

LAW ENFORCEMENT MANAGEMENT INSTITUTE

**THE DEVELOPMENT
AND
IMPLEMENTATION OF
MICROCOMPUTER TRAINING FOR
LAW ENFORCEMENT**

**A RESEARCH PAPER
SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
MODULE III**

**BY
PAUL E. BROWN
HOUSTON POLICE DEPARTMENT
HOUSTON, TEXAS
AUGUST, 1991**



ACKNOWLEDGEMENTS

To Fred Toler, Executive Director of the Texas Commission on Law Enforcement Officer Standards and Education, to Jack Ryle, Director of the Texas Law Enforcement Management Institute, to all of the members of the Texas Law Enforcement Management Institute Board of Directors, and to all of the new friends I have made as a result of my participation in this program I want to give my deepest thanks.

To the Librarians at the Houston Public Library, Texas A&M University Library, Texas Women's University Library and Sam Houston State University Library who without their help and patience I could not have completed this project.

Most of all, I want to give thanks to my two sons David Alfred Brown and Michael Peter Brown, and my beautiful wife, Beth Somano Brown who give me my strength and are the reason that I strive for excellence. The three of you make all the effort that went into this endeavor worth it and I love each of you very much.

PREFACE

When I first began my research, my thoughts about training, and more specifically microcomputer training, were that the law enforcement community was unique. I believed the concerns, of a instructor teaching the uses and applications of microcomputers, would not be the same in a police department when compared to a private corporation. I was astonished to find we are not that different. Although, the data that we collect, or the subjects that we write about may be different, the actual training of our students is remarkably the same. As I talked with trainers throughout the corporate community I found that each of them encountered the same problems, the same miscommunication, and the same difficulties in convincing managers about training issues.

I truly hope that this document will increase the ability of members of the law enforcement community to give microcomputer training the consideration that it truly deserves. If we do not begin to devote more effort on training we will surely increase our inefficiency and ineffectiveness.

Reference for this paper will come from a new section I currently manage in the Houston Police Department; The Technological Applications Unit of the Houston Police Academy. The remaining information comes directly from current literature on training, and the business community.

This document was produced using a Compaq 386/20 LTE ,Hewlett Pakard Laser Jet III, and Microsoft Word for Windows.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
PREFACE.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES	v

Section

I. INTRODUCTION	1
II. THE NEEDS ASSESSMENT	6
III. SURVEY OF TEXAS POLICE DEPARTMENTS.....	8
IV. THE TRAINING PLAN	13
V. THE TRAINER OF THE FUTURE	19
VI. SUMMARY	25

Appendix

A. COMPUTER SOFTWARE VENDORS	26
B. END NOTES.....	28
C. SELECTED BIBLIOGRAPHY	35

LIST OF TABLES

Table	Page
Computer Training Required.....	8
Word Processing Software	10
Graphic Software	11
Database Software	12
Spreadsheet Software.....	13

I. INTRODUCTION

As early as only ten years ago we were in era where we were amazed with the little boxes that were called microcomputers. The average user could only compare the microcomputer to its big brother, the mainframe computer. It was almost inconceivable the power that was available at our fingertips. As a nation we have matured with regards to technology and especially the computer. We look at the computer today as a common piece of equipment. Computers are in our offices, homes and just about everywhere we go. We have computers in our cars, our watches, our microwave ovens and there is even a computerized toilet. Our society has accelerated its pace dramatically over the last decade. However, the Law Enforcement Community has failed in one crucial area. That area is training.

The typical business organization in the U.S. allocates some \$825 per worker each year on computer training. Roughly 50 percent of all large organizations offer computer training programs. There are also many organizations that do not support their workers when it comes to training.

¹ When we look at training in general terms, statistics from a report from Training magazine indicate that U.S. organizations with more than 100 workers collectively spent \$44.4 billion for training in 1989. U.S. organizations are still experiencing problems with competitiveness, motivation, and creativity.² In one study cited we see that there is not enough technical training and education currently available, and the training that exists is unevenly distributed in the technical workforce.³

Just a short time ago the Wright Brothers measured their accomplishments by determining how many feet they had flown. When the Wright brothers took that short flight

they could not have imagined, that within one generation, man would walk on the moon. Long before Neil Armstrong made that "One giant leap for mankind", he had trained and walked on the moon hundreds of times in a simulator.

Like Astronaut Neil Armstrong, managers, can no longer afford to be computer illiterate. Computer literacy will be a key factor in maintaining and advancing managerial careers.⁴ Computer literacy means the ability to perform real-world tasks such as developing correspondence, analyzing costs and tracking inventory on a computer. The proliferation of application packages has made the use of computers easier. Applications such as Word Perfect have changed the workflow in offices and enabled managers to cut down on personnel costs.⁵

Computers help managers with their essential tasks, communication, coordination and negotiation. In addition, the smaller the organization, the more important it is for the managers to be computer literate, because small organizations do not have the resources to support a large clerical staff. Computers allow employees to do work that could not otherwise be done within the organization, such as developing proprietary databases or financial analyses.⁶ The flexibility of any given organization depends upon the ability of the organization to train its employees.

Management should take steps to see that new employees start their jobs in a manner that will ensure they will progress satisfactorily. The steps that management can take include; developing immediate rapport with the new employee; providing a formal orientation program; and assigning clear and meaningful job descriptions.⁷ The effectiveness of a training program depends on several factors, including its ability to simulate the work environment, its availability at non-central facilities, its interactivity, and its ability to provide feedback.⁸

Many training managers fail to provide skill training and career development opportunities for their own staff members. Keeping trainers satisfied and motivated entails giving them fulfilling work, respect, and the opportunity to grow. Some training managers have been successful in bringing in entry level people and teaching them how to be trainers.⁹

M.I.S. - Management Information Systems' executives often view training either as an expendable item that is too costly for the budget or as a necessity with a cost that cannot be gauged in dollars and cents. Managers say that 1 percent to 4 percent of MIS budgets goes to training, but comparisons are difficult because not all organizations measure the same things. American Family Mutual charges about \$100,000 directly to training out of a \$27 million MIS budget.¹⁰ Training directors must communicate to management the threat of skill obsolescence, the ability to significantly change employee behavior by training, and the value of training as a investment opportunity.¹¹

Management must understand that training for technical people is a necessity, not a benefit or reward. Technical people are usually specialists in one area, but may not be completely aware of the organization's objectives and how they contribute to those objectives. Management should realize training and development are two different things. Training stresses the what and, perhaps, the how of something, while development stresses the why of something. Training and development help a organization's employees grow and that helps achieve organizational objectives.¹²

