END-USER COMPUTER TRAINING AND ADULT LEARNING
IMPLICATIONS FOR HUMAN RESOURCE DEVELOPMENT

by

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A thesis submitted in conformity with the requirements
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ABSTRACT

End-User Computer Training and Adult Learning:

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This study seeks to understand how clerical and administrative support staff learn how to use computers and what problems they face in learning how to use computers. The data for the study were collected through the use of qualitative fieldwork techniques (ie. participant-observation, interviewing, document analysis and focus group interviews). To generate the data, thirteen people were interviewed: seven clerical and administrative staff, four computer trainers and two education and training coordinators. While observations were made at four computer training sites, documents were collected from ten different participant organizations. To ensure credibility of the study's findings, peer debriefing and member checks were used.

The findings of the study show that people learn how to compute through peer-support, attending night courses, taking individual mini-training seminars after work, and by asking friends. The findings of this research suggest that people learn how to use computers more through personal struggle with the software. The informal means of learning at the workplace is well established. Effective use of these informal means of learning needs support from management.

The major problems users and learners of Personal Computers (PCs) face are difficulty during the first encounter with the software and misunderstanding of their problems by experts. Management misunderstanding of users' problems and lack of support for learning are found to be the major obstacles to effective use of computer technology. It was possible to learn from this study that computer trainers and learners are making the best out of what is available for effective learning and teaching in the workplace. Finally, the study examined specific learning problems in End-User Training and suggested adult learning principles and methods to help people better learn how to use computers.

ACKNOWLEDGMENTS

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CHAPTER ONE

INTRODUCTION

Statement of the Problem

This thesis investigated the problems of End-User training (EUT) and how clerical and administrative staff learn how to use computers in three industrial settings. Thirteen people and ten organizations were involved in the study process. To ensure credibility of the study's findings peer debriefing and member checks were used.

End-User Training has been cited as one of the most important support functions by computer users. Many practitioners argue that users need to learn computer concepts and techniques. It is also widely recognized that current levels of personal computer (PC) training and support are not sufficient for most PC users. Computer hardware and software are continually growing in capability, as well as use, but user training and support systems have not kept pace with technological advances.

The major reasons why training and support are lagging behind hardware and software development are the technological imperatives, use of traditional management practices, depending on ad hoc solutions and too much promise and less performance. The next section will discuss these problems. Adequate training and support has not developed because:

1. The Information Systems (IS) function began in most organizations with the introduction of tabulating machines in the early 1960s to automate the accounting functions (Hebenstreit, 1983). The IS professionals served as technicians operating machines, rewiring to handle different jobs, running jobs and clearing jams. For two decades, users were not considered part of the picture and end-user training was not

anticipated. Most IS departments still have no training staff of their own. Koong and Liu (1990), Stamper (1973), and Tsay and Solomon (1986) indicate that although the accounting area was the first to be computerized it is still having trouble with computer and systems knowledge.

2. Computer manufacturers, software publishers, printing companies, and network suppliers did not recognise the business and educational opportunities that training and end-user support offers until quite recently. The need for End-User Training was not originally anticipated. Today, we observe an explosive growth in information technology which has not been accompanied by an equivalent improvement in the understanding of information.

3. The traditional forms of most work organization do not emphasize learning. The general approach to work has been to reorganize job content (OECD, 1993) or to adjust work to the presumed low skills of the workforce rather than to upgrade the employee (Pascale, 1990; Weisbord, 1987). Many employers still use this approach for work tasks in which learning and work are not significant components or are not related to each other (Weisbord, 1987).

4. The development of help desks intensified a common problem faced by both computer specialists and users. The specialists were found to be overworked, frustrated and unable to cope with user calls. Common cries for help from users included: printer would not print, computer would not boot, the laser printer would not work for Lotus 1-2-3, etc. These are actually requests for help to learn how to use a computer. The users are adult workers and their requests are for immediate use and

for learning. However, the adult learning aspect of computer training remains a neglected area in theory, practice and research.

5. The promise of user friendliness made by computer vendors (X software requires little, if any experience with computers) overlooked the educational implications of: time, environment, trainee background, skills, and motivation to learn in a fast changing environment. Even Elisabeth Gerver (1984, p. 31) in her book, <u>COMPUTERS AND ADULT EDUCATION,</u> states that:

> one can learn to use a good word processing program...in about half an hour, if help is available from a good teacher or a good set of instructions.

These assumptions ignore the lack of a good teacher and a good set of instructions in EUT, learners' individual differences, past experiences, absolute or relative lack of computer experience, etc. What is more critical and problematic in this kind of short training is, not only individual differences, but also the inappropriate lumping of novice users with advanced users. This approach can easily discourage beginners. Pressman (1982, p. 25-26), argues that it encourages learners to accept myths related to computers. Gun Marie Forsberg, cited in Goranzon (1993, p. 26), had this to say about one short course and the myths related to it:

> I was able to follow the first half day of the course, but I understood nothing they said after that. When we asked for explanations of specialist terms, they used even more specialized terms and jargon. He told us which buttons to press ... When we asked for explanations, we were virtually told that it was so complicated that we should not try to understand it. 'do as I say, and don't ask so many questions'...

While Forsberg reveals the general problem with short courses, a recent computer conference held in Toronto brought out the reality of user-friendly software, the disparity between promise and performance and lack of basic knowledge by users. In an article by Brehl (The Toronto Star, 1994) M. Spindler confronted Microsoft by

stating "Do not tell me about the highway when I can not get out of my driveway" (Brehl, 1994, b 9). This statement by Spindler indicates that while a minority deals with the so called Information Super Highway the bulk of computer users still have a problem of changing from one disk drive to the other. Buxton, (1994) considered the term "information highway" as misleading and advised us to put people before pavement on the information highway. As a technical assistant and consultant, it was also such disparities and personal observations that generated my interest in this research area.

Purpose and Scope of the Study

The purpose of this study was: (1) to explore and understand how people learn computing in public and private training (learning) centres, (2) to identify problems with this learning from the perspectives of learners (users), computer trainers, and education and training coordinators. To accomplish these objectives, I conducted an intensive literature review to develop a theoretical framework to guide my study. Based on the literature review I developed the following six questions to guide the research work.

1. How do individuals and groups learn about the new software?

2. What exactly happens when people learn how to use computers?

3. How do office workers learn about computing?

4. Where do they receive their computing training?

5. Where do they go for support as they use computers?, and

6. What are the main problems that learners and users face?

This study is not an evaluative or comparative study of public and private training centres or trainers and coordinators. What is to be investigated is each

participant's learning experience and the problems they face in learning and using computers. The study was limited to clerical and administrative end-user staff.

This study took the initiative to help people understand the learning process and use environment of computers by support staff. This understanding can be used as a tool in the creation of programs that will help adults effectively learn and use computers.

Significance of the Study

The emergence of Personal Computers has radically changed computing and issues related to training and use. Computer use is no longer limited to research and accounting departments. Today computers are used practically in every office. As a result, workplace computer training of users is now a necessity for business survival. The last, but not the least, issue concerns short courses on computer use which violate basic learning requirements of time and practice to achieve mastery.

1.   A survey of automation in Canada in 1986 indicates that office automation accounted for 64% of the technological change (Betcherman and McMullen, 1986, p. 17). Recent evidence (Industry, Science, and Technology Canada, 1989) shows that new technology continues to be introduced into the Canadian workplace. There is no sign of comparable progress in EUT and support. Simms (1994) indicates that the computing industry in Canada is growing at a rate of more than 15% a year and the current shortage of programmers is going to grow from 4000 to 15,000 over the next three years.   This study will help to understand this problem as it relates to workplace.

2. End-user Computing (EUC) has three dimensions; (1) the user, (2) the technology, and (3) the organization. The user dimension embraces application knowledge, skills, and people. Most of the relevant research, thus far, has dealt with information technology and the organizational aspect of computing. The user education and training aspects of information technology, however, have largely been ignored. Less attention has been given to the environment in which Information Systems are used and how the use of this technology is learned. Our current knowledge of how to support the user's learning process remains elementary. This study will examine the process and methods available in end-user training programs.

3. Information systems and EUT are social systems. This implies that for all computerized functions one can identify human factors. Locating and supporting the human factors in these functions is under-emphasised (Avison and Fitzgerald, 1991). This necessitates a different approach. The problem of EUT affects computer science, education, sociology, and philosophy. So far, EUT problems related to education or training based on adult learning principles (see Appendix A) or theories have not been given due consideration.

4. Approaches to EUT in the workplace are often scattered, uncoordinated and conflicting. The approach so far seems to be "sink or swim". Few qualified adult educators are involved in the design and implementation process in this area. As a result, the issue of reducing the myths related to computers and how to learn about the computer remain mostly unresolved. Many users still feel uncomfortable with computers. This study will try to examine issues and conditions that generate fear of computers and learning to use computers.

5.   Much of the current software and hardware used by industry and business (for example, Clipper, Oracle, just to mention a few) are not available in most schools and universities. Schools, colleges and universities can't afford the state-of-the-art technology for students, due to the lack of funds and rapid obsolescence of software. As a result, end-user training in the workplace, both in public and private organizations, seems the only possible means of helping workers learn to use new computer technology. A recent article in the Globe and Mail stated that "many students learn the fundamentals on machines that are more than a decade old and have long vanished from almost all workplaces" (Feschuk, 1993, c2).

6.   Specific software training given by vendors or consultants can generate problems between Information Centres and end-users. Most vendors teach the use of specific packages, focusing on product features and mechanics. Once users return to their offices, many have difficulty bridging the enormous gap between what has been learned and what is to be done. End-users receive a limited and technically-flavoured training, but are not given practical approaches on how to handle their regular work load and how to cope with errors. The result is that users may become hopelessly bogged down and give up. This adds to computer mystification, fear, and avoidance, rather than diminishing myth, fear and what is called "computer anxiety". End-user training should make users masters of their systems by putting them in control. In most cases, however, the support needed to accomplish this is missing.

According to Osberg (1988, p. 23), "Canada is a nation of data processors. Many Canadian workers produce not goods but information." According to the recent Report on Computers (1995), the Information Technology (IT) industry employed 342,000

Canadians in 1994. The IT sector in Canada is worth anywhere between $19 billion and 49 billion a year. It is also the only sector growing at 6.7 per cent a year. This study will contribute to the understanding of learning needs of data processors. It will help educators and industry trainers to effectively facilitate learning and using computer technology.

Understanding the six questions raised in this study and sorting out problems that learners (users) and trainers face, helps to realistically approach workplace training and learning. In placing emphasis on adult learning, the study makes a significant contribution to Management Information Systems (MIS). That is, the study will help MIS personnel balance the focus given to technology with an understanding of personnel using the technology.

The study will identify ways and means of using adult learning principles and methods in EUT. It has also supplied the rational for focusing on adult learning in end-user training. The study helped the researcher to integrate literature from different fields and show how adult learning principles and methods fit and serve the true purpose of learning and teaching adults. In this regard, the study contributes to the knowledge base of adult learning and teaching. It is hoped that the researcher has taken the first initiatives to introduce the issue of training employees to use microcomputers from an adult learning perspective (see Appendix A).

Definitions of Terms

Computer Literacy is an understanding of computer characteristics, capabilities, and applications, as well as the ability to implement this knowledge in the skillful, productive use of computer applications suitable to individual roles in society (Simonson, Maurer, Montag-Torardi & Whitaker, 1987). Inherent in this definition is the notion that computer literacy can be interpreted within the individual users'

context. In this respect, computer literacy can be viewed as a dynamic process in which the users' skills develop and change over time as their computer needs change. **End-User** "is an office or production worker, teacher, tool and die maker, ship's mate... rather than an engineer, programmer, or computer scientist, making use of advanced technologies" (Gattiker, 1990a, p. 228). End-users are non-data processing professionals. In this study the terms user and learner are used interchangeably.

End-User Computing is the adoption and use of software applications by personnel outside the information department in support of organizational tasks.

Learning is the processes of transforming experience into knowledge, skills, and attitudes (Jarvis, 1990, p. 196).

Technology: This term is very popular. It also has so many definitions. For example, in only one book Goodman, Sproull & Associates (1990) one can find eight different definitions for the term. In this study, technology is defined as "the physical combined with intellectual or knowledge processes by which materials in some form are transformed into outputs used by another organization or subsystem within the same organization... the skill and information requirements necessary to carry out the processes represent the core of this definition" (Hulin & Roznowski, 1985, p. 47).

Training: Training typically involves instruction and practice aimed at reaching a particular level of competence or operative efficiency... often training addresses itself to improving performance in direct dealing with things... Other sorts of training are more concerned with dealing with people... Yet other kinds of training are more indirectly concerned with changing or controlling people or things. But in every case what is aimed at is improved level of performance... brought about by learning (Dearden, 1984, p. 58-59).

This definition was selected for study for its clarity on value of learning in training and its comprehensive indications of all possible training types.

Limitations of the Study

This study is not a comparative or evaluative study of public and private training centres. It is meant only to understand how most clerical and support staff learn and use word processing and other data base application software. What is to be investigated is each participant's learning experience and the problems they face in learning and using computers.

The purpose of this study is not to get data that can be generalized to a larger population. It is not the intention of the researcher to apply any inferential statistics (to calculate mean, average or standard deviation) to the collected data. The essence of the study is to understand and initiate the understanding of the most common possible problems of learning. The types of end-users are limited to clerical and administrative staff for the following reasons:

1. The bulk of the problems in end-user computing are mainly in the clerical and administrative areas (Clement, 1994, Eason, 1976, Kling and Scacchi, 1980, Panko, 1988).

2. This area is also the first to be computerized and, according to Raymont (1989), is where half of end-user computing is done. Lowe (1992) also indicates that 55 per cent of computer use in the workplace is done by clerical and administrative staff.

3. The majority (66%) of the information centre users are administrative staff and knowledge workers (Shah and Allen, 1988).

4. Visscher (1988), clearly indicate that this area lacks empirical studies and does not receive attention in educational literature.

Organization of the Thesis

This introductory chapter stated the nature of the problems under study. It also outlined the purpose, significance scope and limitations of the study. In addition, it defined some important concepts and terminologies in this study. The next chapter reviews the academic and professional literature on end-user training and adult learning. The third chapter describes the research design, methods and techniques and process of data collection. The main purpose of chapters four and five is to provide the findings and analyses of the data collected over the course of this study. The final chapter summarizes the main findings of the study and presents recommendations and conclusions.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

This literature review is an attempt to present a comprehensive statement about learning and using computers from diverse sources and perspectives. Secondary sources included in this review were selected on the basis of criteria developed to meet the current need for this review. Manual and electronic searches were conducted several times from 1993-1995 using key words such as end-user training, end-user computing, training in the workplace, adult learning and computer, software training, and novice computer training.

This reviewer has noticed that adequate discussion is lacking on how people learn computing. How learning proceeds and what factors influence the learning process are missing, as demonstrated in most research cited in tables 2.1 to 2.5. Interest in exploring the full complexity of a situation and placing End-User Training (EUT) in the context of adult learning or education in general is not apparent. In spite of this, every issue of information systems professional or academic journals deals with either End-User Computing (EUC) problems or solutions. The majority of these journals also support the importance of EUC and EUT. There is also a well developed critical success factor measurement for EUC. The problem of learning and using computers, however, continues and needs further effort to facilitate learning.

The first section initially addresses what we mean by learning and training then reviews the status of End-User Computing and Training research. In this section the disparity in EUT research and the lack of focus in user education and social aspects of computing are discussed. The importance of user (clerical and administrative staff) education is presented. Then end-user is defined. The last section

discusses important qualitative studies in end-user training. Finally, the non-evaluative nature of this research is clarified. A summary is also given.

Search Mechanism and Criteria

ERIC and Dissertation Abstract searches for this topic resulted in three articles. Telem (1993) reports that his ERIC computerized search confirmed the absence of research on Information Technology in educational research. The rest were located by using the ProQuest ABI/INFORM Business Information CD ROM at the University of Toronto School of Management Studies. Literature was selected based on the following criteria:

1.   They are related to adult learning and teaching principles:

2.   They include people, technology, and organization in their approach to learning and using computers:

3.   They respect and value different perspectives: and

4.   They accept the learning process as a social and a continuous process.

First, to make this review of literature clear and understandable, two important concepts in this study need some clarification. These two concepts are Learning and Training.

Learning

Learning, as a major human activity has fascinated philosophers and historians. It has also been a major focus of psychologists. But so far it is so elusive, difficult to understand, and defies easy definition (Merriam and Caffarella, 1991). The predominant view of learning is that of planned activity between student and teacher. In most cases it is assumed to be similar to 'what we did when we went to school'. Ambiguity still exists in defining this central concept in education and training, and in identifying important variables associated with learning. There is also a problem

of distinguishing essential from contributing factors. causal connections. and quantification of learning. What we mean by effective learning is difficult to measure and quantify for the "bottom line" or return on investment.

Most variables in learning seem like free radicals (molecules or atoms with unpaired electrons) in the human body. Variables in learning have a chain of reactions and effects just like free radicals. If left unchecked and unrecognized, they can damage or destroy learning just like free radicals destroy the body. Learning is unique because there is no one definitive guide or method that cures all and works universally.

As a result of ambiguity that still exists in defining learning, the following statements became more or less common as a popular way of approaching learning or training: "the most valuable commodity in today's world is the human asset, and people have to be developed and challenged to maximize performance." "People are the key, not the technology." These statements do not give a complete picture of learning or a complete picture of learners. Lack of consensus or focus is common to the concept of learning. To this effect some consider learning as a product and learners as customers.

Thomas (1991) reports that learning is cumulative and not always measurable. On the other hand Watkins (1995. p. 8) indicates that workplace "learning is linked to the bottom line" to improve competitive advantage. What is meant by maximizing performance (competitiveness) without clarifying how skill and performance are developed is confusing. Skills can be practical, procedural, and methodical and situational. These skills are encouraged, developed, and maintained through learning and the cumulation of experience. They require a specific structure, and support to achieve learning. Better performance and competitiveness are related to human hands and brains and can not be bought but learned. "There is no royal

road to learning." This age old statement and the meaning it expresses is as accurate today as it was years ago.

Human assets and potentials are developed, enhanced, and maintained and they improve performance when people are given a learning opportunity. Performance is application. Application, according to (Ottosson, 1995, p. 19), is the action of applying (performing) to put a thing into practical contact with another. The thing applied is most often thought of as principles, ideas, and concepts. This is similar to what Knox (cited in Merriam and Caffarella, 1991, p. 257) refers to as proficiency--capability to perform satisfactorily. Performance according to Knox, involves a combination of knowledge, attitudes, and skills. These three comes as a result of learning and interaction which need means, procedures, support, and understanding of what learning is. Usually the need for learning means, procedures, and structures become more urgent in most societies during major problems or a crisis.

Learning becomes an important issue mostly when organizations face a major problem with technological change. As Jarvis (1987) notes, learning begins when there is some "disjuncture between" "what was" and "what is." Issues related to learning and training either address the individual learner or the organizational aspects of learning. The psychological literature mostly dwells upon learning rates, behaviour changes, and cognitive maps of individuals. Few authors deal with learning as it happens in particular cases and how it is possible. Emphasis on behaviourial changes and neglect of what happens as we learn or how learning is possible in a given context are related to learning theories identified, used, and popularized.

There are many learning theories as there are definition of learning. For example, Dejnozka and Kapel (1982, p. 321) list eight learning theories. In all

theories how individuals learn is still not well explained. According to Smith (1983, p. 34), some of these theories describe learning as "a product, a process or a function." Yet learning is both a product and a process. The concept of learning means different things to different people. Some learning theories are impersonal, and generalized, and exclude matters such as relationships and the social location of learning. Others try to humanize learning. In both cases, there is a clear lack of balance and mix of perspectives. Some learning theories accept eight types of learning. Others consider only six types of learning. There is little agreement on the number and types of learning. Some confuse right and responsibility inherent in learning and teaching. Others contain contradictory philosophical assumptions. In between, learning and teaching as a moral and ethical activity is given minor interest.

Learning theories, according to Usher (1989, p. 88-89), have different sites/roots of origination, but the same site of application. This site of application is mostly misunderstood. Darkenwald and Merriam (1982), Jarvis (1987), Smith (1983), and Thomas (1991) present a detailed account of learning and what it is not. Yet as Kidd (1973, p. 23) stated there is no answer to the question, "What is learning?" As a result Jarvis (1992, p. 247) states "learning remains a symbol of the paradox of the human condition."

A popular definition of learning in management circles is any relatively permanent change in behaviour that occur as a result of opinions (Robbins and Stuart-Kotze, 1994, p. 441). According to this definition learning is for change of behaviour or opinion. Yet learning may occur without an overt change in behaviour (Dejnozka and Kapel, 1982). This definition is not only difficult for educators but also for experts who want to calculate returns on investment for training or education.

Learning is the cultivation of habits of discrimination and observation for understanding, interpretation and application. It involves both mind and body. Every human action and instruction (even written instructions like recipes for assembly) require understanding and interpretations (Howard, 1992). The learner is expected to find rather than passively take. Even "show-and-tell" requires an interpretative effort on the part of the learner. Learning is not only information processing, storing, and retrieving for immediate use.

Learning is not just a psychological process. The study of learning is not also limited to the domain of Psychology. It is noteworthy to note that Maslow never mentioned learning in his hierarchy of needs. According to Jarvis (1987, p. 47-50), the need to learn preceded the development of the self. Mind is one of the results of learning and self emerges out of the development of mind.

Learning is intimately related to/with the life of the learner and occurs within a social context; and involves interaction, a social dimension, and an active living human being. People, structure, climate, and policies of the organization influence the nature and quality of learning in organizations (business, industry, and schools). Explanations of learning, its nature, and problem needs more than overt observable variables or more than one perspective. This is why (Jarvis, 1987, p. 15) notes "learning should be regarded as a social phenomenon as well as an individualistic one." This approach to learning is similar to what Thomas (1991, p. 4) states as the main characteristics of learning.

According to Jarvis (1990, p. 196) learning is "the process of transforming experiences into knowledge, skills and attitudes." This definition was selected out of the five definitions that Jarvis (1990) states because it makes learning as clear and explicit to training as it is to education. For Jarvis, learning occurs in a variety of

processes, and modes: formal, informal, and non-formal. He also identifies a variety of learning methods such as: learning by examples, learning by instruction, learning by practice, and learning by reflection.

Most definitions of learning involve change in behaviour as a result of experience and practice. But according to Jarvis (1987), experience and practice are not the same. Practice, according to Howard (1992), is often constructed as a way of passing on established knowledge and procedures. Vigilance and not only repetition is the issue of practice. Learning is not only practice. It is not a singular process, and its outcome is mostly unknown or even can be contradictory. There is more than one type of learning process, and learning outcome (Thomas, 1991). Learning (inquiry, discovery, and interpretation) cannot be easily rendered to formulas. Failure to grasp the subtleties of learning leads to over simplification or neglect.

Howard (1992, p. 8) presents a critical review of how the formula called Talent + Instruction + Practice = Success (TIPS) which reduced all subtleties and questions of learning to ones of a measurable, fixed, and static nature. According to Howard the above formula is problematic because it reads success from the behaviour of those who have been already successful and established.

Learning is a process of meaningfully relating to what is being experienced. It depends on the context (classroom, teaching practices, ethos, etc.), the nature of the materials, the task, and the ability, knowledge, motivation, and interest of the learner. The purpose of learning is to operate, to know, to control, and to use (to apply). Application is "a process that connects the head with the rest of body, the theory with the practice." It is interaction with the existing..." (Ottoson, 1995, p. 25).

Learning is one of life's most painful and joyful experiences. It is painful, because it can reveal and uncover hidden problems (personal weakness) and the

challenge to learn or unlearn. It is painful when it is difficult. It is joyful when it is made easy and achievable, and the feedbacks is encouraging. It is also believed to be the most useful action, process and result of human activity. Irrespective of its pain and happiness, the human learning process involves change and transitions. Learning, according to Jarvis (1992, p. 210) is "a response to change, but it also creates it; learning is a mechanism of adaptation... safe... but learning is also a risk taking activity."

Change is often initially painful. What is common and inherent in the change process is the very difficult period when it seems impossible to know whether one should move forward or backward. Peter Jarvis (1987, p. 198) indicates this stage as a "disjuncture" a time of either/or. This is the time when a learner undergoes a process of self-questioning. During this transition period, learning and the learner suffer if proper support is not available. As a result, a learner might develop negative attitudes toward learning. Educators and facilitators are key to making learning easier and putting forth positive images of learning (Brookfield, 1986, Kidd, 1973).

In the case of this study, learning involves helping users as they approach the keyboard. In terms of Lewin's change process (Lewin, 1947), this means conducting an organizational analysis and demystifying computers (unfreezing), conducting the training session (moving), continuing support for further learning, giving signposts, and informing users of new software (refreezing). Unfreezing in End-User Training might be saying to learners "you do not need a faster system; you need to learn how to us this one." In short this means creating a learning environment and facilitating learning in line with situations and learners.

Learning involves the intellectual, emotional, physical, and spiritual self. This is why adult educators urge facilitators/trainers to pay attention to: flow,

sequence, and moving from less difficult to more difficult, from less risky to more risky, and from easier to harder concepts. The movement of understanding is constantly from the general (whole) to the specific (part). Providing time, breaks, and demonstrating before practice is to satisfy the physical, intellectual, and emotional needs of learners. Providing effective learning opportunities involves encouraging the engagement, attention, and motivation to learn. This is mainly because people learn a great deal from each other if they have a structure, receive feedback and are given an opportunity to share and compare experiences (Thomas, 1991). Thus, providing learning opportunities involves consideration of many variables.

SUMMARY

Learning refers to the acquisition, extension, and clarification of knowledge and experiences. The purpose of knowledge gained is to organize things or people. Though it is an activity of a learner, learning occurs within a social context and this context supports or hinders learning. Learning can not take place in a complete vacuum (Collins, 1991). It is not possible to measure learning within a short period of time. It is the effect of the learning environment.

Learning covers the entire spectrum of human life. It requires participation and respect. It requires sitting, asking, listening, and sharing knowledge and experiences. Learning is human, holistic, and interactive. Furthermore, the context is critical and what is learned is dependent on the learner. For Kraybill (1971, p. 324) learning is "a people interacting process." Productive interaction is possible or depends upon understanding of the learner and of the teacher as a person. The practical problems of learning are often characterized by uncertainty, worry, and doubt. They involve values, conflicts, and dilemmas. Learning is a complex process that it is affected by many different internal and external variables.

One also can not boil down problems and solutions related to learning to simple psychological questions. Uncritical acceptance of practices, methods, and concepts for learning or training seems the way out of genuine complexity. Perelman (1984) explains this acceptance as the gaps in policy, employment, and professional societies as well as gaps in rhetoric in theory and practice. Learning must be approached carefully. This careful work helps to make a contribution to learning and creates value in learning for learners. Careful work and creating value in terms of learning is to understand the following and what they imply as indicated in parentheses:

Learning is the discovery of the personal meaning and relevance (interpretation).

Learning is a cooperative and collaborative process (interaction/dialogue).

Learning is an evolutionary process (cumulative, stages).

Learning is sometimes painful, it is a vehicle for soaring into the unknown territory (transition, help).

Learning is both social and individual (paradox, contradiction).

The process of learning is emotional and intellectual (holistic). With the above understanding we now examine the meaning and purpose of training.

Training

Reviews of training and development appeared in the Annual Review of Psychology four times from 1971 to 1992. The focus was on training design, methods, trainee characteristics and the pre- and post-training environment. Yet no clear agreement was found concerning meaning of training and development. Some call training 'workplace learning.' Others consider it as human resource development or management (Watkins, 1995). Training can be in-house, off-the-job, external off-the-job, planned on-the-job, and support for self-study. Recently training has meant:

organizational learning, cognitive learning, high technology CDROM training, team training, and on-the-job training (Tannenbaum and Yukl, 1992).

The word _training_ implies skills which are more or less misunderstood as static (Rubenson and Schutze, 1995, p. 100). Training for most management experts is basically the use of formal instructional programs to establish (standardize) in people the requisite skills and knowledge to do a particular job in organizations. For some training is schooling which takes place inside the company. The mission of training department is, to simply supply training, according to the view of managers or supervisors. Training only requires that we learn a specific thing and follow the directions precisely. Goldstein and Gessner (1988, p.43) define training as a systematic acquisition of skills, rules, concepts, or attitudes that may result in improving performance in the work situation. The above assumptions of training recognize only formal instruction. The chance for people to learn through observation, direct experience, and from each other, according to the above assumption is not considered training. There is also no indication of the major purpose of training--learning in the above definitions or assumptions.

Jarvis (1990, p. 341) defines training as "a planned and systematic sequence of instruction under supervision designed to impart predetermined skills, knowledge, information, and even attitudes." Patten (cited in Darkenwald and Merriam, 1998, p. 65) defines training as a formal procedure which is used to facilitate employee learning.

According to Dearden (1984, p. 58-59)

> training typically involves instruction and practice aimed at reaching a particular level of competence or operative efficiency... Often training addresses itself to improving performance in direct dealing with things... Other sorts of training are more concerned with dealing with people... Yet other kinds of training are more indirectly concerned with

changing or controlling people or things. But in every case what is aimed at is improved level of performance ... brought about by learning.

Similar to Dearden, Newman (1993) defines and considers training as learning to perform a role better. Most definitions of training stress mastery. Some stress the location of the training, others stress the function of training. In most cases behaviour change and performance, and formal instruction or procedures are the common terms in training. What makes Dearden's definition of training relevant for this study is that his definition clearly shows the three types of training (dealing with things (computer), dealing with people (users) and dealing with change (organization, systems). He also shows that training objectives or purposes are achieved only through learning.

Training is a means to bring about learning. It is giving an opportunity for people to learn, to enable workers to progress, to adapt, and to learn and help each other learn. In short it means creating a learning environment. To this effect most adult educators recommend starting any training with the learning needs and not with technology. This approach helps in understanding and defining what blocks learning.

Training refers to learning focused on the present job for application. It is aimed at improving the skills or providing the knowledge currently required by the job. According to Rubenson and Schutze (1995, p. 97), it has a very specific objective and focus. It is either employer-driven or employee (applicant-driven) instead of employer and employee-driven. To date there is no national standard (except in Australia, Germany, Japan, Korea, Singapore, and South Africa) for training anyone that organizations can train (Ministry of Supply and Services Canada, 1992, Wilson, 1992). The general advice is 'choose your flavour, choose your trainer' but on what

standard? Problems created in lack of training standards and trainers competencies seem to have resulted in focusing on stress or time management training than teaching employee new skills. Similar to this focus there is also a chance in training to rent a room and call it a training centre. Issues of value, choice, interpretation, judgement, and understanding in training can not be easily reached.

The most obvious ingredient of training is the development of skill. But training is also not only a matter of skill acquisition. What distinguishes between learning which is seen as educational and learning which is most appropriately viewed as training is still difficult to pin down. This is mainly because concepts of learning, education, and training are various. Bridges (1993, p. 44) notes skills as "something low in cognitive content, something typically learned through rehearsal" and simple practice. Thus there is a common perception that skill training is for the less intelligent, less important.

The term training has no generally accepted definition (Bramley, 1986). Any organizationally initiated procedure which is intended to foster some learning among employees is called training. The central values of training are: an intention to contribute to improved performance a concern with skills, attitudes, and behaviour patterns that enhance organizational effectiveness. What is considered as education or training seems to be determined by the culture of the society. The coexistence of multiple values permits the different approaches, definitions and meanings of learning and training.

What is also very important in training is understanding how the workplace environment can affect the perceptions of learners toward learning. The extent to which intentions (mission/vision) are converted into actions is determined by inhibiting and facilitating factors in organizations.

Similar to education and development, learning and training are troublesome concepts. The major crisis of education and training of "function, fit, flexibility and frustration," to use Perelman's words (Perelman, 1984) is the outcome of focus on technology rather than on learning and on people. Simply saying people are the primary and ultimate source of any wealth without understanding and supporting the learning that is needed to create that wealth is naive.

What is missing in learning and training is what (Jaccaci, 1989) called "a learning culture." A learning culture is where collaborative creativity in all contexts is the basic purpose. It is where the measure of success is the combined wisdom of business, government, union leaders, and the learning community. This learning culture is similar to the training culture of Wilson (1995). Developing a learning or training culture involves creating an environment where individuals are not afraid of making mistakes. The training culture offers structure, symbols, and means to develop a comprehensive program that balances specificity and generality, and skill and knowledge for competence. These encourage to perceive training "as an integral and sound economic behaviour" (Wilson, 1993, p. 3).

The lack of awareness of the difference between the importance of learning and the importance of knowledge is one major problem in misunderstanding learning and its environment. Though Production (output) requires People + material + technology + Time, technology is conventionally seen as a primary factor in production. Another problem in learning is the contextual and attitudinal obstacles (barriers) which are common but not easily detected or changed.

The problem with training is that it lacks a focus on conditions of application for what is being learned. It is either context-specific or general. There is strict dissociation of acquisition of knowledge from acquisition of skills. Miller (cited

in Kenney and Reid, 1986, p. 28) notes some limitations of training related to environment as:

> an environment which cannot use the skills the trainee acquires
> in training; an environment which will not permit performance
> of the behaviours acquired in training; a change in behaviour
> which cannot be measured; employees who are unmotivated....
> established organizational goals.

Historically learning and training are segregated. Methods of training do not mostly stress cognition, imaginary, and action (Rubenson and Schutze, 1995). From the experience of this writer it seems also the result of situation where practice in training and human resource development surpass theory and empirical evidence. This situation seems to help dealing with whatever seems popular more than creating an environment that helps learning though the opportunity available in training.

The new concept called 'organizational learning' fails to put attention on the tools and process people may need to learn within their organizations. It also fails to highlight how organizational life facilitates or hinders learning (Goodman, Griffith and Fenner, 1990, Hirschheim, 1986b, Kling, 1987, Lyytinen, Klein and Hirscheim, 1991, Orlikowski and Gash, 1994). According to most organizational learning experts, learning is transformational, single-loop, double-loop, generative, experimental, anticipatory, innovative, integrative or action learning. This approach to learning aims for self-actualization or radical change in management or organizations. Yet the basics concerning how people might be helped to learn is not questioned. Learning is still considered as change of behaviour and the lack of experts to process organizational learning is considered the major problem/obstacle to learning.

The difference between learning for an educational purpose and for training purpose is the outcome of difference between learning at the workplace and learning at schools. It is not only the notion that "theory is learned in the classroom and then

applied in the workplace" (Jarvis, 1987, p. 250) but also the old difference between liberal education and technical education. The workplace learning and instruction are mostly said to be limited. This still remain troublesome, contentious, and unclear. The narrow focus of training is mostly because training focuses on individual training and equates learning with behavioral change and empowerment. But, according to Weisbord (1987, p. 101) "individual training, no matter how powerful, can not by itself be a strategy for change" (learning). These narrow focuses are noted by Resnick (cited in Watkins, 1995, p. 9) as: a focus on acquiring specific competencies rather than generalized skills, contextualized reasoning rather than symbol manipulations and tool manipulations rather than a thought activities.

Training is learning that is provided in order to improve performance on the present job. The purpose of training can be for remediation, extending knowledge, imparting new skills or concepts, and expertise. It is a small part to of education. The distinction between education and training raised by critics is not always clear.The various differences mentioned seem to obscure the reality that learning is the common factor linking education and training. In both cases meaningful learning involves cognitive as well as affective factors. Education and training are complementary parts of the same delivery process (Thomas, 1991). Training is about detail, while education is about patterns (Lloyd, 1990, p. 16). Patterns are theories, detail is practice. Training is about detail and applications. As clearly stated by Dearden (1984, p. 64) "the point of learning.. under training is to secure an operative efficiency. The point of learning under ... education is to secure breadth and depth of understanding..."

Highlighting their difference is unhelpful. This is mainly because both are concerned with the systematic development of human potentials. Their purpose and processes overlap. Cognitive and affective needs or development are not two clearly

opposing poles. It is also very difficult to imagine any training which does not have some educational effect and vice versa. In short, some of each exists in both (Kenney and Reid, 1986, p. 9). Alfred North Whitehead (cited in Collins, 1991, p. 67) long ago echoed that "there can be no adequate technical education which is not liberal education and no liberal education which is not technical." This statement of Whitehead is more about balance, and grey areas in education and training where there is no pure partition. The statement is more about balancing the aims of education and training, the degree to which objectives can be specified, and the time that is given to digest and monitor the learning methods and materials.

If training emphasizes general principles and trainees are encouraged to devise alternative ways of learning, and if informal learning on the job is recognized and guidance is given for informal learning as a part of training, the gap between education and training can be reduced. This means the focus will be on learning.

A precise definition for learning, and training is not available, and imposing it is impossible. Yet Dearden's (1984) definition of training and Jarvis's definition of learning are operational for this study. These two definitions clearly indicate that it is the learning (journey or the process) that matters not the methods and formality. This is mainly because Dearden's definition of training indicates dealing with things (computer in this case), with people (users and learners), and with change or control (the social aspect of computing, and its organizational impact).

Problems

With so much written and reported about the growth of the knowledge-based industry and society, it is surprising to find so little attention given to how we learn and use computers. Many computer users still think that computing and computational issues are too complex and difficult to understand.

While users simply follow "orders" from the machine, some represent end-users as a master over a machine. According to Miller and Thomas (1977, p. 512): "The user is placed in the position of an absolute master over an awesomely powerful slave,... where obedience is immediate and complete..."

Considering users to be masters of a machine before creating and understanding the educative environment for users removed the issue of training and understanding of learners/users from serious consideration. This kept our knowledge about End-User Computing and Training management infrastructure incomplete and without a theoretical basis (Gattiker, 1992). The reality of being a master over a powerful machine seems also to contradict the current popular question of why computers contributed so little to productivity gains in organizations (OECD, 1993). Jiang and Kopec (1993) discuss societal and technological problems of computing. They show that computer sales are down because of difficulties in learning how to use them in business.

Today, terms such as master, user-friendly, user interface or graphic interface, learning, and using computers are found problematic. McKersie and Walton (cited in Kling and Jewett 1994, p. 259) observe that "despite widespread recognition that most systems are under-utilized because of inadequate training, the deficiency is repeated in systems implementation after systems implementation." End-Users daily tell horror stories. They consistently face anomalies, reality shock and confusion (Carroll, 1987, Carroll and Rosson, 1987; Gasser, 1986; Levine and Rossmoore, 1993; Sproull, Kiesler & Zubrow, 1984).

