggest help to me personally is when I joined a local PC Users group and the introduction into available utility programs and disk handlers."

"I purchased computer and software for tax preparation and bookkeeping as that is my occupation. I have my tax program under control but I do not have the General Ledger program on the computer so I can use it. I did take a 10 week course at a vocational technical school on Basic Computer, but still would like more training on the computer as I have the time and the availability of programs."

"Except for the most popular spreadsheets and wordprocessing packages, training is seldom available at our location. Since there are so many applications available, this is understandable. There may not be a concentration of people in this area using the packages we use. We can't afford to send our people to New York, Los Angeles, etc. Manuals have improved greatly in the past two or three years or we would have a big problem. I remember my Osborne manual. It was horrible."

"Our PC has been used primarily as a remote terminal for the IBM system 36. We received extensive training to run these programs on the 36 but no training to use the PC as a PC."

"People who program seem to think the end user has as much knowledge as the programmer. This creates programs that are not user friendly. I hate to have to set down and read a 50 page manual to run a program. To me this is crazy when the programmer could anticipate your moves and put prompters on the screen.

Any program that is generated for my company has to be user friendly. If I can't sit down and run the program the first time, it goes back, regardless if it is about accounting, management, or any other thing. Every program should be tested at the sixth grade level before

its brought to the market-place. Programs that are not user friendly create fear and confusion for the operator.

As a businessman, I am interested in results not mega-bits etc. A computer and program should be like a car, put the key in and go. People drive very sophisticated cars and they are not mechanical engineers. I do not care what ERROR 601 is!! The best training device is the computer itself."

"We purchased and still own a computer but no longer use it because of 1). my office workers didn't like it and resisted using it, 2). we were "burned" on some very expensive custom programming, 3). the time that it required to use the computer was more than the time required to manually do our work. In short, we spent a lot of time and money ($15,000) for nothing."

"I do not have a microcomputer and I would like to get one for my business but don't know what kind to get."

"We will have an interest in microcomputers in the near future. I have problems selecting a computer that fits our operation."

"We do not use any microcomputers, but are using in house NCR I 9020 System for processing all data relating to the banking profession."

"Microcomputers have been purchased and are scheduled for delivery in February for two locations. Two days of training workshops conducted by the computer vendor will follow the completion of installation."

"We would very much like to have a computer for our business. But we feel that we do not know enough to choose the one right for us--or how to get the necessary training to operate it correctly. We have several friends who purchased computers and went back to the old method after several months."

"We are a farm machinery dealer and are considering a computer at this time."

VITA

JUDITH JOYCE EDGMAND

Candidate for the Degree of

Doctor of Education

Thesis: A PROFILE OF MICROCOMPUTER TRAINING IN SELECTED OKLAHOMA BUSINESSES

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Detroit, Michigan, February 5, 1942, the daughter of Joseph J. and Helen R. Srp.

Education: Graduated from Hinsdale High School, Hinsdale, Illinois, in May 1960; received Bachelor of Arts Degree in Sociology from Michigan State University, East Lansing, Michigan in March, 1965; received Master of Science Degree in Business Education from Oklahoma State University, Stillwater, Oklahoma in May, 1979; completed requirements for the Doctor of Education Degree at Oklahoma State University in July, 1987.

Professional Experience: Graduate Assistant, Department of Administrative Services and Business Education, Oklahoma State University, January 1978 to May 1979; Administrative Assistant, American Appraisal Company, Seattle, Washington, September 1979 to August 1980; Academic Counselor, Department of Computing and Information Sciences, Oklahoma State University, September 1980 to present.

Professional Organizations: Delta Pi Epsilon, Business and Professional Women's Club.