Computer training is not limited to clerical personnel, police officers, supervisors and managers. It is also important for the Chief Executive of an organization to become trained. Overcoming three problems can reduce the reluctance of Chief Executives to use computers. The problems are: lack of a link between strategic planning and management information

systems (MIS) discussions, which is solved by a strategy preceding MIS development; projects structured to prevent Chief Executives from making contributions, which is solved by contributions from Chief Executives at each decision point in the projects; and MIS staff focusing on the technical system and ignoring the social systems of organizations which is solved by addressing the human aspects for the technical dimension of projects.¹³

Education in the law enforcement community is very similar to that of the general population. For example, the educational system of 1989 was based largely upon the industrial age, where people were expected to have the same job for a lifetime. A modern educational system must produce students who have thinking skills, who can deal with abstract ideas and who can take information, evaluate it, put it into context and draw conclusions. Innovative programs around the U.S. have been started to improve the system.¹⁴ However, statistics for the U.S. Department of Labor predict that, in the next generation, 50 to 75 percent of the jobs available will involve computers.¹⁵

Training and development professionals should design employee training programs to provide workers with behavioral fluency in their jobs. Behavioral fluency is the knowledge and confidence to accomplish a task smoothly, correctly, and without hesitation. The elements of training programs designed to provide workers with behavioral fluency include ~~time-based~~ performance measurement and evaluation; self-paced learning and practice ~~procedures~~; and efficient and easy to use materials.¹⁶

Employees may often be resistant to learning new skills in training courses because they fear change, but trainers can achieve positive results in countering resistance by using a variety of nonconformitive approaches. These approaches will initiate learning and change without directly acknowledging resistance.¹⁷

Several problems can occur if a training program is not implemented. Employees with computer experience will end up giving advice to noncomputer-literate workers, which wastes time and does not result in educating other workers, and workers who must train themselves could end up procrastinating. Organizations can simplify the training process in many ways, including; ensuring that all employees become familiar with the basics, identifying user needs, taking into consideration individual learning styles, imposing deadlines on acquiring computer skills, and training in stages.¹⁸

It should be noted that organizations lose money when they use volunteers from information services (IS) staff to develop and teach courses. Technical skills do not automatically make a good teacher. In addition, a professional trainer needs about 13 days to develop one day of instruction. Volunteer staff who have other duties do not have this kind of time. The highest proportion of training costs is made up of the salaries of the students in their classrooms. Gambling with using a novice to train these people makes little economic sense. Volunteer IS staffers can be used as mentors, trainers and coaches, but they must be carefully selected and trained for these new roles.¹⁹ Training is only effective if IS personnel doing the instruction has teaching skills. Also, IS trainers should have an understanding of end user needs. Training should be part of the original systems design process rather than an after effect of computing.²⁰

Organizations can profit from training and retraining older employees. The average age of workers in the U.S. is increasing. Some 25 percent of the labor force will be at least 55 years of age by 2016. The factors to consider when training older workers include; that older workers take a longer time to learn and store data, the hearing and vision of older workers may be impaired, and older workers may not be familiar with high-technology equipment.²¹

II. THE NEEDS ASSESSMENT

Needs analysis is essential to planning a curriculum for an information systems training department. Educational requirements, needs analyses should cover the selection of training media and the verification of student and class availability. The primary way to gather information for a needs analysis is by interviewing staff members. A good need analysis will uncover budgetary limitations, produce staff profiles, establish foundation courses and identify specific needs. The analysis will also enlighten an MIS department to the cost of supplying training and the consequences of not meeting training needs.²² When conducting a training needs analysis, employers should discover employees' perceptions of the organizational culture by asking them about the skills and characteristics that are likely to be encouraged, recognized, and rewarded.²³

Organizations can conduct effective training needs analysis by designing a questionnaire that distinguishes between training needs and training desires. The questionnaire should include two primary criteria: importance, which is the relevance and frequency of the activities and behaviors of a specific job; and proficiency, which is the competence of employees in performing their jobs. The steps in the needs analysis process include developing a job profile and a questionnaire. The questionnaire should include sections on employee attitudes, job dimension summary ratings, and demographic information. The development of the questionnaire is followed by several steps, including the interpretation of the results, the use of focus groups to clarify the results, the development of training goals, and the evaluation of training effectiveness.²⁴ The questionnaire should also include sections on employee attitudes, job dimension summary ratings, and demographic information.²⁵

Things to consider when securing a trainer include identifying how a trainer believes people learn, which will affect training methods used, and determining the role a trainer is expected to fill.²⁶ Organizational trainers often enter a state of heightened awareness called "The Training Zone" where their best capabilities emerge. Within the training zone the trainers operate at an ultimate balance of cognitive and intuitive reasoning, and they also inspire others to perform well. They transform ideas into actions and constantly stretch the limits of their knowledge and abilities. Experienced trainers can learn to control this experience and enter the training zone at will.²⁷

Information systems managers consider implementing technological change an important part of their job, but how can an organization build upon existing technology without suffering significant downtime? One solution is to train members of the staff, as trainers, in the new technology.²⁸

The training that is related to microcomputer training is almost endless. Below is a list of some of the areas that need to be addressed within the microcomputer training curriculum.

COMPUTER TRAINING REQUIRED

Word Processing	Graphic Processing	Database Management
Spreadsheet Development	Local Area Networking	Wide Area Networking
Telecommunications	Computer Security	Computer Ethics
Disk Operating Systems	UNIX	Scanners
Laser Printers	Dot-Matrix Printers	Daisy Wheel Printers
Ink Jet Printers	Color Printers	Thermal Transfer Printers
Bubble Jet Printers	PC Facsimile	Plotters
Video Digitizing	Multi-Tasking Systems	Terminal Emulation
Desktop Publishing	CAD/CAM	Mapping Systems

III. SURVEY OF TEXAS POLICE DEPARTMENTS

At the end of 1990 a telephone survey of all Texas municipal police departments with a population in excess of 26,000 persons was conducted. Each department was contacted personally and after locating a representative of the department who was responsible for the microcomputers in their department. Several issues, only referencing IBM compatible personal computers, users were questioned about what word processing software, graphical software, database software and what spreadsheet software were utilized by their department. It is important to understand that this paper, nor the persons interviewed, are endorsing any one software application. However, the purpose of this survey is to give users an idea where to go for assistance when considering the purchase of a specific package. In addition, this paper includes, in Appendix A, a description of each of these software applications.

The word processor software application is by far the most prolific application found. We have seen in the past that word processors were considered electronic typewriters, however, with the advent of the microcomputer most standard word processors are capable of far more. The word processors described below are closer to being considered a desk top publishing system. They bring graphics and text together, and use a variety of fonts, point sizing, and styling. Today the average user has at his or her disposal the capability to prepare documents that just a few years ago would have to have been out-sourced to a print house for completion.