Systems under-utilization and confusion are related to discrete entity computing models/system, which have no consideration of infrastructure for training and support. Discrete entity computing is a system of computing which does not

recognize human learning problems in which intention, meaning and flexibility are not accounted and where the prescribed process is the linear and unproblematic top-down method. Educationally this is equivalent to what is called behavioursim. The conventional computing models, according to Hirschheim (1986a, b); Kling (1987); Kling and Scacchi (1980, 1982); and Lyytinen, Klein and Hirschheim (1991), are discrete entity models. In discrete entity computing models the human factor, the social aspect of computing and infrastructure (training and support), is taken for-granted. As a result of these discrete entity computing models, organizations started using computers in the workplace with a bare minimum of training; just enough to transfer from typewriters to personal computers. As a result, educators do not currently have good answers for the following six questions.

1. How do individuals and groups learn about the new software?

2. What exactly happens when people learn how to use computers?

3. How do office workers learn about computing?

4. Where do they receive their computing training?

5. Where do they go for support as they use computers?, and

6. What are the main problems that learners and users face?

George, Iacono and Kling (1994) call for more attention to the above questions. Allwood and Wikstrom (1986) recommend investigating the importance of a proper understanding of computer-related concepts for effortless learning of complex computer programs. Yet, except in Human-Computer Interface (HCI) literature, the concept of effortless learning is not clear in most educational literature.

End-user computing has grown explosively in the last decade. This phenomenon has often been described in popular computer magazines as "a change too fast." End-User Computing (EUC), however, continues to be "the familiar

unknown." Our real knowledge of what goes on in the office with end-user computing, according to Panko (1984), is very shallow.

The gap between the perception of the importance of end-user computing, and the degree to which it is actually supported, is also growing wider. Panko. (1984, p. 206) citing Doswell, states that "definitions abound... however we find these definitions fundamentally inadequate." In addition to many definitions, there is also much research conducted in this area. In all cases the educational and training aspects of End-User Computing (EUC) are not well defined or well articulated in research. Our understanding of users' problems is, therefore, still elementary.

Tables 2.1 through 2.5 show that considerable research has been conducted on subjects such as: comparing novices and expert learning and programming skills (table 2.1), how to learn to use a single software program (table 2.2), computerphobia (table 2.3), classification of users (table 2.4) and user satisfaction (table 2.5). This does not seem to have increased our knowledge of how people learn computing which could be used to facilitate improved learning. Most of these studies do not investigate knowledge use and application. Most of them center around single software applications and inadequately address the learning process required for effective learning. Yaverbaum and Culpan (1990) reported that current techniques to integrate computers into the user environment still fail to achieve maximum benefits despite much research on the subject.

A longitudinal study on learning and performance of software (Lotus) skills conducted by Nilsen, Jong, Boillis, Olson, Rueter, and Mutter (1993) with MBA students, showed that our computing skills are still low and that learning and using software skills is not easy even for MBA students. Nilsen et al. (1993, p. 150) stated that "we do not have an integrated view of both the qualitative aspects and the

performance details of how learning takes place as people learn." Lack of knowledge about the process and variables involved in the acquisition of computer skills, according to Gattiker (1992, p. 562), is still a major problem.

Missing Research

Tables 2.1 to 2.5 show the nature of EUC research. One can clearly observe in the tables that studies about user education and the social aspects of computing are missing. End-User Computing, or End-User Training, research is not only fragmented but also disproportional. It is unbalanced because far more research is being conducted in management-oriented circles than in typical support or clerical staff environments. Carroll (1987) points out that much research concentrates on expert users while the more difficult issues arise with novice users. Attention given to support staff is minimal.

Clerical workers, for example, have thus far absorbed the bulk of the changes brought about by office automation (Giuliano, 1982). The educational needs and problems of clerical workers, however, are not found except in Ahola-Sidaway and McKinnon (1993), Clement (1994), Eason (1989), Eason and Damodarn, 1981), Hebenstreit (1983) and Martin (1988). Problems of clerical and administrative workers' educational needs are not given adequate consideration (Nelson, Whitener and Philcox 1995). At present, there are no research findings that show clerical and administrative workers' perceptions of microcomputer usage. Martocchio (1992) demonstrated the importance of identifying users, who see microcomputer usage as an opportunity or as a threat, as a means of how to approach their specific training.

Table 2.1

Summary of End-User Training Research

STUDY/MODEL	FINDINGS
Baxter & Oatlay (1991) compared 16 people with experience and no experience on 2 different packages of Lotus	They found no difference between learning Excel and Wingz
Bostrom. et al. (1990) influence of a novice's learning style in learning spreadsheet and email	Found that abstract learners performed better than concrete learners
Davis & Bostrom (1993) Lab experiment Computer interface and training methods	Found individuals using the direct manipulation interface performed better than those using command based interface NO difference in terms of perceived ease of use
Davis and Davis (1990) hypothesis test on the effect of training technique. age. experience & education	Human information processing type moderates effect of training methods
Gomez et al. (1986) learner characteristics that predict performance (learning) Source of learning difference with ED UNIX editor	Found age & spatial memory impacting performance with interacting with computers
Hendry & Green (1994) Qualitative study Interview with 10 discretionary Lotus users	Found even simple problems spreadsheet formula are not easy to create/understand concluded as there still much to learn about how people use/learn spreadsheet
Hicks et al. (1991) compared CBI & Human Instruction with 193 students	Found no difference in students attitude towards the two instructions. Ability to comprehend and apply to a task is greater with human instruction
Kerr & Payne (1994) compared commercially available tutorial. animated demonstration	Found problem solving a better method and powerful visual format of lotus as a major quality of use

Table 2.1

Summary of End-User Training Research

STUDY/MODEL	FINDINGS
Napier et al. (1992). knowledge of command usage in Lotus program	Found out of 505 possible Lotus commands only 27 were frequently used the 27 commands accounted for 85% of the use
Nelson and Cheney (1987) descriptive model for organizational learning and acceptance of IS technology	Support for 2 of 3 relationships by the same authors finding that training leads to greater ability and higher utilization
Nilsen et al. (1993) first trained in lotus then followed the progress of 36 MBA students event logging program was used during performance	In comparing of total & sub tasks or times. keystroke level performance. and strategies to complete. they found that users do not quickly and readily learn to use software packages
Olfman et al. (1991) comparison of methods to enhance motivation	Found application-based training is best for novices than construct-based training
Parton et al. (1985) Menu selection with 165 university students in 4 groups compared 4 training methods	Found the tree diagram of the entire menu structure to provide clear picture of the system and highest satisfaction
Thompson. Higgins & Howell (1994) influence of experience on computer use	Found that experience influenced utilization directly

Table 2.2

Summary of Single Software EUT Research

Author	Software	Method	Variables	Outcome Measures
Baxter & Oatley (1990)	Spreadsheet	comparison methods	experience novice	learn-ability
Carroll et al. (1987)	Text Word Processing	self-learning	standard & minimal manual	accuracy & time
Hicks. Jr. et al. (1994)	Spreadsheet	lecture & CBI	syntax recall comprehension hands-on	CBI for recall human lecture for comprehension
Keer & Payne (1994)	Spreadsheet	animated demonstration	doing & watching	Learning Lotus through problem solving
Napier et al. (1992)	Spreadsheet	Hands-on exercise	No. of commands used	Frequently used Lotus commands are 27

TABLE 2.3

Sample of Research on computerphobia, Attitudes, Experience, and Anxiety

Author	Sample	Variables	Operational Measure	Result
Igbari and Chakrabarti (1990)	187 part-time MBA students	demography, training & management support and experience	computer anxiety attitudes towards computers. Systems quality	Training and computer experience reduce computer anxiety. Management support affect both anxiety and attitudes
Murrell and Sprinkle (1993)	29 participants	12 items questions	attitudes survey	Negative attitudes, frustration & confusion about the use of computers is related to lower job satisfaction. Computerphobia is more related to educational & operational problems.
Nelson, Wiese, & Cooper (1991)	182 Univ. Students in 9 class room	gender, programming experience, games	computer experience questionnaire	Early programming experience playing computer games reduce the problem. Early positive encounter and self-efficacy reduce the problem
Weil, Rosen & Wugalter (1990)	500 U. students	computerphobic, comfortable & uncomfortable user	computerphobia etiology questionnaire personality type mechanical experience	Early role modeling & experience reduce computer anxiety

Table 2.4

End-User Classification Methods

Methods	Author
DP Orientation:	McLean (1979)

DP professionals
DP Users:
      DP amateurs
      Non-DP trained users	

Computer Skills: NonPrograming End-User Command Level User End-User Programmers Functional Support Personnel End-User Computing Support Personnel	Rockart and Flannery 1983)
Management level and by Computer Facility Used:	Benson (1983)
Top Upper Middle Lower PC, Mainframe or both	
Interaction and Use:	Davis (1985)
Direct Indirect Autonomous	
Proposal with no criteria	Rivard and Huff (1985)
Micro-DP Department Users Staff Analysts Opportunity Seekers	

<div align="right">table continues</div>

1. Table 2.4

End User Classification Methods

Methods	Author
Functional Areas: Accounting/Finance	Summer (1986) Pyburn (1986-87)
Engineering MIS Production Sales and Marketing Transportation/Distribution	
Information Consumption Production and Control: Operation Development Control	Cotterman and Kumar (1989)
Organizational Activity Dimension and role: Clerical Management Professional	Galletta and Heckman (1990)
Education and Experience: Informed user Proficient user Developer	Juliff (1990)

Table 2.5

User Satisfaction Research

Author	Relationship Tested	Results
Doll and Torkzadeh (1988)	content. accuracy, format ease of use & timeliness	Validated the reliability of these five to measure user satisfaction
Finlay (1993)	review	No single measure of success is really important and none has found full acceptance
Gatian (1994)	user satisfaction system effectiveness user behavior	Found relationship between user behavior and Satisfaction
Kim (1989)	review of user satisfaction (US)	Concluded US is viewed in terms of A) attitudes towards MIS B) information quality C) MIS effectiveness not clear which to measure
Lalomia & Sidowski (1990)	review	Found no validity & reliability for various measures
Lawrence & Law (1993)	perception & satisfaction	Found user perception of representation influence user satisfaction
Moore & Hurt (1992)	information service and service quality	Found weak support for user satisfaction model
Melone (1990)	review	User satisfaction not enough to measure effectiveness
Seddon & Yip (1992)	compared 3 measures of of UIS models	Found that Doll & Torkzadehes model as more useful measure of user satisfaction
Suh, Kim & Lee (1994)	belief, ability and ease of use	Found users computing abilities abilities exert significant & direct effects on user beliefs ease of use and usefulness of IS

Most of this research reveals an inadequate understanding of users, data processing technology, and the learning process. Amoroso (1988); Pascale 1990); Robey and Zmud (1992) and Weisbord (1987) indicate that organizations that survive in the future must be able to respond rapidly to environmental change. The major problem inherent to rapid response in any organization is what management experts call organizational overhead. Organizational overhead is mainly paper work which involves forms, purchase orders, invoices, price quotations, service machine serial numbers and office expenses. The idealized "paperless office" has not yet been realized. The bulk of these tasks are still done by support staff using different computers and software without training.

The learning needs of support staff who handle the major obstacle to rapid response (organizational overhead) have been left un-examined or even forgotten. Office/administrative employees receive the least amount of training (Geber, 1989). What it takes for a clerk to locate a given datum in a given database, what it looks like to navigate from one window/screen to another in most database and financial software, what these users think of their machines and software and their daily problems is considered to be simple to do, easy to learn, basic and common sense. The study of electronic mail which was conducted by Bikson and Law (1993, p. 105) at the World Bank, found the main problem to be a lack of training: "desirable features of the system go unused, because staff either do not know about them or can not execute them." Survey and interview data were used to conclude bank employees both need and desire more training.

The root cause for the lack of user education can be traced in Seymour Papert's (1980, p. 7-9) work. Papert stressed what he called "learning without being taught." He goes on to state, "I believe that the computer presence will enable us to

modify the learning environment... will be learned ... painlessly, successfully and without organized instruction." Computer presence without organized instruction was originally supposed to increase learning and productivity. Next to the idea of learning computers without teaching intervention, the way people understand computer technology seems to be responsible for most of users' educational problems.

Frey (1989), citing Mitcham, indicates that people see technology as an object, as process, as knowledge and as volition. Our comprehension of technology deepens as we proceed from the view of technology as an object to that of volition. Most people view technology as an object. Technology as process involves the concepts of making and using (Frey, 1989, p. 25). Although using is a more comprehensive concept than that of making, most research cited focused more on making.

The other important factor in the user educational problem is the emergence of Personal Computers (PCs). According to Boyce (1990), the shift from mainframe to PCs, non-transferability of programming skills to software applications skills, reliance on vendors, and rapidity of change put users' education at a disadvantage. Boyce showed that there was no natural progression from learning how X computer program operates to actually using it. As a result of this fear, apprehension and frustration by users and developers may overwhelm learning, teaching, sharing, and self reflection. Much of user education is an uncoordinated, and untested program with a strong marketing approach. This is especially a chronic problem with novice computer user training.

Training the novice. One of the most neglected parts of computing is research on novice users or how to introduce the computer to users. In no other area of computing is there a consistent tendency for experts to see only those parts which are of direct technical interest and ignore those which are human is more apparent

than in novice computer training (Pacey, 1983). In 1984, Paxton et al. reported that very few relevant studies were available. Ten years later, there are still no relevant studies. Most deal with learning how to program (Du Boulay and O'Shea (1981). Studies on learning in the workplace are scarce. What is available are the studies reviewed by Paxton et al. (1984). Carroll (1987) and Carroll and Mack (1987) which strictly deal with learning a specific word processor. The latest one by Santhanan and Wiedenheck (1993) deals with the discretionary user of software.

In most cases authors do not make a distinction between "naive" and "novice" computer users. Relevant studies or reviews of literature on how novice users approach application software are still not available. The original five works reviewed by Paxton et al. (1984) recommended (a) to use principles of Educational Psychology when designing computer training; (b) to reduce fear and instill positive attitudes toward the computer; (c) to use computer training as a vehicle; (d) to provide privacy for adults when attempting to learn to use the system, and (e) to observe the trainee who does not mind being observed. According to Shneiderman (cited in Paxton and Turner 1984), the first design principle is to know the user. This means conducting a situation analysis and developing a program.

While the above-cited recommendations were instructive and educational from adult learning perspectives, today there are few end-user training programs which include a training needs assessment. As a result, our knowledge of novice computer users is based more on assumptions than on empirical research.

The Adventure of Getting to Know a Computer, originally conducted in 1983 (Carroll, 1987), is one important research project on how novices learn computing. Though the research subjects were temporary office workers (with primary focus on production rather than learning), Carroll (1987, p. 640) was able to identify

critical problems faced by new computer users. Most of these problems indicate the lack of a broad perspective on learning and effective facilitation (Short, 1981).

Eason (1989) observed that office automation requires more training of office workers. He recommended the provision of points-of-need support for learning-by-doing for novice users. In clerical tasks this point-of-need support is helpful during input, processing, output, storage, and communication. The provision of support which Eason (1989) recommended requires a knowledge of what is happening when users input, process, produce, store, and communicate information in a computing environment. This knowledge helps to understand that computing is a social process, rather than just the technical processes of using a machine or using a spreadsheet. The acceptance of the computing environment and activity as a social process is generally lacking.

Computing as a social practice. Today, the computer is no longer considered to be a panacea for productivity. Labels, such as "magic machine," "electronic brain," and a pervasive manifestation of computers are no longer as "hot" a topic as before. To understand a sudden change in computing we need a method. A method helps us to describe computing as it is developed, performed, and experienced.

One method that helps us to understand computing as a social activity/process is what Kling and Scacchi (1982) call WEB models of computing. The conventional models of computing are called discrete-entity analysis or models. The WEB models of computing and Discrete-Entity models of computing differ in perspectives and basic assumptions.

Basic Assumptions of Discrete Entity Models of Computing are:

1. A computing resource is best conceptualized as a particular piece of equipment, application or technique which provides specified information processing capabilities.

   a) Each computing resource has its costs and skill requirements which are largely identifiable.

   b) Computer based technologies are tools and are socially neutral.

2. Role of Infrastructure:

   a) The infrastructure for supporting the focal computing resource and the organizational procedures by which it is organized and sustained are critical elements.

   b) Each computer-based service is provided through a set of structured resources. Infrastructure, either technical or administrative is a neutral resource.

   c) Human factors are organizational problems which are separable from technical problems.

3. Control over infrastructure:

   Organizations have ample resources to support all their computing needs.

4. Any element of infrastructure can be analyzed independently of:

   a) its interactions with other computing resources

   b) the social or organizational arrangements.

5. Social action:

   Formal goals, procedures, and purpose best describe social actions.

Basic Assumptions of WEB Models of Computing

1. A computer system is an ensemble of equipment, applications and techniques.

> a) Each computing resource has benefits, costs, and skill requirements which are partially identifiable

> b) Computer based technologies are also social objects which may be highly charged with meaning.

2. Role of infrastructure:

> a) The infrastructure for supporting the focal computing resource and the organizational procedures by which it is organized and sustained are critical elements.

> b) It is not necessarily neutral

> c) There is no "human factor" which is separable from the delivery of computer-based information services.

3. Control over Infrastructure:

> Organizations have limited resources. Not all necessary infrastructure/resources are available (in adequate quality) as needed.

4. The information processing leverage provided by a focal computing resource is contingent upon:

> a) its interactions with other computing resources;

> b) the social or organizational arrangements

5. Social actions:

> Structural constraints, and participants' definition of their situation often influence organizational actions (Kling, 1987, p. 312).

The above statement clearly indicates the quality inherent in WEB models of computing. In discrete entity models, "all things being equal is the rule. While the social setting of technical development and use largely ignored" (Kling and Scacchi, 1982, p. 70). Context, infrastructure, and history are mostly neglected. Faster data flow means faster and better decisions. Specialists who use these models treat success or failure in terms of technical criteria. In this respect, 'user and involvement' has become a cliche, and both user and involvement are ambiguous" (Kling and Scacchi, 1980, p. 273).

The WEB models of computing are more explicit about the role of infrastructure. The infrastructure includes education, training aid, support, documentation, inside and outside experts, and administrative procedures that provide and support. The implications of the WEB models of computing are far reaching in terms of learning, using, and social meanings of computers. Computer technologies, according to the proponents of WEB models of computing,

> are not artifacts of nature like limestone caves. They are conceived, designed, shaped, ignored, tinkered with, layered, redesigned, sabotaged, criticized, and appraised to fit a complex web of human interest (Kling and Scacchi, 1980, p. 322).

Web models of computing and their interactionist perspectives (see table 2.6) shed greater light on socially and technically complex, embedded computing process than do discrete-entity models. Therefore, the understanding of computing as a social process or act requires a deep understanding of WEB models.

WEB models of computing place design and use in a continuum, rather than treating them separately. Relating design and use process facilitates learning from each other and helps to focus on the human knowledge needed to use computers (Ives, Hamilton and Davis, 1980; Keen, 1980; McInerney, 1989; Leavitt, 1965). WEB models of computing also satisfy what Maruyama (1984) considers humanizing

applications of computers. According to Maruyama, what humanizes computer applications is: (a) beneficial combinations of individual difference among users; (b) individualized learning/training with minimal isolation; and (c) interactive learning with human help. WEB models of computing accept that providing practical and up-to-date documentation and training demands time, attention, skills, and inclination to help users and an organizational support. Contrary to discrete entity models, WEB models pay more attention to the ways people live (learn) and work with computing. The learning orientations of WEB models of computing as indicated in table 2.7 is type B while discrete entity models support type A.

Understanding computerization as a package and as an emerging process is close to reality in a computing environment. Today, what is constant is change in hardware and development of new versions of a given software. In this context what Wildemeersch (1991), called learning from irregularity offers a better understanding of how to cope with situations of uncertainty, complexity, instability, and uniqueness of computing. Wildemeersch (1991) reports that learning from irregularity gives adult learners the capacity to question, appreciate and express themselves. The process of questioning, appreciating, and expressing generates meaning for learning and using computers. WEB models of computing encourage user expression and meaning making.

Table 2.6

Two Perspectives for Analyzing Computing

	Rationale (DEA)	Interactionist (WEBA)
Technology	Equipment as Instruments	"Package" as Milieu
	Unified Organization	Situated Social Actors
Social Setting	1. The User 2. Tasks 3. Consistency and Consensus over Goals assumed	1. Differentiated Work organizations and their clientele 2. Groups with overlapping and shifting interests
Organizing Concepts	Rationalization of Formal Procedures · Intended Effect · Authority · Productivity · Necessity · Cost-Benefit · Efficiency & · Task Assumed	Defining situations, Labelling events as Social Construction Work Opportunities Constraints Package trust, motivations self-esteem, user involvement role defined, or negotiations
Dynamics Technical Diffusion Good Technology	· "Meet a Need" A Good Technology "sells itself" · Effective · Efficient · Correct	Fit between attributes, environment & organization. Help organizations adapt
Workplace Ideology	Scientific Management	Individual fulfilment through evocation of value and meanings

Source: Kling and Scacchi (1980. p. 256)

Table 2.7

Two Different Orientations of Learning

Type	A	B
Assumptions about Knowledge	Knowledge as valuable commodity, existing independent of people. Can be stored and transmitted	Knowing as process of engaging with attributing meaning to the world including self in it
Assumption about Learning	Acquisition & addition of facts. concepts & skills	Elaboration & change of the the meaning-making processes. Enhancements of personal competence
Purpose of Education	Dissemination of stored knowledge. Skills	Development of the whole person. Learning to learn
Meaning of Independence	Individualism	Autonomy
Basis of Learner choice	Cafeteria. Selection from a set of range of carefully prepared dishes	Self-catering. Planning menus. deciding raw materials required & experimenting with ways of preparing
Course Structure	Based on organized & sequenced syllabus and course materials	Based on process of planning deciding and experimenting
Concerns for Relevance	Consideration given to problems of application & transfer	Participants' own working lives regarded as prime source of learning material
Social Element	Source of comparison for individualized learning task	Inherent part of learning provide challenge & collaboration
Instructor's Role	Subject expert. Guardian of knowledge	Facilitator. resource person & co-learner
Evaluation	proficiency against recognized standard	Part of learning process. Based on collaborative. mutually agreed criteria

Source: Hodgson (1993)

WEB models of computing consider computing as a package (human skills, soft/hardware) and as an emerging process whose problems evolve over time. Gasser (1986) studied anomalies common to the emerging process of computing. His study showed the importance of user education and social support in a computing environment.

This meaning provides users with direction to select and retain information and to make inferences about the relationship between technology and their tasks (Goodman et al. 1990, p. 259-265). Weick (1990) believes that microcomputers do not give a complete picture of the process. This hardware can be esoteric to users. A sense of uncertainty is common with computers. A learner or a user will not get the whole picture of what is going on while a lot happens behind the scenes. This situation affects learning and using computers.

Uncertainty is mainly because, as Biskup and Kantz (1994) show, many tricks are necessary to use a given software effectively. These "tricks" are mostly undocumented and not immediately clear. They have to be learned by experimentation or through training. A logical and viable option to overcome this is the development of means to support users so that they may locate their direction and be accepting of uncertainties within available resources and time-frames. Contrary to this we observe a focus on one aspect of technology with no consideration given to socialization, training, and retraining.

A focus on technology (hard /software) removes consideration of learning, teaching, human need, interest, and value in technology (Webster and Robinson, 1991). Learning without interest, organized support and value is troublesome. Yet the gap between technical support, and human support is wide.

One major reason why computing experts/leaders did not feel the importance of users' education is the lack of balance between what is called "technical and human factors." The lack of balance in the computing environment, is because of what is called discrete-entity models of computing. Discrete-entity models of computing, according to Gasser, 1986; Hirschheim and Newman, 1991, Kling, 1987; Kling and Jewett, 1994; Kling and Scacchi, 1980, 1982; Lyyntinen, et al. 1991, focus on technology and consider the human side of computing as a minor or simple problem to be solved during implementation.

From the learning and teaching perspective, the impact of not accepting the social process of computing has far reaching effects. Most writing on microcomputers exemplifies what Ronald Barthes (1972/1957) termed the "creation of myth." One can daily observe the one sided story (easy to use, easy to learn, fast machine, friendly, plug and go) of microcomputers on television. This has generated many myths about computers. This, according to Barthes (1972/1957, p. 129-143), has turned reality inside out; it has emptied technology of history; it has removed from computers their human meanings as tools so as to make computers denote or signify a human insignificance.

Furthermore, in most IT analysis and comment, conflict exists between how the making of technology and the using of technology is defined (Boyce, 1990; Frey, 1989; Hakken, 1991; Kling, 1987). Enthusiasm for computing can be seen in books, journals, and daily papers. Microcomputers are equated with relevance, production, speed, efficiency, reliability, and accuracy. The topic of learning computers, exceptions and exception handling in use environment and the social processes involved are mostly absent.

Neglecting the social aspect of computing affects motivation, individual differences, and the learning process. Motivation is the most important factor in training for an adult who feels threatened by technology, by pressure to attend class, or who is overwhelmed by learning material (Gattiker, 1990b; Harrison and Rainer, 1992; Sein and Bostrom, 1989, Wlodkowski, 1985). In addition to this, computer training vendors assume people are already motivated and everyone learns in the same way. They focus on product rather than on process and concepts.

Downs and Perry (1984, p. 21) stated that "how people learn (the process) is as important as what they learn (the product)." McLean (1991, p. 32) wrote that "process is the application of know-how," which is dynamic and calls our attention to action. The dynamic nature of learning/using environment is not adequately recognized. Instead of first understanding how people learn, what process they follow, and what it takes to become computer literate, researchers focus upon designing the interface and measuring levels of anxiety and satisfaction (see table 2.3 and 2.5).

Designing a precise set of functions and calling computer programs friendly have had an impact on social process in computing environments and on learning how to use software. This is primarily because there can be no context where all eventualities are accurately predicted. History enters into all contexts (Linn,1991). Lisa and Apple Macintosh, which were originally developed under a notion of simplicity, like driving a car (James, 1992), today require in-depth instruction and experimentation. The in-depth instruction and experimentation that every Apple user undergoes is simplified as easy graphical interface which still needs further help and learning. A universal user-friendly software is not available so far. Therefore, the provision of effective training requires an understanding of user context and history.

Hirschheim (1986b) proposed that hermeneutic analysis (relying on the common sense of office workers) is the best approach to acquire information needed to prepare people for future office work. Hirschheim believed that office automation is more than technology; it is also understanding how people learn and use information technology. Eason (1989), Keen (1980, 1985) and Martin (1988) focus on the centrality of human users and human skill in information technology.

Discussion of the social implications and how people learn computing is over simplified in End-User Computing or End-User Training literature. Fear, intimidation, disinterest for lack of proper computer introduction is easily translated into computerphobia (Noble, 1984). Neither the researchers nor the creators and promoters of IT developed a clear image of IT or what Giacquinta, Bauer, and Levin (1993) call "social envelope" (the social expectation and relations).

Focus

Research in EUC seems to focus on the development, design, and measurement aspects of information technology. As a result, technological change with primary considerations for the needs of adult workers, and especially of the older employee, have been neglected. As Goddard, (cited in Carter and Honeywell, 1991) indicated, we are unable to use available grey power, experience and skills. A survey by Carter and Honeywell (1991) and James (1993) showed that all older employees prefer to be trained how to use computers.

Attention given in end-user computing research to learners' needs and the constraints in their real-world situation is minimal. Users are rarely asked what they do when they first begin to learn a computer package. Quite a few researchers asked users about the working knowledge and skills they use in their work or training. The work of MacKeracher and McFarland (1993/94) highlighted the importance of the

above questions. As Nielsen (1989) pointed out, users are mostly studied in HCI research to find out why they do or do not do things the way user-interface experts feel they ought to do.

Current Delivery Mode and Problems

Conventional computer training methods use lectures, practical hands-on experience or a combination of the two. Lectures and videotapes are the most common vehicles of training. The most popular method of learning computer use at the workplace is learning by doing with some demonstrations, commonly called "show and tell." The relative efficiency of these methods towards improved acquisition of computer skills is not clear.

Research by Bostrom, Olfman and Sein (1990) examined the influence of a novice's learning style in learning typical end-user tools such as spreadsheet and electronic mail. The results suggested that it is essential to match training methods to individual learning styles. However, the details of methodology and conditions were not made clear.

Naomi Karten is an experienced observer of end-user training in Canada and the U.S. Karten (1986b, p. 7) states that:

> all you have to do for end-user training is round up users, line them up one or two per PC, show them how to make their software sing and voila, you have got a bunch of skilled users.

Karten (1986b) was able to identify important verbal reactions of learners in end-user training, such as; "I know how it works, but I do not know how to use it," "Attend and forget." Karten maintains that most end-user training focuses on software features and functions. This product-oriented training helps users to master the mechanics of software but does not adequately prepare them to use computers effectively.

Yeager (1990) reported the pitfalls of end-user training methods. Karten (1986a); Gattiker (1992) showed that there was lack of attention to education and awareness of delivery methods in end-user computing. As a result, despite all the training given, and dramatic reduction of the cost of systems, microcomputers remain complicated devices that require many hours of study to use effectively.

Learning by Doing

Computing technology in most offices has not gone beyond the friendly interface which is still not a clear construct for end-users. Learning by doing (Carroll et al. 1987), a process which is so popular in most work organizations, is not helping us to catch up fast. Research by Waern (1993), showed that people do not learn very effectively by doing, because they have difficulty in choosing alternative actions or in observing outcomes and interpreting them.

The modern version of learning by doing is using a Computer Based Training course on a computer network. Anyone on the network can access the training on their PCs. The idea of training at one's desk is desirable but the environment can be less-conducive to the process of learning because of workplace interruptions. As Watkins and Marsick (1993, p. 19) stated, "the primary purpose of business is not learning, but to produce." For some learners, work sites are not perceived as an attractive places to learn (Cross, 1981, p. 215).

Learning by doing is an effective learning method provided there is a trainer or a senior person responsible for training and apprenticeship culture in the workplace. According to Lieberman and Linn (1991), learning by doing is partly self-directed learning. It can be supported by combining instruction, scaffolding and encouragement for better knowledge, skills and self-monitoring. Darrah (1995, p. 34) notes that "trainers did not receive any guidelines for conducting on-the-job training.

Instructors recognized no differences among learners, and simply offered their standard curriculum." Such training for Darrah was something being done to learners, not with learners. Novice learners and learning by doing need structure, systematic presentation of material, guidance, and coaching both during and after the process.

In addition to this, variables such as self-perception, motivation, and efforts by the learner and organizer need to be taken into consideration when we approach computer learning through learning by doing. These variables are rarely mentioned outside the Journal of Research on Computing in Education. After observing the conditions of adult learning and teaching of microcomputers in England and U.S.A., Bostock and Seifert (1986, p. 149) concluded that "adult educators are the best people to teach adults about computers, rather than computer scientists, company trainers and software manufacturers." The experience of Richard B. Pearlstein (1991), manager of training at the U.S. Senate Computer Centre, validates Bostock and Seifert's conclusions.

Attitudes, Images, and Phobias

According to Pearlstein (1991), computer experts have an attitude of computer centrism. This is, the belief that everyone is as fascinated as they are about the details of computer systems. The question of computer literacy is not addressed in IS's professional journals. Current computer users at the workplace are mostly people who completed their high school or college education before computers were part of their education. To this effect computer literacy, fear and anxiety about computers can not be taken as simple and natural. Fisher (1991), Igbaria and Chakrabarti (1990), Kennedy (1975), Massoud (1991), Murrell and Sprinkle (1993), Nelson, et al. (1991), Rafaeli (1986) and Weil, Rosen and Wugalter (1990) reported a widespread fear of computers.

In addition to this, Bentley (1983, p. 73-80) shows the image of the computer experts as the prophets (the salespeople), the high priests (the technicians and programmers), and the altar attendants (the operators) which are not easy for learners to relate to during their first encounters with computers. The image of the computer experts, fear about computers, and computer centrism of experts impede learning (Nelson, Wiese, and Cooper, 1991; Sproull, et al. 1984).

The "nerd" image (Simms, 1994) of computing is the result of what Pearlstein (1991) described as computer centrism. This "nerd" image of computing is related to the problem of little student interest in computer studies. Maurice Simms (1994, p. c2) reported that the computer industry is growing at a rate of more than 15% a year and the industry shortage of computer specialists is going to grow from 4000 to 15,000 over the next three years. In spite of this projected need, there are not enough people in the pipeline of the education system in the area.

The shortage of highly qualified computer experts is not a critical question in this study. The issue behind Simms' article is that it has brought out clearly the reality that even school, college, and university students have a problem with computers and computing. Simms' article helps us to raise the educational issue of how people's fears and reservations about computers can be minimized. What can be done to motivate older adults or other specific computer user groups? The research on computerphobia and user satisfaction appears to focus on measuring anxiety and satisfaction, rather than finding the ways and means of developing a positive attitude, image, and understanding toward learning computer skills. The image of computer experts and computing environments at present is not appealing to students.

End-User

End-users in this study are users who are not programmers and users with no knowledge of computer language to code (write) programs. This approach accepts Davis' (1985) typology of users and Gattikers' (1990a) definition of end-user. Davis classified users as direct, autonomous, and indirect users. His typology does not include the development dimension of End-User Computing. This is also closely related to the role-oriented framework of Galletta and Heckman (1990) selected for this study. According to Cotterman and Kumar (1989) participants in this study would be classified as user-operators, who actually run the particular packages on PCs on their desk. Available end-user classifications are listed in table 2.4. In this study End-Users are clerical and administrative staff. Yaverbaum and Culpan (1990, p. 441) also considered end-users to be non-programmers. Clement (1994) called these groups low-level users, people with no facilities or formal support to expand on their knowledge. The term "low-level" refers to their position in organizational hierarchies, not to their computer use.

According to usage, this group embraces the majority of users. In a study of computer use in 55 organizations Bikson and Gutek (1983) found that 73 per cent of clerical staff use computers. Lee (1986) and Morell and Fleisher (1989), reported that users in the non-technical job functions (accounting, adminstration, marketing, personnel) spent more time per week using PCs than users in technical positions.

Clerical and administrative staff work in what Panko (1988) called Type I departments. Type I departments handle the routine information processing chores of the organization. Type I departments are commonly referred to as back office operation (where support activities occur). Type I departments were also where data processing and office automation started. According to Panko (1988), workers in these

departments work at their computer over six hours a day. The main activity of Type I departments workers is collecting, processing, storing, retrieving, and disseminating information.

Organizations today depend, more than before, upon the end-users' effectiveness in processing and transferring information using new and advanced technology. Computers are used in organizations for record management, electronic communication, inventory control, accounting tasks, purchasing, human resource management, word processing, as well as for business analysis, design, and production activities.

The use of computers for business analysis, design, and production requires clerical and administrative support staff to collect and input raw data. I believe a prime place to start to know about the process and problems of learning and using computing is with low-level office workers. These staff have minimal information exchange, can not keep themselves up-to-date with software publishing company beta release notices, and have no personalized library of manuals. In short, they have limited learning resources. The lower on the hierarchy the lower the chance to attend computer seminars, or to join user groups. As a group the low-level users had not generally been consulted about the introduction of the computer at their workplace. Their perception of IT as a threat or as an opportunity is very important in this study. Asking this group of users the following questions is useful in studies like this one: How do they learn about computers? What level of computer experience do they have? How many software packages do they use or have learned? What methods and processes have they used and followed? What problems did they face while learning to use the technology?

The interview questions listed in appendices B and C are designed in such a way that important data on users' assumptions, experience, expectation, knowledge, and problems concerning information technology are collected. Comparing users' interview data with data from trainers is believed to give a clue to how far the learners/users' assumption, expectation, knowledge, and problems are similar or different. This helps to identify and categorise frames and themes important in EUC (Orlikowski and Gash, 1994).

Understanding. Understanding in this study is an interpretation of situations. According to Westrup (1994), understanding is situated and requires dialogue and the application of concepts. Understanding is conditioned by time, place (context), and past experience. According to Lakoff and Johnson (1980), understanding emerges from interactions and from constant negotiation. Recurrent experience leads to the formation of categories. These emerging categories define what is called coherence. Coherent structuring of experience gives individuals personal meaning, direction and significance.

The meaning of IT can only be described and its significance appreciated in the context of its uses and its users. Meaning does not come about in isolation, but is embedded in the capacity to appreciate, express, and judge. Yet users' appreciation, expression, and judgment (perspective) of IT is not available in most research listed in tables 2.1-2.5.

Understanding in EUT (adult learning) also means discovering the myths created by popular magazines. It means listening to what users mean when they use or listen to terms like "easy," "fast," and "friendly," software. Understanding the myth in computing can be seen in Barthes (1972/1957, p. 151). The computer is "a kind of ideal servant, it prepares all things, brings them, lays them out, the master

arrives... all that is left for one to do is to enjoy this beautiful object without wondering where it comes from."

Understanding involves not only the uncovering of our own horizons, but the discovery of the users' horizon as well (Polet, 1994). Understanding needs patience, flexibility, and tolerance for mistakes (Draves, 1984). User understanding, therefore, means to be patient, flexible, and tolerant. It also means to be in line with users' experience, situation, and level of technological awareness. Understanding the user involves making an effort to learn the user's need, situation, and requirements. In short, it means recognizing the user as a learner in a world of technological flux. Understanding the adult learner means recognizing the diversity and variability of learners, methods, and styles. It means recognizing the multifaceted aspects of adult learners (Brookfield, 1986; Brundage and Mackeracher, 1980; Rogers, 1993).

According to Winslow and Caldwell (1992, p. 76), what an Information System often does not have is an understanding of the users' need, situation, and technological awareness. This is why Rogers (1993) considers the first task of the teacher is to explore what sort of image the learners already possess of the new subject. This approach to understanding calls for going out, observing, and asking people who are learning and using computers. In terms of specific training it can be conducting a written or an oral survey just before the session to identify learners' beliefs and images.

Interviews and observations help to understand, verify, or elaborate users' perceptions, frames, and specific problems they face. What HCI experts call usability testing is observing people using a product or a system. Therefore, going out and observing users is beneficial both for the industry and the learning community.

The need for context. The operation of PCs requires time and human expertise, no matter how user friendly they may be. It is time and human skill that are neglected in end-user computing. Research and systems analysis methods fail to account for the human aspects of technology that have impacts upon learning and using computers (Franklin, 1990; Levine and Rossmoore, 1993; Misa, 1992; Scarrott, 1994). The role of context in learning and using computers is neglected, misunderstood, or given a minor role in EUC/EUT research.

