UNIVERSITÉ DE SHERBROOKE

Stratégies d'apprentissage d'adultes inscrits à un cours de logiciel de traitement de texte dans un cégep anglophone de Montréal

Adults' Learning Strategies in a Computer Software Learning Course in a Montreal Anglophone Cegep

par

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SOMMAIRE

Stratégies d'apprentissage d'adultes inscrits à un cours de logiciel de traitement de texte dans un cégep anglophone de Montréal

Cette recherche porte sur les stratégies d'apprentissage d'adultes inscrits à un cours de traitement de texte. Cette recherche s'est déroulée au moyen d'une observation et d'une analyse des façons dont ces étudiants ont contrôlé leur apprentissage et de la manière dont ils ont utilisé les ressources à leur disposition. Pour réaliser cette recherche, six adultes inscrits à un cours de 45 heures de traitement de texte WordPerfect sur ordinateur personnel ont été interviewés en profondeur. De plus, une observation systématique a été menée dans quatorze classes différentes.

Cette recherche a été réalisée dans le cadre du paradigme du constructivisme. Ce paradigme invite à concevoir l'apprentissage comme un processus actif dans lequel les adultes en apprentissage utilisent les événements et les ressources pour construire leurs connaissances et développer leurs habiletés. Le constructivisme met l'accent sur l'aspect interprétatif de la nature de l'apprentissage et sur le fait que les étudiants participent activement à l'élaboration du sens qui résulte de leurs expériences, sens qui les relie au monde extérieur.

Les résultats one été analysés en fonction de huit thèmes différents : l'aide à l'étude, la motivation, le choix de l'idée principale, le traitement de l'information, l'anxiété, les attitudes, l'autocritique et le contrôle de l'apprentissage.

Cette étude démontre que ces adultes ont employé des moyens fondés sur l'exercice de leurs connaissances. Ils ont dû appliquer eux-mêmes les concepts reliés à l'apprentissage du traitement de texte en se servant de leur ordinateur pour pratiquer, répéter et réviser leur habileté. À ce propos, les adultes ont préféré mettre en pratique la méthode succès/échec ; ils n'ont eu recours au livre que pour appliquer de nouveaux concepts aux exercices suggérés à la fin de chaque chapitre. Ces adultes expliquent aussi que la façon dont ils établissent des liens entre leurs connaissances se réalise par l'application pratique de concepts d'apprentissage du traitement de texte à d'autres applications en dehors du cours concerné.

Cette étude a aussi mis en lumière le fait que ces adultes étaient des étudiants très motivés et avaient la conviction que ce cours leur permettrait d'obtenir plus facilement un futur emploi. Ces adultes se sont perçus comme des apprenants à la fois auditifs et visuels qui préfèrent les instructions directes du professeur. Alors que ces adultes ont indiqué leur intention de se tenir au courant des développements technologiques et de parfaire leur connaissance du traitement de texte, ils ont aussi indiqué que, pour eux, la méthode d'apprentissage préférée

pour leur formation future demeure la présence personnelle du professeur au moment de l'enseignement.

ABSTRACT

ADULTS' LEARNING STRATEGIES IN A
COMPUTER SOFTWARE LEARNING ENVIRONMENT

This research explored the learning strategies of adults enrolled in a word-processing course. As well, this research inquired into the views these learners held of their control of learning and how they employed the available learning resources. The study used a qualitative approach. Two individual in-depth interviews were conducted with six adult learners enrolled in a 45-hour word-processing course learning WordPerfect on individual personal computers. All fourteen classes were observed.

Constructivism was selected as the appropriate conceptual framework as in this approach learning is seen as a constructive process in which learners use events and resources to extract learning. Constructivism emphasizes the interpretive nature of learning in which learners actively participate in and abstract meaning from their experience and relate this meaning to the outside world.

Findings are organized around eight themes of study aids, motivation, selecting the main idea, information processing, anxiety, attitudes, self-testing, and control in learning. Thick descriptions are used to provide examples of each theme.

This study found that these adults used strategies that enabled them to rehearse their knowledge by applying word-processing concepts in a hands-on manner using the computer to practice, to repeat, and to review their skills. In this regard the adults preferred to use a trial-and-error approach to learning and used learning aids such as the textbook mainly to apply new concepts to the exercises provided at the end of each chapter. These adults also indicated that the way in which they built connections in their knowledge was through practical application of word-processing concepts to other applications beyond those included in this course. This also study found that these adults were highly motivated learners who believed that this word-processing course would bring them closer to their goal of future employment. These adults described themselves as aural and visual learners. They preferred direct instruction from the teacher. While these adults indicated their intentions to remain technologically current and to increase their knowledge of word processing, they also indicated their preference for direct instruction in future learning.