WORD PROCESSING PROGRAMS

	<i>Word Perfect</i>	<i>Multimate</i>	<i>Word Star</i>	<i>Display Write</i>	<i>PC Write</i>	<i>P.F.S. Write</i>	<i>First Choice</i>	<i>MS Word</i>	<i>MS Works</i>
<i>Abilene</i>	✓								
<i>Amarillo</i>	✓								
<i>Arlington</i>	✓		✓			✓			
<i>Austin</i>				✓					
<i>Baytown</i>	✓		✓						
<i>Beaumont</i>	✓						✓		
<i>Big Spring</i>			✓		✓				
<i>Brownsville</i>			✓						
<i>College Station</i>			✓						
<i>Corpus Christi</i>	✓			✓					
<i>Dallas</i>	✓								
<i>Galveston</i>			✓			✓			
<i>Garland</i>								✓	
<i>Humble</i>						✓	✓		
<i>Houston</i>	✓	✓	✓			✓	✓	✓	✓
<i>Killeen</i>	✓								
<i>Kingsville</i>						✓			
<i>Lubbock</i>	✓								
<i>Midland</i>	✓								
<i>Missouri City</i>									
<i>Orange</i>	✓					✓			
<i>Port Arthur</i>	✓		✓						
<i>Stafford</i>	✓								

Graphic software applications have allowed the average user to take complicated information and transfer them into a picture format. Graphs, charts, photographs and tables of data are seen daily in news print, in magazines and on television.

GRAPHICS PROGRAMS

	<i>First Graphics</i>	<i>Harvard Graphics</i>	<i>First Publisher</i>
<i>Abilene</i>			
<i>Amarillo</i>			
<i>Arlington</i>	✓		
<i>Austin</i>			
<i>Baytown</i>			
<i>Beaumont</i>			✓
<i>Big Spring</i>			
<i>Brownsville</i>		✓	
<i>College Station</i>			
<i>Corpus Christi</i>		✓	
<i>Dallas</i>			
<i>Galveston</i>			
<i>Garland</i>			
<i>Humble</i>			
<i>Houston</i>		✓	
<i>Killeen</i>			
<i>Kingsville</i>			
<i>Lubbock</i>			
<i>Midland</i>			
<i>Missouri City</i>			
<i>Orange</i>			
<i>Port Arthur</i>			
<i>Stafford</i>		✓	

Although word processing is the most widely used type of software, database software, in reasonable probability, will have the greatest impact on today's law enforcement. Databases allow us to build various systems ranging from a simple system to keep track of a department's inventory of equipment to a multi-level system to be used for crime analysis purposes. Although all of the software listed below have limitations, the average developer will only be limited by his or her creativity.

DATABASE PROGRAMS

	<i>DBase III & IV</i>	<i>DATAEASE</i>	<i>PARADOX</i>	<i>RBASE</i>	<i>Q & A</i>
<i>Abilene</i>					
<i>Amarillo</i>		✓			
<i>Arlington</i>					
<i>Austin</i>	✓				
<i>Baytown</i>					
<i>Beaumont</i>	✓				
<i>Big Spring</i>					
<i>Brownsville</i>					
<i>College Station</i>					
<i>Corpus Christi</i>				✓	
<i>Dallas</i>	✓		✓		✓
<i>Galveston</i>			✓		
<i>Garland</i>					
<i>Humble</i>					
<i>Houston</i>	✓	✓	✓		✓
<i>Killeen</i>	✓				
<i>Kingsville</i>		✓			
<i>Lubbock</i>	✓				
<i>Midland</i>	✓				
<i>Missouri City</i>					
<i>Orange</i>					
<i>Port Arthur</i>					
<i>Stafford</i>					

A spreadsheet is a software application that could be considered a word processor for numbers. A spreadsheet program allows you to enter a series of mathematical formulas, also known as mathematical models, which the spreadsheet software will constantly calculate.

SPREADSHEET PROGRAMS

	<i>Lotus 123</i>	<i>Symphony</i>	<i>M.S. Excel</i>	<i>Freelance</i>	<i>Quatro-Pro</i>	<i>Clipper</i>
<i>Abilene</i>						
<i>Amarillo</i>	✓					
<i>Arlington</i>	✓					
<i>Austin</i>	✓					
<i>Baytown</i>						
<i>Beaumont</i>	✓					
<i>Big Spring</i>						
<i>Brownsville</i>	✓					
<i>College Station</i>			✓			
<i>Corpus Christi</i>	✓					
<i>Dallas</i>	✓					
<i>Galveston</i>						
<i>Garland</i>	✓				✓	
<i>Humble</i>						
<i>Houston</i>	✓		✓		✓	
<i>Killeen</i>						✓
<i>Kingsville</i>	✓					
<i>Lubbock</i>	✓			✓		
<i>Midland</i>	✓					
<i>Missouri City</i>	✓					
<i>Orange</i>	✓					
<i>Port Arthur</i>		✓				
<i>Stafford</i>	✓					

IV. THE TRAINING PLAN

Organizations should measure employees' skills before developing a training program so that they will have some way of evaluating the effectiveness of the program. The steps involved in developing a training program include setting goals for the program, identifying which employees will be involved, providing employees with feedback, and helping employees develop their own training goals.²⁹ The guidelines for making training meaningful include making the training job related, finding a location where training can be carried out without interruptions, and making the location comfortable, clean, and neat.³⁰ Timing is critical to the success of training and development programs.³¹

Organizations which want to hire the most effective employee training instructors need to select instructors who understand and use the various instructional methods that are available when conducting training sessions.³² Training of employees should not be a one-time experience, and instead should be a process that goes on for as long as an employee is with the organization. To that end, there are four objectives that should be incorporated into an employee training program. The first objective will be to develop a standard vocabulary for beginners and experienced users which will enhance inter-user communication, improve problem resolution and will reduce user learning curves. The second objective, will involve the use of experienced users who can contribute case studies or examples of specific applications for a work setting. The third objective will be the reduction of problems by tackling trivial problems at the outset which will result in a calmer, less stressful training experience. The fourth objective, increasing user satisfaction, is measured by the number of user complaints or how the system meets previously unfulfilled needs.³³ In addition, suggestions to make computer training more effective include: creating interest; presenting material in a logical way; and repeating major points.³⁴

Training and development professionals can facilitate the transition employees must make when beginning new jobs by presenting them with opportunities for enjoyable active learning. The truths about people and training include; all people are similar, people learn by doing, and learning can be enjoyable. Nearly all people involved in the training process need to feel acknowledged and need reassurance. The elements of creating an environment that enables someone to learn by doing include: making the training relevant to their jobs, using job simulation, and teaching interactive skills. Introducing an element of healthy competition into training can also make learning more enjoyable.³⁵ In addition, curriculum design should take into account age-related thinking patterns. The adult classroom experience has received a good deal of theoretical treatment, but few empirical studies have been performed.³⁶