In the absence of context one can not recognize either product or process limitations. Processes or products introduced without context and limitations can generate false expectations. Dookheran (1990) reports problems in EUC were generated as a result of false expectations. These unrealistic expectations will require a great deal of educational effort to reach an achievable expectation. Gattiker (1992) and Sein et al. (1987), for example, reported that research on learning to use computers has lost sight of research findings that signify learning to be a function of motivation, ability, and time. This is mainly because of dealing with false expectations from computing. A rich body of literature that exists in Educational Psychology, Adult Education, and Anthropology regarding learning processes, positive motivational dynamics, and methods is under-utilized in training people about computing.

Educators continuously inform us that computers, per se, or application software, "do not really affect learners in any direct way; it is the way they are used (learned) that is crucial" (Salomon and Gardner, 1986, p. 18). Contrary to this, human-computer interface literature still suggests that the elimination of training through universal interfaces is possible. This approach according to Hirchhorn (1984) is utopian and illusory.

A disregard of the context of learning and use will lead to the attribution of problems and difficulties to the machine or to humans. Operating system problems are at times identified as operators' problems. Users most often are blamed for these problems (the case with computerphobia and anxiety research). The context in which learning and using computers can be explored is through direct observations of people learning to use computers. Observation helps to initiate dialogue with users and learners as equals. This dialogue enables one to understand users' immediate problems, their problem solving approaches, and what process and methods they use.

Bostrom et al. (1988), reported that the attributes the learner brings to the training and use environment, such as motivational traits, prior knowledge, and experiences, are usually unquestioned. This is especially a problem in the human factors literature. The human factors literature and user satisfaction (table 2.5) emphasizes user-system interface with the ultimate goal of developing idiot-proof computer systems with built-in error avoidance mechanisms.

Samples

Most of End-User Training research (table 2.1-2.5) studied novice learners of computer skills when testing certain relationships. The definition of novice common to these studies is not clear. Past research concentrated on younger subjects without assessing the potential effects of age, motivation, and previous computer use. This work has been conducted using student samples which limits its utility to adult learners (Gattiker and Paulson, 1987; Gash and Kossek, 1990). The limitation in ranges of different research perspectives is a serious problem but in addition all this work has been survey or laboratory oriented.

The majority of the problems discussed and the different perspectives examined (in tables 2.1 to 2.5) are findings derived from research on students. There

is also an emphasis on discretionary users (Eason. 1989: Santhanam and Wiedenbeck. 1993) who are mostly managers. The human-computer interface research which deals with design, development, usability, and ease of use was also examined from student samples. The unique quality of users as thinking and acting adults in diverse environments was not given due consideration. One very important lesson or outcome of these studies (even if it is based only on student samples) is that they have clearly shown that learning application software is not easy, even for MBA students.

Qualitative Research in Adult Computer Training

Going out. observing and having dialogue with users and learners helped:

1. Barrie (1981) to discover which training approach most benefited adult learners;

2. Erikssson et al. (1990). to develop comprehensive user education.

3. Howard (1992) to develop descriptions of users and learners;

4. Nordenbo (1994a,b) to understand adult learners' perceptions of information technology; and

5. Orlikowski and Gash (1994) to identify technological frames of users and developers;

Booth (1993) identified four qualitatively distinct conceptions of computers. These conceptions of computers were: 1) the computer as a tool; 2) the computer as a facilitator; c) the computer as a machine; and d) the computer as a universal engine. Although Booth examined the conceptions from learning to programming, what she identified through her research is helpful to understand users in end-user training.

End-User Computer Training and Adult Learning and its Implications for Human Resource Development is a continuation of Barrie (1981), Eriksson (1990),

Hellman (1992), Howard (1992), Nordenbo (1990a, b), and Orlikowski and Gash, (1994). The study will follow the same theoretical background and orientation of their work, but will differ in focus. The intent of this study is understanding the learning process and the problems involved in learning and using computers.

Difference

This study of EUT is different from previous studies for the following reasons. The focus of the study is on understanding learning process of information technology within specific contexts (public and private training centres in Fourth Generation Languages and low-level-end-users or learners) on how users learn computing. The study regards the user not as a passive receiver of external knowledge but as the focus of an active, ongoing process of learning (change).

The first major difference lies in defining end-users as non programmers and in terms of their role in the organization. Sipior and Sanders (1989, p. 116) define EUC as:

> The development and use activities associated with the employment of computer resources by one or more non-DP professionals in functional areas, to perform or facilitate job related tasks and responsibilities. Individuals are involved in EUC activities if, in employing computer resources, they either directly interact with the computer or are engaged in a task leading to direct interaction with computer.

In the above definition the terms 'development' and 'coding' appear to co-exist with the term "Non-DP professionals." Development and coding is the task of programmers not the work of the majority of end-users. The co-existence of these terms is suggestive of the assumption that End-Users are all programmers or will become programmers (high technological optimism). The other problem with the above definition is that it considers EUC as independent and users doing their own

programming instead of relying on the DP departments. According to Klein and Hirschheim (1987) this is too superficial.

This researcher does not believe in the notion that it is possible to create a better, cheaper way of doing computerized activities with more programming or without the intervention of human help. The study assumes the possibility of creating a better way of computing is by understanding and helping users how to learn and how to use available software. The major problem in organizations and the interest of this research is knowledge about using available application software. It is assumed that knowledge of application software comes before knowledge of how to program for the majority of adults using computers. Clement (1994), Gattiker (1992), Hendry et al. (1994), and Raymont (1989) reported on the importance of knowledge of application software. The most crucial dimension of end-user computing today is learning to use available software tools not the development of new programs (Sein et al., 1987).

Empirical research (Benson, 1983; Chacko, 1992; Eason, 1989; Ginzberg, 1981; Necco and Tsai, 1988) has shown that very few organizations have some sort of standard for program documentation. As Benson (1983, p. 40) states, "to most personal computer users, documentation was unknown." A study by Tracz (1984), at OISE, whose goal was to develop computing philosophy, policy, and to better understand user needs and future goals of computing is an exception to the rule found in most work organizations. Necco and Tsai (1988, p. 31) listed concerns about the potential problems of poor documentation. Chacko (1992) recently found that the problem of documentation is severe, even with trained experts. This is also a chronic problem in the computing industry.

To expect non-programmers to understand computer systems programming documentation makes the use of computers very demanding and builds more myth.

It is also like "putting the cart before the horse." As Schiffman, Meile and Igbaria (1992) reported, documentation requires a substantial understanding of software packages in technical, syntactic, and functional details. This kind of unrealistic expectation is missing such questions as: Did we provide users with an aid which will convey the basic concepts of the system? Did we ask them how they save and retrieve their files? Did we provide opportunities and facilities to end-users to experiment with the software without fear of crashing the system? The answer to these questions is often taken for granted, as "they know." Summer (1986, p. 44) reported that "fewer than 20 per cent of the users surveyed had developed control, backup and recovery, and data security for their applications."

To demand that a typical end-user understand systems documentation and to include development and coding in an end-user definition seems to be the work of a person unaware of the reality in computing environments. Sein et al. (1987), demonstrated that even learning simple tools such as text editors is not easy. Carroll (1987), reported that learners of a system often do not feel that they are in control or may feel that they are lost. Igbaria, Pavri and Huff (1989) report that many people have found computers to be difficult to apply, due to their fear of and anxiety about computers. They noted that the optimistic scenarios proposed by many in the computer industry are not realized at the level of end-users. Considering all these theoretical and practical reasons, this researcher has limited his end-user definition to users of a computer system, excluding programmers or systems professionals.

The second major difference concerns the typology of end-users. Limiting end-users to clerical and administrative staff helps to answer important educational questions raised by Juliff (1990) such as: 1) Who are end-users? What do end-users

do? 2) What do end-users need to understand? 3) What attitudes need to be formed by end-users and trainers?

Understanding the above questions in terms of the current situation of users and the use environment makes the implementation of end-user training realistic and achievable. Juliff (1990) suggested that we first help users to become informed users, then progress to helping them become proficient users and developers.

The model by Koong and Liu (1991) also denotes a movement from computer literacy to end-user self-sufficiency implying Juliff's progression in users' education and skills. Juliff (1990) sees users and users skills and learning needs moving along a time-space continuum that is constantly moving and shifting. Situations like this require that we strive to understand and make sense of how low level end-users first learn and use computers. Based on this approach, it is possible to promote an environment wherein experimentation and learning are fostered, which will enable clerical and administrative staff to gain and apply skills necessary to run applications software. Placing the learning needs of the user on a continuum and starting from the lower level, helps to evaluate progress and operationalize what is mostly a misunderstood construct called user satisfaction in MIS literature.

The focus of this study is not only to explore the experience of end-users, but also to understand the general learning process of adults and their particular problems. Users and learners in this study can be first-time users/learners or users who are upgrading their knowledge. The perceptions and experience of learners that will be collected is on PCs and software such as Lotus, WordPerfect and dBase.

This study will also use Keen's (1980) adaptive framework (modified) to examine and categorize concepts and ideas collected from participants (Figure 1). Keen's modified adaptive model helps to formulate a thorough understanding of social

interactions in computing environments, user's problems, and a strategy of mutual trust building. A series of small, adaptive, formal, and informal interactions takes place between a user, a builder, and a system which the model depicts is a learning process. Understanding the nature of this small adaptive interaction helps to explain the learning process of a user and the builder.

Orlikowski and Gash (1994), even though they did not explicitly mention Keen's model, employed the user, developer, and system categories of Keen (1980) in their interviews and observations. They also used the same dimension of IT that Keen identified.

According to Keen (1985), the dimension of IT includes time, soft/hardware, people, and requirements for new skills in applying technology. The conventional approach (technological frames) to learning and implementing IT omits the dimension of time, people and the needs for new skills. As a result, the "intelligent technology" today "lacks intelligent" workers, which is mainly caused by the lack of a pedagogy to develop its users (Schuck, 1985). Examining users' and developers' approach, meaning and understanding of the system, using Keen's model, makes the identification of interactions within computing environments manageable.

In this research, the HCI and MIS literature is used to understand the basic concepts and problems of end-user computing. In this regard, my approach and goal are closely related to Orlikowski and Gash (1994) and Hellman (1992). As a result, therefore, the interview guides, listed in appendices B and C, are designed in such a way that learners' assumptions, expectations and knowledge can be collected.

The essence of this study is to collect and understand users' perceptions of information technology. I want to listen to what they say about how they learn, how

yy

FIGURE 1 Modified Keen's Adaptive Framework
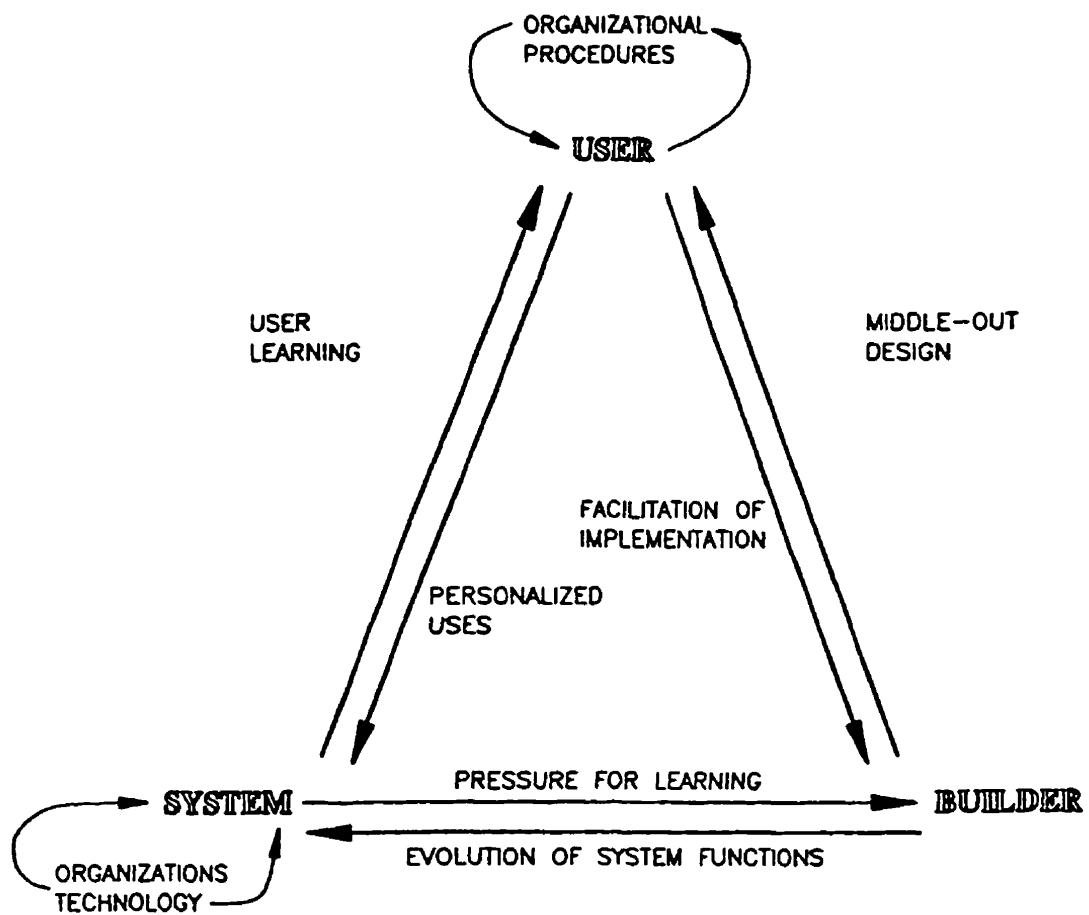
they improve their computing skills, what problems they face, and their preferred method of learning computers.

The search for user perceptions, perspectives, and experience on computing has nothing to do with evaluation. As a person inclined to conducting a qualitative study, I go to the field to learn and listen, not to pass judgement. The interview guides have been tested (piloted) for their non-evaluative purpose. This research is not a search for general or universal "truth," but is intended to illuminate a new understanding of computer users and learners and how they acquire their computing skills. Symbolic interactionism (Blumer, 1969) was the philosophical view that informed this study. The goal is to understand the practices that individuals employ in managing and making sense of their computer learning process and the problems they encounter.

Summary and Conclusion on End-User Training

End-User Computing researchers identified problems and recommended methods and models for end-user training. Eason (1988,1989), for example, presented learning needs and modes of promoting learning in IT. Koong and Liu (1991), following Eason, informed us to start from computer literacy and move to EUC self-sufficiency. One training strategy that is recommended by Ehrlich (1987), from Wang Laboratories for office communication, is to provide education that demonstrates positive impact, to provide step-by-step training on unfamiliar features and to provide follow-through to encourage system use.

Davis and Davis (1990), Gattiker (1992), Gattiker and Paulson (1987) showed the influence of training methods and personal characteristics on acquisition of computer knowledge. None of these studies was based on adult users or framed in terms of adult learning and teaching. The systemic introduction of computers and

reinforcement of learning is not well examined. Other training- related research, done by human computer interaction or interface experts, focused on the design and development of computer software/interface. The emphasis given to usability and ease of use, error avoidance rather than error management, considered the final elimination of the need to train users as a main goal. As a result, it did not take training and users education beyond technology's promise.

The literature is also contradictory because, according to conventional wisdom, the acquisition of new technology usually necessitates awareness, skill upgrading, formal training, and continuous learning. This obvious consideration is usually the most ignored in computing. Trade journals, such as PC Week, report that formal end-user training in the office is diminishing, while informal training is increasing. While formal training is decreasing, new versions of software and faster machines are daily brought into offices. Informal training basically consists of on-the-job training, learning by doing, or learning by exploration (Staufer, 1992). An on-the-job training program is not mostly structured to insure that a trainee has the opportunity to spend enough time learning new concepts.

Robert (cited in Staufer, 1992) reported that learning by exploration (learning by doing) can cause substantial frustration without available human help. In the absence of human help, established objectives, and controlled conditions, learning by doing loses its educational value. Veenman and Elshout (1991, p. 309) discuss how learning by doing and learning by discovery enable students to bridge the gap, improve motivation, and enhance learning. Under what conditions and with what type of learner this will happen is still not clear.

Research and training deal with user satisfaction, instead of focusing on how to help users adapt to the new technology. User satisfaction research tends to

ignore both the historical context in which systems are used and users' skills, which may affect satisfaction. What MIS literature needs to measure in user satisfaction research is actually users' computer knowledge or education. Research by Massoud (1991), conducted on adult basic education students, as well as Igbaria and Chakrabarti (1990) with end-users, showed that trained people with computer knowledge are more satisfied with their PCs and develop a positive attitude towards computing.

According to Joyce and Showers (1980), the impact of training is: 1) awareness, 2) the acquisition of concepts or organized knowledge, 3) the learning of principles and skills, and 4) the ability to solve problems. These impacts are minimal in the end-user training literature. They are minimal because available research on individual differences (for example, Gattiker, 1990b; Harrison and Rainer, 1992; and Sein and Bostrom, 1989) is rarely used. The works of Wlodkowski (1985) on motivation, Richey (1992) on instruction for adult learner, Brookfield (1986) on facilitation are left unused.

As a result, the goal of making computer instruction accessible and familiar (Russon, Josefwitz and Edmonds, 1994) to adult learners and users is not achieved. Neither the claim of Bronsema and Keen (1983) that education should be a dominant concern, nor the adult learning issues, were used in end-user training.

The focus of the research listed in tables 2.1 to 2.5 is upon techniques (procedures) for batch processing, not on understanding of the process of learning which is important in current network environment. Data from Fotheringhame (1986) suggests that without the provision of explicit training in general principles, experience on single example or software (text editor) does not result in the proper use of other text editor packages or software. The influence of learning a given text editor

or software through one method on the subsequent learning of other text editor/software was not examined.

In most cases, as suggested by Hesketh, Andrews, and Chandler (1989, p. 163), analogical reasoning is expressed more in terms of cognitive psychology. In cognitive psychology the activity of the mind (programmers and programming) takes precedence over the activity of the hand (clerks and word processing). This precedence has resulted in what Carpenter (as cited in Frey, 1989, p. 30), noted: "there are good violin manufacturers today, but there is no Antonio Stradivarius." Cognitive psychology is focused more on higher skills than on how to learn the basics of computer usage. The basic is assumed to be too obvious and is simple to ignore. Cognitive psychology also considers technological knowledge to be at the lowest level of skills and similar to artisan skills associated with manual or physical manipulation. The process of acquisition of skills is learning and understanding; and the interaction process between a learner and a machine from a novice point of view is not well known or treated.

Kitajima (1989) recognized the importance of getting an interpretive understanding of users interacting with computer systems. Suchman, (cited in Kitajima, 1989), suggested that user actions/understanding should be founded not on plans but on local and social interactions within his/her environment (machine). This approach indicates that understanding of a user is situated and should be interpreted on the basis of local interaction. This interpretive understanding of a computer user is lacking in most MISs research. As a result, users must struggle with the difficulties in applications that experts assume to be universally easy to learn and easy to use.

The human resource group has not played an important role in delivery of EUT in any of the research listed in tables 2.1 to 2.5 (Gash and Kossek, 1990;

Gunton, 1988; Kochen, Yuan and Barr, 1986; Parsons, 1988). The adult learning principles and methods (Appendix A) and what the adult learning theory and practice can offer to better EUT are also not visible in tables 2.1 to 2.5. For these reasons, this researcher has found it reasonable to present in the next section a separate review of literature on adult learning.

Adult Learning Principles and Methods

Introduction. In the previous section of EUT literature review, it was clear that the issue of how adults learn, what problems they face and what to do about the problems related to users and their learning was absent. Most, if not all, MIS literature seriously neglected issues related to the concept of learner motivation, building confidence, self-efficacy, and creating a conducive learning environment for learners. The neglect of the above concepts in MIS literature is not surprising. It is not surprising because, long ago Gerver (1984, p. 16) reported that "there has been virtually no serious evaluation carried out in the field of the use of computers in adult learning." While Gerver attributes the neglect of adult learning to lack of evaluation, Weisbord (1987, p. 172) relates the issue to the bottom line in MIS which is speed, productivity, and training cost reduction. For Weisbord "the bottom line on the bottom lines is dignity, meaning, and community." In EUT this means respecting users' dignity, helping users develop their meaning of IT, and organizing a user community that can effectively use and solve their computing problems. The purpose is to create, adapt, and extend new technology to solve work related problems.

Dignity and meaning comes with dialogue and communication. Dialogue and communication take place when beliefs, values, commitments, and passion are shared in common. This demands willingness to listen and to seek to understand what are the main learning problems of adult computer users/learners. The common beliefs, value commitment, and passions most adult educators have are commonly stated as the adult learning principles and methods listed in appendix A. In this regard, the educator is not a surrogate doctor who will solve all computer's problems and leave behind the user's fear and limitations but one who starts with the learner's fears and limitations while respecting the dignity of learners.

According to Weisbord, this dignity, meaning and community brings efficiency, effectiveness, and higher productivity. This is what is currently called productivity through people. Productivity through people is possible by helping adult workers learn. Effective adult learning requires understanding of learners while at the same time encouraging the natural tendency for them to learn, making content relevant and creating a conducive learning environment, and helping adults relate their experience to what they learn. In short, these are the basic assumptions about the adult learning principles and methods listed in appendix A. Though these principles and assumptions were well developed and practised in other areas of management and staff development programs they are not common in EUT.

The absence of adult learning principles in computer training is related to computer culture (Discrete Entity) which Boland (1987, p. 363-365), indicates as the removal of the human actor from serious consideration to be fantasies and states:

> the fantasies lead us to ignore the fundamental nature of interpersonal dialogue in the achievement of meaning... Through our image of information we are fostering an image of the world in which human meaning of knowledge and action are unproblematic, predefined, and prepackaged.

In short most MIS literature could not help educators raise a serious question such as, How can we educate every adult computer user to become more adaptable to IT? This is mainly because workforce education has long been neglected. One way out of the problem is accepting and using the adult learning principles and methods stated in Appendix A. These basic assumptions and beliefs about adult learning are a collection of research findings which were accepted as a guide to help a facilitator of adult learning.

The principles of adult learning are presented by Biggs (1991) as presage (prior knowledge, motivation, ability, curriculum, method, climate, assessment)

process, and product. Bryan. Beaudinn & Greene (1993) present the principles of adult learning as, what to do before the training program, during the program, and after the program. Carter et al. (1991), present it as planning checklists for designing computer training for adults. Fiddler and Marienan (1995) present the principles and methods of adult learning in its most developed form as: support. inform. and affirm. Even (1981) approached the adult learning process as past. present and future.

While the above are the result of large scale research outcomes in various adult learning environments, Grupe and Connelly (1995) present what is presented in Appendix A as the ten principles of adult learning. The twenty-two good educational practices listed by Mark (1989) are also another way of stating basic principles of the adult learning process. In addition to the above different presentations, the following authors: Boud (1987). Brookfield (1986). Brundage et al. (1980). Cheren (1990). Cross (1981). Dickinson (1973). Griffin (1987). Hammond (1990). Jarvis (1987). Kidd (1973). Knox (1986). Knowles (1980). Ritchy (1992). Thomas (1991), and Tough (1979) discuss the adult learning principles and methods in great detail. In terms of EUT. they are all about effective adult learning practices that cut across various educational and training settings. Gravan and McCracken (1993), citing Rakes. show effective adult learning in EUT to involve the following activities: showing how new computer skills and knowledge relate to what adults already know; making sure that the material is meaningful; showing concern for users; helping learners to be active participants; encouraging them to ask questions and knowing whether users are motivated to learn.

What is common to all research and discussion about adult learning are the following: planning the learning and teaching process and evaluation. Creating the learning climate, promoting learning to learn, supporting learners, and involving learners is critical. Motivation to learn, identification of learners prior knowledge and background (fear and concern), program design, and classroom process and techniques can facilitate learning. Navaratnam and Scott (1995) discuss how educators use these concepts in terms of environmental scanning. This environmental scanning for training is achieved by identifying the strength and weakness, opportunity and threat for learning/training. According to this argument, effective adult learning means matching learners strengths with learning opportunities or removing what is considered as a threat to learning and reducing the weakness of a learner, a facilitator, and a sponsoring organization.

The starting point in this process is stated by Mark (1989, p. 48), as "highlight the positive: build unconditional self-esteem and motivation via positive reinforcement." This is creating the learning environment. What emerges from serious consideration of the adult learning principles and methods is a guide which will help a trainer: take learners through a transition stage at a comfortable pace, use personal stories that may help learners break fear about computers, keep activities simple, explain jargon, and most importantly to be patient. These are basically about self-efficacy, creating a learning environment, and general facilitation of adult learning processes. In the following section, we will discuss what the adult learning literature says about these concepts.

Self-efficacy. Self-efficacy refers to an individual's confidence in one's ability to take action and achieve a given purpose. It is a personal judgement of one's ability and talent. According to Bandura (1986), self-efficacy can be developed through

vicarious experiences (observing others, through persuasive statements (saying I know you can do it), and through performance accomplishments). Self-efficacy involves both performance (behaviour) and cognition (skill).

Bandura (1986) shows how a progressive program of modelling, coaching, desensitizing, fear of failure, and encouraging independence can enhance self-efficacy. According to Bandura, self-efficacy is a gradual skill acquisition process through enactive mastery. What Bandura calls desensitizing is similar to what Lewin (1947) called "unfreezing." It is for this important reason that Bronsema and Keen (1983) call for educational intervention before technology introduction into the office. It is this educational intervention which is missing and which gives users a problem. It not only gives them a problem, but it has also proliferated into the consideration of computing as if it were beyond their reach.

Both Ertmer, Evenbeck, Cennamo and Lehman (1994), and Oliver and Shapiro (1993) agree that without self-efficacy, performance may not occur at all. Looking at how self-efficacy is developed for computer use helps us to gain an understanding of how individuals come to feel capable of using computers. Ertmer et al. (1994, p. 57), report that a learner's self-efficacy for a specific computer software could be enhanced by increasing the amount of time interacting with computers and with instructors.

Computer learning and its use environment are intimidating to the novice computer user. Computers may be feared and are intimidating mainly because they are not effectively socialized. Learners initially need a sympathetic listener to whom they can voice their frustration and confusion. The personal and private interaction between a learner and instructor at this initial time is critical. Schunk (cited in

Ertmer et al. 1994) suggests that if initial experiences are perceived positively. change in self-efficacy is likely to occur.

The development of self-efficacy is also related to Knowles' (1980) assumption of andragogy. According to Knowles (1980, p. 43) andragogy "is another model of assumption about learners" which focuses on adult learning as an effort toward self-mastery and self-concept. Anadragogy is meant to place the emphasis on the learner learning and on respecting and utilizing the experience of adults. It is about relating and understanding what Tyler (1949) called "logical and psychological organization of learning" to make learning an active process for learners. Andragogy is based on self-concept, experience. readiness to learn, and the time perspective of adult learners. Self-concept, according to Cross (1981), is related to the developmental stages of learners through which adult learners develop their knowledge and confidence as they continue learning. In this regard. self-efficacy can emerge from self-concept.

In learning basic computer skills. self-concept is important for its symbolic value as used in symbolic interactionism. In symbolic interaction, the self-concept is used to let the individual ask the question of "who am I" in this learning situation? and for the instructor to respect the individual learner (Vaske & Grantham, 1990). The issue (for symbolic interactionism and adult educators) in self-concept is to have self-respect, self-confidence, and respect for each other; which is what well designed adult learning programs aim to achieve. The purpose is to build individual confidence and motivate adults to learn and take action. The goal is to make learning possible, achievable and within the reach of adults. How the learner views himself/herself is an important aspect of the learner's willingness or ability to learn. Symbolic interactionism also attests that cultural values and orientation play a stronger role

in motivating the learner. To accomplish this, an educator needs to create a learning environment.

Learning environment. For some, learning environments are equivalent to education or the design of education. This is its broadest meaning which has some value when trying to understand learning and help a learner. Although the learning environment/climate is an important concept, one can not find its definition except in the American Educators Encyclopedia (Dejnozka & Kapel, 1982, p. 294). This encyclopedia defines learning climate as: "the type of atmosphere or conditions in which learning takes place... the teacher generally establishes... interpersonal relationships... are the major determinants." It is supporting and encouraging the learner to know or feel that he/she is among people and in an environment which cares that they succeed in learning.

Davie (1989), Galbraith (1991), and Knox (1986) are some of the adult educators who specifically focus on learning climate. Galbraith considers the issue of a learning environment to be what happens or what contributes at the first session which establishes a supportive, challenging, friendly, informal, and open atmosphere. Galbraith (1991, p. 20) addresses the issue of a learning environment in terms of creating a conducive psychological climate. According to Galbraith, sound adult learning process is achieved in a climate that "suggests mutual respect, collaborativeness, mutual trust, supportiveness, openness to challenge, risk taking, pleasure and friendliness." Davie (1989) approaches climate-setting to decrease anxiety and to set the intellectual climate. Knox (1986) stresses the importance of supportive learning during the first session.

Our current understanding of the learning environment and climate-setting is credited to M. S. Knowles. Knowles (1980, p. 67), in particular, uses the term

"educative environment" as identical to learning environment/climate setting. Knowles (1980, p. 223-226), discusses the characteristics of an educative environment conducive to learning. Setting the climate includes the way learners are greeted. oriented, introduced, and treated by the instructor. In this regard, Knowles' educative environment is equivalent to what Tyler (1949, p. 97) called psychological organization which is "the relationship as it may appear to the learner."

Climate-setting involves asking learners what they are, who they are, what special resources they have, and what questions, problems and concerns they have (Knowles, 1980). What makes climate-setting an important first step in learning is that it brings a sense of security and trust to the learner and the facilitator. Hammond (1990) shows how this trust and security helps to minimize conflict and apprehension.

The use and learning environment of computing is where one observes what the anthropologist Pelissier (1991) calls "a great divide." The modern, the advanced, the sophisticated and the fast versus the primitive, the crude, and the slow which are all a fertile ground for conflict. Table 2.8 illustrates some of the most important contrasting characteristics observed in most computer use environments that impede learning and effective usage (Beath and Orlikowski, 1994; Clegg, 1993; Jiang & Kopec, 1993). The table summarizes the core problems from the perspective of both lower level end-users and computer trainers.

The table (table 2.8) shows the two polar groups with wide gaps between them. In the table, there is an old anthropological debate such as: [us and them, primitive and civilized, open and closed and dominant and subordinate]. "X is too technical, has no empathy with users, X is not user oriented, she feels superior," are statements used by users when talking about computer experts. The experts, on the

Table 2.8

A Contrast of Technologists' and Users' Technological Frames

Domain	Technologists'	Users'
Nature of Technology	Focus on technological capabilities in isolation.	Misunderstanding or confusion about the technology
	I knew in an hour that it was a breakthrough software.	I know nothing about it I still do not know what it is exactly.
	The faster we could get to critical mass, the sooner people would use it	Is it a new version of 1-2-3?
Technology in use	Installation is critical, it is the primary focus:	Lack of training seen as an inhibitor to understanding and using technology
	The focus is to keep machine running so they are purely focused on the technical implementation	If I had more formal training the product might be more useful.
		Training here is so basic it does not tell you much.
	Users will learn to use the technology on their own. So we minimized training to reduce the period of trial. We didn't want they [the users] to think they had to learn to use Notes.	It is no good just putting the technology on our desks. You have to show us practical applications, something with real value to my work

table continues

Table 2.8

A Contrast of Technologists' and Users' Technological Frames

Domain	Technologists'	Users'
	Application is easy. The average Joe can build his own application. People are smart, they will figure out what to do. The machine is mechanically based. If you worked around it all the time you could figure it out.	Computer training here is awful. It really is. I wish you would come to see for yourself how bad it is. I'm a reasonable smart person but [the technology support staff] make things so complicated. It is not very helpful

I would be dead in the water without Joe, he knows the system inside and out. |
	We want more: intelligent agents"	Show me how to do it, and I will do it myself
	The staff were reluctant to spend much time on anything that took them away from the office	The first training session was too elementary.
	I wouldn't explain as much his interest is getting the technical information than actually understanding what is going on Users don't understand what they are doing. They don't know what they are doing.	A call to hot line usually solved any problems but wasted time.

other hand, view users as: those who spend too much time interacting with applications and not enough time learning about them, users mostly prefer procedures that are not optimal. The table is the mirror image of divisions, walls, partitions, separate values, and meanings held by technologists, computer experts and the user. Table 2.8 in short, summarizes overt and silent problems in the use and learning environments that are a source of conflict, misunderstanding, and apprehension.

Conflict and apprehension are realities in the learning process because there is no learning without emotion and challenge. Climate-setting reduces this conflict and apprehension by bringing a human dimension to the learning process. For the computing session it helps to fight misconceptions about computers, to unfreeze fear and helps to build learners' confidence. A step-by-step introduction for adults to the physical machine and the software reduces the chance of jumping on to the machine and getting frustrated and facing what is called "production bias" or "production paradox."

The need to create an educative climate in computer training is even clearer than before. Allwood and Wikstrom (1986); Kennedy (1975); Moran (1981); Nickerson (1981); Paxton and Turner (1984) show that the learning needs of each novice learner are different. Garavan and McCracken (1993a, b); Grupe and Connolly (1995), and Carter and Honeywell (1991) show that the need for more adult learning principles and methods is necessary in order to create a learning environment for people to effectively learn about computers. In this regard, Guinan and Bostrom (1986) deliver a communications framework needed to learn while using/developing computer-based information. After creating a conductive learning environment, the adult educator faces another daunting activity of facilitating learning.

Facilitation. Facilitation is a process of helping adults learn (acquire new skills and knowledge) either in a formal or informal setting. Facilitating the learning process involves creating a learning environment. This learning environment is safe, allows people to take risks and respects the whole person (Brundage and et al., 1980. Nowadays, facilitation is more popular than before. It is no longer confined to adult education literature. In fact, some computer experts have recently started to sound like adult educators in terms of their focus on this construct. Mumford and Henshall (cited in Martin, 1988), Shah et al. (1988), and Olfman and Bostrom (1991) indicate how far the use of facilitation as a process has become important in learning and using computers. The missing link, with regard to using and learning computers is found to be connecting learners to the learning resources based on an adult-adult relationship. Sixteen years after Patricia Cross (1978) identified the problem of linking users with learning resources, the topic has become a major issue in Management Information Systems literature.

Craig (1992-93) in his article entitled Improving in-house computer literacy cites Cross (1981) on how to approach computer training. Ehrlich (1987) and Hirschheim (1986a) are some of the reports which strictly focus on facilitation and were presented at the Association for Computing Machinery (ACM) proceedings. Beise, Niedermana and Beranek (1992) in their article Facilitating technology-supported group work are searching for what makes an excellent facilitator.

Many adult educators have written about adult learning and facilitation. Brookfield (1986), for example, lists six principles of facilitation. What is common in all reports about facilitation is respect and collaboration. Hammond (1990, p. 151-157) extends effective facilitation to include: providing the learner with a framework, ensuring the learners' current assumptions and creating new opportunities for

learners. Hammond's statement on making "the idea of learning to learn understandable and palatable." in particular, is an important addition when trying to understand facilitation in adult learning. Facilitation brings the learner, the learning and the instructor (facilitator) unity. It is an interactive transaction. The process of facilitating learning involves an instructor who is not only a passive learning resource supplier but an active participant. He is one who helps or guide the learning of others. To achieve this in EUT the need for human- centred system and the middle-out design become important.

The Need for a Human-Centred System. The purpose of a human-centred system is to have a guide to make sense out of the vast amount of information circulating. This guide helps people learn and use computers. So far, many organizations have no basic map or guide to help their employees locate a product or a supplier record from a large company data base. Quite a few users can enter and exit a company data base without a problem.

To reduce the problem, Davenport (1994) recommends humanizing-information management. Morris (1994) calls for a user-centred information service. Mumford (1987) recommends Effective Technical and Human Implementation of Computer-based System (ETHICS), Maruyama (1984) calls for humanizing the applications of a computer. The emphasis in all recommendations is for a balance between technology, organization and the user. The issue in all cases is how to help users get awareness and how to help them acquire computing skills and knowledge so that they can use computers with manageable problems.

What Maruyama (1984) calls "humanizing application of computers" is a search for what adult educators identify as a conducive learning environment. The interest in humanizing computer systems brought a new meaning to the human

computer interface/interaction term called "know the user." The original meaning of this slogan was for the designer to provide a familiar model of a computer for a typical user. What is not yet clear is the impossibility of eliminating users' individual differences in both the use and learning environments.

To "know the user" is now understood to be the deep understanding of a user as a human being. In terms of adult learning, 'know the user' identifies comments such as "I know I should learn how to use the computer, but it looks so complicated. I do not think I will be able to master it." These comments were left unidentified or unused because most professional journals down played the importance of identifying and using them in training. Dignity, meaning, community and developing the courage to know/learn are not well developed in computing literature.

Middle-Out Design. Middle-out design is what is commonly called emergent design. The purpose of emergent design (middle-out design) is to enhance learning and relevance and to use the combined life experiences of the learners and experts. It is to encourage participation in design of learning activities, realignment of goals and to help cope with ambiguities. The possibility of using the middle-out design (learning from each other while working together) which is depicted in Keen's model (Keen, 1980) is still not visible within the current computer use environment.

Today a reluctance to accept an emergent design and understand the user, on the part of the experts, has resulted in the vast current misunderstandings in the computer use and learning environments. Oz (1994, p. 34), reports these misunderstandings to be corresponding failure, process failure, interaction failure, and expectation failure. In terms of EUT and adult learning, these failures are a mismatch of objectives, results, lack of skills and resources, low user interaction, and involvement and vaguely expressed expectations for training. Correspondence failure

is usually because of paying less attention to the felt needs of end-users. Interaction failure is the outcome of "corporate directives that the employees must use the system."

Robbins (1995, p. 16) traces the historical, socio-political and systemic nature of turbulence in the field of IT that forced it to neglect emergent design, pluralism, positive interaction with users and states:

> we continue to resist new thinking, and we criticize what we do not understand, we pretend to listen to our customers (our audiences) but we ignore their basic needs unless it suits our personal agenda...

The above statement by Robbins illustrates the contradictory situations in the computing environment and what has made computers and computing an "incommunicable art" (Snow (1963, p. 47). Bainbridge (1987, p. 272) shows this situation as an "irony of automation." The irony is that IT experts seek to eliminate people from the process because they are unreliable and inefficient. Yet they require people to perform all the tasks the designer could not automate. Learning and using computers were made incommunicable arts because the process lacks sequence and structure.