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INTRODUCTION

Today's technological age is seen by some as an avalanche which provides a wide range of options (Lewis, 1988). Among these options, the personal computer is considered the most significant new product of this technological time. While the computer itself is not new, the invention of miniaturized circuits has led to a decrease in size and an increase in speed. Combined, these new innovations have resulted in a significant decrease in cost of computers and have helped to put personal computers within the reach of millions of people. The nearly universal adoption of the personal computer is witnessed in many areas of society including that of education.

Personal computers are now being employed by instructors and learners alike as teaching machines to help individuals learn new material, as learning tools to promote the formation of new ideas, and as learning resources to access information (Heermann, 1986). One of the most widely used computer software involves word processing. Within the general population word processing was reported as the second most employed method of using a computer (63%) preceded only by the use of games (73%) (Lowe, 1990). As such, word processing is described as an indispensable tool. Among workers, one in three reported using a word processing software for an average of about 16 hours a week (Lowe, 1991).

Computers are now designed and marketed on the assumption that users can teach themselves how to use a new software (Briggs, 1990). Yet, as a result of years of teacher-directed education, some adult learners may have difficulty doing so. Even with pervious computer experience, these learners may not be able to form the right queries, or their knowledge of one piece of software may not guarantee mastery of a new one. Written explanations do not always improve their performance on computer-based software tasks (Beard, 1993; Briggs, 1990).

Today, adults learners are participating in education in ever increasing numbers and frequency (Lowe, 1991). Many reasons motivate adults learners to return to the classroom to acquire knowledge of computer software. Birren and Woodruff (1973) cite the following motives: (a) as the rate of technology continues to accelerate, individuals can no longer be prepared for an entire life by education acquired in the early years; (b) the demand for workers with knowledge of computer software could provide access to careers for women; (c) jobs are shorter lived than in the past and newer jobs often require knowledge of computer software. For these reasons many adult learners approach their learning with a problem-centered orientation (Knowles, 1980).

Adulthood is described as the most significant as well as the longest stage of life (Long and Hiemstra, 1980). When adult learners elect to participate in a formal learning environment, they bring with them an accumulation of experience, and

these previous experiences can serve as a rich resource for learning (Knowles, 1980). As unique individuals, adults have acquired certain ways of responding to their experiences (Gerver, 1984). A pivotal aspect of learning is the way that learners perceive their own learning experiences as unique and individual (Kidd, 1973).

Given the increasing number of adult learners as well as the growth in computers and computer software, it is important to gain a greater understanding of how adults learn to use computers and computer software. This research explores how adults, attending a word processing course in a classroom environment, learn that computer software. Specifically, this study examines the strategies adults employ, explores how these adults perceive their control in learning and inquires into those resources which adults employ when learning a word processing software.

The remainder of this thesis is organized as follows. Chapter 1 introduces the research subject and further describes the problem around which this research is focused. This study is explores the strategies that adults use to learn word processing; the views these learners hold of their control in learning; and how they employ the available learning resources. The conceptual framework portion of this chapter explores the theoretical basis for this research. In this study constructivism is considered to be the appropriate framework as, in its essence, constructivism is concerned with how people make sense of their ever-changing

experiences. Chapter 1 also explains the specific objectives of this research. This qualitative study is designed to explore the views of a group of adult learners and to present their views of how, in a word processing computer software course, they learn both with technology and about the technology. The last section of Chapter 1 presents background literature in the areas related to adults and computer technology. More specifically, empirical studies have been examined and synthesized into several main areas related to learning and technology and include: experience; anxiety and attitudes; teaching and learning approaches; and instructional aids. To assist readers in relating to these studies Appendix F provides a table format of all studies included in the review of literature.

Chapter 2 discusses the overall design of the study. Each of five sections explains the research method, the sampling method used, the research instruments, the way in which data was collected and procedure used in the data analysis. This study employed a qualitative methodoloy. In this respect the study probed the understandings and the particular constructions of the participants and did not attempt to generalize findings to a larger population. A qualitative methodology sought to draw meaning from the processes and perceptions of the study participants. The third section of Chapter 2 describes the two research instruments used in this study: observation and interviews. In this study all classes of one word processing course were observed. As well, two separate in-depth interviews were conducted with six adult learners. The final two parts of

Chapter 2 provides details on the way in which data was collected and the procedure used to analyze and determine the eight themes within the data.

Chapter 3 presents the findings in the data and presents them in relation to the eight relevant themes. Discussion of each theme is preceded by a brief review of how participants in this study learn word processing in relation to the findings discussed within each theme. This section includes thick descriptions, that is participants' own statements to assist in depicting each theme. The final section in Chapter 3 provides a summary of the findings, as they relate to each theme.