The purchase of a computer system does not necessarily guarantee that employees will learn it well and quickly, regardless of training programs. Problems can emerge whose basic cause is lack of compatibility between training programs, employee expectations, and software support services.³⁷ The best way to ensure staff support when installing a new computer system is to plan a well-designed, comprehensive program. Top management involvement is the most important factor that determines whether an automated system will succeed or not.³⁸ When evaluating an off-the-shelf training package for a new software program the evaluation needs to be done carefully.³⁹

Since training and MIS departments are frequently understaffed, organizations sometimes turn to training vendors for technical and end-user training. One way to select a high quality training supplier is to issue a request for proposals (RFP) to likely vendors. The issues to cover in an RFP include the objectives of the training and a general description of the organization, a deadline for proposals, an explanation of the computer environment and the types of training needed, and what types of financial arrangements and other

information about the vendor are required. Personnel working in a department's legal section should discuss confidentiality and ownership of materials. Insight from all relevant departments should be sought and a list of criteria to be used in the evaluation of proposals should be drawn up before RFPs are issued.⁴⁰

Generally, costs range significantly from one organization to the next, from under \$50 for a one-day class to over \$750 for a three-day class. Factors to consider when planning to establish a training program or when implementing an end-user or technical training curriculum include: clarification of objectives, evaluation of vendor fees, formation of reasonable rates, establishment of consistent fees, maintenance of fixed fees, availability of a cancellation policy, and the possibility of free training for novices.⁴¹

In the law enforcement community there are a lot of questions that must be addressed regarding ethics, computer ethics are no different. It is difficult to measure whether the increase in the popularity of ethics training has improved the ethical behavior of employees, but organizations can take steps to encourage employees to act in an ethical manner.⁴² This is extremely important when considering the software copyright laws.

Occupational training techniques that combine experienced line managers and trainers can make effective use of the skills of each if steps are taken prior to the beginning of the training program to ensure it is a cooperative effort. The steps include: determining if the managers have any valid objections to the program; ensuring that both the managers and trainers develop the material; and ensuring that the manager understands that training techniques are important to the training process.⁴³

Organizations providing training for employees typically select content-based training methods for instruction which emphasize providing information and then testing individuals

on what information they remember. However, research by Harvard Business School's Professor Jim Cash reveals that a better alternative may be skill-based learning. Skill-based training involves giving trainees a task and then demonstrates how to verify that the task was done correctly. The technique also suggests that instructors provide background on how a skill will help trainees. In Cash's study, two groups, one using content-based learning and one using skill-based learning, tackled a case study. The skill-based group solved it in 4.5 hours, while it took the content-based group 8 hours to find a solution.⁴⁴

Properly planning on-the-job (OJT) training and development programs enhances their efficiency and effectiveness. The objectives of OJT programs include orienting and training new employees, upgrading the skills of experienced workers, and cross-training current employees. Job Instruction Training (JIT) is an OJT planning method established in manufacturing organizations during World War II. The steps in implementing JIT include thoroughly analyzing each job task, showing employees how to perform a task, and explaining to employees important parts of the tasks.⁴⁵ Occupational training shortens the time required for new employees to attain an acceptable performance level, prepares experienced employees for new jobs, and enhances the performance of experienced employees in existing positions.⁴⁶

Collective training is a new training and development technique that focuses on the entire organizations rather than training individual employees. Collective training was developed from the Instructional Systems Design training methods developed for the Army in the 1970s. The key elements of collective training include analyses of the organization, design of the training programs, and the development of the training programs. When analyzing organizations, the primary components include their goals and objectives, structures, and personnel. An analysis should identify organizational functions and how they are accomplished.⁴⁷

The four basic steps in managing the employee training process are planning, organization, implementation, and control. The elements of the planning phase include making a list of the skills required to handle the employees' jobs, separating those skills into the ones learned on the job and those that must be taught, and developing a timetable to reach the training goals. The organization phase determines basic factors that include who will teach the training program, what skills the employees already possess, and what materials will be needed for the program. During the implementation phase, supervisors can provide support for employees by focusing on concepts that include open communication, flexibility, and patience. The training process is controlled by both the employees and trainers. The employees can ask questions, seek help, and practice new skills, while supervisors can provide knowledge, tools, and assistance.⁴⁸

Supervisors should follow the five basic steps of training to ensure that employees will be able to accomplish what they have been taught. The five basic steps are: telling trainees what they are expected to accomplish; setting standards by showing them what they are expected to accomplish; giving trainees first-hand experience by letting them try; watching the trainees at work to ensure they accomplish what they were trained to do; and praising or correcting their performance.⁴⁹

Off-site training can be more effective than on-site training in certain situations, such as when there are inadequate on-site facilities, or when the employees in the training program are coming from different locations. Trainers should also consider other factors, including the possibility of distractions, the types of people being trained, and the sensitivity of the material being discussed.⁵⁰

The best way for trainers to evaluate a meeting facility is to visit the site. Trainers should select a clean, comfortable, soundproof, and temperature-controlled room. The room

should be able to accommodate all participants comfortably, without being too large. A crucial factor in selecting a facility is the quality of the audiovisual equipment⁵¹ The seating arrangements in an off-site training room are as important as the presentation of information. The type of seating configuration depends on the number of participants and the type of training. Putting seats in rows in the traditional classroom style enhances the acquisition of knowledge, but it discourages participation. Arranging tables in a U-shape encourages participation.⁵² In addition, power requirements must be determined if actual hardware for each student will be utilized.

V. THE TRAINER OF THE FUTURE

Organizations are all facing more restrictive training budgets, fewer employees and an ever increasing amount of knowledge that must be passed on to personnel. New and innovative ways to address training and specifically microcomputer training in the future must be found. The microcomputer will be the preferred source of training for the future.

Workforce education and skill levels are declining, while automation is advancing rapidly. Artificial intelligence, hypertext systems, expert systems, and robotics are useful, and they are meant to aid rather than replace the workforce. Educating the workforce therefore becomes a primary problem in a technological society. "Master systems" for on-line education and training are suggested.⁵³ High technology training systems, such as computer based systems or interactive video systems, cut training time and provide instructional benefits. These benefits include one-on-one interaction, consistency, efficiency and self paced instruction. The American Society of Training and Development estimates US businesses spends about \$30 billion in education and training annually. SK&A Research estimates that 30 percent of organizational dollars are spent on computer based systems; interactive video systems and teleconferencing account for 2 percent each. Compact disc technology promises a new wave of training technology, but it is too soon to know when it will arrive.⁵⁴

Computer-based training (CBT) tutorials offers organizations many advantages for helping the changing workforce to become computer literate. The advantages of CBT tutorials include availability, self-paced features, and changeability. Other forms of CBT technology that can improve efficiency and increase productivity include on-line help,

reference guides, and job aids. The next significant CBT technology for training is the multimedia computer that integrates sound, video, and computer functions.⁵⁵