Dickinson (1973) indicates that the ordering of any learning task is an important factor for effective learning and suggests the following arrangement for sound instructional process/sequence: From simple to complex, from general to specific, from concrete to abstract, from familiar to unknown, and from most to least frequent. On the other hand, Eason (1988) presents the learning needs of office workers and modes of promoting learning (see table 2.9).

Table 2.9

Learning Needs & Modes of Promoting Learning

Learning Needs

Delivery Modes	System Centred		Application Centred			
	IT Basics	System Model	Command Learning	Skills	Task-System Match	Application Building
General Education	YY					
Familiarization	YY	YY	Y		Y	
Main Interfaces		YY	YY	YY	Y	Y
On-line Help			YY	Y		
Manuals & Prompts			YY		Y	
Expert Support						YY
Local Support			Y		YY	

Source: Eason (1988) Information Technology and Organizational Change

Note: Y = Secondary
       YY = Primary

The table presents a range of ways to deliver learning with different kinds of learning required. In the table, the major types of learning required are indicated with YY while the secondary types are represented by Y depending on the delivery mode and the level of the learner. For example, to familiarize individuals learning about IT basics, system models are indicated as a major type while command learning and task-system match are indicated as secondary. Eason particularly stresses what he called pre-use learning. Pre-use learning is related to the problems that are critical during the first encounter with a computer. Eason (1989, p. 236) states that,

> Many new users make extreme and unrealistic assumptions about the technology and are very nervous about their ability to cope with it... The familiarization sessions before implementation... can be extremely valuable.

To this effect, Eason considers the aim of the first session as a preparation for people to learn "to set people up for learning," rather than teaching the entire application in one day. This approach to end-user training calls for more facilitation to help people learn by building their confidence.

The Importance of Adult learning principles and Methods

One important reason why the need for more facilitation became so important in end-user training is identified by Geisler (1992, p. 76). Geisler considers "every investment in IT as a voyage into frustration." Defying the notion of "easy-to-use and easy-to learn," Geisler warned computer experts that the human problems in computing needed what he called the three Ts.: time, training and tolerance. This is similar to the learning process approach of Korten (1980) which is learning to be effective, learning to be efficient and learning to expand one's knowledge. These three different learning needs are time, training, and tolerance. According to Alan Thomas (Thomas, 1991, p. 4-18), the main characteristics of learning are: learning is

irreversible, learning takes time; learning can not be done overnight by magic, it is not coercible and it derives more from other people than from one person.

Research by Clement, 1994; Eason, 1988, 1989, George et al. 1994; Rockart & Flannery, 1983), have repeatedly shown that users turn to local experts or friends for help, rather than to the organization's technical experts. This has generated the need for training the trainer (Fitzgerald & Cater-Steel, 1995). In this regard, some Information Centres have already started looking for volunteer instructors to teach basic Windows. These volunteers are for the most part local experts in various departments closest to the end-users. To effectively prepare these home grown functionally competent users to train and support their peers the adult learning principles and methods were found to be very important. This is to help trainers to establish user groups, how to build computer awareness and how to individualize learning while creating a non-threatening environment for training and support.

The second important reason why facilitation (the adult learning principles and methods) became so urgent and important is related to the nature of computing technology itself. In most other technologies, once initial investment occurs it will bring more benefit with lower investment in the latter stages. In modern computing, and in particular, with office information systems, the system continuously needs investment in software and human skills. For example, the movement from Third Generation Languages (3GLS) to Fourth Generation Languages (4GLS) involved significant learning and adjustment, due to the fact that many of the concepts of a 4GLS environment are difficult to learn.

Third generation languages were initially more difficult to learn but easier to use as familiarity increased. Fourth generation languages are easier to use initially, but become more difficult to use for complex problems. Constantly adding new and

advanced features in 4GLS creates a new learning process and along with those new problems. According to Avison and Shah (1994, p. 247), "third generation languages and fourth generation are not a matter of changes in degree, but change in type." The need for education, training and support for each and every new version is very high.

In terms of EUC, the S shaped growth (logistic) curve is not operational (Avison & Shah, 1994). This is mainly for two reasons. First, initially, most users are not prepared to master the operating system that runs a computer system. Users also move to different versions before achieving a certain critical mass in computing skills and knowledge. For example, the lack of basic computing skills in the DOS environment became quite visible with the training of Windows. Skills such as moving, resizing and activating windows, choosing commands (from command menus) and tool bars, clicking and double clicking and dragging with a mouse, and using the scroll bar and direction keys became a major problem for learners transferring from a DOS to a Windows environment.

The interface between the application software and the operating system, in most cases, returns the user to the operating system. In this regard (Dyck, 1995) reports Macintosh is not a "walk-up-and-use computer" for a naive computer user. It requires learning in order to use it. The interface that made Macintosh "easy to use" is still not easy for most users. People still have a problem with computer interface and how to save their documents using available interface.

Second, In addition to initial training, computing requires continuous education and refresher courses. James (1992, p. 21), for example, concluded that "neither information nor information technology can be used effectively without a continuing and pervasive education and training. Users who use two or more software packages and casual users need skills maintenance (Eason, 1989; James, 1992).

Davenport (1994, p. 119-129) reports that IT is not the one most management believe. It is not the one which "if you build it, people will use it." For this reason Davenport calls for the human-centred information systems management that encourages dignity, meaning, and community of users.

Humanizing computer application, and making learning about computers possible and achievable needs to go beyond measuring computer anxiety, user resistance, and user satisfaction. The basic problem behind computer anxiety, user resistance, and user dissatisfaction is lack of skills (experience) and knowledge about computers and the numerous myths that were generated about IT. One educational research document presents an important approach on how to introduce learners to computers, and demystifying computer anxiety and computer resistance.

A study of 666 adult basic education students (Lewis, 1988), found that the students were both interested in and comfortable with computers. This finding was in stark opposition to the findings reported in most major computer journals. In her sample, Lewis used people who were traditionally characterized as having a low self-concept and a negative educational experiences. The adult learning environment was credited as a major reason for such encouraging findings. The adult learning environment was created by what Lewis (1988, p. 7-8) called principles of good practice and teaching techniques that facilitate learning. These principles of good practice are:

1.   Demystify the computer

2.   Attempt to ascertain the learner' worst fears

3.   Start with basics

4.   Recount your own personal experience as beginning computer user

5.   Avoid jargon or buzz words

6.   Take things slowly

7.   Don't give students too much information at once

8.   Remind learners that they do not have to memorize everything

9.   Provide numerous and frequent opportunities for hands-on experience

10.   Promote learning partnership

11   Utilize learner as peer tutors to assist others

12.   Encourage group work

13.   Encourage learners to share their success as well as their problems

14.   Reassure users that it is all right to make mistakes

15.   Reserve time for open discussion

16.   Whenever possible, hold computer course in neutral or nontraditional locations such as lounges or libraries

17.   Invite women to be guest speakers.

The most significant approach of Lewis' is that it indicates that the responses of adults to computers can be effective, cognitive, and instrumental. So far, computer training is being provided simply for its instrumental value in running a simple spreadsheet or processing memos. Presently, computer training is not even meeting its instrumental value (Eason, 1989). This is because both the training methods and the kind of training given are not compatible with what the learners can easily relate to. For example, Berg and Poppenhagen (1985) found that adults are relatively distributed across the different learning styles. Many adults approach even mechanically-oriented learning tasks from a theoretical or conceptual direction. Yet in EUT basic methods of teaching and learning are still one day training or CBI without some help.

The second value in Lewis' work is that it is simple and easy to adopt. Above all she states "those who are working with adults must learn as much as possible about the individual's attitudes towards computers in order to develop the appropriate approach that promotes the achievement of computer skills" (Lewis, 1988, p. 6). Lewis' recommendations are comprehensive and include important issues raised by Carroll, 1987; Eason, 1976; Nickerson, 1981; Nielson, 1989; Olfman et al., 1991; Paxton et al., 1984; Robson, 1990; Rothchild, 1981; and Sein et al. 1987, 1989.

Eason (1976), in particular, identified the general attributes of the naive computer user. A naive computer user is a person who is not an expert in computers, but rather one who has a limited knowledge of computers. She/he is at risk in the use of a computer system especially when the system is on-line. An unusual response by the system can be traumatic and this experience can colour his/her attitude. Eason (1976, p. 6) states that, the term naive computer user in some "circumstances is inappropriate; 'computer servant' would be a more accurate description. Employees in this position, are mostly clerks,...." Educationally, Eason is pointing to trainers with whom they are dealing. Yet, except in the case of Lewis, this understanding of who is the user/learner is seriously lacking.

The suggestion by Lewis addresses the silent features of learning that are largely neglected by others and which give learners a difficult time learning and using computers. Creating a learning environment, building learners' self-concept, respecting the individual differences of learner, and using different teaching methods are all indicated in her recommendations. Building learners confidence, in particular, when the learners are lower level workers and older adults, is very critical. These learners, while having a potential to learn PCs, often lack confidence in their ability to master a new technology.

What is clear in her approach to teaching and learning about computers is the way she approached motivation and the need for mixing instructional methods. Hiemstra and Sisco (1990) also point out the importance of mixing and blending delivery patterns and roles. Lewis' focus was upon how to help people start learning. The goal is to build comfort and confidence and to make computer training an opportunity rather than a threat. Her point is to make people ready for a computing journey using all possible methods. Another goal is to give structure, confidence and provide a road map for further learning. Kraybil (1974, p. 335) states the importance of giving structure is "once the structure of a subject is exposed, an individual can then acquire other details throughout life with which to elaborate structure."

The seventeen points that Lewis stated, as principles of good practice, concern creating a learning environment and moving learners smoothly through the change process. They are about building learners self-efficacy. This is what Bronsema and Keen (1983) call educational intervention. Educational intervention for Bronsema and Keen involves applying the above recommendations of Lewis (1988) with the proper understanding of concepts such as self-efficacy, individual differences, learning environment, and facilitation process. This is to effectively help people move in the change process. From Lewis' study it was possible to see it was a lack of such help during the learning and using process that generated computerphobia and user resistance. Unfortunately, so far, these concepts have rarely been used in computer training programs.

Self-Directed Learning. The work of Lewis (1988) in terms of computer training identifies one important element about self-directed learning for adult learning. She recommends a mix of delivery patterns while Training Magazine's industry-wide survey showed that videotapes and lectures are the major methods

(Richey, 1992). The industry survey reflects one approach which is all instructor-directed training, or all individualized instruction. Individualized instruction is basically called CBL and CBI. Yet Richey (1992), citing Caffarella and O'Donnell reports that self-direction in itself is not always beneficial to learners.

The concept of self-directed learning became important with the work of Tough (1979). Tough initially approached this through what he called learning project. Learning project means a highly deliberate effort to gain and retain certain knowledge or skill. Knowles (1980, p. 47-48) defines self-directed learning as a process in which individuals take the initiative in designing learning experiences, diagonising needs, locating resources, and evaluating learning. This is similar the self-teaching that Tough presented in his research. Tough (1979) consider self-teaching as taking responsibility for planning and directing the course of learning. Self-direction and self-directed learning involve a learning contract, self-organizing ability, the ability to observe, some sorts of induction or introduction and peer learning, autonomy, self-concept, and control. These qualities are not the universal characteristics of learners. In learning there is also a balance of power and control, social interaction, and sharing. Learning without some support or help, structure, and social interaction is difficult or un-achievable. Self-directed learning involves the facilitator, the learner and interaction of the two.

In self-directed learning there is mutual responsibility of learner and teacher. But to extend the characteristics of an educated few to all adults in the involvement of adult learners in a process of self-diagnosis of their learning needs, constructing their model of competencies, and ability to measure the gap between "where they are now and where they would like to be" (which Knowles (1980, p. 47-48) presents as self-direction is not practical.

Self-directed learning is not beneficial in itself because there is no sophisticated educational or training software that can satisfy the needs of different individual learners. Even if it were present, making changes on the CD ROM requires a different authoring system beyond the reach of most trainers. The other problem is related to learners and learning itself.

Part of the problem in the learner control (CBL) is that many learners are not aware of their own strengths and weaknesses, they may not know strategies related to metacognition, and are poor judges of their level of achievement. In other words, learners may not have the required skills to make and monitor choices as they relate to performance in learning (Steinberg, 1989). In computing literature, Carroll (1987) also reports that people are not always careful planners, not good at systematically following instructional steps, and are often poor at recognizing and recovering from errors they make. In the case of female learners with no computer experience, there is also what is known as "we can but I can not" thinking in learning about technology. Many women have stereotyped themselves as inadequate in the face of technology. The inadequacy is mainly because of lack of prior experience which using CBL facility demands. In this situation, self-direction and learner control is more a problem than facilitating learning. In some cases, learners will want to be told and will resent having responsibility for learning alone. Others will be suspicious of trainers/educators who, by seeking to consult, appear to abandon their responsibility as a leader or teacher.

The benefit of learner control, in most learning, is after providing the learner with training in learning strategies such as how to use on screen help and how to navigate through the packages (modules). This is what adult educators call the skill for learning how to learn. Effective learner control requires the ability to

discriminate between critical and tangential information and subject-specific learning skills. This ability is mostly not well developed with low-level computer users. The mere presence of a tool is not beneficial if the learner does not understand how it can help. Shared control of instruction/learning is more facilitative than total control by either learner or computer (Steinberg, 1989). Similar to Lewis, Steinberg indicates the value of mixing methods and the need for balance in approaching learning and teaching.

Technology is a time saver, but the initial stage of learning and utilization of technology is challenging and time consuming. In their article, 'A Retrospective View of CBI Ten Years of Research, Okolo, Bahr and Rieth (1993) present a comprehensive and balanced view on CBT. CBT for novice learners appears to be more effective when it is preceded or accompanied by instructor-directed instruction. The need for balance was identified by Okolo et al. (1993), but this balance is still lacking. The lack of balance contradicts the way people learn. People learn by doing, by making mistakes, by asking questions and having experts/facilitators share experiences to show them what step to take, what can go wrong and what has gone wrong. Asking task-related questions is a means of getting information and explanation.

The basic problem with self-direction in computer training is that it is applied beyond its basic assumptions. Self directed learning does not imply that learners complete their learning alone. The use of one another as resources, as well as the instructor, underlies the assumption of self-direction. There are also learning contracts, collaboration among learners, and collaboration between a facilitator and a learner for effective use of self-directed learning.

Learners can be active or passive. Some learners have strong self-confidence, others need help to develop their self-direction (Candy, 1987). The world of learning and using computers is not full of active learners who can make the maximum out of most self-study packages. Self-study packages for computer studies are strongly based on the untested learners' ability toward self-direction. What is important for adult learning is not to focus only on self-direction but to effectively apply what Lewis called good teaching practices. These good teaching practices are the principle and methods of adult learning given in appendix A. Both (appendix A and Lewis, 1988) indicate the need for human contact for developing computing skills, self-esteem, and respect for human intellect as well as for providing immediate human feedback.

Summary

The adult learning principles and methods and the various factors they involve in terms of end-user training are about facing the reality of teaching and learning about computers. This is basically because the "user-friendly" myth seems to have lulled PC users and their managers into a false sense of security. It is friendly but users are still having a problem with computer applications in their daily work.

Lin Quoted in (Bloomfield, 1989, p. 420) states:

> user-friendly means that the programmer has adopted a deficiency model of the user's competence and has encoded another layer of instructions... Thus ease-of-use is related to powerlessness rather than control.

So far this deficit model was unable to encourage positive development of users computing skills because it had no interest or focus on what energizes, directs and maintains users and learners action and activities. Extra layers of instruction which made the computer systems look easy actually required extra learning and the result in most cases made computers a very complicated facility to use. In addition to

this, the linguistic codes and computer culture which is technologically oriented made manuals difficult to understand and use as a learning aid. This has left users powerless in front of a powerful machine.

In this study the adult learning principles and methods are believed to help users of PCs become powerful and in control, first by building their self-confidence, and then encouraging them to learn humanly in the best interest of the learner.

CHAPTER 3

RESEARCH DESIGN AND METHODS OF DATA COLLECTION

Introduction

The purpose of this study was to understand how clerical and administrative support staff learn how to use computers and what problems they face in learning how to compute. The study is designed to understand the experiential knowledge of low-level computer end-users. Experiential knowledge "is knowing an entity - person, place, thing, process, etc - in face-to face encounter and interaction." (Heron, 1981, p. 27). In this study the intention is to understand computer users and learners, their activities, problems and feelings through a sustained acquaintance (Eisner, 1991). To achieve this, a qualitative research approach was selected. Qualitative techniques were selected mainly for two major reasons: (a) the nature of the study, and (b) the desire to learn personally what learning and using computers look like at the lowest level of office workers and beginners from themselves. Qualitative research is direct observation of human activity and interaction in an ongoing, naturalistic fashion (Rist in Rogers, 1994).

Qualitative field techniques, in particular participant observation, interviewing, document analysis and, focus group interviews were used in this study. Qualitative field techniques help the researcher to get personally immersed in the situation of participants. It affords the researcher an opportunity to become intimately familiar with people, their activities and problems (Bogdan & Biklen,1982; Eisner, 1991; Geertz, 1973; 1984; Lofland,1971; Marshall & Rossman, 1989; Patton, 1990).

In end-user training research, (Davis and Bostrom, 1993; Dervin, 1992; Eriksson, 1990; Gattiker, 1990b; Orlikowski et al., 1994) recommend utilizing verbal protocols, asking subjects to describe what users think about their learning, and using computers to explore

what is missing. Hirschheim & Newman (1991) report how a symbolic approach helps to interpret the actions of social actors in a computing environment. Kaplan & Duchon's (1988) study indicates that combining quantitative and qualitative methods is important to study the relationships between perceptions of work and a computer information system. In a study by Goetz and LeCompte (1984), qualitative fieldwork techniques were used to elicit data from the "insiders" perspectives. In the present study these insiders were low-level computer end-users, learners of application software, and computer trainers.

Dervin (1992) suggests that there is a need to study the human use of Information Systems (IS) from the perspectives of the actor. Actors in IS are involved in what Dervin (1992, p. 66) calls "gap-defining and gap-bridging" processes. These gap defining and gap bridging processes are discontinuous and episodic. The processes involve questions, answers, ideas formed, resources obtained, blocks or barriers faced, and strategies used. This gap-defining and gap-bridging process, which every end-user faces, can not be subjected to quantitative studies. Interviews and other qualitative techniques are assumed to help understand how, with what, and where individuals face and solve gaps in learning and using IS.

Rationale for Qualitative Research

The qualitative research method provides a mechanism to better understand uncharted studies or misunderstood phenomena and processes, such as end-user computing. The strength of qualitative research is its accurate depiction of a particular process with a particular instance (small sample). Qualitative research acknowledges the importance of context, allows for reconsideration of issues which are considered unreliable and subjective in quantitative research.

> Subjectivity is not an illusion to be overcome, but rather it is another part of
> reality, no less important than any part... that is why it is an urgent task... to

reinsert the observer's point of view into modern scientific discourse (Harari and Bell, 1982, p. xii).

Qualitative research recognizes that complete objectivity is impossible, and guards the researcher against formulation of a narrow hypothesis before undertaking the research. Peshkin (1988, p. 17) also points out, that subjectivity is a "garment that can not be removed" the best one can do in any role is to "manage it - to preclude it from being unwittingly burdensome."

To offset the potential shortcomings inherent with qualitative research such as subjectivity and validity, I conducted site observation, semi-structured interviews, document analysis and focus group interviews. The researcher's subjectivity and objectivity are also reported, so that a general picture and understanding of learning and using computers can be achieved.

Criteria for sound qualitative research are identified by Marshall and Rossman (1989), Fetterman (1988), Lincoln and Guba (1985, 1986), Miles and Huberman (1984), and Strauss and Corbin (1990) who indicate the need to have basic criteria of qualitative research. Eisner (1991, p. 53-60) considers the basic criteria to be coherence, consensus, and instrumental utility. Coherence is structural corroboration, which is commonly called triangulation through the use of multiple data sources. This corroboration also asks whether the results are in agreement with other research findings.

For the above-mentioned problems and needs, Lincoln and Guba (1985) emphasize the need to make one's substantive and methodological presuppositions, theory, or conceptual framework explicit. The use of theory, according to Bogdan and Biklen (1982, p. 30), is to help data "cohere and enable the researcher to go beyond an aimless, unsystematic piling up of accounts." In this study the conceptual framework selected is Keen's adaptive framework (Keen, 1980). This framework was used in such a way that it directs the research and limits

its boundaries. The intention is not to compare or pass judgment, based on Keen's adaptive framework, but to understand basic interactions involved in learning and using computers.

Participants

A total of thirteen people were interviewed for this study. Of these, seven were clerical and support staff using or learning about computers, four were computer trainers, and two were education and training coordinators. End-Users in this study are people who use applications, such as Lotus 1-2-3 for payroll or accounting, dBase for inventory control or data base management, WordPerfect for word Processing, and Human Resource Information Systems (HRIS) for HR management in private or public organizations.

Participants in this study are administrative and clerical staff in private and public organizations. Two participants were from public while four were from private organizations. All trainers and one training coordinator who participated in this study were private trainers. The jobs of the participants (administrative and clerical staff) are more or less similar, irrespective of organizations (public and private firms). Their tasks include processing, storage, communication, and monitoring of information. How these people learn and how they use computers has, for the most part, not been studied. Except for the word processing clerks, the majority of administrative staff handle complex databases. Specific characteristics of participants in this study are given in table 3.1. In addition to users, participants in this study include computer trainers.

Selection Criteria

Sites. The names of nine training centres were obtained from the Business Information Centre, Business Directory at the University of Toronto School of Management Studies. This directory was considered the best directory available in the area. After securing the names of the available training centres, the researcher contacted the Information

Table 3.1

Characteristics of Participants in this Study (Learner/Users)

NAME	SEX	AGE	WORK EXP. (YRS)	EDUCATION	PC EXP. (YRS)	POSITION	TYPE OF FIRM
Betty	F	35-45	15	College	12	Manager	Public
Hector	M	35-45	15	BSc.	10	Clerk	Real estate
Lina	F	35-45	19	HS.*	8	Typist	Public
Sosy	F	30-35	11	HS.	10	Clerk	Insurance
Bob	M	30-35	18	HS.	10	Clerk	Oil Company
John	M	35-45	18	HS.	10	Clerk	Manufacturing

*Note: HS. = High School

Processing Society representative in the area. The purpose of this contact was to make sure the focus of these sites was upon application software training and not computer programming. The researcher also made an initial visit to the site to understand the nature of the site, its focus, and whether access was possible. As a result, two training sites were dropped from the list, due to their strict focus on computer programming and electronics training. The researcher found the use of random selection of the sites ineffective and used his knowledge of the history of private training centres, where any one can rent a room and call it a training centre. The majority of computer training centres also focus on programming and on PC technicians training where software application is mostly secondary and optional. To make sure my judgement and historical understanding of private training centres, I used another officer of the information technology association of the area to validate my selection and judgement. Random selection also was found less useful for this study because it would not allow the researcher to get the mix of private and public and computer-based and instructor-led training sites. In this kind of study the researcher also found the use of random selection as more of a problem than a solution. This is mainly because random selection defies the dynamic, phasic, and sequential nature of selection in qualitative research (Zeldtich, 1962). In the researcher's judgement random selection was found limiting to illuminate and understand emerging and unanticipated issues in the study.

Seven computer training centres which offer computer training programmes were then used, based on the following criteria.

1. The centres were located in the Metropolitan Toronto area;

2. they were accessible; and

3. they focus on application software training.

During the course of this study, the researcher visited a total of seven computer training centres. One instructor-led training site was used for pilot testing. Intensive observation and regular visits were made at one computer-based training site and two instructor-led training sites. The two instructor-led training sites are identified as "A" and "B" while the computer-based site is identified as "C" to protect the identity of these centres, as requested by their management.

Users. Users were selected on the basis of the following criteria:

1. Experience in clerical and administrative support staff positions,

2. previous computer experience,

3. willingness to participate, and

4. use of one or more application software programs.

Both males and females were included in the study in equal numbers. The overriding criteria were having a clerical staff position and experience with one or two software packages. The last criterion reflects the reality that no one employee is expected to use only one software package.

Trainers. Four trainers from instructor-led training centres were involved in this study. Three trainers were selected as a result of follow-up from the focus group interview. One trainer was selected because his training site was identified for site observation.

The context and goal of the study necessitated procuring different perspectives on sampling and selection of participants (Bogdan, & Biklen, 1982; Goetz & LeCompte, 1984). To make sure that users and learners who participated in this study are representative of clerical and administrative support staff, purposive sampling was used to identify each participant.

Purposive sampling involves selecting information-rich cases (Bogdan and Biklen, 1982; Kendall and Kendall, 1993; Lincoln and Guba, 1985; Patton, 1990). Purposive sampling is what Glaser and Strauss (1967) call theoretical sampling. According to Patton (1990, p. 168), "the logic and power of purposive sampling lies in selecting information-rich cases for the study in depth." In this, study information-rich cases are those from which one can learn a great deal about end-user computing. The reason for purposive sampling is to select cases whose study will illuminate the questions under study. The selection of cases is criterion-based. The researcher established and used a set of criteria or lists of attributes listed in previous sections that the units of study must have. Sampling of participants is based on parameters given under selection criteria.

Purposive sampling in this study involved emergent sampling, continuous adjustment and focusing on participant selection. The purpose of these activities was to extend, validate and contrast ideas, problems and feelings of different participants. The first participant was selected through a professional computer trainer. Selection after the first participant was based on the dynamic, phasic nature of purposive sampling (Zeldtich, 1962).

In line with this approach, three participants (users) were identified using snowball or chain sampling. Snowball or chain sampling is obtaining information from a known source and using that source to identify and locate subsequent instances for observation (Patton, 1990). Gotez and LeCompte (1984) call the same process network selection. Network selection is a strategy by which successive participants or groups are named by a preceding group or individual. Selection in snowball sampling (network selection) strategy is on the basis of participant referrals. This method, in particular, helped to locate two users in two different sites using the same software, but for two different purposes and who faced different

problems. The other three learners/users were selected as a result of making their acquaintance during an intensive training site observation.

Research Techniques and Data Collections

Participant Observation. Participant observation refers to the circumstance of being in or around an on-going social setting (workplace and training centres) in which the investigator obtains information through relatively intense, prolonged interaction with those studied (Levine, Gallimore, Weisner & Turner, 1980; Lofland, 1971). In this method of data collection, the researcher plays dual roles of observing and interacting with research participants. The extent to which the researcher was a participant observer varied from complete observation to direct immersion in the setting as a full participant. The researcher started as an onlooker (passive observer) and finally became a participant (active) as the study progressed. According to Gold (1958), the role of the researcher was observer-as-participant at first, and participant-as-observer to a certain extent. This role did not restrict the researcher's communication with participants. In this way, I was able to collect data by talking with learners/users, and with computer trainers and by observing on going training sessions.

Participant observation, to Jorgensen (1982, p. 12), is especially appropriate for scholarly problems when: (1) little is known about the phenomenon, (2) there are important differences between the views of insiders, as opposed to outsiders, (3) the phenomenon is somehow obscured from the view of outsiders. Participant observation is one technique for data collection very often used with document analysis, interviewing of participants, direct participation and observation and subsequent introspection (Denzin, 1989). With this principle from Denzin, I started out by conducting what Spradely (1980) calls a "grand tour." My purpose during the "grand tour" was to get a general feeling of each site. According to

Spradely (1980, p. 73), the general question which governs the grand tour is the question of "what is going on here?" At the initial stage of observation, I became a "professional stranger" (Agar, 1980) at all sites of observation.

My concern was to map participants' experience through careful observation and description and let the data emerge. In this study "let the data emerge" means moving from one example, problem, or process given by one participant to another similar or different examples, problems, or processes. Understanding and using the "let the data emerge" method helps to broaden the insight, validate the problem at issue or accept what was not anticipated during site observation and interview. This was experienced in this research during the focus group discussion with John where he cited a specific case that his wife had experienced with the hospital information systems. The case brought out how the system trainer discounted the questions, learning problems and concerns of nurses and support staff during the training session.

The aim was to describe computer learning and user (trainee) experience from the point of view of learners or users and computer trainers themselves. The focus was to understand and get descriptive categories that attempt to catch the essence and differences in ways in which computing concepts or activities are understood or experienced. I had nothing to superimpose or no hypothesis to confirm or reject. The framework selected and the interview guide (see appendices B and C) are open, flexible, and required site observation, listening, and watching human activities. Direct, on site, face-to-face contact with people and events through observation and interview helped to view computing holistically for accurate description.

Being a stranger to a situation, listening to what people said, and watching what is going on helped me to come closer to the issues, understandings, and problems related to

computer training and learning. Eight months were devoted to observing the training centres and seven individual participants. One instructor-led training centre and two computer-based training centres allowed me to observe a class while a session was going on. Observation and discussion with students and instructors helped the researcher in understanding the problem facing students and instructors.

In all cases, observation focused on the teaching and learning process, methods and problems. Observation was done, based on the following three major areas:

A)   the structure of training provision,

B)   the level of operational problems with learning and technology,

C)   the service orientation of the IS department. (see observation checklist (Appendix D)

I used the following events, activities, and processes as sensitizing concepts (Patton, 1990, 216-218) to help me approach a field which is ambiguous. These sensitizing concepts were to get "a general sense of reference" and "for directions along which to look" (Patton, 1990, p. 391). The specific sensitizing concepts with which I started data collection were the following:

1. Conditions of technical training programs

a) teaching methods, b) learning environment, and c) duration and frequency of training,

2. nature of instruction,

3. amount of time available for trainees to learn and practice,

4. provision of follow-up support,

5. training contents,

6. the process of end-user training and computer systems introduction.

These sensitizing concepts are similar to what Strauss (1987, p. 21) calls theoretical sensitivity, which helps the researcher learn about data in theoretical terms. Sensitizing concepts provide a basic framework highlighting the importance of certain kinds of events, activities, and behaviour. They alert the researcher to ways of organizing observations and making decisions about what to record.

Site observations were conducted for eight months, initially on a daily basis. This decision was taken because trainees in all training centres are on a fixed shift. The only alternatives the researcher had were to make himself available for two different shifts and search for possible acquaintances and access to individuals. The researcher was also permitted by the authority to talk to students only during their extra time outside the classroom. To make the maximum use of the available opportunities, I spent the initial observation time integrating myself with the training centre communities. Slowly, my presence was assumed to be more as a student than as a mere visitor.

After a month of daily visits of three-to-five hours, I was able to develop some acquaintance with students. Then, during the second month the observation interval was on a weekly basis. Later, this interval was raised to once per month because of the opportunity developed to meet the students through telephone and personal interviews. Individual negotiation with each participant was achieved during the first month of site observations.

During this data collection, the researcher was also involved in tutoring three learners in data base management. One trainee brought his workplace computer print-out to the researcher for further tutoring. The other two trainees basically used their module exercise for clarification and tutoring. During this tutoring process, the researcher gained an invaluable experience in the day-to-day problems affecting learners and users. In the initial

observation of the study, I experienced what Eisner (1991, p. 170) means by "flexibility, adjustment, and iteractivity" nature of qualitative research.

What guided my participant observation was advice from Levi-Strauss (1963, p. 280) which states: "on the observational level... all the facts should be carefully observed and described, without allowing any theoretical preconception to decide whether some are more important than others." Through being flexible and evaluating the situation I developed the focus group interview as one method of data collection. I went to the field with basic definitions, techniques and a working knowledge of information systems. This helped me to get access, and credibility, and provided a common ground for discussion with computer trainers. I also used my experience in technical assistance and adult education to effectively relate to users' concerns and fears regarding computers (see appendix E) while tutoring them.

Semi-structured Interview. The interview questions were designed and tested for clarity on six word processing students. The researcher then pilot-tested the interview guide with two clerical staff and one instructor. All interviews were tape recorded and listened to, in order to obtain feedback from participants for further clarifications. As a result, one item was deleted from the interview guide.

The interview method employed in this study was a semi-structured interview. To provide consistency among the interviews, a semi-structured open-ended interview was used. A semi-structured interview was selected because it is more dynamic and flexible than a structured one. The semi-structured interview is a powerful way to gain insight into educational issues through understanding the experience of learners and educators. The main reason for using this method of interviewing is to get respondents to freely express their thoughts, problems, and means around particular topics directly related to EUT. It helps

to stress the interviewee's definition. and lets participants introduce their notions of what they regard as relevant or major obstacles. The semi-structured interview help to stress verbatim accounts of events important for validity and reliability of the research findings. It is also consistent with people's ability to make meaning. The nature of a semi-structured interview helps to collect data on how these participants arrived at the attitudes that they have towards teaching. using and learning computers. It also helps the interviewer to follow the issue under discussion in further detail. Patton (1990. p. 283) shows this further discussion to be a means

> to explore. probe and ask questions that will clarify and illuminate the particular subject. Thus the interviewer remains free to build a conversation within a particular subject area. to word questions spontaneously...

This is the freedom and flexibility that the semi-structured interview provides. which reduces the mechanical obstacles between the interviewer and the participants.

The semi-structured interview helps the interviewer maintain what Seidman (1991. p. 13) called "a delicate balance between providing openness for the participants to tell their stories and enough focus to allow the interview structure to work." It is also possible to communicate empathy and encouragement through semi-structured interviews (Gotez and LeCompte, 1984. Lofland. 1971).

The Interview Process. The researcher asked questions from prepared semi-structured interview schedules. Sample questions used are found in (Appendices B and C). This strategy was employed for all interviews with users and instructors. The interview was conducted in an environment that allowed for personal and life-experience discussion before starting the main interview. Initially. informal interviews and discussion were carried out with users without taking notes and tape recording until a workable relationship was established between the researcher and the participants. All interviews commenced with the

researcher explaining to the participants the purpose of the study. This allowed for incorporating the advice from Taylor & Bogdan (1984, p. 25) which state "to be truthful but vague in the portrayal of the research purpose to the participants." To improve validity of reporting, participants were encouraged to ground their responses and discussions in actual computer learning events, problems, and experiences. The interviews ranged from forty-five to sixty minutes in length.

Informal contact, particularly with six learners, continued for days and weeks until I felt the learners were comfortable with me. In all cases, trust was established through an exchange of ideas and making the purpose of the study useful and educational to the participants and the researcher. Permission to allow me take notes and/or tape record their responses was asked in all interviews. Twelve interviews were audio-taped with the permission of the participants. Verbal and written explanation of the research purpose was given to each participant, in order to obtain their written consent [Appendix F consent form]. The taped data were transcribed verbatim, using pseudonyms for the participants.

Focus Group Interview. Focus group interviews involve the use of in-depth, group interviews in which participants are selected based upon purposive sampling of a specific population that share a common problem. (Lederman, 1990, p. 117). The purpose of the focus group interview is to explore in-depth and to learn how and what people feel about the issue at hand. It has been described as a highly efficient qualitative data collection technique that can be applied in the study of human experience (Flores & Alonso, 1995; Krueger, 1988; Merton, 1987; Morgan, 1988; Patton, 1990; Watts & Ebbutt, 1987). Focus group interviews are useful in generating and validating ideas during the course of the interview. Its value is what Bormann (cited in Kendal and Kendall 1993), calls "chaining out" ideas from a small

group to the mass media, or vice versa. In this study it was used to generate and validate ideas and perceptions.

The researcher conducted two focus group interviews. One focus group interview was with computer trainers and one with learners. The importance of focus group interviews evolved as a result of previously held individual interviews with users and trainers. The need to check and counter check the issue with other trainers and learners became very important. The focus group interviews emerged from careful evaluation of situations and direct experience with learners and trainers. Time to contact contract computer trainers and for learners on a fixed time-table was found to be the major problem during this research process.

Recruitment. In case of the trainers' focus group interview, I used the computer trainers network which meets once a month. This network group was selected because it is well organized and homogenous in its composition. The network members are external and internal computer trainers in the area. I arranged the interview with the secretary of the network and used their meeting hall. The identification and selection was based on the intensity sampling model. Intensity sampling is selecting cases that manifest and elucidate the phenomenon of interest intensely (Patton, 1990, p. 171-172). The identification of the network group and the selection process through intensive sampling involved exploratory work and prior information about the group and judgement by the researcher for its educational value. The secretary of the network helped the researcher as a facilitator/moderator and the researcher asked questions. After the researcher read the question, the moderator asked a person to respond, giving each participant equal chance. In the case of the focus group interview with the five learners, the researcher conducted the

discussion by himself. The interview was conducted on March 25, 1995 at OISE. (See Sample
Trainers focus interview guide Appendix G).

Collection and Analysis of Documents

The third method employed to collect data was document analysis. Published and
unpublished documents distributed by organizations were examined. Dobbert (1982, p. 180)
and Goetz and LeCompte (1984, p. 152) referred to this method as archival research whereas,
Sherman and Webb (1988, p. 47) describe it as research/enquiry. The specific items or tasks
involved in this process include some or all of the following:

> The collection and analysis of textbooks, curriculum guides, memos, enrolment
> records, minutes of meetings, student personal records, student and teacher
> handbooks, student classroom products, lesson plan and other teacher files,
> correspondence, government documents... (Goetz and LeCompte, 1984, p. 153).

Data collected through document analysis were vital in order to substantiate
information acquired through either participant observation and/or interviews (Gotez &
LeCompte, 1984, p. 154). In this study ten different training handbooks, office electronic
memos and correspondence, newspaper reports, training timetables, and work exercises were
collected from instructors and students who participated in this study. According to Marshall
& Rossman (1989), documents collected for this research are contemporary records, public
reports, and opinions. One unanticipated benefit of document collection that this researcher
came across was the opportunity to obtain labour union perspectives on computer training
arranged for him through Bob (a participant). This labour perspective on computer training
helped the researcher to get an idea about technology training in a manufacturing
environment.

In addition to site observation, individual and focus group interviews and document
analysis, the researcher also visited the computer department of one School Board, two

computer laboratories, computer learning resource centres at two major universities, and two community colleges in the area. These visits were to help the researcher confirm and compare learners' perception of different computer learning environments. This process is what Patton (1990) indicates as search for negative cases.

One criterion which Heron (1981, p. 32) stressed for effective research is correspondence which means an agreement between the world and an inquirer's understanding and presentation. According to Patton (1990, p. 485) this agreement is "judged by its relevance to and use by those to whom it is presented." This is similar to Lincoln's dependability and confirmability. What Eisner (1991) calls coherence, consistency, and instrumental utility is also similar to correspondence. To achieve this, I consulted an Information Science professor who has done similar work. I also discussed the study with three professional trainers.