Chapter 4 provides a discussion of related literature and relates each of the eight themes in the findings to the literature.

The final chapter summarizes the study and provides an overall view of the findings in this study as well as the link between this research and the conceptual framework. This thesis concludes with several appendices including the interview schedule and the contact summary form used in gathering the data, a participant consent form, two letters of introduction, and a summary of the empirical computer studies.

CHAPTER 1 - RESEARCH SUBJECT

1.1 The Problem

The kinds and complexity of computer software have been increasing rapidly over the past decade and this trend shows no signs of reversal (Robertson, Stephens & Company, 1993). Each year thousands of adults enroll in computer software courses including word processing courses. For the first time in history our society is evolving to an adult oriented society as compared with a youth oriented society (Cross, 1981; Merriam and Cafarella, 1991). In this emerging scheme more adults than ever will require knowledge of computer software to keep pace with technology. Instruction in using computer software can assist learners in defining problems, designing solutions, debugging errors, and producing results.

When adult learners elect to participate in a formal learning environment, they bring with them their acquired ways of responding to experiences. Adult learners are therefore likely to employ different learning strategies and they may well have particular views of their control of learning. Learning strategy research focuses on how people mentally process information and construct knowledge in memory. Learning strategies describe a number of processes, actions, and various mental operations intended to assist, influence and facilitate learning (Conti and Fellenz, 1991; Dansereau, 1985; Weinstein and Underwood, 1985). Included in these processes are cognitive and metacognitive strategies such as organizing, selecting and elaborating new information, as well as performance monitoring to detect

discrepancies between known and new information (Weinstein and Underwood, 1985; McCombs, 1988). Research on learning from written text shows that learners use various cognitive strategies to select, organize, integrate, and remember information. Research also shows that the amount, the kind, and the way in which learners use these various cognitive strategies may vary among learners (Campione and Armbruster, 1986; McCombs, 1988; Olgren, 1993; Weinstein and Mayer, 1986).

The degree of control assumed by learners will be influenced by various factors including the learners' cognitive and metacognitive learning strategies (Garrison, 1993). Garrison defines control "as the opportunity and ability to influence educational decisions" (Garrison, 1993, p. 30). Control in learning can be viewed from two perspectives-external and internal (Candy, 1991; Garrison, 1993; Pratt, 1988). Garrison (1993) provides the following description of external and internal learner control. External control involves management functions and focuses on those issues which are situationally variable. Included in these issues are the planning, management, and evaluation of education. According to Pratt (1988) adults vary considerably in their desire, ability and readiness to exert control over these functions. Pratt also points out that situational variables depict impermanent states and are dependent on adult learners' commitment and competence at a given point in time. Internal control relates to the means of the learners to construct meaning. The degree of internal control assumed by learners will be

influenced by learners' intellectual abilities, attitudes and dispositions as well as specific metacognitive learning strategies. Thus internal control is concerned with a learner's process of critical reflection and the learner's "internal change of consciousness" (Garrison, 1989, p.58; see Garrison, 1993). As such, this internal learner control is comprised of both "a cognitive process and a predisposition to accept responsibility for learning" (Garrison, 1993, p.34). As a cognitive process, internal control is a private process and the responsibility of the learner. Responsibility implies that learners have to be actively involved in their learning to create meaning through critical analysis and integration of new ideas and information. When learners assume responsibility for their learning they also assume ownership of that function. Garrison cautions that while learners are ultimately responsible for their learning, the predisposition for responsible learning may be influenced by others through discussion and experience.

According to Candy (1991, p.211) "The major determinant of learner-control is the learner's subjective understandings and feelings of potency." Much of the research which has been conducted on learner control "...is from a teacher-dominant perspective, and comparatively little research has been conducted on the issue of learner-control from the perspective of the learners themselves." (Candy, 1991, p.204). Cross (1981) points out that little is known about how adult learners actually use various resources in their learning projects and how they view themselves in their learning. In the domain of computer software, little

research has been conducted which deals with how computer concepts are acquired and used.

Nor have computer software educators conducted much research into the learning strategies of adults in the natural setting of a computer classroom (Kay, 1992a). Adults will continue to require instruction in computer software and many of these learning experiences will continue to take place in a classroom environment.