Computer-based training (CBT) offers several important benefits to organizations looking for techniques to train the growing and changing collection of human resource information system (HRIS) users. The basic characteristics of CBT include work stimulation, self-paced learning, and availability as needed. The characteristics of CBT applicable to HRIS include decentralization of HR systems, quick and inexpensive response to change, and variety in instructional topics and levels. Some forms of CBT can assist in management training.⁵⁶

Arthur Anderson & Co. used computer-based training (CBT) to help teach fundamentals of accounting to employees in its management information consulting division.⁵⁷ Chase Manhattan Bank NA uses a computer program developed in-house in a course it offers for managers to help them improve staff mobility and efficiency. The computer-based course resides on a single high-density disk. The bank sends the course to its data centers around the world for staff training in a standardized format. The program is limited to simple graphics supporting IBM's CGA standard because compatibility throughout the organization is a major issue. Computer-based training saves the banking organization the cost of bringing employees to a central training center or sending trainers out to various sites.⁵⁸ Massachusetts Mutual Life Insurance used CBT to help reduce its 75 percent turnover rate among new insurance agents, and to reduce training times. The North American Finance Group of Citibank used CBT to train company representatives in product knowledge.⁵⁹

One reason for the slow growth of acceptance of computer-based training (CBT) is a lack of talented courseware authors. It is estimated that it takes up to 250 hours of work to

produce one hour of courseware, and authors do not become truly proficient at CBT until they have produced five or six courses. Compounding the problem is the fact that most CBT software has been created by computer specialists, rather than by trainers. A good CBT program should be grounded in documented principles of learning, it should build specific skills, and the topic of the course should lend itself to CBT. Accuracy and brevity are the keys to a meaningful content. Screen designs should allow the student to focus on the content of the course, rather than the computer. Frequent, interactive questions help to keep the students attention.⁶⁰

Major organizations increasingly turn to computer based employee training as new microcomputer technologies, development tools and graphical interfaces become available. Key advantages of computer-based training (CBT) include the ability to create short, easy to remember lessons and the ability to reinforce traditional instructor based training. Improved authoring systems now speed courseware development, and the spread of microcomputers in large organizations provides a powerful impetus for CBT technology. Observers say that CBT use has waited for the technology to mature because some early CBT programs were difficult to use. Many consultants expect training to be a major management issue in the 1990s because illiteracy and increased automation are causing productivity problems.⁶¹

Computer-based training(CBT) has been shown to be an effective training medium for some learners in some situations. What is less clear is what types of technology are best suited for training applications. CBT is becoming especially popular in industries such as banking that are already heavy users of computers, and with large organizations. Within the training field, users are split between the virtues of computer-based training and interactive video instruction.⁶²

Organizations can customize packaged training programs so that standard packages better fit their training needs. Major points to consider when customizing packaged programs include: getting permission from program vendors; deciding what to customize; establishing learning objective; enlisting the help of experts; and selecting customized situations that are not current hot issues with organizations.⁶³

The term "multimedia" has many definitions, but it usually is used in conjunction with computers and training. One definition of multimedia is the use of integrated media that combines devices that cost less than broadcast-quality videos and are easier to use than traditional video technology. Computer multimedia can be defined as the use of visual or audiovisual presentations that have been developed by using integrated computer technology, including audio, video, and computer graphics. Trainers can use multimedia technology to create professional-quality presentations by plugging such equipment as a videocassette recorder, tape recorder, or compact disk player into a computer.⁶⁴

Federal Express Corp plans to spend \$40 million on interactive video training and testing system that will connect 600 work-stations to two central databases that are 2000 miles apart. Interactive Training Systems' development of the touch screen based system that Federal Express will implement, is called the Transporter. Each Transporter system has a library of 32 laser discs, 1300 NEC Power Mate II AT compatibles, and Sony laser disc players. Federal Express will require 19,000 couriers and 2,000 service agents to pass competence tests on the systems. The systems are expected to reduce errors and improve services, and Federal Express hopes to improve training and reduce management overhead. Federal Express may expand the Transporter systems capabilities to include drivers and billing clerks, customer-service specialists, and pilots.⁶⁵

Automobile manufacturers use video as a cost effective way to distribute more maintenance training to car dealers, but video may not be the best way to deliver all needed training.⁶⁶

Digital multimedia, with the power of full-screen, full-motion video and audio on a microcomputers is drawing praise from organizational trainers and users for its simplicity in handling procedures ranging from course design to hookups to remote sites. Digital multimedia differs from analog-based interactive video disc (IVD) as trainers and users can translate analog video signals to work with computer-based video. Digital multimedia is an asset to training environments for several reasons: training can be embedded within applications, course materials are easy to create and maintain, applications can be networked and the initial investment is less.⁶⁷

Using the entertainment potential of computers to develop training programs that are both enjoyable and educational is a good approach to employee development in today's complex networked computing environments. Some game programs have elements of computer-based training, and a few organizations, such as Hewlett Packard, have made large investments in in-house simulation software for high-level training. Blue Chip Software's American Dream is one of the best commercial simulation programs but is difficult to find.⁶⁸

L.A. Image is designing computer games that educate and train sales staff on employees benefits at the recently merged SmithKlein Beecham Pharmaceutical Inc. L.A. Image developers first create a series of screen designs on paper and then use a variety of microcomputer applications to automate their design. The developers devise a paper storyboard of the games publishing package using, Microsoft Corp's "Word" word processing software and Corel Systems Corp's "CorelDraw" illustration program. To electronically create the storyboards on the microcomputer, the designers use Electronic

Arts' "Deluxe Paint II Enhanced" and "Deluxe Animator" animation and paint software. Paul Mace Software Inc's "Grasp 3.5" scripting language is used to integrate the microcomputer files.⁶⁹

Lastly, when considering the possibilities for a system beyond tomorrows dreams and expectations, that system is Virtual Reality. Virtual Reality (VR), which creates a realistic sensory experience through computer-based simulation, can be used in many training applications. VPL Research's DataGlove creates a computer image of the user's hand, which can be used to manipulate a computerized image of an object. DataGlove can be used by trainers to help employees perform manual tasks. VR can even help trainers teach employees to operate devices that have not yet been developed. VR technology is still in the early stages, but VR systems of the future may include such features as sound and touch capabilities.⁷⁰

10. SUMMARY

In summary, this paper emphasizes one thought about microcomputer training and training in general. That thought stems from a phrase developed while teaching at the Houston Police Training Academy. "You have to Slow down to be able to Speed Up" Everyone has learned various skills in their lives, some good some not so good. However, to be able to do them better, more efficient and faster, training must catch up with technology. We will have to slow down, learn new skills to replace old ones and then be able to accelerate. Since a great part of our lives is spent learning and teaching, the best training must be made available. Having done this, departments will enable employees improve themselves, save on mistakes made by employees, and will give back to the community their valued trust and investment.