To safeguard the process of data collection and analysis from my accepted subjectivity, I focused on what Lincoln and Guba (1986) call credibility, transferability, dependability, and confirmability. To achieve credibility, I was involved in a prolonged engagement with learners, persistently observed computer training sites, and used four different data collection techniques for triangulation. I conducted an active search for negative cases (disconfirming cases) at two different university and junior college computer laboratories and one major commercial Bank. I conducted validation and clarification through member checks by letting them read their interview transcript and the researcher's comments related a given discussion. The member check was to make sure that the accurate description of process, problems, and statements of participants was the one I had written.

Coding and Data Analysis

My approach to the coding for this study was as follows:

1. through semi-structured interviews and observations I developed categories;

2. I searched for elements of order, pattern and consistency within categories; and

3. I conducted analysis of the data based on the categories which evolved from the data showing order, pattern and consistency.

Temporarily, I listed a coding scheme (appendix H) based on a major dimension of computer training. Judgements about what is really significant and meaningful in the data were taken by the researcher, based on recurring regularities of the problem or process in the individual and group interview data, in field notes, in observation interview, and document analysis. Codes were determined or identified during the coding process using the following criteria:

1. factors identified by participants as pivotal or fundamental,

2. factors referred to with high frequency,

3. similarity between participants' perceptions, and

4. unique statements and differences between users' and trainers' statements.

Data were sorted and classified using a combination of highlighting and line-by-line, as suggested by Van Manen (1984) and further developed by Tesch (1987). Highlighting and line-by-line search panning and surveying approaches were used to determine categories (themes), and subcategories (sub-themes). In the coding process, I kept the language as close to the data as I could. Levi-Strauss (1963) recommends that paying close attention to the language of the participants is of utmost importance in doing analysis. This was to avoid superimposing and translating ideas into my subjective interpretation. To maximize the

voice of the user/learner and trainers, all categories were developed from the interview and site observation data.

From interviews and site observation data, categories were developed and classified according to themes, patterns and stresses by participants. Key phrases (indigenous concepts) used by participants were sorted and were related to sensitizing concepts identified from research. Verbal categories used by participants were identified with their attributes. A search for patterns, and for recurring themes and regularities in the data was conducted.

In this study, categories for analysis were prioritized according to educational value, and special interest to learning information technology. Participants' and training officers' perspectives were compared to identify similarities and common problems. A matrix was developed to classify major problems identified in interview questions, document analysis, and analytic memos. Four different sites were compared and contrasted based on observation data, analytic memo, log, and personal reflection done after each observation.

Analysis consists of breaking up, separating, or disassembling research materials into pieces, parts, elements, or units (Jorgenson 1989, p. 107). Research materials in this study are field notes, observation logs, analytic memos, interviews, and the result of document analysis. Sorting and sifting these materials helped to assemble them into a meaningful document.

To sort out categories repeated regularly, I used what Moustakas, cited in Patton (1990), states as immersion. Immersion in this study means reading transcribed observation and interview data several times to pick and highlight statements or phrases revealing the participants' experience. In other words, immersion means scrutinizing collected and transcribed data line-by-line to identify the experience relevant to this study. I conducted this by going back to the raw data and reexamining the data for new insights.

Tesch (1987, p. 232) explains a set of similar approaches:

> When panning, the researcher looks for precious elements, which take the form of descriptive expressions in the material that are "at the centre" of the experience, those that address its nature, or directly pertain to the phenomenon. All the other ingredients are sifted out: they are not included in the analysis. The line-by-line approach can be thought of as surveying where the researcher looks at each square inch of their territory and tries to capture what is there, making sure that nothing important is overlooked.

Tesch's approach makes the data sorting process systematic and disciplined. Sorting in this way means clustering categories into preliminary themes. According to Tesch (1987), reading and re-reading and making notes helps to identify meta-themes. Identifying metathemes is both a process of synthesis and reduction.

I started the analysis for this study first by listening to the recorded interviews. Then, the recordings were transcribed using a commercial transcriber. The transcripts were coded using the left margins. The transcripts were read once again while listening to the tape to check the accuracy of the transcripts. To satisfy the need for anonymity, the researcher used coloured folders to store written transcripts and used codes to identify a particular participant file in his computer hard drive.

For the first round of analysis, the transcribed data were read several times to pick and highlight the statements or phrases particularly revealing about the participants' experiences and expressions being probed. During this time, the researcher was looking for key phrase/terms, or what Patton (1990) called indigenous concepts.

Indigenous concepts/data were scrutinized line by line, through highlighting, to identify process, method, and problems (the experience) described by the participant. In terms of Tesch (1987), this is similar to what she called panning and surveying. Using a line by line search, highlighting what seemed important and through immersing myself in the data, I was

able to formulate tentative major themes and sub-themes. With the formation of tentative themes, I started to look for patterns and common themes shared among participants in line with Patton's (1990) pattern detection.

Pattern detection during this phase involved identifying what are commonly-shared and common statements, and what was a unique process, method or problem. Pattern detection also involves sorting, matching, and classifying. Pattern detection is to identify overlaps, to identify what matches, to find interconnections, to form a pattern using data from four sources. This was the most challenging and hectic part of this study. Formulating a meta-theme with its constituents, dimension, and components and, again, collapsing the preliminary formulation and reformulating a new major theme and sub theme was time consuming.

I also took my idea, the reconstruction of the study the way I understood it, to people in systems education. Using what Tesch (1987, p. 236) called: a) a sense-making ability, b) an order-making ability, and c) a recognition producing ability I was able to form four meta-themes. Sense making is the ability to locate meaning out of a massive collection of words, sentences, and phrases. The other two are the ability to organize and arrange the different parts of the findings in such a way that the final product is accessible to the community of learners. These process involved checking my interpretation of events with the interpretation of the participants, checking the different data sources and making extensive use of direct quotes. This is to also help a reader of the thesis decide if the claims, deductions, and conclusions are justified. Using these three abilities, I collapsed the preliminary themes and sub-themes into four meta-themes. These are:

1.   The First Encounter with computers

        -The learners experience/expression

-The trainers expression of the first encounter

-Management interpretation of the first encounter

-Approach to End-User Training and reducing resistance

2. Paradox in Use & Learning Environment

    -Operational Problems

    -User expert interaction in use environment

    -Instructor-led & computer-based training environment

3. Sense-making by users/learners

    How learners and users learn, define, and bridge gaps

4. Major problems

CHAPTER 4

FINDINGS

Description of the Training Sites

The training sites observed during this study were of two types. One category was an instructor-led training centre and the other computer-based. In this study, the researcher visited four instructor-led and two computer-based training centres. The researcher has found it important to describe the nature of the two training sites, rather than describing each training site separately. To assure confidentiality, all names of participants have been changed and fictional names are used to report the findings.

Instructor-led Training Centres. The main characteristics of an instructor-led training centre are:

1. They are all one-day training centres.

2. They are either on the premises of the sponsoring firm, or on the premises of the contracting trainer.

3. They serve on first come, first served basis.

4. Selection or pre-screening of trainees is not part of the training centre's responsibilities.

5. Most trainers are contract trainers or provide training as required by any firm. Permanent in-house computer trainers, except in one case, are not available. Training coordinators are permanent staff and serve both as coordinators and trainers. In most cases, they function more as coordinator than as trainer. Administrative functions, such as coordinating, budgeting, and administrative meetings, consume most of their time.

6. Trainers and training coordinators are implementors of training programs and not decision makers about training.

7. Training needs are always assumed and trainers are not involved in assessing the condition related to learning needs.

8. The awarding of a training contract is based on an open market (public) bidding system where the lowest bidder is always the winner and not necessarily the best choice.

9. All training rooms are equipped with 10-12 personal computers. furnished with system 486 PCs connected by a network to a central server.

10. A one-day training session can involve introductory, intermediate, or advanced levels, but training is always in the following software programs: DOS, Windows, WordPerfect, Lotus 123, Quattro Pro, dBase, Word, Excel, Ami Pro, Access, Project, and Corel Draw for windows and DOS.

While the ten characteristics noted above are the common denominator of most training sites, the following two training sites, identified as training site A and training site B, have unique characteristics that deserve separate description.

Training Site A. This training centre belongs to one of the largest utility companies in the region. The centre's coordinator Mr. Arny and his training staff are located in an office building that is across the street from the centre's head office building. The training centre has its own copy centre equipped with a modern Xerox machine, and has two full-time staff. The site prepares its own training materials (learning manuals and handbooks) and supplies these to regional training centres. The centre uses a software called Skill Builder to prepare training materials for each course and module.

The centre also has one separate room equipped with four personal computers and two individual enclosed reading carrels with listening devices (ear phone, video). This room and its facilities are used as a self-study centre by the staff of the corporation. The key and learning resources for this self-study room are available from the training secretary on

request. This self-study room is similar to drop-in community learning centres. Individual members of their staff from either the head office or the regional offices are free to use the facility whenever they wish and on whatever lesson they wish. Most of the self-study materials are on floppy disks and appear similar to PLATO developed by Control Data Corporation.

The centre has five permanent training staff and two training rooms. In addition to its permanent staff, the centre also uses external trainers, depending on the regional area training needs and the number of training requests. Each training room is equipped with 12 PCs that are connected to an over head projector with a data show device attached to the PC that the instructor uses. This device allows the students to physically see the key the instructor presses on the white screen in front of them. Mr. Arny demonstrated this to me so that I could get a feel for it. The space available for the instructor to go around and get direct access to each of the participants in the classroom is wide and open. The tables are set in two rows. Each row has three tables with six chairs and six PCs.

This training site also handles other management development training that is deemed important for the corporation. One of its training newsletters, which is published every month, announces:

> Want to prepare yourself to be as marketable as possible for new job openings in or outside XXX? Many of our customers are citing these as reasons why they are attending our computer or soft-skills courses. We are pleased to offer free training consultation to recommend courses for popular software, or high-demand skills in the internal or external marketplace.

This site is very unusual. Learning how to use modern technology and other personnel development programs is fully handled and conducted by the same training group. Attention given to aggregate training programs can be seen in the above statement in training news letter. The site provides comprehensive training to all operating staff who will work with the

computer systems. User training at this site involves CEO's, directors, managers, and low-level users. This site also delivers other personnel development training programs such as management development, performance evaluation, workplace effectiveness, and personnel motivation. This kind of organization of training programs is very rare. Learning how to use Lotus 123 and learning how to tackle business challenges in new ways are treated as important and closely related. A monthly publication of the training newsletter advertises DOS Primer and a course by Dr. Edward de Bono.

This training centre also has 13 lap-top computers in a van for mobile training use. On the day of my second visit to the centre, Mr. Arny told me that one of his trainers was training in one county branch office, using lap-top computers. The training section has also formed partnerships with other private training firms to deliver training at different regional offices. It also has an agreement with most major hardware and software companies in the region for timely supply of new software releases to train its own staff. This allows their own training staff the required time to learn the newest programs and take their knowledge to their trainees in a short time.

Up to quite recently (4 years ago), the training coordinator used to temporarily place his training staff in the various departments of the corporation. This was to help trainers understand their would-be trainees and the nature of their business and computing problems. This temporary placement (1-2 weeks) of instructors in the different departments was found to be effective for both trainees and instructors. In the words of the coordinator:

> this approach was effectively used in the corporation when most applications were DOS-based and when the knowledge gap between a trainer and a trainee within the corporation was wide.

Such placement appears to have functioned as a needs assessment in EUT.

This temporary assignment of instructors in different departments was discontinued due to the lack of resources. The centre currently faces a daunting reality. According to the training coordinator,

> the demand for training is always increasing, the software is getting more complicated and the resources for computer training are getting smaller and smaller.

Mr. Arny, who is the coordinator of the training centre, is also a trainer for three different software packages. He is more a trainer and less a coordinator. Unlike most coordinators who spend most of their time in meetings, Mr. Arny is more often in a classroom than in a meeting. His explanation of the trainees' problems and the problems related to resource allocation were the most succinct and comprehensive explanation I heard from most training coordinators in this study. Arny's major problem is how to balance the needs of mixed groups in one training session. This major problem involves different and exaggerated expectations from one day training, the impact of easy to learn and the demand for training in all possible software available.

Mr. Arny had a clear understanding of learners' problems. His understanding of the learners' came from his direct interaction with trainees under his instruction. One training coordinator I met during this time was more interested in how to reduce costs by sharing training facilities with other firms than in trainees' learning. The other coordinator appeared to be more focused on searching for more practical software. For this coordinator, most of the software available is academic and not useful for her purpose. The discussion with Arny was presented because he was the only education coordinator who more explicitly focused on the interest and problems related to this study.

Site A was organized in such a way that it can deliver all training needs (Information Technology and management development) of the organization under one management in one section. This approach to computer training where information technology departments and the human resource departments work cooperatively is very unusual in the history of computer training. One can see registration for effective listening, effective sales and for DOS primer managed and coordinated under one education and training coordinator. The challenge and the problem in this site is how to meet the rising demands for training with decreasing resource allocated for training and the increasing complexity of new and advanced software coming into the office. Teaching mixed groups on a first come first service basis, and helping a clerk and a trained accountant in one day training session are the major challenge.

Training Site B. This training centre, located in the west end of the city, is owned and operated by Mr. Walter who was once a senior programmer for a large medical laboratory. The centre has two trainers with Mr. Walter being the principal trainer. The centres' market segmentation basically focuses on the training and retraining of new immigrants, construction workers, and their families. Compared to other training sites, this training centre is relatively small. The centre has two training rooms. One room contains eight PCs, while half of the second room is used as an office and the other half is called a display (demonstration) room. The logo on the wall of the display room reads "We are here to develop your computing confidence and our business is to help you feel at ease with personal computers." There is nothing fancy in the two classrooms. There are no overhead cameras, or sophisticated multimedia teaching aids. The chairs are ordinary, like those found in most community learning centres. The environment is simple and barely suggests technical training.

The demonstration room has a blackboard where new trainees receive orientation lectures. Most people in the centre call this room a display room. In this display room, there is a medium-sized table on which there is one PC whose outside cover has been removed and parts dismantled so that one can clearly observe the internal parts of the machine. The initial orientation for new students begins with half a day demonstration of the personal computer. It is part of the training package to physically open the machine and show the various components of a PC.

This demonstration is based on an individual interview and assessment by the two instructors. The individual interview provides the instructors with the individuals' prior knowledge of PCs and also determines the depth of the demonstration. For half the day session, people with no previous computer experience learn the different parts of the computer in the presence of the instructor. The training approach used in this training centre is to equip learners with basic computing skills by building learners' self-confidence. In this site there is a strong belief in the strength of learners' ability to learn. This focus on learners' strength is visible in the following activity and statement by Mr. Walter:

In one of my observations at the site, I was allowed to sit with new students and observe what was going on. I observed while Mr Walter demonstrated the different parts of a PC. He meticulously explained each and every part of a PC and its purpose. Each student was encouraged to touch and feel all the parts, except the mother board. While demonstrating Mr. Walter said:

> nothing in this machine can be broken if you touch it. The electrical voltage is
> five to eight volts direct current and there is no danger in it. The only thing is
> not to smoke, drink coffee or tea, or touch the mother board.

As he demonstrated, Walter touched the keyboard with his right hand and said, "everything starts with you when you press this keyboard." Then he went on to explain how

the pressing of the keyboard is transferred by the system to the text or numeric types on the screen.

After the physical demonstration was completed, the students sat at the two corners of the table. Using a chalk board with a PC in front of him, Mr. Walter then started demonstrating the use of different disk drives. He inserted two different sized floppy disks into the disk drives and demonstrated how to format a floppy disk. While demonstrating, Mr. Walter said, "just remember: do not use these commands when you format a disk. "Saying this he turned to the blackboard and wrote the command: <Format c:>. "This command eliminates everything from the hard drive and then the machine can not communicate with you." Step-by-step, Mr. Walter led the learners through the various DOS commands. Finally, he gave the participants the summary of important DOS commands (hand out) and said, "with these commands, tomorrow you can start your application training. Feel free to practice configuring this machine whenever you feel." The hand-out was written in bold large fonts and easily readable. At this site it was possible to observe how the human facilitator exposed the myth of computing, explained the lesson, and finally gave learners time to practice.

The logo of this site is encouraging for new immigrants and educators. It shows the site knows its participants and tries to start from the level of learners. The site is small but its approach to computer training, such as its orientation and demonstration sessions, demystify computers and can build learners self-confidence. Learners in this site are mostly new immigrants and construction workers and their families. For lack of English language or cultural background and/or lack of time they were not willing to explain some possible learning problems they face in learning about computers.

Training Site C. This training centre is located in the centre of the city, close to a big shopping mall. It is housed in a building with six floors and occupies half of the 4th floor.

The centre has one common study room which looks like a lecture hall. There are no screens or chalk boards in this room. This room is also used as a coat cupboard for students. What is clearly visible in the room is a large paper with large print text covering half of the back wall. The title on the paper reads: How To Keep Job Number One. I took some time to read it and at the end I jotted down some of the points to remember the situation. Some of the points were: 1) get a good start, 2) follow the rules., 3) keep a learning attitude.

Opposite the common study room there is a reception desk. To the east of the reception desk there is one large training room. On the way to the training room from the reception desk there are two notice boards. One board is filled with a white square card-board paper with the word 'HIRED' written in capital letters. Each card identified, the name of the student, the company that hired the students and the type of employment. On the second notice board there are training procedures about self-directed job search. According to the posted rules, the centre requires students to complete five developmental seminars, one resource clinic, one customer relations seminar, and completion of course curriculum.

Opposite these notice boards, there is a small room with a sticker on the door that reads: Typing Room. In the room there are four model AS300 electrical typewriters. The four walls of the room are full of touch typing charts. The charts are hung on the wall from left to right in the order of chart 18, 6, 8, 15, 4, 12, 2, 3, 20, 10. Between chart 3, and 20 there is a coloured picture of an IBM PC keyboard.

Next to the typing room there is the main computer training room. It is very clear to a visitor when she/he enters the room that it is very congested with materials, tables, computers, and people. For example, there are fifty-seven personal computers with bright blue coloured monitors in the room. There is no clear division or partition within the room but it is possible to identify the office skill training section and the electronics training

section. One clue I used to identify the electronics section was that the northern section had no screen. Secondly, the table on the north side is full of scattered PC parts, electrical wires, micro- electronic tool-kits and computer mother boards.

One row of computers faces each wall of the room. Five rows of computers are in the middle of the room where students sit opposite each other with a computer screen facing each student. All PCs in the room are connected to a network server in the staff room.

I learned that at this training centre all trainees work individually on a PC. The room with 47 people "learning" and interacting with computers is usually very quiet. There are no questions, no talking, no whispering, and no indication that the room is full of 47 adults. One only hears the sound of dot matrix printers, but no human voices. Students sit at their stations opposite one another but interact only with the screen and the keyboard. Learning as a solitary highly private individual activity is observed. In my five observation visits to this room, not a single student paid the least bit of attention to my presence.

In the south corner of the room there is a desk, a chair, and one PC. This corner is used as the instructor's area. The instructor sits and waits for any student to come and ask for help. Sometimes students line up to get his assistance. At other times, students can get immediate attention. When providing help, the instructor goes to a particular student's PC, examines the problem and determines how best to solve the problem.

The training centre offers service three times each day. The three shifts are in the morning, in the afternoon, and at evening. Every form of computer skill training from typing tutor to computer programming and electronics is given, using courses developed on floppy disks. What a student needs to start this training course is to pay the school fees. One can start the training course at any time. Each student is assigned one PC for a fixed time and works at it individually. Students can take a break any time they wish to. However, each

student has to write an exam at the end of each module. and to complete an individual job search seminar.

Students talk to each other only when they get up from their chairs and go out of the building for coffee or for a cigarette. Tension. owing to the pressure to complete the course as soon as possible. can be observed on these students' faces. Some of these students are part-time students, some have part-time jobs. while others are unemployed. The age range of the students I observed appeared to be about 26-55. Through my consistent observation at the centre, I came to know many of the students. Their reaction to their learning process and methods used will be discussed later under computer based learning environment.

I did all my observation with the admission of the director and with the help of the students. This is why the discussion in this site did not mention anyone in charge of this site.

The focus of the site. from what is overtly displayed on its notice board. seems to be how to search for and keep jobs. Procedures to follow in the self-directed job search and examination instructions are clearly posted on the wall. In the classroom one can observe learning as a solitary. and highly private (individual) activity. The role of the instructor is to monitor the operation of the equipment rather than monitoring the learning process of 47 people. The clue for this was lack of interaction in the classroom. The problem in this site involves how people take CBT and then. with no support. either fail to learn or learn with great difficulty.

The First Encounter and Getting Started With Computers.

If there is anything that computer learners and users recall with sadness and exasperation it is their first day's experience and encounter with computers. The first encounter with a computer for the majority of learners and users is similar, irrespective of

whether the experience was with an instructor-led learning environment or a computer based learning environment. The answer to the question: "What do you think about learning how to use the computers?" was always "difficult and frustrating."

The seven participants in this study had the following comments about their first encounter with computers:

Sosy described her experience in the following way:

My first day with computers was terrible, devastating, sad, confusing, boring, frustrating and a total failure. It was really difficult to express in words. You will think I am an idiot to face it all by myself. The problems I faced is not only poor planning from my part and having bad luck. They just left me by myself with a floppy disk. It is awkward. Facing the machine with its confusing messages and unable to respond to it let you feel really stupid.

For Lina it was "a shock, scary, and unbearable." For Betty, Hector, and John the first encounter made them feel stupid, irritated, intimidated, and dominated. Some felt desperate and alienated. The first experience for Bob was mixed. He was both fascinated and intimidated. Bob said:

I was fascinated by the machine but at the same time I felt too timid to even touch the keyboard. I felt at odds and the keyboard seemed jumpy.

For some, the first experience was soon forgotten. For others it is still remembered as a bad memory. The bad memory of her first day of computer training is described by Lina in this way:

A person who has undergone what I went through will never forget that kind of computer training so easily. The teacher was fast and the stuff was too technical. That training was not about learning but it was about what was lacking in me. It made me feel worthless and guilty. I finally got a headache. I do not know how I left the classroom. I wonder how computer people forget that they are teaching people. It was really strange to me. I was sent to a training centre for two days. In that training session we were treated like school kids. What was frustrating was not only the information overload but

the speed of the trainer was incredible. The experience of that first training was sickening, sad and a total shock to me. I still wonder why they did that kind of thing. They knew that during those times the computers were just coming into offices. The trainers had no respect for me and other learners.

Why should you go to a training session and come out confused, and thinking you will never make it? I was once a teacher and I think it is possible to make things simple, approachable and non-threatening. Trainers' speed, impatience with students and the technical terms they use make understanding impossible. I do not expect computer trainers to be real teachers but they need to be willing to slow down and share their knowledge with small men and women working in the office.

In Lina's description it is possible to see pre-training expectation for learning. What she experienced in the training room conflicted with her knowledge of teaching and learning. For Lina, learning about computers was not made simple and approachable. As a result, it has affected her self-confidence for further learning.

Bob, John, and Sosy are students at a computer based learning centre (Computer Training site C). In this training site students learn from a system without extra help from an instructor. All were part-time workers when they started to learn about computers. For all of them, the first module was the most difficult and time consuming part of the whole training programme. Bob described his problems during this initial week in the following way:

They gave me a floppy disk and a handbook then I was assigned to a PC from 8:30 AM to noon. I was not oriented or introduced to how to start my first module. There was no instructor around. Well, I got personal freedom to confuse myself. I spent precious time on the first module and now I have no time left to do what is really challenging.

Sosy was so frustrated and was on the verge of walking out of the program. Sosy has the following to say about her experiences during the first encounter:

They gave me a floppy disk and told me to go and start. I was unable to start the first lesson. I had nobody to inform me about the basic procedures on how to call the first lesson from a floppy disk. I wanted to drop out of the program.

I only stayed thanks to my husband who insisted that I should be patient. This is how I went through the hard time during the first three weeks.

The experiences of Bob and Sosy reveal how the computer alone can not motivate and personalize learning. The learning process when using the computer alone from the perspective of these learners, is also not made simpler. This demonstrates the need for further help from a facilitator.

Betty was sent to her first computer training by her manager who thought that she would do everything within a couple of hours. The manager considered learning word processing identical to learning advanced typewriting and assured Betty that she could do it easily. When the training started Betty said,

> I found things were far different from what my manager had told me. It was a surprise for me. I thought I was hopeless with computers. I had believed my boss and gone to the training room with some confidence. My expectation was to finish everything by lunch time.

For Betty, the shock was the difference between what her boss had told her and what she faced. In both cases, the difference emanated from unrealistic expectation from training to achieve what is un-achievable in a given period of time. This unrealistic expectation can be a misunderstanding of what is involved in learning or an underestimation of the desired skill by the manager.

The frustration or the confusion during the first encounter is partly related to linguistic and cultural backgrounds. Lina talks about this background and says:

> I have been brought up to view technology as a difficult field which is mainly the work of boys. In grammar schools girls are basically meant to learn sewing and home economics. The nearest best technology for girls was in using the typewriter. In the traditional female occupations such as nursing and kindergarten teaching training there was no need of technology. There was no need and assistance to learn technical skills. When the computer said press the button, it reminded me of sewing and fixing shirts. When it said abort, I did not know how it came to know that I was pregnant.

Computers and computing are seen by Lina as "a very difficult subject to learn." Many still think a computer belongs to clever boys. The above statement of Lina indicates that the distance between computing and women is still considerable. It is considerable because the language used, for example "abort," is mostly negative, dehumanizing, and not appealing for women. The use of such terms indicates that communication can not be separated from who is in charge.

Some participants, Betty in particular, locate their problems in the first encounter to learning in mixed groups. All the participants in this study had a negative experience with their first encounter. Except for Lina who has not gone beyond a two-day training session, all the participants went for further training on their own initiative and now consider the initial problems with computers as an unnecessary evil. They believe that they could easily have learned computers had organizers paid some attention to their individual needs and situation-specific problems. For example, this situation-specific problem for Betty was relating improved inventory control to basic concepts of data base management. The reflection on their first encounter may be the result of increased learning and experience with computers. For Sosy, it was because she found a teacher whom she considers "a person who removes all the hurdles from the first day of computer training."

The experience of these learners in their first encounter with computer is negative. Their negative experience was expressed as: terrible, devastating, confusing, boring, I got personal freedom to confuse myself, they left me by myself with a floppy disk, and they treated me like school kids. It was a period when participants experience solitude and ask How Should I proceed? Saying "take this floppy disk, go and practice" with no vigilance to what the learner is doing during the first encounter can be said to be one source of these negative experiences. According to these learners the first encounter has considerable tension.

It is more a fear-invoking situation than the one that makes learning possible. The chilly climate in the training room makes it uncomfortable to ask, to share, and to understand what is going on. The atmosphere generates stress and stressors which heighten anxiety.

Trainers' description of the Learners' Situation

Trainers used adjectives to describe learners' situations during this first encounter of computers. They said trainees are: passive, dependent, silent, reserved, and afraid even to touch the keyboard. They can not use the mouse and some hide their fear and ignorance. Alziola, one of the trainers, said:

> They do not know the left and the right side of the screen. I have to say over there, over that corner. There is no smiling face after coffee break. There is no pre-selection. People come without knowing what is expected of them. They are already frustrated and we add to their frustration. Some learn fast while some are very slow and we are all easily frustrated.

Walter another trainer, said:

> In general, these people are willing to learn. They ask questions. They take notes. There is nothing they can not do to learn about this machine. What they need is simple help and some initial directions. Inoculate or build their self-confidence. Let them play with the keyboard. Then you will see how they do. You will be surprised by their progress.

Gloria, another trainer, said:

> What we see in the training room has basically nothing to do with a learner or an instructor. There is just no procedure to follow in sending people to learn application software. We are expected to perform miracles. I know what these trainees are facing. I experience their problems daily. As a trainer, if I tell the real story of the problems in this situation to management it would seem like I am complaining. The management does not know how to deal with training. They have no idea about what learning involves. They do not know what type of trainees they are sending to training centres. This is why the students are silent, passive and mostly reserved.

Gloria continues:

> There is low reinforcement of learning. Some students come to the training centre after they are tired of seeing a PC sitting on their desk for months. The

rest come and are trained for a system that is not yet to be installed. I know of a case where the company spent money training people on apple machines but finally found out that its purchasing department had brought in IBM machines. Just because the Apple machine was not accepted by one department we were asked to train people again.

The above statements indicate that there is no negotiation, communication and information sharing when organizations provide computer training. Trainees come to training centre because their managers have sent them or because it is a policy determined by their departments to do so. Trainees have no signposts that give information about content, methodology, and what they can expect during their training. Trainers also have no idea about whom the course might benefit. Uncertainty is common for both trainers and learners. This uncertainty easily leads to frustration which can result in antagonism and withdrawal. These situations make learning and teaching difficult tasks to achieve. Arny showed these difficulties as:

> our trainees vary from clerical staff to the CEO. All of our training is given in one day. We are a one-day training centre. We know there is overload and saturation of learners with technical stuff, but we have no alternatives. We can not distribute training. We do not know beforehand and have no control over who is coming. The company also does not have resources to deliver training based on experience and educational background. We are doing the best with what is available.

On the other hand Sosy considers the uncertainty, the frustration and the difficulty with learning computers basically as a managerial problem. Sosy expressed this when she said:

> our managers typically do not understand the problems we face. I do not think they know what it looks like to sit in front of a screen and do something with the help of computers. Most of the recent upgrades - I mean - software are highly sophisticated and complex. They know that we were not well trained even with the original version. They add software on software, features on features. I do not know who will use all these. There is no support. There is no chance to practice. You get familiar with the system yourself while working.

For most clerical and support staff becoming familiar with the system while working includes lunch time conversation and reading a manual while on the way to work.

The trainers description of learner's situation as passive, reserved, and afraid is related to what the learners have said about their experiences during the first encounter with computers. The trainer's description indicates the end-user computer trainees have no advanced notification and realistic description of training prior going to the training room. Learning in computer training is not considered as requiring feedback and motivation. It also clearly shows the existence of serious misconception in management circles concerning what is involved in the learning process.

Management Interpretation of Learning Problems: Trainers Perspectives

Gloria (a trainer) explained how the End-User Training started. She said that for the managers, the problem was resistance to using a ready-made facility: the computer-- because of computer anxiety and fear. Therefore, what users need is to be shown and told very simply how to use the computer at the initial phase of computerization. What we today call computer training started as a means of reducing resistance and fear. To do this, managers first started to call in their computer experts who in turn, called in vendors. The vendors started showing and telling users how to operate the computer.

This trend continued until PCs became widely distributed throughout the offices. It became very expensive to use vendors. In an effort to cut training cost companies started using internal and external trainers without having a structure for computer training. Computer training is not related to other human resource training and development, but remain different and diverse entities: computer training and other personnel training

activities. The advance in PC technology also brought in the notion of "easy-to-use and easy-to-learn."

The trainers' perception of the phrase "easy to use, and easy to learn" is "it depends on your experiences." For them, learning to use computers is not easy. Learning to use a computer takes time and effort. Using computers is complex and differs from place to place and from individual to individual. Alziola put the situation with the above phrase, as follows:

> In one case, of the 500 or more PCs in the office, people are using only ten per cent of them for 2-3 hours a day. The majority of the PCs are sitting idle although loaded with up-to-date application software.

Betty, who come across an expensive software sitting idle in her office, states:

> This purchasing and inventory control system was bought six years ago but people in the office have been unable to use it so far. Not a single person is using it now. It is complicated and people were not given training on how to use it.

Arny, who is an instructor and at the same time a training coordinator commented on "easy to use and easy to learn" notions and said:

> what is lacking in the concepts and is creating a problem in learning and using computers is that neither the computer experts nor the management acknowledge that the notions are a hurdle for learners and users. Experts have forgotten what it cost them and how long it took them to learn and use computers effectively. A marketing ad. was taken as a book of faith. Management believes that it is really easy to teach and easy to use computers. Having been accepted as a book of faith, the notions "easy to use and easy to learn" went out of balance. I think we need to be more realistic to teach people.

"The result of easy-to-learn" Arny says is:

> blaming the technology and unnecessary comparison of live-instruction with computer-based training. In this comparison the computer is always found to be the best because it creates a dynamic and motivating environment. There is active learning taking place in computer-based training but not with live-instruction. Everything good, effective and worthy is related to computers and computer learning environments. To date, I have come across nothing that can tell me the combined effect of learning from the computer and live-instructor.

Alziola, on the other hand, has this to say:

This lack of balance is leading us to a mindless use of technology. You can see this mindless use of technology where people are given a software and are expected to learn how to use it without human assistance. People are wasting their time and managers are sending novice and advanced computer users to learn from machines.

Managers generally assume two things about their employees. One, they are already motivated to learn, or two, that they are resistant to using computers. In either case employees are sent to training centres. Since it is assumed that it is easy to learn how to use computers and that they are assumed to be highly motivated, there is no need for further motivation and orientation of people going to the training centre. Some employees are given what is regarded as a "holiday" to spend a day at the training site. This approach to computer training, according to Gloria, "has generated a situation where trainees go to the training without proper mental preparation. Some trainees go to the training centres with confusion while others go with high expectations." Some trainees also know already that they are not going to use the software they are being trained on. As a result, computer training has always remained a one-shot affair and teaching of introductory Lotus and word processing software without built-in mechanisms for better learning and training.

Management interpretation of learning problems presented above has a confusion of purpose and objectives for EUT. Trainers are not sure their purpose, according to training managers, is to reduce resistance or to train users in application software. Trainer's interpretation show how organizations select high performance application software and fail to provide needed training or support in the use of the system. The above statements also indicate how managers went for all upgrades and ended up with incompatible human ability, skill, and fast and powerful machines and software in one office. For managers it seems unusual for someone to spend more than a day at the training centre. One day is a lot of time

to spend learning without going to use. But according to these trainers, this one day is not made conducive to learning.

Paradox in Use Environment

This section is presented under two subheadings. These are: The Day to Day Operational Problems and the Interaction of the User and an Expert.

Day-to-Day Operational Problems. The following are common statements made by the participants (learners) in this study about the day-to-day operational problems in the use environment:

1. The use environment is prone to problems and these problems are never recognized as such.

2. We use advanced systems with bare minimum skills. Expert advice and support are not available. If support is available, it is either incomplete, confusing or difficult to understand.

3. Experts are not willing to cooperate.

4. Poor user interface is considered to take care of us. It is assumed that everything is well set and that most problems are due to the users, our own problems and not the system or the technician.

This particular problem was identified by John as a major one. By poor interface John meant "lack of consistency with regard to the look and the feel of user interaction with computers. These interfaces include input devices, menus, mouse" For John, "the interfaces are not dependable nor, transferable." He said:

> I can not find a good example of consistent interface in the market place except in the words of sales men. Spreadsheets are not similar. Word processors are not similar. Above this, the input and output devices are all different. Each and every one is different. Every one of them have their own problems when you use them. You see the problems when you use them. It is at the users' end that you can really understand what they mean by user interface.

5. Help desk experts consider computing to be simple and expect users to remember everything fast and to almost be perfect.

6. Immediate managers have no computer knowledge. They depend on information technology experts. They trust the experts more than the user who is facing the problem. Information technology people have no feeling for small users.

7. There is no significant institutional support to really help users. Users personally struggle to make sense of the problem.

People are not only using Lotus or Word processing software. Betty also uses a purchasing and inventory control system. Sosy uses a large insurance company data base. Hector uses a sophisticated Human Resource Information System (HRIS) software. Other software is industry-specific. Training in the use of these specific software packages is not readily available. What is common in the three software packages described above is that all of them are basically inventory control and accounting systems and they are all based upon a relational data base.

Sosy was sent to the training centre as a result of accumulated rejected reports during the use of a complex insurance company software. Here is what Sosy has to say about the use environment in her office:

> There is always something which is not clear about data entry by support staff in the insurance company. The work is mostly tedious. It is repetitive. Work goes on 24 hours with different shifts. The problem and errors in the night shift work are not apparent to the next day shift until the computer people run their test or reports. We are asked to work fast. Employee turn over in data entry is very high. New temporary staff make a lot of mistakes. The amount of rejected cases accumulate daily. Data is gathered from each broker office and is then entered into the central computer by data entry people. Updating the data base involves manually checking records, inputting and editing. We have to watch for many things. There are different discount rates, different funds and different fees. There are different insurance policies with different premiums. An individual might have group and individual policy with different premiums. We have to match and verify each and every record. Most of us have no data or file management skills. We do it manually. Finally the

accumulation of un-updated rejected reports reached beyond control. As a result of this accumulation. I was sent to this training school to learn data base management.

While Sosy was finally given training in data base management. as a result of use problems (accumulation of exception reports). Hector's problems seem more complicated. The software that Hector is using is very complicated. I confirmed the complexity of this software with HRIS consultant (Jerry) at one of the biggest banks in the area. Jerry said that "the software is not user friendly. It is also not for beginners." The software in its original form had twelve major modules and a large number of sub modules. Editing and reporting with this software requires advanced knowledge of data base management. Hector had to use the system after only two days' training.

This software (HRIS) was further enhanced. and is still being modified. It was originally intended for use in personnel functions. In Hector's office. they enhanced the software for use as a property management and asbestos monitoring system. Hector says:

> Initially, we were told to use a fixed menu within the software. We started to use it and developed an input system for asbestos monitoring and tracking. Then programmers started merging and adding modules. In doing this they lost some important historical data we had been collecting over the last three years. They are still "enhancing" the system they always enhance. What I think they are doing is stitching separate modules together and making it look like a new and different module. While the programmers rush me to review the new version with other users. my manager wants to postpone any review of the new system until I completed what I am currently doing.

Hector continues:

> The software is not user friendly. There is no short easy way of reporting systems. To get a report of one page you have to print 20-30 pages. There is no one in the office who knows the system which I am using. The manual I have is no longer functional because the system has been enhanced so many times that the manual and the system now are different. It is getting more complicated and no one is making it any easier for us. In the office, I am a User Committee secretary. The programmers demand detailed information. The managers ask for summary reports. We, the users, have no idea of what detailed information or a summary report are when it comes to the HRIS. It

is not helping us. Except for the two contract programmers, there is no one in the entire corporation who knows this system to help me.

Here it seems users are caught between supplying detailed information for programmers and summary reports for their immediate managers. The managers and programmers also seem not to be communicating well, so that users can understand what is expected of them. In Hector's case, what is lacking is not only someone who knows the system to help him, but also how people learn to use a new system is highly misunderstood by programmers and managers.