Appendix A

WORD PROCESSING SOFTWARE

DISPLAYWRITE, I.B.M. Organization, 472 Wheeler Farms Rd., Milford, CT, 06460
ISP: 39737-362, Approx. \$295.00

MICROSOFT WORD, Microsoft Organization, 16011 N.E. 36th Way, Redmond,
WA, 98073 ISP: 53150-760, Approx. \$399.00

MICROSOFT WORKS, Microsoft Organization, 16011 N.E. 36th Way, Redmond,
WA, 98073 ISP: 53150-740, Approx. \$195.00

MULTIMATE ADVANTAGE II, Ashton Tate, 52 Oakland Ave. N., East Hartford,
CT, 06108 ISP: 55718-300, Approx. \$565.00

PC-WRITE, Quicksoft, Inc., 219 First Ave. N. #224, Seattle, WA, 98109
ISP: 64467-500, Approx. \$89.00

PFS-FIRST CHOICE, Software Publishing Organization, 1901 Landing Dr.,
Mountainview, CA., ISP: 73300-250, Approx. \$149.00

PFS-WRITE, Software Publishing Organization, 1901 Landing Dr., Mountainview,
CA., ISP: 68075-078, Approx. \$49.95

WORDPERFECT, Wordperfect Organization, 1555 N. Technology Way, Orem, UT
84057 ISP: 68012-600, Approx. \$495.00

WORDSTAR, Micropro Int'l. Corp., 33 San Pablo Ave., San Rafael, CA., 94903
ISP: 53000-725, Approx. \$495.00

GRAPHIC SOFTWARE

HARVARD PRESENTATION GRAPHICS, Software Publishing Organization, 1901
Landing Dr., Mountainview, CA., ISP: 73300-050, Approx. \$395.00

PFS-FIRST PUBLISHER, Software Publishing Organization, 1901 Landing Dr.,
Mountainview, CA., ISP: 73300-025, Approx. \$99.00

PFS-GRAPH, Software Publishing Organization, 1901 Landing Dr., Mountainview,
CA., ISP: 73300-150, Approx. \$140.00

DATABASE SOFTWARE

DATAEASE, Dataease International, 7 Cambridge Drive, Trumbull, CT., 06611

ISPN: 65662-100, Approx. \$750.00

DBASE, Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502

ISPN: 05500-160, Approx. \$725.00

PARADOX, ANSA Software, 1301 Shore Way Rd., Belmont, CA, 94002

ISPN: 03672-850, Approx. \$725.00

Q&A, Symantec, 10201 Torre Ave., Cupertino, CA, 95014

ISPN: 77413-695, Approx. \$349.00

R:BASE, Microrim, 3925 159th Ave. N.E., Redmond, WA, 98073

ISPN: 53075-255, Approx. \$700.00

SPREADSHEET SOFTWARE

CLIPPER, Nantucket Organization, 12555 W. Jefferson Blvd., Los Angeles, CA,
90066

ISPN: 55949-100, Approx. \$695.00

FREELANCE, Lotus Development Organization, 55 Cambridge Parkway, Cambridge,
MA, 02142, ISPN: 45525-080, Approx. \$495.00

MICROSOFT EXCEL, Microsoft Organization, 16011 N.E. 36th Way, Redmond,
WA, 98073 ISPN: 53150-270, Approx. \$495.00

SYMPHONY, Lotus Development Organization, 55 Cambridge Parkway, Cambridge,
MA, 02142, ISPN: 45525-200, Approx. \$695.00

END NOTES

- ¹ Paul Schindler, PC Week, *"If you think training is expensive - you could try ignorance"*, Dec 5, 1988, p.47.
- ² Marc J. Rosenberg , Training, *"Performance technology working the system"*, Feb 1990, p.42.
- ³ Anthony P. Carnevale and Eric R. Schulz , Training & Development Journal, *"Technical training in America: how much and who gets it?"*, Nov 1988, p.18.
- ⁴ Alan J. Ryan , Computerworld, *"Managers can learn from NYU tech class"*, April 24, 1989, p.66.
- ⁵ Ellen Braun , The office, *"What does computer literacy really mean?"*, Nov 1989, p.47.
- ⁶ Patricia W. Hamilton , D & B Reports, *"Real executives do type - the use of computers by executives"*, Sept-Oct 1988, p.40.
- ⁷ Arthur R. Pell , Managers Magazine , *"Helping your new people get started"*, July 1990, p.28.
- ⁸ John Doyle , Credit, *"Innovations in training"*, Jan-Feb 1991, p.10.
- ⁹ Beverly Geber , Training, *"The care and feeding of trainers"* , Aug 1988, p.41.
- ¹⁰ Michael Ball , Computerworld, *"The pros and costs of data processing training: Necessity or luxury?"*, Feb 15,1988, p.129.
- ¹¹ John Murphy , Training, *"Can the growth of training make the training director obsolete?"*, July 1988, p.28.

-
- ¹² Milt Reitzfeld , *Journal of Systems Management* , *"Training is necessary not a reward"*, Feb 1989, p.25.
- ¹³ Quinn Spitzer , *Journal of Business Strategy*, *"Strategic solutions to high-tech problems"*, May-June 1991, p.59.
- ¹⁴ John Sculley , *Personal Computing*, *"Technology is reshaping both work and workers"*, Oct 1989, p.218.
- ¹⁵ Jennifer Brawer, *A+ teacher's toolbox*, *"Computer-equity project seeks to close the computer-use gender gap"*, Sept 1988, p.61.
- ¹⁶ Carl Binder , *Training*, *"Closing the confidence gap"*, Sept 1990, p.49.
- ¹⁷ Raanan Lipshitz and Victor Friedman and Haim Omer , *Training & Development Journal*, *"Overcoming resistance to training: a nonconfrontive approach"*, Dec 1989, p.46.
- ¹⁸ Jackie Mathys Cowlshaw , *Training*, *"Taking the time to train"*, April 1991, p.41.
- ¹⁹ Bill Sebrell , *Computerworld*, *"IS pros as adjunct instructors"*, Oct 9, 1989, p.117.
- ²⁰ Glenn Rifkin , *Computerworld*, *"The trouble with technology training"*, April 15, 1991, p.74.
- ²¹ Catherine D. Fyock , *Training & Development Journal*, *"Teaching older workers new tricks"*, April 1991, p.21.
- ²² Mark Duncan , *Computerworld*, *"Correctly spelling out needs: needs analysis "*, July 17, 1989