The day-to-day operational problems identified by users include: unrecognized problems, incomplete documentation for support, a confusing and difficult support system, dependence on a non-dependable software interface, lack of computing knowledge by managers, managers' unconditional trust of computer experts, experts trusting the system more than users, and general use of computers before knowing the what of computers and the how of computing. The problems are institutional, human, and technical. Programmers/experts discounting users problems as not necessary, and their un-cooperativeness are a continuation of a computing legacy when programmers where placed in basement offices insulated form other organizational problems.

The Help Desk. An insight in to the frequency of the day-to-day operational problems of the user can be seen by the level of activity of the help desk people. The help desk can be within the organization or located somewhere outside the office. In the case of a one large commercial bank where Jerry works, there is a 24-hour help desk service for employees. An employee just dials 1-800 and can receive help. The help desk operates from one central location.

The help desk is always busy. In this regard, Mrs. Linda said that in her office the help desk receives around 400 calls per day. The Wall Street Journal, (August, 28, 1995, B1)

also indicates that it is normal for a help desk to receive 23.000 calls per day from large companies. "If it does not work in this way call the information help desk" is a universal guide. Mrs. Gina, a trainer, in one of her comments during the trainers focused group interview said:

> management wants to have a better help desk than to train users to help themselves. This better help does not have enough resources and its young technicians have no patience with the users. They are young, dynamic and aggressive. This is good for advanced computer use environment but not helpful when it comes to helping beginners and those at the intermediate level.

While Gina explained what managers want was a better help desk service, users of the help desk raised the following concerns during the focus group interview.

1. The personnel at the help desk always enjoy solving technical problems. They go straight to the keyboard to check the problem and leave you hanging there. The help process almost always ends abruptly.

2. Help technicians have a very limited contact time for each individual problem. They have no time to humanely understand users' specific problems and take no initiatives to ensure the users understanding of the problem and the solution. Extending users' horizons and knowledge is not their priority.

3. Most help technicians are not familiar with what the individual caller's job entails.

4. They are not flexible. If they are servicing a printer problem, that is what they fix and will leave, even if you inform them of another problem. They solve the problem you requested and do not assist with any other possible problems.

The above four situations show that the help desk rarely gives either a conceptual explanation of the problems or a possible account of how the solution was reached. Lina reflected on her experience with her company's help desk in this way:

> Calling the help desk unless you know how to talk their language is a problem. They ask you to tell them what has happened in detail. They do not know that

having a problem itself erodes my memory. They treat you roughly. Once I got humiliated and really frightened. Since then I do not call them. I now consult a colleague or a person nearby. These colleagues just help and solve the problem without asking you a question.

The help desk for Bob is:

usually a waste of time rather than solve problems. You phone them and they ask, you "did you re-boot?, Did you check the cord?, Did you do this and that?" They always consider you too stupid even unable to check a cord. They have no idea of who they serve or who they are talking to. For them users are all an ignorant bunch of people. Outside the information department and the office of the executives, the help desk people are just dictators. When they really know something, they do not share it with you. When they do not know, they do not accept that they are at times as ignorant as the rest of us. I saw them very many times. The more I called them, the more problems I had. They do not tell you why they have changed something. Users are not stupid people. I finally got tired of being lectured to and stopped using them.

It is difficult for users to describe computer problems over the phone lines. It is not also easy for the technician to offer workable solutions for most users. Callers are said to respond to the telephone inquiry, "Are you in DOS?" with "No, I am in Toronto." The face-to-face support service is said to be effective with most users but are mostly problematic. This is mainly because the technician's approach and interest are mostly different from the approach and interest of the user.

Two cases from document analysis given to the researcher by the participants show the problems prevalent in the use environment. (See appendix I). Case one (see appendix I) is a memo written from a systems expert for the users. The memo is about locating an e-mail message sent some months ago but never delivered to the receiver. The messages were found "lurking deep in the mail directories." For quite a while senders and receivers were having a problem with this electronic communication. Some users reported this problem as soon as they detected it. There were constant claims that mail was sent while those to whom it was sent said they never received it. While the problem can be either a users' or a computer

system problem, Hector said, "information people assumed that it was the users' fault and the problem remains unsolved. Finally we got this beautiful letter that told us that all our lost messages had been found."

The second case (see appendix J) reveals that users have a problem using computers. Some have a problem with how to save their files in the proper place. The problem of using advanced word processing features while not knowing the directory of where to save micro files and where to locate some utilities can be gleaned from the memo. Users have a problem of differentiating their own private directory from the WordPerfect directory. In the network there are system directories. There are public and private directories. Then there is the WordPerfect directory with its sub directories. The second memo asks the users to go to WordPerfect sub-directory before they know the main directory. The reaction to the second memo by one of Hector's colleagues was:

> I do not know how to interpret what the message states, press this and press that. Why do not they fix the system in one central place than allow people to fix what they can not fix. This technology can not be fixed using a screw driver or hammer. The solution is good training and good support. These are not made available to us. Instead we get such a well written letter.

The above problem is more related to how systems experts send electronic messages using complex computer terminologies, assuming that users are homogenous and able to understand technical terms. A memo to Hector about HRIS also indicates such complex terminologies which are difficult to interpret and understand. For Hector the difference between DOS text and WordPerfect text was unclear.

The nature of the help desk is problematic both for users and help desk technicians. The dynamic, aggressive nature of these young officers compared to non-computer trained users by itself is an obstacle for effective delivery of help. Users ask for patience but

technicians have no time to show and practice their patience. Limited contact time between the internal help desk technician and the user limit the opportunity to extend users computer horizon. While a user wants the internal help desk technician to act as a facilitator of learning, technicians act as doers. This "doers" role on behalf of a user (just to solve an immediate problem), is one feature that McAuley (1994, p. 423) represents as "macho" management and competency in corporate culture. The temptation to solve problems is overwhelming. Taking the keyboard away from a clerk and typing X into the machine may save time, but it is unlikely to help learners learn. A balance between doing and facilitating is needed but unavailable. This unavailability is may be the result of a lack of enough resources. The a sole interest in the time and speed at which a given call is answered and solved might be another factor. Pure interest in time and speed per unit call generated universal help desk software and a universal user and user support system. but so far seems unable to help people learn. The above discussions also show that managers are more interested in increasing automated help desk than in increasing resources for user training.

User and Expert Interaction in the Use Environment. Examining user and expert interactions, relationships, and understanding users' perceptions related to interaction in the use environment were particular areas to which special attention was paid to during data collection. Special attention was given to the above construct for the following reasons:

1. The core services which users need most from the Information Centre are troubleshooting, consulting, and training. These three services involve the direct interaction of users and experts.

2. What the users feel and say about the kind of help and how they receive this help can indicate the nature of the relationships and interactions that take place and that have developed over time.

3. According to Cushing (1990, p. 47),

> one element that is unique to management information systems (MIS) is the interaction of MIS developers, MIS users, the MIS itself, and the organization in the process of development and use of MIS... These interactions were identified in the research framework as essential elements of MIS that distinguish it from other scientific disciplines. Cushing suggests that "MIS" research might be defined as the study of interaction of MIS developers and MIS users in the process of development and use of MIS within organizations.

4. The understanding of these interactions helps one to interpret the process in terms of Keen's (1980) adaptive framework selected as a conceptual guide for this study.

User and expert interaction in the use environment is seen by Betty as one-way traffic. She says:

> It is just one way and that is the way the technical people want it to be. You tell them there is a better way out of this one way traffic but they tell you that it is not possible to modify. As a clerk I was tired of being looked down upon. Now I have some grasp of the data base. Purchasing is what I do for a living. I studied it very well. My problem is now the computer system with which I cannot communicate with the account payable group. I call them daily. How long can we go on calling different experts for different problems, I do not know. What I know is that whoever comes only fixes things for today and we again call them the next day.

Betty's main problem, as to why she could not communicate with accounts payable using available computer systems can not be clearly classified as either a technical or human problem. It is both software and human related. The software (Purchasing and Inventory control system) (PICS) according to Betty,

> does not support timely billing and order tracking. The system locks up and behaves unexpectedly. This is not limited to (PICS). In my e-mail I also face similar inconvenience. Please disregard previous email. File appears to be corrupted and you will not be able to open it is a common message. When experts teach you or install such a system they do not tell or warn you ahead about such problems. They do not tell you the real story so you can mentally prepare yourself for the new and possible challenges.

One-way communication, where users only listen or accept what is said and have no early warnings, are a conducive environment to generate conflicts and more misunderstanding.

Early warning, according to Betty, also implies early training and possible mental preparation of the user.

The use environment is the centre of conflicts. Some of these conflicts are caused by the lack of technical knowledge. For others, it is due to the lack of human consideration. Users consider the problem to be basically due to a lack of empathy, human touch and human interest on the part of computer experts. Hector works with two external contract programmers. He also uses the internal information service group in his office. Currently, he is the secretary of the users' committee implementing the new HRIS. The committee has been working for the last three years to implement a modified HRIS.

The two programmers modify the program at a different site and communicate with the users through electronic mail. A chain of electronic messages that the programmers and Hector exchanged in the last two years was made available to the researcher for further document analysis. These electronic communications show the nature of interactions between the programmer and Hector. Initially Hector sent the following message (first message) to the programmer.

> I still have not received the new HRIS program file and the training manual that has been promised. In late March 1994 I spoke to Mr. YYY and he said it would be forthcoming in a few weeks.

The issue in this message is lack of the program file and the training manual.

Programmer to Hector:

> As I recalled, you were trained on the system late last year. We were expecting to hear from your office the date when you will begin using the system. I am passing your message to our help centre to arrange your schedule for implementation.

The focus of this message is that Hector did not notify the programmer of a start date.

Hector's reply:

In regard to my September, 1994 training session, the trainer assured me the general morning group review would be followed with an afternoon segment to address my specific concerns. However, the group session lasted much longer than anticipated and there was no time to properly address my needs at the end of the afternoon. The session ended without a specific training on the new version. I do not know if such a session is called complete training and review.

Clearly the issue in this message is about training.

A programmer message to Hector:

I have been asked to oversee the installation and set up of HRIS for your site. Since I have just been advised of this issue and some of the background information, I will need some preliminary information from you, particularly in regards to your set up security. It is my understanding that you received training earlier. Would you prefer to take the course again?

Hector to a programmer:

The training session I had in September, 1994 was incomplete, as I explained to Mr. YYY. I received no files with the manual instruction in order to review the new version.

A programmer to Hector:

It has taken us so long to get back to you. It looks like this process is going to be a little more complicated and time consuming than we all originally thought. So we will just have to bear with it and ease along. In order to prepare for the installation of the system, we will first need some information from you. First of all, we need you to email me a copy of your GENDB and CALDB databases and your supervisor user_ID_CA.

A reply by Hector:

Please find attached the requested files. I still have not received a manual for the new system. By now I am supposed to prepare a handbook to our users here. Neither my training request nor a manual for users was given serious considerations. Please resolve these two issues so that we can be on track soon.

Here the user has come full circle asking the same questions he raised a year ago.

In the above messages, the language programmers used to communicate with Hector is different in meaning and in what it stresses. Programmer's language in the memo commonly stresses only files and system ID's. Hector on the other side, stresses the need for

training and instructional manuals. Hector was trained one year ago and still was unable to practice on the new version. In all the messages clear, precise, organizational, and training goals for the implementation of HRIS are not visible. As a result, the communication between the two seems unending. These communications also indicate how programmers underestimate training related problems. In all messages from the programmers, computing is not seen as a package (hard/software, skill, organization) but only as one single software, file and user ID.

The messages from the programmers clearly show that the person is considered less important than the software. It also reveals that the programmer's messages are not directly responding to the user's demands or needs. Through the memos it was possible to observe that training was not carried out as promised, the user manual was not made available as a guide to the user and training is not phased or sequenced so that the final training is given before the implementation. These memos have encouraged frustration and conflict instead of learning and mutual understanding. Hector explains the nature of conflicts that he experienced as:

> These people only react to users' expressed needs. We people have no knowledge of the potential problems that we might face the next time. My focus is my immediate problem. Programmers cannot anticipate our future problems. They do not ask us how we are doing and what problems we are facing. They are more eager to fix small things here and there. You ask them why these things happen now and then they get nervous. Conflict is right there but no body admits that it exists. The experts are always right and the user is always wrong. Our managers have no knowledge of what computers are all about. The only thing they know is to accept the word of the experts and support what the experts tells them. Everything they say supports what the experts says and wants. This is why the world is so divided in two different people in computing. Some of us are blind about technology. The rest of us struggle with some knowledge. The computer expert cannot see these blind followers or the problems the hard working users face. At times everything is wrong. You

cannot please them. You also have no knowledge what please them.

What is recurrent and common in user/expert interaction from the perspectives of these low-level users is the world of we/they, ignorant/intelligent, powerless/powerful, passive/active, slow/ fast, primitive/advanced, traditional /modern, disrespected/ respected and valued/not valued. The interaction is more like a world of contrast than a smooth flow of ideas for better understanding of each other. The use environment is the world of blaming, rather than really solving problems and helping each other (see appendix 10 A). Betty depicted the situation in the use environment this way:

> Complain about your headache with this system then you will get this chain of things. It is not the software, no it is the hardware, it is a network, no it is the cabling. If you insist on complaining they will finally tell you that the fault, the problem, is you the user.

The electronic messages between Hector and the programmers show how far a user can be at fault by experts. The statement "we were expecting to hear from your office the date when you will begin using the system" implies that the delay with training and implementation etc., is the user's fault.

The use of application software according to the above discussion means installing software, not providing sound communication for understanding. Though MIS researchers indicate one element unique to MIS is user, expert and systems interaction, this interaction and communication is only one way. Communication in use environment is either technical communication (use Y software) or organizational (I want that report by X). In this kind of communication users voices are not heard or found important.

The lack of a link with in available software is forcing users to call computer experts. User and expert communication and interaction defy What Bateson (1972, p. 483) stated as "What 'thinks' and engages... is the human plus the computer plus the environment.

And the lines between man, computer and environment are purely artificial, fictitious lines... What thinks is the system." According to participants' statements it is only the experts or the computer which takes the centre stage for engagement. Users and experts interaction indicate a clear difference in words, ideas and focus among the stakeholders in EUC. For computer experts in the office everything is clear, simple and intuitive. What computer experts and managers consider, to use Berger and Luckman's (1966) phrase the expert's "here" is the users "there." Experts' interest does not overlap with users' interest or understanding and use. The situation also shows how for computer experts with computing knowledge, everything looks like data, bits, bytes, and speedy calculators. Problems are bugs, set-ups, crashes, errors, and configurations not the lack of support for users, circular communication, and lack of sharing and encouragement. Circular communication between users and programmers nullify users' immediate concerns and problems.

Learning Environment

Instructor-led Environment. Instructors' responses to the questions: Can you tell me what it is like to be a computer end-user trainer/manager? and what is the main problem in teaching application software programs?, individually and in focused interviews, resulted in the following major points:

1. No support or appreciation for the trainer.

2. Mixed group training and persistent complaints from learners and managers

3. Cafeteria type of selection and serving whomever comes first.

4. Zero learning curve training today and expecting an expert type of work the next morning.

Computer trainers operate under these four troublesome conditions. Gina expressed the situation as:

We are asked to perform miracles. Once I was asked to organize a training course for the introduction to Wordperfect in a Windows platform. Based on that agreement, we organized the course and we sent our trainer to their centre. By the time the trainer arrived at the centre, he was told to train WordPerfect with a DOS platform. We had to change everything. The instructor, the teaching material and the mobile PC that the trainers use for training outside our centre.

Alziola expresses the situation as follows:

People with whom we deal in computer training, have neither the time nor any understanding of what they are telling us to do for them. Education and Training Coordinators in most offices are more interested in getting course lists. Their only good criteria of trainer selection is effective communication. I am sometimes confused whether they are looking for a human relations person or a good adult educator. You tell them the truth about facilitation process, training needs analysis, post training follow-up the discussion change to cost saving. They do not conduct their needs analysis. Our contract, our agreement and the need to train are all based on assumptions. These assumptions in most cases are wrong. So far, very few organizations I work with face their training problems realistically.

Gina also expressed the focus of most training coordinators as finding the most cost effective training from various training vendors and volume purchase of courses. Her explanation was as follows:

A focus on learning and the learning process is not well known. I know for example, there are some organizations with an IT Standards Committee, but could not find what was their standard for IT education and training in their organization.

A lack of standards defining how to help users help themselves resulted in the following situation that Linda experienced. As a trainer, Linda once faced the daunting reality of training in the windows platform using a mouse. The trainees were unable to double click with a mouse. Linda says, "On observing this problem, I let the students practice how to use the mouse using SOLITAIRE - a software game within Windows that Microsoft has already attached to the system."

SOLITAIRE is a game that helps users learn how to use a mouse. Playing the game usually takes 10 to 15 minutes. While the trainees were playing the game, the manager came in and complained to Linda that she was wasting time by letting people play games rather than teaching them. Linda said of the incident:

> He asked me through an official letter to remove SOLITAIRE from the hard disk. Managers have no notion of the learning process. For them, teaching is leading people straight to the computer screen and sending them home at the end of the day.

The problem related to Solitaire is more an indication of what learning perspectives or conceptions people have than a simple misunderstanding of Linda's approach.

Learners, on the other hand, consider a one-to two-day training session as a perk. What bothers learners most is learning in mixed groups. Lina describes her problem in learning in a mixed group as follows:

> the faster you are, the better the trainer helps you. Nobody looks after the slow trainees - after the lost and the confused and most of all after the ones in need of serious help to learn.

Here, Lina is saying that the learner is not able to cope with the pace of teaching which forces the learner to feel insecure and threatened to learn. Bob on the other hand considers his problem with short computer training as:

> The course I took was about the mechanics and features of the software. The difficulty is applying these mechanics to my work back in the office. Understanding of how to use the mechanics in my specific job demanded a different type of training and time to test my understanding. These two were a luxury in a one day training where different people from different areas of interest and background are trained together. The problem for me was getting too much and applying too few of them.

In one way, Bob and Lina face similar learning problems. The problem of speed and pace of teaching is common in both cases. This results when a trainer tries to cover everything possible about a given software in one day training without considering the

learners' level. Mixed group training not only hinders learning for most people, but also makes it impossible to transfer skills learned at the training room to the workplace.

Similar to computer users in the office computer instructors have minimal support. They are expected to meet the demand of unrealistic expectation from one day training and produce instant experts with minimal support. For these trainers preparing for training for some training managers means going through instructional manuals supplied by training vendors and selecting effective communicator for computer training. Education and training coordinators according to these instructors are more focused on how to find cost effective training and buy volume purchase of courses.

Computer-Based Learning Environment. This is a learning environment where a computer-based system helps the student to learn about computing. The course is highly structured and segmented into modules. Time per unit course is determined by a number of modules in a single course. One module can range from two days to three weeks. For example, a complete course in microcomputer business application (generally called Office Skills) consists of introduction to WordPerfect, 40 hrs; advanced Wordperfect, 30 hrs; Lotus, 25 hr. and computerized accounting, 50 hrs. A course in data base management took Sosy three months to complete.

In this learning environment, the system seems to take precedence in teaching and helping learners. The role of an instructor is almost non-existent. Basic information for the students is given by administrators and secretaries. Getting students to start their lessons consists of simply handing them a floppy disk and a handbook.

The students describe their situation in this learning environment as follows:

"Here is the disk and that is your PC, go." (John)

"The problem is how to start the first lesson." (Sosy)

"I was given the freedom to confuse myself." (Bob)

"I was placed in a big library." (Bob)

In this learning environment the presence of the instructor is minimal. S/He is in the room just to monitor technical problems instead of helping students. Students consistently mention their problems with the first three modules.They said the first three modules are very problematic and hard to endure. The first three modules are, in fact, the most frustrating part for the majority of students. This learning environment is explained by Sosy in this way:

> The first lesson (module) was a total loss. I did not know what to do or what to press. Nobody was around to tell me how I should do it. The workbook and the floppy disk they gave me was not explanatory. There was no orientation. Orientation was only about administrative things such as time allocation, fee payment and how to sign for module exams. The people who oriented me to the school system at the reception desk had no clue to what they were leading me. The nature of the training and how I should approach it were not made clear to me.

John is another student at this centre. He says:

> Boy, I was placed in front of a PC screen without any introduction or some sort of class orientation. Self-study, which they say is easy with computers, is frustrating. Here they give you a small disk and tell you to learn. It is possible to learn if you are a risk taker like me but it is frustrating for the first three weeks.

For Bob the story is different. His problem is not only the lack of some introduction or orientation by a live-instructor, but his problem is also related to the purpose of simple practice. And he described his problems, as follows:

> They tell you, to simply practice, practice. Practising with software is time consuming. In simply practising I do not know whether I am playing with garbage or really doing something important. To practice for effective learning you need to know a bit more about the system than you expect. You have to at least be able to come out of the mess when lost in the system. To do this there must be some structure. The structure I want and the one I believe will help me is not in the system. The school believes that the system is easy and we can follow the procedure. Every time you have a problem you have to go and line up for help from the instructor.

This simple "practice, practice" is more related to what Alziola said: a mindless use of technology without human assistance.

In the focus group interview held in an OISE classroom with six learners, Sosy presented the situation of a computer based learning environment, as follows:

> Unless someone has patience and maintains her interest, she can get easily irritated in this learning place. The kind of error messages you get and the time it takes to get help is very frustrating. The situation in the first three weeks kills your desire to learn. It is easy to be frustrated. The whole thing during this time was unbearable. You are alone by yourself. Nobody understands or believes what you undergo during this initial time. It is unbelievable. Neither my husband nor my brother believed what I was telling them. Just like the computer error messages, they started blaming me, as if everything was caused by my weakness and fear.

What irritates learners might be their own unrealistic expectation from computer training, common in a situation where there is no specific training needs assessment. The error messages are more related to the interface language mostly used in computer applications. Terms, such as "invalid parameters" default, are said by the participants to be confusing. What is educational from the above statement by Sosy is that what learners face in learning how to compute is not even believable by their own intimate friends. This situation should urge trainers to realistically understand learners, in order to reduce most of the difficulties involved in learning how to compute.

In Site C, computer technology is believed to teach and support learners. This belief reduced the role of an instructor to limited monitoring of the learners' situation and a focused monitoring of effective operation of the system. Letting learners simply practice is not leading learners to further learning. It simply frustrates them. The main problem of this site is not the CBT system, but the application of the concept of self-directed learning as a universal learning method. Learners are not homogenous and the use of such universal method invites more learning problems. Initially CBT are intimidating because they are not related to

learners' experiences of learning or background. Just providing a floppy disk with an avalanche of modules or lessons for starters to start with is inviting problems and making it difficult to learn.

How Learners Learn about Computing

The ways in which these participants became familiar with computers are diverse. They say: "I went to a night school course, had a one-day training given by the office, saw a demonstration at the computer show, heard about it from friend and became familiar through a co-worker." In the world of these participants' learning processes there was a combination and balance of learning systems and methods. They used formal and informal methods of learning or whichever was convenient for them.

Beyond becoming familiar with the physical computers, learners identified the following specific methods of learning how to compute:

1. Peer-support and use of a local expert within the department;

2. Taking risks to master the system;

3. Attending numerous mini training seminars after work and picking pieces from here and there;

4. Asking friends and participating in user groups;

5. Bought a book with own money;

6. Copied the manual and started to fool around with the system. Read the manual while coming to work; 7. Enrolled in a night school computer course; and

8. Started coming early to the office to practice the tutorial in the system.

For Bob:

visiting computer shows, private company displays and contact with friends is the way to learn, but the workload is always heavy and a rush to meet a given deadline is continuous. You ask your boss for time off for educational purposes

there comes a statement such as, can you do it next time? We are busy now, the dead-line for inventory submission is next week and on and on.

John claims that he is a self-starter. He always stresses the point, "I am self-taught"

and goes on to say:

> I picked important things about computers from people like me in users group. The most important knowledge and vital secrets are the ones I got from other people and not from books, manuals, tutorials or from training at the workplace. I went for computer training after having learned part of it. Computer training at the workplace is to make people know a couple of things and leaves you to suffer with the little knowledge. The one they give for the ordinary worker is more of a problem than a solution. It is very fragmented. It is mostly how to press a key or call a help desk than what the computer is all about. Just tell me, what is the point of learning Lotus when you do not know how the software does what you want it to do? Why don't they teach us the operating system that controls all these software? I have seen a flux of software but the operating systems throughout these period have remained constant. They are DOS, Unix, Macintosh or Windows.

> I learned this stuff through my own struggle. It was good for me that I was irritated by the way people taught me how to use the computer. It gave me a gut to fight. A will to struggle and take risks. As I see it, these short computer training courses only make things more complicated than easier for the learner. Why do they let us jump to a sophisticated software when they know our problem is basic? I am seeing things from a wider perspective than you have asked me to, but what do people really learn in two days of application training? They learn that Mr. or Mrs. X is intelligent and they are not, Mr. X is quick, and they are slow. In the hospital my wife felt exactly the same situation.

Interviewer: Can you please explain what has happened in the hospital with your wife?

> My wife is a registered nurse. A year ago, the hospital she works at computerized the entire system of nursing and patient care. The training for all medical staff was recommended by the hospital system's consultant. The medical information management system is a very advanced system and runs under windows platform. My wife is not interested in using the mouse and she finds typing commands easier for her. The day she took that training in the hospital, for the first time in her life, she told me that she could not do it. She said she spent the whole time going from one window to another without identifying a single record she was supposed to locate. The one day training had already killed her strong will to learn. She was upset about the way they treated the material and the trainees in that course. They simply ignored most of the important questions they raised as unnecessary. Now the hospital has the option to lay off people who are unable to learn.

> You see, Ken, things with learning need not be complicated. We must start from what is simple and move slowly to what is complicated. This way you reduce fear and are encouraged to learn. In computers this process of learning is reversed. You start from advanced stages and work backwards to what is basic. From my experience, this has resulted either in totally reducing the use of computers to pressing a limited number of function keys or to users having no confidence.

In John's statement we can see what triggers his further learning for computing. John also discussed the social implications of computer training (learning) and its immediate impact on his wife. The statement "Computer training at the workplace is to make people know a couple of things and leaves you to suffer with the little knowledge." implies an important remnant from the battle between the mechanics' institute and the trade unionists on the two different conceptions of knowledge. Benjamin Warden once said "mechanics institutes were not intended to teach the most useful knowledge, but to teach only as might be profitable to the unproductive" (quoted in Newman, 1993, p. 58).

Sosy was exposed to short formal training twice. In one case she was given a ten minute PC skills certification test called KRYTERION and a one day Lotus training. She said she was trained but never used this software at her workplace. The second time she was given another one day training in WordPerfect. Sosy says she is not placed where she can practice her newly acquired skills. Finally, she was sent to this training centre where she is now learning data base management. Sosy was trained in Lotus and WordPerfect but because of lack of practice she said she cannot use these two packages now. Sosy says:

> when I was trained in Lotus but not given the chance to use the system, I thought I had failed in my test. Finally, we heard that we were trained but were not using our skills because of changes in management. We are trained but cannot practice the skill.

Sosy's experience indicates how trainees are woefully ill informed about what to expect after training. The problem is that this kind of situation is not only lack of practice but also how

people learn and transfer their skills onto the jobs when they do not know where they are going in their learning/training.

Irrespective of computer experts and lack of support, men and women in the office learn and teach each other using different methods. These learning and teaching methods involve using support (users) groups. People who come together to pool resources to learn about new uses and otherwise share the joy and pains related with using and learning new software or new machine. The other methods used by these participants include: visiting computer shows, peer contact, asking questions, picking pieces from different places at different times and attending computer night school.

Major Problems

What trainers and learners identify as the major problem in learning and teaching about computers, compared to the current popularity of the computer revolution, knowledge society and knowledge management, is very disturbing. It is disturbing because most of the problems were so basic that it seemed well taken care of with the numerous management innovations we read about in most professional journals. What is surprising about these problems is not the recognition of the problems but their persistence since the time computers became part of a workplace reality.

The main problems in End-User Training are:

1. Management focuses on the machine and they are ready to upgrade equipment, but not on human beings who use the equipment. Equipment is installed with the participation of technical experts and managers. Decisions to organize and deliver training are made without the participation of the trainers and learners. Even education and training coordinators are not part of the decision-making groups.

2. Management's misunderstanding of the human learning process and training.

3. Lack of purpose for EUT and considering the computer training centre as a "garage" where people can be "fixed" for a PC in a short period of time.

4. Continuous upgrading of software and hardware

> Alziola summarized the main problems in computer training as follows:

> End-User training operates in a vacuum. It is like a tide which suddenly rises and then falls. There are no fixed or agreed upon principles or person accountable for computer training. There is little that is accumulated to justify the needed changes. The personnel departments themselves are very slow to adapt computers. The Information technology people have little interest in the training and education of users. In between, technology, hard working end-users and trainers are blamed for most computer ills.

Operating in a vacuum, having no agreed upon principles or accountability for training, being slow to adapt computing, and having no interest in training are an indication of an EUT system that mirrors the educational values of organizations and the discrete entity models of computing at large. It is also because of these problems that most issues related to EUT are curious and conflicting to computer users and readers of trade and academic journals.

Most trainers, except Arny, are involved in training in basic application software. These are spread sheets and word processing packages. Computing includes more than these software packages. In fact, participants in this study, except Lina, use other large industry specific or generic software, such as Purchasing and Inventory Control and Human Resource Information Systems. While many people use these kinds of advanced systems, there is no wide recognition of training for these systems. Except for Sosy, all users of these packages were not trained by the organization they currently work for. Institutional support for non-word processing training packages seems to be inadequate.

Summary of Findings

People learn through using friends. by asking the nearest knowledgable person at the workplace. by taking night courses. and by attending mini training seminars after work.

What Exactly happens when people learn how to use computers depended on conditions they encounter during their first training session or their encounter with computers. Learning through CBT was frustrating and initially very discouraging for learners. In the case of Site B where learners confidence was given priority learners seem to assemble. and disassemble the machine. and be able to deal directly with the operating system easily. In the classroom learners at this centre effectively ask questions and take notes.

People receive most of their basic training at their workplace. Some receive their computer training at the private computer training centre. For support. learners/users mostly go to their immediate workplace knowledgeable person. Outside their workplace people go and ask their friends. Some also participate in users group for support.

Problems that these participants consider as a major obstacle to their learning and effective use computers include: management focus on technology. and managers misunderstanding users problems related to learning and using computers. The general lack of purpose for EUT is a problem both for learners and trainers.

CHAPTER 5

DISCUSSION OF THE FINDINGS

Introduction

Chapter Four focused on expressing the voices of actors involved in end-user training. The condition of end-user training observed by the researcher was reported in that chapter. Chapter five presents an interpretation of these observations. In this particular study, the existence of a visible gap between users, managers, and computer expert makes interpretation very difficult. The gap between the assumptions made about end-users and users' actual expressed opinions about learning to use computers is extensive. Most possible explanations about end-user training available in Management Information Systems and educational literature fail to bridge these differences.

In 1946, the first machine that calculated at electronic speeds was built at the University of Pennsylvania. This was Electrical Numerical Integrator And Computer (ENIAC) which used vacuum tubes instead of modern transistors. Half a century later we are still amazed by the amount of data that can be stored and the speed at which computers are able to select and present information. Except for the prophets, the priests and the altar attendants, to use Bentley's terms (Bentley, 1983, p. 75), the computer is still something new, complex and advanced for many people. The difference between the hardware and software is still a mystery, secret, unknown, or unexplained. The skills of the computer experts are also mostly alien to most. This is mainly because, users were mostly given the machine but not the support necessary to use the machine effectively. What makes the situation curious, paradoxical and contradictory is the gap between the emphasis put on the user skills and the

technology. Strong and Miller (1995, p. 227) show this contradiction in terms of the human ability to handle exception and state.

> people processed the most complex cases that the computer systems could not process, but they did not have the opportunity to become experienced with simpler cases because computer systems processes these cases more efficiently.

A similar case was defined by Bob as "reversed learning," that is, learning advance features in application software before mastering the basics of computers.

The situation of end-user computing, and end-user training is curious, paradoxical and contradictory. Conflicts, misunderstanding and conflicting reports, complexity and simplicity, hopes and frustration coexist in the use and learning environment. The amount of money being spent by companies and individuals on information processing equipment is rising. It is estimated that about 70 per cent of investment was on computers and telecommunication equipment. The use environment is driven mostly by the promise of increased productivity, efficiency, and effectiveness.

The interpretation of users' and trainers' problems is very difficult and challenging. Overall, in this study it was possible to identify serious problems during the first encounter with computers and a negative user and expert interaction in the use environment. Management's assumptions of problems during the first encounter and user/expert negative relationships were found to be major problems hindering effective learning. This was supported by all participants.

Prelude. It is possible to generalize the major problems identified in this study as basically a problem of management and upgrades. The latter one is the reality with modern, fast moving, and continuously changing PC technology. It takes now nearly 18 months for a new PC to move from the computer laboratory to mass consumption. "Upgrades and upgrades," as mentioned by a trainer, is a problem we have to live

with. This "living with "is not to accept the old misconception that planning is impossible when the future is continually changing. Accepting that managers, computer experts and business leaders could not improve the effective use of computers is to submit ones-self to technology and be a follower of it. Therefore, the focus on management-related problems helps us to relate what users and trainers say in relation to available research. The problems that learners and instructors face are more related to management systems in the use environment. The experiences of these participants in this study are parallel to the following statement.

> In terms of our ability to really use this information, we are like a reed in a wind storm. The winds are managers and the extent to which we can do anything is determined by the pressures they exert and how much room they give us (Zuboff, 1985, p. 136).

Presently, it appears we are simply following the technology. The real masters of personal computers at the workplace are still very few. Staff shortage at most levels was an accepted condition in the history of information technology. The quantity and quality of human factors behind this technology are still very thin. From its very inception, the computerization process at the workplace was not approached in such a way that it was a learning process. This is why many users and trainers claim that there is no learning curve in end-user training. The zero learning curve involves becoming an instant expert immediately after one or two days of computer training. The term reversed learning process is also related to this lack of proper learning process in learning and using computers.

The most common features repetitively used in WordPerfect, Lotus, and dBase by these participants are print, save, copy, sort, and view. This is consistent with the findings of Kay & Thomas (1995). These commands perform what Kay and Thomas called "primitive operations." Users have limited alternatives to go beyond using these features. They have to meet short dead-lines. This pressure consumes their time

and they have no extra time to learn while working. Users have very few alternatives or the time required to become minimally proficient. As a prelude, the above statements helps to examine problems with the first encounter.

The perceptions of end-users about important features of training and their problems are often ignored. Trainers state that they are expected to achieve a "miracle." Attention given to learning in terms of time, support and resource is minimal. Trainers and users of personal computers are achieving, perhaps by miracle, results considering the problem and the lack of attention given to their problems. Gina (a trainer) stated this lack of attention as: "it would make our (trainers) challenge a little bit more manageable if we had a bit more support and appreciation. But... nodding her head... she said "we trainers never see it." Given better support, the experience of these users and trainers suggests that most computing problems would be under control. This needs to start from the first encounter.

The First Encounter and Reducing Resistance

The first-time encounter between users and computers was not usually easy. The experience is still not easy for the majority of users, although some progress has been made in what is called user interface. Computer users still face what Carroll (1987, p. 640) has called disorientation (by the screen display), illusiveness (unresponsive or unchanging system), mystery messages, slipperiness, and paradox (in command interpretation). This is mainly because the first encounter is the time when learners such as Sosy and Lina say "what am I supposed to do now, how should I proceed?" This is the critical time when users need help and support.

People today still say computing is not easy. It is not easy because the first encounter is a clashing of two cultures--the technical and the social. To interpret what is involved in a clash of the two cultures in the computing environment one

needs a different lens than the one offered by Information processing or cognitive psychology. So far these two lenses were the primary perspectives that informed MIS and education. This researcher found anthropology delivering a better perspective to discuss the reality of the clash of two cultures in using and learning about computers.

This is mainly because the chasms between the needs of the learner and the ideas of those who run MIS, the one between the producers of computer learning materials, and users of these materials is wide and can not simply be defined as user or expert problems. Few MIS leaders and office managers seem to be aware of emerging nature of computing problems and the need for learning. This situation can not be a simple mismatch between stimuli and responses. Too often technology took precedence over learning. The computer experts trust and effectively pay their obedience to technological progress. The non-experts feel the burden of continually learning or upgrading their skills more than any technological blessing. Experts speak of efficiency, speed, and precision of computing facilities, while the others speak of diversity, complexity, and ambiguity of software and the need for comfort for human learning. The experts search for purity of technical information and are mostly driven by detail. Users are more interested in basic ideas. The non-experts feel the pollution of information and its relation to human understanding and the danger of isolating information from human involvement.

In this relation Douglas (1966, p. 162) states:

> the search for purity is that it is an attempt to force
> experience into logical categories of non-contradiction.
> But experience is not amenable and those who make the
> attempt find themselves led into contradiction.

This search for purity and simple focus on computer systems is the source of contradiction and paradox in use environments. In between, the experts lose the

reality of trying to understand what it really looks like to learn computing in one day and the learner was unable to really focus on learning than on the complexity of computers. What makes the first encounter with computers critical and problematic is that both cultures have their own hopes and dreams for computing. In most cases, these hopes and dreams are loaded with unrealistic expectations and adjectives such as "tremendous" efficiency and "startling" results. These unrealistic expectations make the learning and using of computers more difficult for users. Experts show excessive optimism while users show pessimism. Optimism can be said for lack of information and pessimism is for lack of a bit of imagination. The problem as Alziola said is that "experts have a lot of data which did not help them to be realistic about technology." The exaggerated claims and considering computers as a panacea that can solve all problem without users support is what Alziola considers as unrealistic.

Experience with the first encounter was negative because the situation requires the coordination of: time, empathy, patience, understanding learning, and teaching all, at the same time. With the introduction of information technology, these needs were either removed as unnecessary noise or viewed as traditional and conservative. According to Alziola,

> to motivate learners, to find the spark that opens the door to curiosity
> and learning which is the purpose of a facilitator is not part of the
> training tender document and trainers can not do what is outside their
> agreements.

As a result, what Virginia Griffin (1987) calls becoming and staying responsible, maintaining and increasing self-esteem, owning one's strength, trusting one's own flow, dealing with confusion and ambiguity, relating to others in computer learning, and the use environment is left unrecognized (untested).

Training handbooks used in most computer training programs show this un-recognition. The first page of most training handbooks begins with features and function keys without a small statement to motivate learners and demystify computers, such as the one of Spurgin (1985).

The first page of the Educators's Guide to Using Computers, by Spurgin, starts with the following question. What is computer networking? and states:

> Teachers fight an eternal battle against slang and jargon. All of us met people who enjoy speaking their own profession's language just to confuse and annoy. The people who develop computers are the same way. After all, technology is their baby. They want to make it sound important, mysterious, so incredibly clever and sophisticated that no mere mortal could possibly understand it. And their plan has worked. Although... there remains a substantial group whose palms begin to sweat, whose shoulders turn to iron, and whose feet head to the door when they hear a phrase 'computer networking.' The secret to feeling comfortable with networking is to understand the uses of computer communication. It is all word, jargon rooted in imagination rather than fact (Spurgin, 1985, p. 5).

Instead of starting with, What is word processing? or What is a computer?, most training manuals start with function keys that enhance what Sproull and Zubrow (1984) call adolescent tricks. John identifies these adolescent tricks as super-guide, undocumented tricks, speed-up secrets, instant tips, and shortcuts. These tricks add confusion and ambiguity, rather than increase learners' self-confidence, and only results in frustration. This is why statements such as, "it is frustrating," "it is confusing" and "It is adding fear to my own fear," were so common with these participants.

What has happened in the computer learning process is that we put the people into a process of change or transition, which is always turbulent, and left them without any resource for help. The anthropologist, Mary Douglas indicated that

> danger lies in transitional states, simply because transition is neither one state nor the next, it is undefinable... The danger is controlled by

ritual... Not only is transition itself dangerous, but also the rituals..."
(Douglas, 1966, p. 96).

Computer users were not helped during their difficult time of the first encounter. The first encounter with computers was the time when self-confidence emerged or was thwarted. It is when users feel like and dislike of computing. For Sosy and Lina this time was undefinable. One can read the grim sad reality when the two discuss their first day experience of computer training.

In the content of this study what Douglas called ritual for transition is helping people move safely through a change process which is an educational intervention basically known also as adult learning facilitation. Facilitating adult learning is time consuming, costly, and often unmeasurable in a short period of time. This makes it very dangerous in a technological environment where efficiency, speed, and measurement are more valued than enabling the user, supporting the learner, extending technological knowledge, creating the learning process, and helping resolve learning problems. It is this disparity that hinders participants learning and encouraged the notion of user resistance.

Participants in this study are not resistant to using computers. These participants are willing to learn and use the machine. What they resist is how they were introduced to computing and how the introducer related to them. What learners and users face during the first encounter is more likely to generate resistance and anxiety than learning. This is related more to the computer culture, rather than the learners fears and inability to learn or cope with computing problems. Culture in this context is not only what people have acquired, but also what they carry around in their heads. It is also an immediate relationship between individuals and the socio-cultural order within which people work and live their lives (Lave, 1988). In this

section, computing culture is meant to mean the discrete entity model of computing (Kling, 1987). This model of computing is very common in learning and use environments.

Computing Culture as a Source of Problems. The computer culture, according to Rothschild (1981, p. 66-67)," upholds and values being aggressive, objective, independent, rational, analytic and unemotional as superior. Being passive, dependent, subjective, intuitive and empathic is mostly considered inferior." This is what Pearlstein (1991) calls "computer centrism." For John, this computer culture is all about being "aggressive, dynamic, ambitious, fast and quick which have nothing to do with helping me learn."

In case of Lina the computer culture, language, jargon and acronyms are "rude and impersonal." Error messages such as "fatal error" and "abort" were "brusque, rude confusing, and intimidating" for Lina. The whole situation of the learning environment for Lina was a revelation of computers as tools built for boys and speed not for girls, comfort and learning through relations. Gallos (1993, p. 3) provides a particularly vivid description of Lina's fears and situation in her first encounter with computers.

> The women felt deep terror that they would not be able to understand,
> that they would not know what to do, that they would demonstrate they
> did not belong, that they would show every one their dumpiness.

Hardy et al. (1994) also indicate that the style of male dialogue and the language men used could intimidate or silence women in computer mediated learning environment.

The jargon and the acronyms that Lina found particularly meaningless are "no memory for clipboard, bad partition, incorrect parameters, no logical drives." Lina said:

these are not common English words. Do not they have a better way of telling me? These things still bother me. It bothers me because I was once a teacher. Teaching requires exposition, examples and exercise. In computer training I saw only short exercise where you even have no time to take notes of these terrible words.

The experience of Lina attests that the learning environment did not recognize the fear that many women experience when learning about computers. Lina's intimidation by the jargon, the speed of the trainer, competition, and isolation, made it difficult for her to cultivate or develop the will to learn. The impersonal climate of the training room had fostered self-doubts. Lina expressed the situation as:

the two days computer training killed my confidence. There were no congenial learning and supportive environment. The meaning and experience of the word abort for a women like me is sad, loses of life and health. The whole approach of that computer training was unfeminine. How can you learn when the word they use remind you something very personal for a woman?

Lina's experience indicates that the computer training room is not simply a social context in which learner's learn. It is a social context in which learners also learn social and gender related lessons. Outside the classroom, these social and gender related lessons are illustrated by the way in which computers are presented. The world of computers, including educational media, is almost entirely male (Giacqinta et al. 1993). Men are the purchasers of PCs, the computer enthusiasts, and the compulsive programmers and illustrators of computing materials. Under this condition how can female students see connections to what they already know in order to map their stories and experience onto new concepts? These situations make learning very difficult and frustrate learners.

Negative learning experiences which result from such frustration destroy further learning incentives, which finally have a negative impact on the individual and the society at large. The experience of Lina shows how a computer culture and

language makes learning difficult. It makes learning difficult because computers were not presented in a way people act, think and relate to each other. In most cases it lacked what Giacqinta et al. (1993) calls "social envelope" which are meanings, beliefs, values and expectations.

The image of Lina, and her problems with the word <u>abort</u> is not limited to one, but can be related to the majority of women who make-up 80-90% of data entry operators or word processors. From Lina's experience it is no wonder that women did not feel confident in the face of technology when the language used is not appealing. In using the word <u>abort</u> the computer language or culture neglected or underestimated the emotional meaning attached to the word. In neglecting its emotional meaning the computer command abort symbolized sadness, fear, and an uncomfortable situation for women to learn. Since women can not form a unity between the symbolic meaning (form) of abort and the content of computer learning which is necessary for effective understanding of symbols, most women seem at a disadvantage in a computer-dominated learning culture. The computer seems not well anchored and objectified in terms of emotional meanings, cooperation, relatedness and understanding to solve problems which most anthropologists and educators think effective for women's learning.

The computer culture focuses more on speed and efficiency, than on the basic human dimension. This human dimension can have affective, cognitive, and behavioral needs. The human skill required to run the software, the individual difference, and the need to learn and participate are some aspects of the human dimension. The neglect of the human dimension in the computer culture is common at the use and learning environment. Computer introduction to the workplace was abrupt. The introduction of difficult concepts such as, <u>parameters, queue, pagination,</u>

default etc., was also abrupt. Coaching a learner with new products, concepts, and materials in familiar terms is the exception rather than the rule.

Building user and learner self-confidence is viewed as a luxury or a waste of time. The case of Solitaire with Linda indicates an absence of understanding for the process of building learners confidence in computer culture. Linda wanted users first to concentrate on learning graphical user interface (GUI). Her manager wanted users to learn Excel before mastering the basics of GUI which help users to easily navigate through the system. This approach to computer training makes learning difficult.

Learning was made difficult because trainees, in most cases, did not feel comfortable with what and how they learned. Failure to provide adequate time, proper sequence, relevant and compatible lessons, and guides caused endless frustration. While a trainee (Hector) showed his frustration with incomplete learning/training, through his electronic mail documentation, the systems programmer still insisted training and support were not the reason for the delay in implementing the new version. The experts, by focusing on user "ID, CALDB and GENDB," confused the users with technical terms before they had a good grasp of the new version of HRIS. For users learning, user "ID, CALDB and GENDB" files comes after having learned about the new version of the system. The programmers' focus on the CALDB and GENDB files shows what Tesch (1990, p. 168) stated as: "the insiders, as usual, wanted to keep the outsiders out, and, as usual, they created a language and culture that helped to keep the gates closed." Transition from one version to another involves learning something anew or unlearning improper or obsolete usage. These needs are mostly down-played by the language and culture created by the insiders, i.e., the programmers working with Hector.

The first encounter was found unbearable because the main computer culture or model places too much trust on the machine, rather than on human ability. One very critical problem resulting from trusting the machine too much and hindering learning is considering individuals who were not motivated by the machine to be phobic and resistant.

Computer instructors are selected because of their effective communication and computer knowledge and rarely for their background in educational practices. The problem that learners face in learning how to compute during the first encounter is the basic lack of a facilitator who can:

-progressively decrease the learner's dependence;

-help the learner to understand how to use learning resources;

-assist the learner to define his/her learning needs;

-organize what is to be learned in relationship to his/her current personal problems, concerns and level of understanding;

-reinforce the self-concept of the learner by providing a supportive climate

Suanmali (quoted in Brookfield, 1986, p. 36).

Yet, Alziola was unable to convince education and training coordinators to put the requirements for facilitation in their training tendering process. As a result, problems in the first encounter continue to persist.

Irrespective of management assumptions (users resistance) and the paradox in the learning and use environment, people are making sense out of existing computing situations when learning and using computers. What is needed is a basic understanding from computer experts, some educational service and support to supplement their own efforts and encouragement from their immediate managers.

What they need is an approach that focuses on their strengths, rather than their weaknesses, and a climate that is conducive to learning that helps them learn while using the system. Their problems in the first encounter are about building their self-confidence. It is more about individual differences and understanding of how people learn than about resistance, anxiety, and fear of computers. This aspect needs to be examined in light of individual differences and learning in a mixed group, management and reducing anxiety.

Learning in a Mixed Group? The desire to learn, like every other human characteristic, is not shared equally by everyone (Houle, 1961, p. 3). The search of significance for reason and for meaning is commonly shared by human beings, but how and what is achieved is dependent upon support given, resource allocated to learning and individual differences. This individual difference includes cognitive and economic access to learning resources. The reasons why people strive to learn are different. The methods and styles they use to learn are all different. Most computer trainees (participants in this study) are goal-oriented learners. Similar to the case Houle observed, Sosy, Bob, and John are at the training centre to get ahead on the job. For Lina, Hector, and Betty, learning is required so they acquire the knowledge to help them perform their work.

Since people learn for different purposes, they also use different methods to learn. It is also possible that they can use the same method. A learner is a distinct and complex individual. A typical or an average learner/user does not exist unless for statistical purposes. Each learner has distinct anxieties, concerns, perceptions, knowledge, intelligence, and problems. Some think in verbal terms. Others use symbols. This is why Kraybil (1974, p. 333), states "individual differences are most

important factors in determining how rapidly and how well the learner will learn and remember."

Individual differences are not only about approaching training or learning through a learner-centred/instructor-centred approach. These two approaches are based on mutual exclusion which defies the dialectics involved in teaching and learning. Learning and teaching are people interacting processes (Kraybil,1974). Learning is about relationships. Such relationships involve respect and understanding. It is this respect and understanding that facilitates or hinders learning. It is also for this purpose that educators focus on individual differences. Betty's question: "Why do computer trainers teach people with different backgrounds in one class?" is an indication of the need to recognize individual differences. Eurich in Kraybil (1974, p. 326) also raises a similar question.

The recognition of individual difference is not only important in a teaching and learning environment, but it is also vital in delivering technical support. Lina's experience shows this importance. "The help desk person came and suddenly said" 'you do not know this yet?' I was ashamed of the question. I am scared of him. The way he treated me is scary. You do not treat people like this." Mirani and King (1994) in their study of 114 Information Centres (IC) found that the IC takes no account of user differences. None of the respondents was satisfied with the technical support available to them.

The way learners are led through their first computer training, as experienced by Sosy, Bob, and Lina, is the one major factor that decreases learners self-efficacy. It is hard for learners to have confidence in themselves when there is no structure and method to help them based on their individual differences. Computer facilities are different even for the experienced person. With computers we need to have fewer

assumptions respecting prior knowledge and more homogenous learners. The diversity of learners as well as of users characterizes end-user computing. Introducing learners to a computer is more of a facilitating of the adult learning process. This facilitation of adult learning (Brockett, 1983, p. 9) is attending (being with a learner), responding (helping the learner to explore his/her strength and weakness) and understanding the learner and his/her problem.

Learning, Management and Reducing Resistance. Learning and management are assumed to be unrelated, contradictory, and at times very confusing. Learning starts somewhere blank and ends at a fixed age. It is simple, limited in scope and time span. Management is a "continuous" focus on "reality" and very "complicated." Bob said that

> the people responsible for making decisions about computers, computer training and what have you with technology in most organizations are no better than ordinary users. They had never used computer. Some even never set the timer on their VCR. We are all confused. We are in the same boat. It is very difficult for managers than ordinary users to value computer skills.

As indicated by Gina

> many managers have no notion of what it takes to instruct or learn. For managers learning, is either a waste of time or it is too academic. Learning is easy. It is something given as a favour. Many times what education and training coordinators call IT training needs analysis is based on reading IT consultant reports not doing the real training needs.

This is not surprising since the educational transaction is always the neglected one. The common learning orientation in work organizations (Table 2.7) is also type A rather than orientation type B. Training is an event that occurs at a particular time.

In addition to the above problem, management also has a problem with the source of advice. Most management consultants and advisors are focused on

maintaining the boundary between what is technical and social. Though anthropologists (Douglas, 1966) have said that boundaries represent dangerous regions which are protected by strong taboos, the boundary between what is technical and social is still well kept. As a result, whenever managers have a problem they consult two or more specialists. These specialists are usually non-educators. This approach further removes managers from understanding what is involved in learning and using computers (Darrah, 1995).

As a result the condition of users in schools, private and public offices including universities are similar. Teachers are asking for extra time to study a given software before it is introduced to the entire class. But they are asked to teach before mastering it themselves. In factories, Robertson (1992, p. 22) shows that, "[they]... promoted this CBT... but there was no time set aside for training, and the demands of production still had to be met." For John, most computer training at the workplace was catch-as-catch-can. In this kind of training the common denominator is "here is the machine, this is what it does, read the manual." This is also what Hector is experiencing. In case of Hector training was "here is the system, now you know what to do with the system. Let the help desk people take care of the staff who can not figure out this great system." This management philosophy and the demand to produce polished documents creates conditions of resistance, and in the process it makes untested management assumptions real.

Production of Polished Documents. In private and public offices, managers demand that their employees should produce polished electronic documents as fast as the machine can. Learning how to prepare a complex document takes time. People are under pressure to produce. Hector showed this pressure as "if a computer task does not have a final time, in hour and minutes, it can consume your chance of survival

with company. You have to meet the dead-line by any means possible." In this study, for example, Hector, Lina, and Sosy are given what Hector called "a choice between the impossible and the unthinkable." Hector and Sosy, in particular, use a sophisticated software for which they say they have no comparable knowledge and skills. A delay in producing a polished report, caused by lack of knowledge and limitation of the software, was interpreted as a wilful delay by managers. According to Hector, "it is impossible to pull a macro and produce the required report within a short time." Hector was asked by management to do what was impossible to do with the software. What is unthinkable for most untrained users is losing their credibility for something they are not responsible for and are unable to do.

Users learn to use most software by asking each other and by referring to a bulky manual. Their problem is not only the lack of educational support, but also how they are asked to deliver a report. Hector was asked by his manager to produce a report for his late afternoon meeting. Hector, identifying the problem, said "it would not be possible to do it in the form and time limit given" to him. Then his manager asked him "why do you not pull from the macro?" as if the macro exists in data base. Hector said, "My manager expects me to produce something that the system itself is not meant to produce or handle. Everything is not Lotus but they think that a Lotus macro exists in the data base."

The environment of producing something polished and fast by any possible means, to use Hector's expression, lacks, what Taylor (cited in MacMullin and Tayler, 1984) call "negotiating space." Instead of negotiating space, managers determine the time and the effort to complete the task. Since managers consider report generation as simple as pulling macros, the effort that a user (Hector in this case) puts into the system to prepare a document is reduced to the simple pressing of a fixed key (pulling

a macro). This further frustrates users who were already frustrated in struggling with complex systems with the bare minimum of knowledge.

Users' tasks involve not only imputing data; they also filter, update, verify, clarify, and transmit information. Dealing with the large data base is not easy. Creating a file, processing transactions, and storing and retrieving records without basic knowledge is a risky and demanding task. Yet, office workers are said to face much lower learning requirements because their tasks can often be quickly learned through osmosis, which is basically called "learning-by-doing." Darrah (1995, p. 33) found that "learning on the job is poorly developed and minimally supported." Darrah showed the case as "a new worker might work next to a more experienced one for as little as 15 minutes... the 'trainer' soon departed to undertake other work, while the tyro continued to..." Learning by doing is finding anything through asking around. This is what participants in this study report as their major method of learning.

User-Expert Relationships

In the case of the use environment, users are saying that using a simple text editor program is difficult. The expert, on the other hand, overtly claims that most of the processes and activities (learning and using) with computers are easy. This "yes" and "no" creates, in one office, the world of users and the world of experts. For experts, using PCs requires following explicit rules. For users, the explicit rules are neither clear nor available. Thus, the relationship between the user and the systems analyst is often rather antagonistic. As a result, an encounter between experts and users, which is the most likely time for learning, is not used for the purpose of mutual learning.

The reaction of the users sampled in this study towards the computer expert was negative, unfriendly, and indicates a world of differences, contradictions, and

misunderstandings. Smith (1989), in her study of 88 experts and 88 users in Canadian companies, found a negative attitude of user managers toward data processing experts. The relationship between the two, according to Smith (1989), is full of conflict and misunderstanding. Conflicts in user-expert interactions are explained as antagonistic and misaligned with credibility problems and a visible lack of communication. Similar to Smith, this researcher also observed hostility, lack of trust and frustration within the use environment (see Appendix K).

Implementation of computer technology and training related to computers, as shown in table 2.8, legalizes experts' espoused theory (Agryris and Schon,1974). This is mainly because the implementation from the experts point of view, as observed in the electronic mail and appendix K, has no consideration for learning, uncertainty, complexity, uniqueness, and possible conflicts which might arise. Users have no capacity (knowledge and time) to question experts' statements, judgments, and expression. Betty explains this situation as a one-way communication and said "specialists run and define every problem only in terms of their narrow technical skill. What they do not define is what it takes to learn, and master the avalanche of upgrades." As a result, Betty said "I am stuck with two vendors that would not work together to help me support heterogenous systems and users." When implementation is limited to the issue of efficiency and fast delivery, most human-related problems (learning in particular) are considered as noise, personal problems, or weaknesses. In this situation, users keep their problems to themselves. This is also why participants in this study use informal means to learn and use computers.

Lower level users are supposed to listen, not to ask. To ask a lot of questions is either to imply a lack of knowledge or acting above one's position. A worker, just like Bob, Hector, Lina and Betty in this study, described the situation as "never argue

with a ... Just go on and do it. Agree with him like hell." (Schuck, 1985, p. 76). In an environment where technical knowledge is highly valued, inquiry is considered to be a sign of worker incompetence. As a result, most workers remain silent rather than take risks in asking a computer expert.

In many cases, this silence is related to vaguely expressed user expectations. Users' inability to voice their expectation because of organizational and knowledge barriers are mostly left un-examined. Lina asked one expert and found the answer to be "you do not know this still?" Since then, Lina stopped using further help from the help technician. This is what the participants in this study experienced in the use of the help desk. Most problems that users face in learning and using computers were left un-examined. This is mainly related to the imbalance in the division of labour in the computing environment. Shortage of skilled personnel is part of computing history in most organizations.

This lack of balance forces organizations to depend on external experts or on only a few people inside the organization. The need for technical knowledge has helped the computer culture to have uncontested power and control over the environment, resources, access, and influence. As a result, what Feenberg (1991, p. 14) calls "technical codes" overrides all possible problems in the use environment. This technical code is a manifestation of computer-centrism where everything is seen as fast, technical, logical, and in linear harmony with system development. This "technical code" distorted the image of one another and caused common misinterpretation. As John stated "those who have knowledge would not recognize many of the problems that people face in using computers" as actually being problems (see appendix K).

The feelings. the expressions. the experiences, the neglect and the perceptions of users reported in this study are similar to the ones found in Clement (1990). Orlikowski and Gash (1994) and Smith (1989). Sound user training. along with helping and understanding the user is lacking in most situations. Clement studied his case in a university setting. Orlikowski and Gash conducted their research at a highly recognized consulting firm. Smith's research was conducted with well educated managers at large private companies in Canada. This suggests that the problems that users face is not an artifact of one particular site or one particular small firm. The study by Bikson and Law (1993) at the World Bank also shows similar situations. In all cases there is no accountability for learning and support. There is also no defined process for users to develop their skills. People just use each other and independently work or design their own learning based on their circumstances.

Lack of Middle-out Design and Its Impacts on Learning. In the experience of participants in this study, middle-out design is not visible because users have a very limited voice or alternatives in learning and use environments (see appendix K). As a result, computing and the computer is made more or less what Snow (1963, p. 47) calls an "incommunicable art" and object. For Hector, this incommunicable art is presented as "it is cumbersome to work with, but you will get used to it easily." After a week Hector said to his programmer "the new system is not doing tracking and seems to be doubling some payments." The programmer replied with" we can not anticipate everything if it does not work, we will fix it next time, till that call the help desk for further help." Bainbridge (1987, p. 272) shows the situation to be an "irony of automation." This irony is that designers seek to eliminate people from processes because they are unreliable and inefficient, yet they require people to perform all the tasks the designer could not anticipate or automate. What Sosy calls

"the accumulation of rejected reports" in the insurance company where she works is what Strong and Miller (1995) call exceptions. These are situations that can not be correctly processed by a computer system; a situation which occurs frequently in computer systems. Yet, the computing culture does not admit the existence of such exceptions. This is why exception-handling is not well recognized in EUT.

Problems related to the help desk that users in this study consider very critical include: wasting their time waiting for somebody from the help desk and trying to get the help of a sympathetic helper. This lack of a sympathetic helper is expressed by Lina as:

> he [the computer expert] came and run through the process. He really types faster than trained secretaries. I was unable to remember the steps he took, and the key he pressed to correct the problem a minute after he left.

Compeau and Higgins (1995, p. 138) also observed this condition and stated "the expert comes to the user's rescue, fixes the problem quickly but without taking time to explain the situation and how it is resolved and leaves." Hector and Lina in particular, stopped using the help desk service due to the lack of sound help.

Easy-to-Learn and Self-Directed Learning

While research by Lieberman and Linn (1991) reports that novices need the structure and systematic presentation of material; Bob, John, and Sosy (learners at CBT) face learning without a given structure, introduction, and orientation. Narrol (1991) also shows that the computer alone can not concretize and personalize teaching. This indicates the need for purposeful teaching. This purposeful teaching involves the active, well planned guidance and intervention of a facilitator. Left on their own, most learners learn computing skills strictly by rote (Narrol, 1991) or just frustrate themselves as in the case of Sosy.

Self-directed learning begins with self-appraisal or with identification of some learning preference. Instructors in the multimedia CBL environment visited during this study have no formal learning contract with learners. Therefore, steps to be taken and specific learning problems are not identified. Instructors usually sit in one open place and wait for the student to come to them and ask questions. Even if an instructors were to move around a training room, the variety of learners, and the variety of software they are using/learning makes such structures unmanageable for a single instructor. Under this condition, it is difficult to offer direct useful comments, clarifications and explanations to all students with freedom to learn different software.

Giving freedom of action to those able to deal with CBL, as in John's case (a risk taker, self-starter) in this study, may well increase their natural advantages for learning. Placing those learners lacking self-confidence in a CBT environment and leaving them to swim or sink with a floppy disk without some initial help/orientation is more like increasing their frustration or wasting learner's time. In this regard, what McClintock (quoted in Candy 1987, p. 164) said about self-directed or self-set study becomes abundantly clear: "self-set study is an education designed to perpetuate privilege and to create elites."

To let a novice control the way s/he learns to use computers without an instructor resulted in confused and frustrated learners. The need for initial direction, orientation, monitoring by a human instructor is high; but John, Bob, and Sosy are saying this basic need is lacking in their CBL environment. Learner control may not be appropriate in many situations. Some learners have no ability to accurately monitor their own learning. Learner control initially always needs some advice or some adaptation (Milheim and Martin, 1991).

The experience of Bob, a learner at the computer-based learning centre, was "I was given a freedom to confuse myself. I was placed in a large foreign language library." This implies the lack of balance in the CBT environment where the learner-controlled instruction is taken to the extreme. The students' attitudes and perceptions of their learning experience during the first encounter at the CBL centre is negative. They sum their experience simply: "It is difficult and frustrating." The need to balance the connotation of independent learning with some human support is very high but this balancing act is getting smaller and smaller by the day in the name of training time and cost reduction. Bob expresses this situation as "The word balance has been realistically washed out of the vocabulary of CBT." This situation has resulted in the statement, such as: "Too often under the guise of 'user friendly technology,' we end up being treated like idiots" (Robertson, 1992, p. 22).

According to Bob, John and Sosy their need to be guided and instructed as an adult learner is largely side-tracked for unconditional trust of the technology in the CBL or multimedia learning environment. Learning from a computer system is a new development. Computers are not made approachable. It is still alien and threatening. There is still a feeling of powerlessness and a sense of "it is beyond the intellectual reach of the ordinary user" among most users. It requires certain knowledge and skill to learn. The CBT system assumes autonomous learning. As Marsick (1988) attests, people cannot be expected to learn autonomy and be autonomous overnight. In letting Sosy and others learn autonomously without help the computer-based learning environment had mystified computers and confused learners. These learners were not particularly motivated or fond of computer-based instruction.

Learner control and self direction are the two main pillars of the computer-based learning environment observed in this study. Both concepts are intuitively appealing, because it is assumed that individuals will be more motivated if allowed to control and direct their own learning. This assumption, according to Bob, Sosy and John, is the major problem of their learning at the CBL centre. Research findings (Chung and Reigeluth, 1992 and Steinberg, 1989) report that in many instances learner control has had a negative effect. Sosy explicitly stated this negative effect numerous times in this study. This researcher believes that giving initial orientation and introduction to new comers and integrating self-direction and human support will reduce this kind of learning problems.

Summary: Problems and Observation

Management assumes that all users' problems are only computer anxiety and resistance. Most systems over-determine their users. Systems experts expect users to shoulder a large part of the responsibility for effective use of PCs. Help desk technicians expect users to clearly state their problems, needs and expectations in order to get assistance. Users such as Lina call the help desk to get first aid, not to relay the story of how she encountered the trouble. This is also what Hector means when he says "programmers want details and managers want a summary report."

Those who have been trained at times have not always been given the opportunity to practice their newly-acquired skills and knowledge. Most application software commands, functions and procedures are easily forgotten if not constantly used or practised.

Computer training has no well-defined policy, or clearly stated goals for accountability. Trainers are not clear about the direction of training. Alziola put this lack of direction as:

The knowledge and skills required by users now and in the future is unknown. Trainers do not know whether the organization is going to expand or reduce its activities and commitment to training. Training so far is always for introduction of this or that software. We trainers can not reappraise or review training programs because we do not know where they (clients) are going within a year or two. Organizations are not willing to examine their learning/training needs.

One critical issue which this researcher found missing both at instructor-led training and at the CBT centre is the consideration for the learning needs of older adults. By "older adults" in this context, I mean people who were laid-off after working 20 to 25 years whom I observed learning computers. Participants in this study are between 35-45 years of age. In all training environments, these adults are treated in the same way as other younger adults. They are expected to complete specific modules in the same time the younger adults are expected to complete them. In a one day training session, they are also led to the keyboard without some preliminary and necessary first measures (encouragement).

Negative Responses and Possible Reasons

One limitation or shortcoming of this study is the negative response of participants. Interviews and discussions with learners/users, and most computer trainers, except Mr. Walter were overwhelmingly negative. It is difficult to understand the reason or possible causes of such negative response. The researcher observed the situation during his initial rereading and analysis of the data collected.

It is promising that all the negative responses are related to management understanding or misunderstanding of learning, technology, or the management style used to manage resources. Learners' negative responses specific to learning and training were more related to problems related to learning from CBT alone without some human help. Trainers' negative response seems to be the result of managing the sale and purchase of training services (which is educational) in exactly the same way

organizations treat the sale and purchase of commercial goods. "Work more with less," (cost saving) the current motto of work organizations, might have impacted the response of trainers and education and training coordinators (buyers of training services).

The negative attitudes of computer users and their managers was well documented. Historically managers did not consider creating a learning opportunity (training) as a solution to their business problems. Participants in this study (except one) were clerks and support staff at the lower rugs of the corporate ladder. These negative responses might indicate the tendency of these lower staff to state their experiences and problems in terms of immediate organizational problems, without polishing their vocabulary or the social context under which they work.

The negative response might indicate what Hardin (1968) 'called the tragedy of the commons' and what Platt (1973) called 'the social traps.' The commons in computer is that managers and experts admire, value and praise it. The tragedy is nobody cares about when to use it, how to use it or not to use and the negative attitudes it generates. Managers initiating the use of MIS hoped for an easy solution (fast, easy, no strike) business. But the social traps is that they find it very difficult to escape from the problem. These negative responses might also be the result of what Pfaffenberger (1992, p. 505-506) calls technological drama (contradictions, ambiguities, and inconsistencies).

CHAPTER 6

CONCLUSION AND IMPLICATIONS OF THE STUDY

Implications for Adult Learning and Training

This study found little training behind the hardware. Users are not given sufficient training to allow them to take advantage of all that the equipment on their desk offers. Users basically work around the system to solve their problems. The productivity issue is mostly related to education, training and user support. These three points are highly misunderstood or are underestimated. The IT experts alone design and deliver computer training.

This approach, where IT experts design and deliver training, resulted in building a mystique that surrounds computers in the form of difficult and bulky manuals, starting computer training with function keys without giving any signpost for the trainee and motivating learners for their active participation in the learning process. Consequently, the approach led some such as John to state: "computer training has magnified old and new problems with learning at the workplace." For John, what is quick and slick for the experts overwhelms and confuses most users.

The user-expert interaction examined through the exchange of electronic mail also indicates past and present problems in the use environment. When Hector insisted on the incomplete training, misunderstanding, and considerable difference between what is said at the meeting and what the programmers said to Hector's manager, the programmer responded with the following statement. "There is, however, considerable discrepancy between my perception of some of the final points of agreement and the revisions requested by users. Therefore, in the interest of time, rather than quibble over this points..." The above answer tends to generate an argument over whose fault it is, or thee user is blamed directly. The argument,

according to the programmer, is always started by users and this argument indicates basic human resource problems.

There are many human resource problems associated with using and learning information systems. Since these problems are not addressed (asked or answered) how to solve critical problems also seems not to have been examined. Since this question was not asked, how end-users should exploit the technology on their desk is left unsolved. This study, through the experience of its participants, has identified the major means users access, manipulate and exchange ideas about computers. These methods are through informal group support and help from a competent user.

The majority learn how to compute through help from the competent user and through self-instruction. Betty explained this self-instruction and its related problems as:

> I learned and improved my computer skills in a piece-meal fashion. The problem is now getting a total picture of the system, which is appearing not possible through picking from here and there. Very often the pieces do not come together to form the whole picture. The sad thing in the whole process of learning through picking from here and there is that unless you connect them together what you pick is not retained long enough. You wonder about my self-instruction problems right ! My office once sent me to training. I was given improved Purchasing and Inventory Control Systems (PICS) training without learning the basics of dBase. Without dBase you can not understand what is shorter lead times, better pricing, better supply order.

The above statement by Betty indicates that content that is learned in piece-meal, isolated from other related content, does not lead easily to what most educators call deep or real learning. Learning improved PICS before understanding the basics of data management is what John and Bob explained as reverse learning. This reverse learning is going from specific to the general (Lotus to DOS), from abstract to concrete, from unknown to familiar, from complex to simple which are all direct

opposite to what Dickinson (1973, p. 55), identified as guidelines for the sequencing of learning tasks for teaching adults.

Neither help from a competent user nor self-learning are official/formal learning methods from an organizational point of view. The educational contribution of these two learning processes is not well supported by management. This is mainly because the computer culture, which the management upholds, often does not support learning processes that were not prescribed by IT experts. In some places helping each other while working, or asking questions is considered a waste of time. Lack of pluralism or insufficient attention to different methods of learning and related social influences are common in learning and use environments. One implication of this study is that it showed the need for pluralism in learning and using the computer in the workplace. The need for pluralism and different ways of helping people learn can be seen in the following statement by Hector:

> There is no explicit checking of understanding in computing environment. I want him to correct my work and tell me a little more so as to widen my understanding. The experts I saw are more interested in band-aid solutions than my learning... They give you the bare minimum of what you ask. This hooks you to them for life. My frustration is having to call them so many times. I am always left with a hazy idea of commands and can not remember sufficient of them to proceed working after the expert leaves my desk.

The statement "I am always left with a hazy idea of commands" indicates a lack of what ethnomethodologists call accountability by computer experts. Accountability in ethnomethodology and adult learning refers to the responsibility to make one's actions intelligible to others. What makes learning computer concepts difficult and un-intelligible is not only computer jargon but also the way computer experts hand new programs to users. Hector's experience with the programmers was: "Here is the new revised, modified, updated system, it seems cumbersome to work with, but you will get used to it easily within a day." If things are cumbersome, it is

not easy to figure it out and learn. This conflicting situation is an indication of a lack of accountability for learning. It is for this lack of accountability that the adult learning literature focuses on learner understanding and facilitation processes that help to make learning and the activity intelligible (understandable). When John is saying "I learn better when I know where I am going and most computer trainers at the workplace have no time to give us directions," he is clearly stating that due to lack of time learners are not given direction for better learning.

In this study it was possible to understand that there was an observable discrepancy between managers' assumptions related to learning and using computers and the actual attitudes and perceptions of users. The underestimating of learning and training time required to understand a given software was found to be a glaring discrepancy. Compressing training time to one or two days, irrespective of learners background, experience, and possible follow-up support, reduced the chance of effective learning and teaching. This is mainly because the required learning time frames are set for the technically-oriented learners, rather than for trainees who are less technically oriented. For lack of time, trainers can not identify where individual learners are having their unique difficulties or can not take a better one beyond the basic objectives of the day. This is why statements such as "show me," "assist me" and "help me" are more common in the use environment.

While the time and means to get computing skills are underestimated, the negative attitudes of users towards computers are, in general, overestimated. For example, users mistakes are immediately notified, but users could not comment on the errors of experts. Users are asked to use a software before familiarizing themselves with the software. Facility and resources to move learners from computer awareness, knowledge acquisition and trial stages are basically not given to users. This situation,

instead of creating cognitive consistency within the use and learning environment. encourages cognitive dissonance within the mind of users. Management's attitudes. beliefs, and actions towards EUC are creating uncomfortable anxiety towards learning and using computers.

Basically, what is assumed to be fear and resistance is actually the lack of support and understanding. It is also the lack of support which Alziola said "is pitting the learner against the instructor and why there is no smiling face in end-user training after coffee break." There is no single, fail-safe course or program to learn about computing. Becoming flexible with ongoing change, learning basic terms. and learning what computers do or can not do seems to be rational acts. Learning that computers are only as capable as they are programmed to be helps demystify computers. This rational act is possible when a facilitator establishes a goal and clarifies expectations; develops a learning environment that values learners' experiences, concerns, fears and motivation; and challenges beliefs and balances factors that make up learning events for adults. Facilitating adult learning in EUT is a very demanding and challenging task. It takes patience, flexibility, and a strong belief in the human ability to learn, provided that basic learning support is given.

According to the experience of these participants, what is inhibiting effective learning is the lack of clarity in one day-training and the focus on software features. The learning process in most EUT is neither clear for learners nor for trainers. In most cases, trainers are not involved in training decisions. Training needs analysis is not common for EUT. Contract trainers are basically implementors of designed and determined programs. Management's expectations from EUT, according to the trainers, are not possible to achieve and are ultimately unrealistic because the

learning objectives they implement were written from the assumed need of the learners.

Computer manufacturers conduct useability tests using managers and information technology experts as the surrogate user. Here, trainers use management-suggested problems they feel their users will encounter as a surrogate for the actual learners' problem. In both cases, the end-users are removed from the real picture. As a result, using and learning application software is overly simplified and often stereotyped. This is why data entry is most often described by information technology experts and managers as a form of unskilled labour which can be done by temporary staff. The experience of Sosy in this study, in particular, indicates that data entry in an insurance company is more than pressing a keyboard and filling in electronic forms. Lina who was a teacher and now a typist said:

> today clerks handle a complex word processing and data base software
> in which they have not been involved and on which they are rarely
> trained properly in their use. Some clerks even train their managers.
> But clerks are not visible anywhere when it comes to decision making
> for computing and computer training.

The removal of the user from the picture shows how far what Feenberg (1991, p. 14) called "technical codes" override the production and use of computers. Trainers say we can not work directly with users to develop specific training and support to complement a one-day training. Learners, on the other hand, said there is no time to practice. These situations make learning and using computers very difficult. John relates this difficulty to the IS department and explained the situation as:

> IS departments employ some of the smartest people around, but these
> smart people are hired for technical stuff not to work with people learn.
> These smart people have no time to do the dirty work, like preparing
> document, validating records and inputting data... They just do not tell
> you what they are doing. They are really smart in exercising their
> technical power over us. They advocate a particular action and system

without providing us with enough information or time. How can you learn in this secretive and arcane situation?

The numerous problems that the learners and trainers identified during this study, when compared to management's huge investment in PCs for higher productivity, appears contradictory. The motivation that directs the application of computer software at the workplace is contradictory. While the cry for productivity and efficiency is persistently stressed, helping people to learn to better use available software packages continues to be neglected. Here is where the human resources groups in any given work organization needs to ask themselves: how can efficiency and productivity come without helping people learn, upgrade and continually update the learning curve of an ever changing technology?

The above question is important because the experiences of this study's participants informs us that reality shock, shortly after entering the training room, was common. Also, pre-entry expectations about computer training were very high and generally remain un-met. Realistic previews to lower pre-entry expectations are still lacking. These situations are the result of an oversimplification of learning by management. The oversimplification of learning hinders the chance of developing the conditions and structures needed in the workplace for people to learn.