-
- ²³ Jil Fairbairns , *Personnel Management*, *"Plugging the gap in training needs analysis"*, Feb 1991, p.43.
- ²⁴ Kenneth M. Nowack , *Training & Development Journal*, *"A true training needs analysis"*, April 1991, p.69.
- ²⁵ Kenneth M. Nowack , *Training & Development Journal*, *"A true training needs analysis"*, April 1991, p.69.
- ²⁶ Stephen B. Wehrenberg , *Personnel Journal*, *"Match trainers to the task"*, August 1989, p.69.
- ²⁷ Cresencio Torres and Mary Bruxelles, *Training & Development Journal*, *"You've entered the training zone"*, May 1989, p.74.
- ²⁸ *The Office*, *"Selecting a qualified training vendor"*, Oct 1989, p.98.
- ²⁹ Joy Hazucha and Katherine Holt , *Training & Development Journal*, *"Starting right"*, Jan1991, p.71.
- ³⁰ Carolyn Nilson , *Supervisory Management*, *"How to train employees one-on-one"*, May 1991, p.3.
- ³¹ Marybeth K. Sauders , *Training and Development Journal*, *"Training tips"*, Oct 1990, p.18.
- ³² Larry Hillman and David Schwandt , *Training & Development Journal*, *"Ways and means"*, Sept 1989, p.28.
- ³³ Byron Glick , *Computerworld*, *"Adding the missing piece in training"*, May 20, 1991, p.136.

-
- ³⁴ Mona J. Casady , Management World, *"Success tips for computer trainers"*, March-April 1990, p.23.
- ³⁵ Kathleen A. O'Halloran , Training & Development, *"Three simple principals"*, Oct 1990, p.15.
- ³⁶ Ron Zemek and Susan Zemek , Training, *"30 things we know for sure about adult learning"*, July 1988, p.57.
- ³⁷ Deborah Fain , The Office, *"Did you buy the wrong software? Probable not!"*, April 1988, p.91.
- ³⁸ Doug Dayton , The Office, *"Computer training: it takes time and patience"*, Oct 1989, p.14.
- ³⁹ Edward W. Schneider , Computerworld, *"It looks good but will it work?"*, Dec 11, 1989, p.126.
- ⁴⁰ Naomi Marten , Computerworld, *"Preparing a training request "*, April 24, 1989, p.112.
- ⁴¹ Naomi Karten , Computerworld, *"The price of in-house training"*, Nov 7, 1988, p.151.
- ⁴² Brad Lee Thompson , Training, *"Ethics training enters the real world"*, Oct 1990, p.82.
- ⁴³ Jeanne F. Glennon , Training and Development Journal, *"Partners in training (line managers and trainers)"*, July 1990, p.30.
- ⁴⁴ Joel Rakow , Training, *"Not just the facts - Ma'am"*, June 1990, p.59.
- ⁴⁵ William J. Rothwell and H.C. Kazanas , Training and Development Journal, *"Planned OJT is productive OJT"*, Oct 1990, p.53.

-
- ⁴⁶ Patricia Peyser , *Management Quarterly*, "*Developing a training strategy*", Fall 1990, p.41.
- ⁴⁷ Vernon Humphrey , *Training and Development Journal*, "*Training the total organization*", Oct 1990, p.57.
- ⁴⁸ Judith Remick , *Supervisory Management*, "*A manager's guide to 'win-win' training*", May 1991, p.1.
- ⁴⁹ Ken Blanchard , *Supervisory Management*, "*Getting work done right: the five steps of training*", June 1991, p.3.
- ⁵⁰ Margaret Kaeter , *Training*, "*Off-site vs. in-house*", Nov 1990, p.5.
- ⁵¹ Margaret Kaeter , *Training*, "*Picking the right site. (off-Site Training Meetings)*", Nov 1990, p.8.
- ⁵² David Sheridan , *Training*, "*Making the site right. (Off-Site Training Meetings)*", Nov 1990, p.26.
- ⁵³ Clay Carr , *Training & Development Journal* , "*Making the human computer marriage work*", May 1988, p.65.
- ⁵⁴ Randy Ross , *High Technology Business*, "*Technology tackles training dilemma*", Sept 1988, p.18.
- ⁵⁵ Ralph E. Ganger , *Personnel Journal*, "*Computer-based training works*", Sept 1990, p.84.
- ⁵⁶ John E. Spirig , *Employment Today*, "*CBT - computer based training*", Winter 1990, p.325.

-
- ⁵⁷ Robert J. Campbell , Training & Development Journal, *"Cost-effective computer-based training"*, July 1988, p.62.
- ⁵⁸ Mark Fritz , Computerworld, *"Chase lets computers do the teaching"*, April 15, 1991, p.76.
- ⁵⁹ Judith Yates Borger , Training, *"Banking on CBT"*, Sept 1988, p.10.
- ⁶⁰ Barbara Ladd , Training, *"Four-star CBT: it takes people to make the machines perform"*, Sept 1988, p.18.
- ⁶¹ Dennis Eskow , PC Week, *"Computer-based training starts to catch on"*, April 16, 1990, p.171.
- ⁶² Pete Holste , Training, *"High tech - hot talk"*, Sept 1988, p.5.
- ⁶³ Paul Taylor , Training & Development Journal, *"How to customize a training program"*, May 1989, p.28.
- ⁶⁴ Bob Filipozak , Training, *"Multimedia: tilting at windmills?"*, May 1991, p.73.
- ⁶⁵ Amy Berman , PC Week, *"FedEx expects better service via networked training plan"*, Feb 16, 1988, p.1.
- ⁶⁶ Marc Hequet , Training, *"Can video replace trainers?"*, June 1988, p.526.
- ⁶⁷ Mark Fritz , Computerworld, *"Digital multimedia to improve training"*, May 27, 1991, p.103.

⁶⁸ Peter Coffee , PC Week, *"Training games have elements of fun built in"*, August 27, 1990, p.44.

⁶⁹ Karen D. Moser , PC Week, *"Company creates PC games for sales training"*, Jan 28, 1991, p.59.

⁷⁰ Mark Fritz , Training, *"The world of Virtual Reality"*, Feb 1991, p.45.

SELECTED BIBLIOGRAPHY

Ball, Michael, *Computerworld*, "The pros and costs of data processing training: Necessity or luxury?", Feb 15, 1988, p.129.

Bermer, Amy, *PC Week*, "FedEx expects better service via networked training plan", Feb 16, 1988, P.1.

Binder, Carl, *Training*, "Closing the confidence gap", Sept 1990, p.49.

Blanshard, Ken, *Supervisory Management*, "Getting work done right: the five steps of training", June 1991, p.3.

Borger, Judith Yates, *Training*, "Banking on CBT", Sept 1988, p.10.

Braun, Ellen, *The Office*, "What does computer literacy really mean?" Nov 1989, p.47.

Brawer, Jennifer, *Personal Computing*, "A + teacher's toolbox" Sept 1988, p. 61.

Campbell, Robert J., *Training & Development Journal*, "Cost-effective computer-based training". July 1988, p.62.

Carnevale, Anthony P. and Schultz, Eric R., *Training & Development Journal*, "Technical training in America: how much and who gets it?" Nov 1988, p.18.

Carr, Clay, *Training & Development Journal*, "Making the human computer marriage work", May 1988, p.65.

Casady, Mona, *Management World*, "Success tips for computer trainers", March-April 1990, p.23.

Coffee, Peter, *PC Week* , *"Training games have elements of fun built in"*, August 27, 1990, p.44.

Conthran, Tom, *Training*, *"Picking the right site. (off-Site Training Meetings)"*, Nov 1990, p.4.

Cowlishaw, Jackie Mathys, *Training* , *"Taking the time to train"*, April 1991, p.41.

Dayton, Doug, *The Office*, *"Computer training: it takes time and patience"*, Oct 1989, p.14.

Doyle, John, *Credit* , *"Innovations in Training"*, Jan-Feb 1991, p.10.

Duncan, Mark, *Computerworld*, *"Correctly spelling out needs: needs analysis"* July 17, 1989

Eskow, Dennis, *PC Week*, *"Computer-based training starts to catch on"*, April 16, 1990, p.171.

Fain, Deborah, *The Office* , *"Did you buy the wrong software? Probable not!"*, April 1988, p.91.

Fairbains, Jil, *Personnel Management* , *"Plugging the gap in training needs analysis"*, Feb 1991, p.43.

Filipozak, Bob, *Training*, *"Multimedia: tilting at windmills?"*, May 1991, p.73.

Fritz, Mark, *Computerworld* , *"Chase lets computers do the teaching"*, April 15, 1991, p.76.

Fritz, Mark, *Computerworld*, "Digital multimedia to improve training", May 27, 1991, p.103.

Fritz, Mark, *Training*, "The world of Virtual Reality", Feb 1991, p.45.

Fyock, Catherine D., *Training & Development Journal*, "Teaching older workers new tricks" April 1991, p.21.

Ganger, Ralph, *Personnel Journal*, "Computer-based training works" Sept 1990, p.84.

Geber, Beverly, *Training*, "The care and feeding of trainers", Aug 1988, p.41.

Glennon, Jeanne F., *Training and Development Journal*, "Partners in training, line managers and trainers", July 1990, p.30.

Glick, Byron, *Computerworld*, "Adding the missing piece in training", May 20, 1991, p.136.

Hamilton, Patricia W., *D & B Reports*, "Real executives do type - the use of computers by executives", Sept-Oct 1988, p.40.

Hazucha, Joy and Holt, Katherine, *Training & Development Journal*, "Starting right" Jan 1991, p.71.

Hequet, Marc, *Training*, "Can video replace trainers?", June 1988, p.526.

Hillman, Larry and Schwandt, David, *Training & Development Journal*, "Ways and means", Sept 1989, p.28.

Holste, Pete, *Training*, "High tech - hot talk", Sept 1988, p.5.

Humphrey, Vernon, *Training and Development Journal* , *"Training the total organization"*, Oct 1990, p.57.

Kaeter, Margaret, *Training*, *"Off-site vs. in-house"*, Nov 1990, p.5.

Karten, Naomi, *Computerworld* , *"The price of in-house training"*, Nov 7, 1988, p.151.

Karten, Naomi, *Computerworld*, *"Preparing a training request"*, April 24, 1989, p.112.

Ladd Barbara, *Training*, *"Four-star CBT: it takes people to make the machines perform"*, Sept 1988, p.18.

Lipshit, Raanan Friedman, Victor and Omer Haim, *Training & Development Journal* , *"Overcoming resistance to training: a nonconfrontive approach"*, Dec 1989, p.46.

Moser, Karen D., *PC Week* , *"Company creates PC games for sales training"*, Jan 28, 1991, p.59.

Murphy, John, *Training*, *"Can the growth of training make the training director obsolete?"*, July 1988, p.28.

Nilson, Carolyn, *Supervisory Management* , *"How to train employees one-on-one"*, May 1991, p.3.

Nowack, Kenneth M., *Training & Development Journal*, *"A true training needs analysis"*, April 1991, p.69.

O'Halloran, Kathleen A., *Training & Development Journal* , *"Three simple principals"*, Oct 1990, p.15.

Pell, Arthur R., *Managers Magazine* , *"Helping your new people get started"*, July 1990, p.28.

Peyser, Patricia, *Management Quarterly*, *"Developing a training strategy"*, Fall 1990, p.41.

Rakow, Joel, *Training* , *"Not just the facts - Ma'am"*, June 1990, p.59.

Reitzfeld, Milt, *Journal of Systems Management* , *"Training is necessary not a reward"*, Feb 1989, p.25.

Remick, Judith, *Supervisory Management*, *"A manager's guide to "win-win" training"*, May 1991, p.1.

Rifkin, Glenn, *Computerworld* , *"The trouble with technology training"*, April 15, 1991, p.74.

Rosenberg, Marc J., *Training*, *"Performance technology working the system"*, Feb 1990, p.42.

Ross, Ralph, *High Technology Business* , *"Technology tackles training dilemma"*, Sept 1988, p.18.

Rothwel, William J. and Kazansas, H.C., *Training and Development Journal* , *"Planned OJT is productive OJT"*, Oct 1990, p.53.

Sauders, Marybeth K., *Training and Development Journal* , *"Training tips"*, Oct 1990, p.18.

Schinder, Paul, *PC Week* , *"If you think training is expensive - you could try ignorance"*, Dec 5, 1988, p.47.

Schneider, Edward W., *Computerworld* , *"It looks good but will it work?"*, Dec 11, 1989, p.126.

Sculley, John, *Personal Computing* , *"Technology is reshaping both work and workers"*, Oct 1989, p.218.

Sebell, Bill, *Computerworld* , *"IS pros as adjunct instructors"*, Oct 9, 1989, p.117.

Sheridan, David, *Training*, *"Making the site right. (Off-Site Training Meetings)"*, Nov 1990, p.26.

Spitzer, Quinn, *Journal of Business Strategy* , *"Strategic solutions to high-tech problems"*, May-June 1991 p.59.

Spring, John E., *Employment Today* , *"CBT - computer based training"*, Winter 1990, p.325.

Taylor, Paul, *Training & Development Journal* , *"How to customize a training program"*, May 1989, p.28.

Thompson, Brad Lee, *Training*, *"Ethics training enters the real world"*, Oct 1990, p.82.

Torres, Crensencio and Bruxelles, Mary, *Training & Development Journal* , *"You've entered the training zone"*, May 1989, p.74.

Vemek, Ron and Susan, *Training*, *"30 things we know for sure about adult learning"*, July 1988, p.57.

Wehrenberg, Stephen B., *Personnel Journal* , *"Match trainers to the task"*, August 1989, p.69.