The structure that supports learning, in most cases, is not well developed. Yet people are asked to learn about technology using technology alone. By this one means at the CBL, where a floppy disk is distributed, it is expected that the learning of the basics of PCs without human assistance will occur. The experiences of this study's participants indicates that the promise of CBT by itself without a teacher is not making learning easier for learners. The sole dependence on the new technology seems

to be increasing the mystery of the machines and elicit statements such as "it was the computer" "I was stupid" rather than making learning possible and easier.

Users' deep misgivings about learning with the system are common. Sosy, a learner at CBL training centre, expressed her misgiving about learning to use the computer without initial human help: "to experience personal confusion, insecurity, helplessness, and self-doubt you can take CBL course." Most of the misgivings about learning at the CBL were related to a lack of someone who can orient, motivate, present, clarify, elaborate, and consolidate new concepts for learners. Orientation, according to Sosy, was about fee payment and exam-taking given by administrative staff, not about the exact introduction of the course and how to start module one or how to use computer-based learning technology.

When people face a new technology, such as computers, and are trying to learn about them they have certain anticipations, and frustrations. Out of these they try to consolidate their approach to the new technology and take a personal approach. This approach helps them routinize the process when using the new technology. Learning and using a new technology has its own process and this process takes time. The process involves, and creates, its own triadic relationships of experiencing technology, expressing some new technical terms and understanding the system.

The development of these triadic relationships also takes time. "It was the computer" "I was stupid" and "It was frustrating" were mostly repeated by users who deal with the computer without being given enough time to develop their computing skills. Therefore, giving ample time for a user to learn is the most important factor. As it is now, time constraints are creating anxiety and decreasing the perception of self-efficacy. This situation blocks further learning. Therefore, those who are responsible for computer training and those who hire contract trainers need to pay

serious attention to the amount of time allocated for a particular training program and skill practice.

User-expert interaction and the exchange of electronic messages between the programmers and Hector implies that there was a persistent misunderstanding which led to conflicts between the two parties. Conflicts in the use environment seem to be resolved by developing rules for procedures. These rules, according to the participants, are developed without a realistic understanding of users' problems and the meaning they attach to any given problem, question and situation. Misunderstandings are not limited to users but are also common for trainers.

This study also found that the majority of computer trainers are contract trainers. These contracts are based on a training bidding system which basically gives no indication of specific learning processes. The experience of Alziola attests to the need to be specific in the training tender bidding system. The change required would appear to be to make specific adult learning facilitation processes clear and specific so that cases, like that of "Solitaire" with Linda, can be reduced. Explicit statements about adult learning processes in the training tender document would help to allocate time for the process of facilitation, for some instruction to modify learners' attention and expectation. It also helps to learn about the learning problems and conduct individualized diagnosis of learning needs and problems. In the case of computerization, facilitating the learning process, creating awareness and encouraging people to smoothly adapt and integrate PC technology to their work, and creating users' confidence is more important than teaching software features.

One important implication of this study is related to metaphors people use in computing and to the notion of "easy-to-use and easy-to-learn." Most metaphors in computing are taken too literally without an understanding of the confusion. In

common computer language, directories have become folders and files have become semi-object-oriented icons within the folders. Literally, the folder/icon metaphors may be simple but many users have trouble performing tasks using icons. Users demonstrated this kind of problem to this researcher by saying "you have to learn its intricacies." "It takes a disproportionate amount of time to master." "It is a huge learning curve." For John, learning the intricacy was "living with increased effort and increased confusion." These intricacies involve understanding what a directory is, the hierarchy within the directories and sub-directories and relating it to a physical folder, which is by no means a simple process. Expectations created and functions offered (icons and actions) are not always intuitively clear for users. As a result, most participants consider themselves "definitely novice," even though they used a computer for more than eight years.

The use environment, which is episodic, is different from place to place. There are multiple and different configurations and settings. Personal computer applications and operating systems on a network vary from workstation to workstation. Each setting requires some specific learning and support. How each setting works is different. Details explaining how a specific system works and how to use it are often sketchy if not totally unavailable. If present at all in the manual, the details are downright hard to comprehend, let alone to use. Personal computers are almost like snow flakes. No two computing environments are exactly alike. Each configuration is unique. The computing environments abhor constants, universals, regularity and similarity. This situation makes site-specific training and support the only way to better use the facility. Unless site specific learning and support are recognized, statements like "maybe you could help me with this Lotus problem" will be present in computing environments for a long time to come.

For example, in this study it was possible to observe that Jerry and Hector use the same software (HRIS), but for two different purposes. As a result, their experience was also different. Jerry was identified as an expert user from one major bank. He was used to validate and compare problems related to the HRIS software. In addition to this, in most data-base software packages the difference between space bar, return key, delete key, and page down are interchangeable. Which key is used for which purpose depends on the configuration or modification used at each individual setting.

The act and the activity in the use environment are all organized in such a way that it makes the expert feel right and the user wrong. The event is mostly unpredictable and time given is short. There is no agreed upon process and skill required to complete a specific task. As a result, the feeling of users, irrespective of education, status and gender difference, is consistently negative. Appendix K clearly shows such negative situations. The highly educated users in Orlikowski and Gash (1994), the executive secretaries in Clement (1990), and the well-educated managers in Smith (1989) are similar to the participants in this study. All participants reported a negative attitude towards the experts and their actions in the use environment.

Problems in learning and using computers observed during this study seem obvious but are left unrecognized. Problems related to the first encounter, management conception of learning, production of polished documents, negative user-expert interactions, lack of emergent designs, and learning from a floppy disk only (CBL and self-direction), ignore the obvious about learning. Learning is individual, contextual, experiential, historical and social. It comes from acting, observing, participating, and reflecting. In this regard Tyler (1949, p. 63) states that "it is what

the learners do that they learn." This statement implies giving learners an opportunity to practice. For Tyler, this practice also needs to be satisfying and appropriate to the learner. Tyler approached this issue through what he called the organization of learning. In this regard, he identified logical and psychological organization of learning. Logical organization is "the relationship of curriculum elements as viewed by an expert" and psychological organization is "the relationship as it may appear to the learner." (Tyler, 1949, p. 97).

In EUT, most experts view learning and using computers to be as easy as driving a car or as using file folders. The logical organization of the computer and the computing environment, rather than the psychological organization of users, is emphasised. To this effect, the organization of learning in EUT lacks what Tyler called continuity, sequence and integration, making it difficult for learners to see relationships between commands in application software and various operating systems. To reduce these kinds of learning problems, Knowles discusses how to establish an organizational climate, and structure, and how to assess needs. Knowles, in extending Tyler's work, helped to solve the problems generated by missing the psychological organization of learning. This is why the adult learning principles and methods (appendix A) are found to be more promising for EUT than other means of teaching computer skills.

Most of the learning problems that learners identified are related to insufficient learning time and support, a mixed learning environment and by asking the learner to learn the machine's operation and application through a CBL facility. These problems are the result of management mis-conceptualization of the learning process and computerization itself. The lack of psychological organization and the

misconceptualization of learning by management can be seen from this statement made by a computer trainer: "we are not given enough time to do needs assessment properly. I must tell you in the history of all the years I have been here, I have never actually done that training process from beginning to end" (Nelson et al. 1995, p. 33).

Most computer training was unable to (a) involve learners, (b) uncover learning strengths and difficulties, (c) provide immediate feedback and (d) use job related learning materials. The needs of the individual learner were vastly unknown. Keeping them mentally alert and giving them signposts at regular intervals was difficult. To improve this situation, computerization needs to be conceptualized as a learning process. Instead of putting the primary emphasis on the artifacts, the process should take into consideration how the learning process takes place. Primary emphasis should be put on the users, and their social and institutional structure, rather than on the promises of recent software versions.

As a result of this study, this researcher was able to detect and confirm two silent problems behind most learning problems in EUT. One is the notion of "learning without being taught" and the other one is "the importance of crash programs." The irony in computer training is that learning without being taught was stated by Papert (1980, p. 7), who was a computer enthusiast and father of the Logo. The second one was mentioned by Knowles, a leader in adult learning at the workplace. Knowles (1980, p. 32) in his discussion of needs and goals of society, considers "the only hope now seems to be a crash program to retool the present generation of adults with the competencies required to function adequately in a condition of perpetual change."

These two statements seem to be taken for granted by management and computer experts without further question. In both cases, the metaphor is taken

literally. Subjecting adults to a one-day crash program to retool them with modern computer skills, with or without a teacher, was easy to do but in the process it lost the key to learning.

The key to learning lies in the mutual interaction of learners, instructors, and computer experts. Individuals learn how to compute as they encounter specific problems. This type of learning is situational and fragmented. Learners need help and further support to extend their questions and to allow them to connect ideas they collect from different situations. In the absence of built-in support mechanisms, this situational and fragmented learning process will remain disconnected and unhelpful for effective use.

Learners continually experience frustration and blame themselves. Interface features are not clear and require some understanding as to how the system works. The interface also has side effects and involves different procedures. The side effects can be confusing, they can result in error messages or getting involved in radically different procedures. These situations imply that learning how to use the computer is not easy. The technical and educational demands on users and instructors in learning to use computers are complex. The management and the information technology experts need to understand the extent of the above problems.

This understanding will only help them answer the question of how users can be introduced to using computers in the most purposeful way. Answering the above question helps to reconceptualize training as a systematic development of the attitude, knowledge, and skill patterns required by an individual in order to perform adequately at a given task or job. This re-conceptualization helps to create a learning environment based on adult learning principles and methods which are believed to give dignity and meaning for information technology use and learning communities.

Implications for Human Resource Development

Organizations will not continue to depend on a few internal or external experts, provided that the essence of the organization is to produce value and profit. Experts need a supporting hand so that they can spend their time on more productive work than dealing with routines. These supporting hands mostly come from support staff. The non-experts, such as the participants in this study, should not spend their time calling a remote help desk for each and every computing problem. This kind of perspective calls for human resources management, utilization, training and development.

Human resource management involves not only selection, compensation, payroll, health and safety. It is not only soft skills such as: effective communication, time management, total quality, or simply satisfying labour laws. Human resource management also concerns development, training, and retraining which are basically about learning. This learning involves pre-learning, learning, and post-learning; knowing these stages help to motivate and prepare people for learning. Post-learning is primarily to reinforce learning, and to give the user the opportunity to use the new skills and receiving timely feedback on performance.

Human resource development is about human learning. It is about creating a conducive environment for people to learn, formally and informally, and apply what they learn to their work. The importance of employee learning, for effective human resource use and development, was captured by the great adult educator in the following statement by Kidd (1973, p. 14)

> In learning the learner opens up himself, he stretches himself and reaches out, he incorporates new experience, he relates to his previous experience, he recognizes this experience, he expresses or unfolds what is latent within him.

The purpose of EUT needs to be to open up users opportunities, to stretch their capacity and reach out for application software. It should be to help them relate a Lotus spread sheet to the company data-base. To do this HR needs to understand the full extent of learning and applying the skills.

This learning and application needs accountability and infrastructure. This accountability and infrastructure serves what Spear and Mocker (1984) called organizing circumstance for people to learn. Organizations need to have a basic infrastructure for learning. Training without this built-in infrastructure and accountability for learning is self-defeating. It is self-defeating because without a visible procedure and process in place, an investment in training can not make learning continuous, developmental, educative and lasting. There is also no historical basis for believing that volunteerism will produce an increase in workplace training or adult learning opportunities.

Basic infrastructures for learning, which Wilson (1995, p. 27) called "a training culture," include training policy and procedures that recognize and facilitate formal and informal learning, materials and personnel. Workplace policies and procedures would create what Schuck (1985, p. 72) called "an environment conducive to the development of intellective skill." Schuck's environment for intellective skill is similar to what Knowles (1980) called an educative environment. Shuck anticipates this intellective skill for the entire workplace, while Knowles refers to a specific learning transaction. As such, they go hand in hand and make learning easier for the learner. Participants in this study directly or indirectly, stated that one hinderance in the learning process was the lack of an intellective environment in the office and an educative environment in the training room.

The learning environment and the training culture of modern computer technology, except in big companies dedicated to learning (Packard Bell, IBM, Motorola, Xerox), are quite similar in most organizations. In schools, teachers are given the minimum help, support and training on how to use computers. One teacher stated this problem as "if we value computer technology, we steal time from our private lives for development." (McInerney, 1989, p. 496). In the office, the majority of computer users are offered only one day of training. Lina a participant in this study said:

> the machine was just placed on my table. It was sitting there for six months before they gave anyone a single day of training. There was no training for the secretaries who were to use the machine. Jim, a co-worker who is knowledgeable about computers, took the time and trained some of us.

Although many application software packages have been widely introduced to the workplace, a failure to treat computerization as a learning process together with unrealistic expectations hinder effective learning and using. Computerization is mostly treated as no more than moving from version to version. Merely dropping PCs and reference manuals on a secretary's desk will not result in effective use or learning of new technology. Helping people learn and hand-holding users during the initial stage is very important.

Experiences described by Bob and John, as well as document analysis show that CAD, LAN, Automatic Inspection, and inter-company computer networks are currently widely used in factories. Training given to the factory workers consists mostly of vendor demonstrations. Once a problem emerges with the machine or the computer program, the machine operator has to call the programmer from his office to fix the problem. Bob said "training to use PCs has never kept pace with the purchase of CNC equipment." Yet most human resources literature tries to indicate

IBM and Packard Bell as examples of effective HRD however, these companies can hardly be an exemplar for all other firms.

These companies are large and also had their learning infrastructure in place. They also have a defined bond with the learning communities (universities). They also went beyond the partition of hard and soft skills. Therefore, the experience of these big companies, compared to the learning needs of most organizations, which have no basic learning infrastructure, or what Wilson called a "training culture," is very sophisticated. For most to emulate them would only lead to frustration. What seems rational and a balancing act for most organizations would be to ask the question: Is there a channel which permits employees to address their learning needs in a climate of open communication in my organization? This question is about basic computer readiness, awareness, and familiarization. It is about putting a primary learning infrastructure in place and preparing people for a long journey toward total quality.

Alternative Approach to EUT

As Mr. Walter said "training people only to use applications software did not take us anywhere." People need to be aware of the technology they use. Bikson and Gutek (1983) detected this problem and suggested application-oriented learning may be detrimental to gaining an extended knowledge of the system. Hessee-Biber and Gilbert (1994) and Prehogan (1993) also suggest a similar problem with teaching application software. Now "people do not live by bread alone" might be adapted to say "users can not be more effective with Lotus or WordPerfect alone." Experience from Training site (B), where Walter is a trainer, shows people are willing and able to learn operating systems. Sosy advised that leading people to computing through the main door rather than letting them in through the back door may make training more effective.

What Sosy means by back door and main door is first learning the operating system and then applying applications software. She believes what is neglected is the elemental need of the computer user to directly deal with the machine, rather than dealing with the interface. This interface for Sosy is neither easy nor persistent from place to place. Bob, more than others, said that there are two or three popular operating systems while there are numerous application software packages. He also recommended learning one operating system and trying applications software. Similar to Snow (1963) Sosy, Bob, and John believe most of the problems users face with applications software are unnecessary and could be reduced with an understanding of the operating system. Walter also reported that basic commands that current users learn in Lotus and word processing are also commands that are available in most popular operating systems. He said "it is possible to hide fatal commands in operating systems and let users face learning the operating system straight."

In addition to learning the operating system, there is a problem with using a data base. In tutoring Sosy, Bob, and John, I came to learn a lot about a data base. The use of a corporate data base is the mainstay of computer use. Corporate data bases are different mainly in form and the content of data field names. Conceptually, most data bases are relational. The logic behind all available data bases is the same, and for that matter fixed. What is the same and fixed in all data bases are entity, relationships, attributes of the entity and the unique identifier. An entity is a thing (car, stock, employee). Each entity has at least one attribute that uniquely identifies the occurrence of the entity in the file. Attributes are descriptors of the entity. The unique identifier is a key characteristic or a primary key that helps when searching the data base.

What is giving Bob, Hector, and John a problem is the meaning of entity, attributes, and how to identify the primary key for search and retrieval. These users are involved in tracking information. They have no knowledge of how the system compares records bit by bit in the data base with a given attribute identifier. This lack of knowledge often times results in misses and false alarms during a data search. This lack of knowledge causes them great frustration when they are trying to meet a deadline. In data base searches, misses, and false alarms are the result of pointing to an empty field or pointing to the wrong field. In both cases, the result is a wrong record which will not match with the given identifier. Entity names can be employees, vendors, policy holders, or stocks. An entity identifier can be an employee number. An attribute can be an employee, vendor, policy holder, or stock name. These are basic concepts and steps to store and search for customer information. Yet, most users have a serious problem with these skills when using a data base. Some use Q + E to access DB2 data on an IBM mainframe. Others use a Structured Query language (SQL) link but few understand SQL tools. Getting access is still a headache. Creating queries is still a basic problem for Bob, Hector, John and Sosy. How long organizations let this problem continue is a very critical issue.

To help make such a difference, Eason (1988, 1989) convinced this researcher to consider that the first computer training experience should be exciting, should let learners feel that they are in control, to let them understand how the system works. Its purpose is to demystify the sterile, cool mechanical applications software and computer hardware. Instead of focusing on CBT, this researcher suggests also a balanced approach to computer training where we can use what technology has to offer with the aid of a live instructor. One approach available for learning computers that is less travelled could be the effective use of what is available in adult learning

literature. To date this has been rarely, if at all, applied to the computer learning at the workplace.

Personal Reflection

This research has taught me how far linguistic differences reinforce unnecessary boundaries between computer experts and the ordinary users (the high priest and the lay people). The user considers technology to be the construct of an expert. The expert assumes technology is their own creation. In between, technology as a socially constructed reality remains unnoticed by all of them.

It helped me to be more critical of what are commonly called traditional and modern classrooms and management. The words traditional/tradition are among the most misused and abused words in the English language. In terms of training and education, the traditional classroom is not purely a dry, jammed lecture given by an orator or simple rote learning. The modern classroom equipped with multi-media is also not full of soft, sparse, individualized, customized lessons developed for learning logical thinking.

The reality in both cases is in between; and these areas need a more mixed and balanced focus, rather than a focus on one which is always considered modern, advanced, etc. To neglect what is traditional, in the name of modern thinking or fads, is to remove human activities such as learning from its historical perspectives. Historical perspectives enable us to learn from past mistakes. This lack of historical perspectives in learning and how to prepare large numbers of people for effective use of technology is the main reason why we are facing similar problems that past generations faced.

My understanding of the problems related to learning, in fact, became more frustrating with this research. This frustration partially came from a comprehensive literature survey related to adult learning and end-user training. Through this literature search I came across the following statement by Prosser (1934, p. 7)

> In shop and office, on the farms and home, the workers of America are confused by the kaleidoscopic, technological, and economic swirl in which they are engulfed; disturbed by the shifting demands of their occupations; discouraged by the uncertain character of their employments; alarmed by their rising standards and requirements of their occupations which they must meet; and baffled in their efforts to meet them because they need knowledge and understanding as well as skills.

This statement is as true today as it was in 1934. Why society has been unable to deliver knowledge and skills for workers and why learning is not an accepted purpose of business and government is still perplexing. Contrary to the assumed difference, both business and government offices have placed too much trust on external consultants and technological tools. External help is necessary; but unless users' knowledge is further developed, there is only a temporary improvement. Tools and knowledge have their own life-span. Both need upgrading. This research has helped me to see how much lip-service is being given to adult learning and skill upgrading.

This study has also helped me to realistically understand the limits of rationality and the necessity of humility and balance in any practice. Making the transition from a typewriter to a computer is not as easy as one may think, both for managers and clerks. The problem is not only the speed of ongoing change and the power of PCs, but also that most people are using PCs without learning about them. Through this study I came to know that both the IS community and the ordinary users are in turmoil. Frustration is common for both of them. Both are saying I have nowhere to get help in dealing with computers (users) or with networks (experts).

Both are in trouble. Available tools make data easier to access, but not to understand. In this situation, what seems rational is learning through adult learning principles and methods with constructive perspectives.

Future Directions and Needed Research

In end-user training, basic learning, and teaching concepts, such as teachable moments, advance organizers, motivation, individual differences, attention, relevance, and confidence building (Draves, 1984), are not well exploited. Fragmented training approaches, conflicting messages, and the lack of pedagogic versatility are common. Lack of understanding of the adult learning process, in general, and users' learning profiles, in particular, is chronic. End-user training has also no direction and clear image for computing. So far, research on computing basically deals with how to automate the use of function keys. Hence, it was unable to focus on how to help people learn and effectively use computers.

What is needed in EUT is to deliver a clear direction and develop a computer image acceptable to users. Focusing on the social aspects of computing can help learners and educators to generate understanding and conceptual knowledge that can anchor computing to important social activities. This can be achieved through what is called "situation or environmental analysis" in adult education program planning. This is the analysis of context with the focus on constraints. What is needed now is research that takes a holistic approach to computing and EUT.

Prehogan (1993) suggested that instead of covering every feature of a software, users can go much further if they are taught the underlying philosophy of each software. This seems promising but needs further research consideration.

Research in EUT has shown that end-users consider the most important support to be other users. The lead user support was found more beneficial than other

supports because of the mutual understanding among peers. Research is needed on how to foster an environment that encourages and promotes learning from one another in the workplace. The future direction and challenge in EUT depends on the understanding of adult learners/users (diversity of learners and diversity of learning methods and learning process) and the social aspects of computing.

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APPENDIX A

<u>Adult Learning Principles in this Study mean a Belief that</u>

1. There is a natural tendency for people to learn. Learning will flourish if a nourishing and encouraging environment is provided.

2. Adults prefer a curriculum that is learner-centred with learning episodes on learners' experience.

3. Adults tend to think of themselves as users' of, instead of recipients of, knowledge (Knox, 1980:79).

4. Adults learn best when they feel motivated to learn and when they have a sense of responsibility for what, why and how they learn (Brookfield, 1986).

5. Adult learners are problem centered and expect what they are learning is immediately useful.

6. Adults need to validate the information based on their beliefs and experience.

APPENDIX B

Interview Guide for Individual End-User (Participant)

1. What do you think about learning how to use the computer?

2. How important do you think it is?

3. How difficult do you think it will be to learn how to use the computer? Why?

4. What would you consider to be important skills and knowledge to operate and use microcomputers?

5. When did you first learn to use microcomputers?

6. How often do you use microcomputers?

7. What do you think computers can and cannot do?

8. What do you think about the method and process you used when you first started learning and using computers?

9. What would you do differently if you wanted to teach your friends or children?

10. What was a memorable time for you in your computer training?

11. Please tell me what you feel about user-friendliness of computers.

12. What can you recommend to improve EUT programs and processes?

13. What do you think is a major problem in learning about computing?

14. What do you feel about the person who taught you first about computing?

15. How are the language and symbols in your computer training related to your daily work/life?

APPENDIX C

Interview Guide for Trainer and IS Professional

1   Can you tell me what it is like to be a computer end-user trainer/manager?

2   What is your understanding of the end-user training process? How is it initiated, implemented and finally closed?

3   What kind of support do you think users need?

4   What do you think are the critical factors that determine end-user training and learning? What about their supply?

5   Can you tell me some major problems you experienced in the computing environment?

6   What is the main problem in teaching applications programs? Can we relate EUT to the organizational or social aspect of computing?

7   What kind of feedback are you getting from end-users you train?

8   What do you think is missing in the process we are using to teach people how to use computers? Is there anything you feel is given too much attention when training people how to use computers?

9   Do you have any advice that you would like to give me about EUT, user support and the computer learning process?

APPENDIX D

<u>Observation Checklist</u>

Structure of Training

                                     Levels
Time and frequency
of training
Purpose
Selection Process

Teaching Methods   Diversity of Method
& course Material   Relevance of content & methods
Difficulty of Material
Software version
Motivational Clues
Concern for older adults

Learning Environment   Facility set up
Climate of the area
Group interaction
Support available
Concern for older adults

Nature of Instruction   Computer-Based
Instructor-Led
Entry, Process. Closure
initiation of class (entry)

Operational Problems   Teachers related
Student related
Software/hardware related
management problems

Participants   Age, sex, goal
Motivation to participate
Background & computer experience
Sponsor

APPENDIX E

<u>Users Concerns and Fears Regarding Computers</u>

Little personal knowledge about computers and worry that they will not be able to learn how to use them

Having to abandon familiar activities and acquired expertise to take on new duties as a virtual novice

Concern over computer-induced health hazards or physical ailments

Worry that they will be tied to computer all day, isolated, paced by it, and monitored for productivity

Fear that they can damage the machine or destroy all its contents by entering improper commands

A perception that they will have to be more rigid, with less opportunity to be creative

Human fear of change and the unknown

Apprehension that could lose their job

Not being consulted during the planning for the computer acquisition and implementation

Previous disappointing experience with computers with residual skepticism as to their value

Frustration because they must continue to do their normal duties and also learn to use the computer

A general uneasiness about computers and their potential misuse

SOURCE: Bloom & Hautaluoma (1990), Cunningham, Farquharson & Hull, (1991); Fisher, (1991); Jiang, Qui & Kopec (1993).

APPENDIX F

Written Consent Form

End-User Training and Adult Learning
Implications for Human Resource Development

To participants in this study:

I am a graduate student at The Ontario Institute for the Studies in Education of the University of Toronto. The subject of my doctoral thesis is <u>End-User Training and Adult Learning Implications for Human Resource Development.</u> As a part of this study, you are requested to participate in one in-depth interview to share your concerns and problems related to how you have learned how to use computers. In this process, I may ask you an occasional questions for clarification or for further understanding, but mainly my role is to listen to you.

My goal is to analyze the materials from your interviews in order to better understand computer training programs, methods and related problems critical for learning. I am interested in concrete details of 1) your experience in using computers and how you developed skills you think important, 2) your daily experience with application software, computer experts and the help desk. As a part of the dissertation, I may develop from your interview a profile in your own word.

Each interview will be audiotaped and later transcribed by me. In all written materials and oral presentation in which I might use materials from your interview, I will not use your name, names of people close to you, or the name of your site. Transcript will be typed with initials for names and in final form the interview material will use pseudonyms.

You may at any time withdraw from the interview process. In signing this form, you are also assuring me no claims for the use of the material from your interviews.

I-------------------- have read the above statement and agree to participate as an interviewee under the conditions stated above.

-----------------------   ----------------

Interviewee   Date

APPENDIX G

Sample Focus Group Interview Guide

I. Introduction

The meditator introduced the researcher to the group and asked the network group to introduce oneself. The researcher introduced himself and provided background rules as follows:

My name is Kefyalew Mandefrot. I am a doctoral candidate at the University of Toronto/The Ontario Institute for Studies in Education. <u>Currently I am conducting a study to understand how people learn computing and what problems they face.</u> As an adult educator I am interested in helping adults learn about common application software. I personally believe that End-User Training (EUT) involve a learner, an instructor and a computer systems.

My purpose here is to listen to your rich experience in end-user training. What I am going to do is spend the next hour-and-half asking questions designed to get a full descriptions of your thoughts and experience. The only ground rules in this activities are that there are no right or wrong answers to anything I ask. I will read the questions and the secretary general of the network will help us facilitate the discussion. I ask that you speak one at a time and regard this tape recorder as an extension of my memory, so that I can provide the faculty with a clear and accurate summary of this discussion. Everything you say is confidential and the results of this discussion will be reported anonymously.

II. Questions

1   Can you tell me what it is like to be a computer end-user trainer?
2   What is your understanding of the end-user training process? how is it initiated, implemented and finally closed?

3   What do you think are the critical factors that determine end-user training and learning? What about their supply?
4   What is the main problem in teaching applications programm? Can we relate EUT to the organizational or social aspect of computing?

5   What kind of feedback are you getting from end-users you train?

6   What do you think is missing in the process we are using to tech people how to use computers? Is there anything you feel is given too much attention when training people how to use computers?

APPENDIX H

Sample Table of Codes

<u>The first encounter with computers</u>

User's/learner's

    -description of participant's initial problems

        scary,surprise, shock

    -participant's expression of their situation during the first time encounter

    -participant's description of the environment/situation

        climate, comfort, atmosphere

    -participant's perseverance/determination likes/dislikes of the first encounter

    -participant's confidence

        -expression or belief in one's abilities/knowledge

        -self esteem and awareness of own potential including awareness of the

    first encounter

        -feeling of helplessness and worthlessness

        -feeling of guilt

Learning activities

    -orientation, introduction, facilitation

    -specific activities the participants identified as

        valuable/important but lacking, likes/dislikes

    -learner's expression of the first module, choices,

        meaningfulness, relevance,

    -learners expression of the one day training

        likes and dislikes of methods

APPENDIX I

A Case from Document Analysis

From: XXXX

To: YYYY

Date: MM DD YYYY Time

SUBJECT: Important Note about eMail

Notice to Head Office Staff

As a result of Monday night's electronic mail clean-up, a few of you may find some unusual new (or perhaps I should say old) messages in your In and Out Boxes. Head Office eMail was brought down for maintenance last night in order to tidy up the system and improve response and delivery times. Hours later, when the system came back up, I was surprised to see that a number of messages long since "lost" have reappeared.

What has happened is this: As all of you are aware, our computer network crashes from time to time due to power outages, hardware failure, sunspot activity (just kidding!), and the like. At the time of these crashes, the eMail system can "lose" messages in transit from one workstation to the next. When we in Information Systems suspect that such a loss has occurred, we notify you of the problem and ask that you check the Info screen of any message recently sent to ensure that it has been delivered to the intended recipient. From time to time, you might find that a message never does make its way through the mail system. In that case, you simply Re-Send the message, it gets delivered the second time, and all goes back to normal.

During Monday night's clean-up, however, the eMail system "found" a number of those messages that never got sent lurking deep in the mail directories. And to be on the safe side, instead of being deleted, they have been resurrected and re-delivered into your mailboxes so that you can have one last look at them before sending them off to that great dead-letter box in the sky.

For those of you who didn't take that last hint, I suggest that you read these special messages and delete them if they are of no practical use.

Please note that your mailboxes might not have been affected by these unexpected visitors from the past. So, if you don't notice anything out of the ordinary, all the better.

Should you have any concerns about the eMail system, give our Help Desk a call at 000-0000. We'd be happy to try to answer any questions you might have.

Regards,

Name in the original document

Name of the Company and Department

APPENDIX J

A Case from Document Analysis

From: XXX XXXXX

To: YYYY YYY

Date: XXXX, XXX XXXX

Subject: Location of files

It has come to our attention that a lot of people are saving their macro files and supplemental spelling files to the main wordperfect directory. It is preferable that everyone save files into their own directory for their own convenience. There fore, I am sending instructions on how to change your file locations.

Go into wordperfect:

press Shift F1

press 6 - (Location of files)

press 2 - (Keyboard/macro files)

Enter your "USR" directory - (e.g. u:\usr\"your usr i.d.") and press ENTER

press 3 - (thesaurus/spell/hyphenation)

press Enter (this is the correct directory for the WP speller)

ENTER Your "USR" directory -(e.g. U:\USR\"your usr i.d.") and ENTER

press F7 twice and you will be back at the Document Screen.

Should you have any problems please call the help desk at XXXX

Thanks

Name

APPENDIX K

Case from Document Analysis

From: Users Manager
To: Information Technology Manager
Date: Date, Month, Year. Time: pm
Subject: Further to eMail. HRIS, Date, Year

Approximately two years ago we met with (Management Information Service Director) and (User Director) to discuss the slow pace at which the HRIS is being developed. At the time a couple of options were discussed including the hiring of a third person to replace (DDD) and the matter was left with you to review the options and advise us. Although we have not received any further communication regarding this matter and there could well be mitigating circumstances for that, we cannot go along with the present proposed changes.

We are currently in the transition period in the implementation of a comprehensive computerised HRIS. Even at this formative stage the utility and effectiveness of the HRIS has been proven. Over the last five years approximately $15 million savings in service and legal costs were realised which are mostly attributed to the information HRIS provides. As such the utility of up-to--date data (information systems) in the management of the resource management function cannot be overstated.

The further reduction of staff on the HRIS is a mute point. In hindsight it appears that we failed to identify and provide the type of resources such as support staff etc., required to effectively manage the transition to a computer based system of this scope and size. This is the time when additional resources are required for the necessary

integration of data base and management by the HRIS user Committee and _not_ a time for further reductions in the development and support staff.

Historically we cannot identify a coherent overview that has served as a guide in the development of HRIS. The training given for the project leader which is only for two days was also found insufficient. This is not a criticism but a fact. Endemic in the trial-and-error method of development is the requirement to be able to redress past errors and to gradually arrive at this coherent functionality. Therefore, all identified HRIS change requests are of utmost priority demonstrating an urgent need for more staff and training. This will definitely translate into immediate gains in terms of client service and cost.

We should recognise that implementing changes (computer system) on a piecemeal basis or prolonged use of deficient or cumbersome applications, even after solutions have been identified, can only serve to further frustrate and demoralise the users during the critical transition phase. We must also take into account that, the gradual/piecemeal implementation of changes in the definition of basic HRIS functions would render hard analysis based on historical data impossible, and will continue to do so until these are finalised completely.

It appears that the remaining development staff have, of late, been able to serve little more than a support function. This has already set back HRIS development considerably. The proposal to have staff temporarily reassigned would set us back even further and compound existing problems. We are not just setting back the development of a few change requests, or enhancements but the entire HRIS development process would have been effectively put on hold. We see the development of the following sub-systems, for example, as very important:
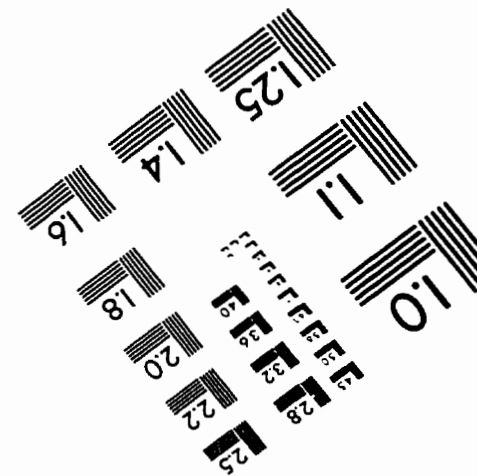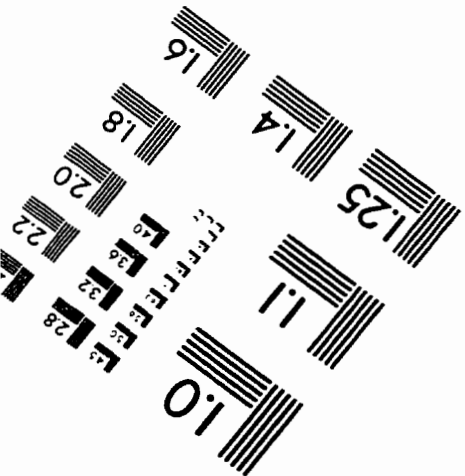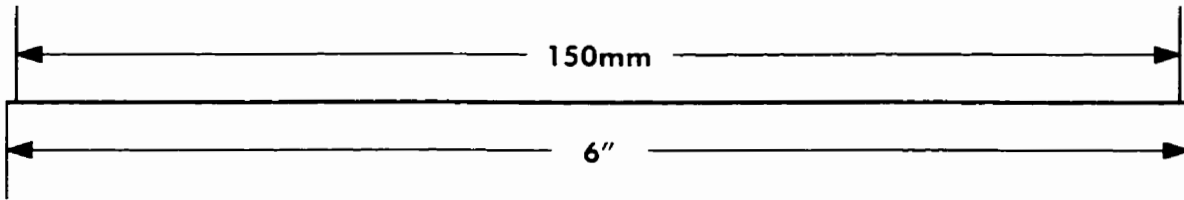
* Vendor Maintenance

* Budget
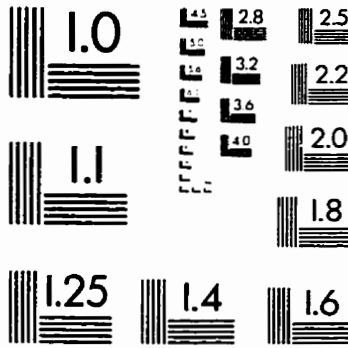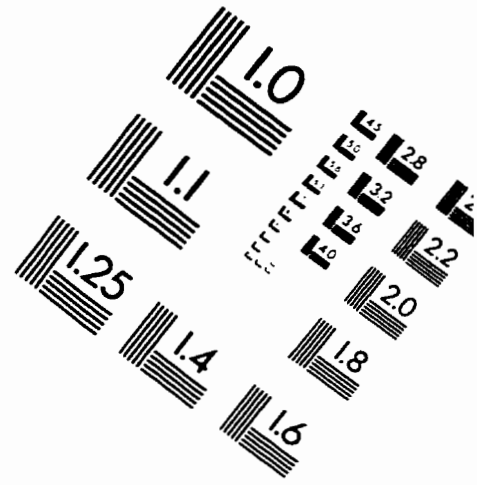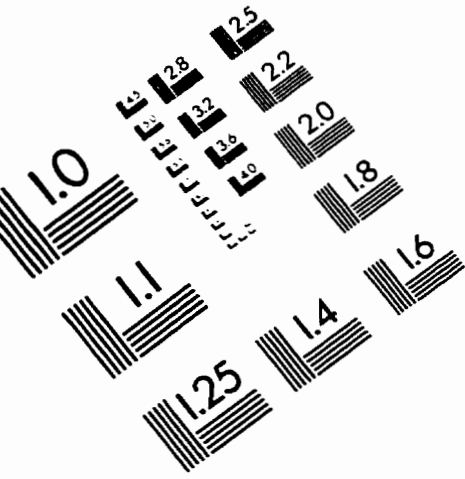
* Consumables

* Building profile.

In addition the proposal raises concerns about a reduced technical and applications support capability. At times when Human resource function is under severe criticism we are looking towards increasing HRIS capabilities to provide the required response. We can not foresee our reliance on the HRIS diminishing and we fully expect it to play a leading role to take us through the next ten years.

CC:

IMAGE EVALUATION
TEST TARGET (QA-3)

1.0 2.5 2.8 2.2 2.0 1.8
1.1 3.2 3.6 4.0 1.6
1.25 1.4

1.0 1.1 1.25 1.4 2.8 3.2 3.6 4.0 2.5 2.2 2.0 1.8 1.6

1.0 2.8 2.5
1.0 3.2 2.2
1.1 3.6 2.0
1.25 1.4 1.6 4.0 1.8

|← 150mm →|

|← 6" →|

APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989

1.6 1.8 2.0 1.4 1.25 1.25 1.4 1.6
2.2 3.6 3.2 1.1 1.1 3.6 3.2 1.8
2.8 1.0 1.0 2.8 2.0
2.5 2.5 2.2