This research will explore how adults attending a word processing course in a classroom environment learn that computer software. Specifically, this study will examine the strategies adults employ, explore how these adults perceive their control in learning, and inquire into which resources these adults employ when learning a word processing software. It is proposed that examining this learning experience from adult learners' perspectives will provide insights into adult learners' views of their learning strategies when learning a word processing computer software, how they employ their learning strategies, how these adult learners view control in learning and which resources adult learners consider beneficial to their learning. These perspectives, in turn, may provide both learners and instructors with a greater understanding of the computer software learning process and may also assist those responsible for curriculum planning and course structure and implementation.

The following section examines the conceptual framework selected for this study.

1.2 Conceptual Framework

In a research study, the conceptual framework explains the principal dimensions being studied and the presumed relationships among them (Miles & Huberman, 1994). For readers, the conceptual framework serves as a frame of reference and permits them to study the findings based on the same framework. Rather than binding the study, the conceptual framework guides it, leaving the research open for discoveries.

1.2.1 Constructivism

This research is concerned with adult learners and their view of their learning strategies when learning of a computer software, how they perceive their control in learning and how they employ the available resources in this process. Several frameworks could be applied to this study. For example, a cognitive framework, which stresses the acquisition of facts and procedures that can be retained and later utilized through application, could be employed. However, a constructivist framework is seen as the preferred framework as it expands on the previous framework in two categories. First, in a constructivist framework, learning is seen as a constructive process in which the learner uses events and resources from which learning can be extracted. The second category emphasizes the interpretive nature of learning in which learners, through an active effort, abstract meaning from their experience and relate this meaning to the

outside world (Candy, 1991; Cunningham, 1991; Perkins, 1991). Thus, in a constructivist paradigm, knowledge is considered to have shifted from an external body of facts to be mastered to an internal construction in which learners propose meaning and significance on events and ideas.

The basic concern of constructivism is how people make sense of the perplexing variety and constantly changing texture of their experience. Constructivists acknowledge various components of this framework including the multi-faceted cluster of perspectives that defy categorization of a single theory. Thus a constructivist framework can be viewed as one in which there is considerable variability (Guba and Lincoln, 1985; see Denzin and Lincoln, 1994). However, in its essence, constructivism is concerned with how people make sense of their ever- changing experiences (Candy, 1991; Perkins, 1991).

In the field of education, constructivism is concerned with how learners construe or interpret events and ideas and how they construct, build, and assemble structures of meanings. This interplay between construing and constructing is at the heart of a constructivist approach to education.

1.2.2 Specific Domains of Constructivism

Candy (1991) presents three key domains of constructivism within education which include constructivist views of learners, constructivist views of knowledge,

and constructivism in learning. While presented separately, Candy notes that these three elements are intrinsically linked and interdependent of one another.

Individuals are portrayed as self-interpreting persons whose attributes include the drive to relate to others and to continually attempt to make sense of their experiences. While this self-constructing aspect denotes a degree of autonomy, this autonomy may vary by individual, given their individual personal characteristics, and by context, given the environmental circumstances of the moment. As individuals, learners acquire their own set of personal constructs through which educational experiences are constantly sifted. While these constructs are in turn altered by new experiences, they form the basic structure which filters all new learning.

While accepting external realities, constructivism notes that knowledge is not just simple copying or replicating (Duffy and Jonassen, 1992). In constructivist terms, knowledge is constructed by the learner through a process of developing representations that fit rather than match external realities. To arrive at such a fit, learners, through their individual experiences, come to know reality (Cunningham, 1991). Thus learners can come to know their own reality only by acting on it.

Learning is therefore seen as an active process through which the learner deduces knowledge (Duffy and Jonassen, 1992). This knowledge must be acquired by the individual and it is seen as the responsibility of the learner to not only engage in active participation of learning, but also to develop internal schemes to construe or interpret events, ideas, or circumstances. At times all learners may take in some information passively; however, the constructivist perspective suggests that even this information must be mentally acted upon to have meaning for the learner (Brooks and Brooks, 1993).

While knowledge construction is a private internal function, some aspects of adult learners' knowledge result from the social interaction with others (Bednar et al., 1992; Candy, 1991; Jonassen, 1994). Savery and Duffy (1995) view the social environment as critical to individual understanding and knowledge construction. On an individual level, social interaction encourages learners to test their understandings and to express alternate views which challenge existing ones and which may stimulate new learning. Because all constructions are not equally viable, the social environment serves as the stage where learners exchange views and information and against which they may test their own understandings and build knowledge compatible with those understandings.

Adult learners bring a rich repertoire of previous experiences to the classroom. As no two people have had identical experiences, adult learners in turn place their

personal constructions on learning situations. Constructivism, which recognizes the highly individualistic nature of how people undertake learning endeavours while recognizing the shared nature of learning, will be used in this study to portray the experiences of learning a word processing software from adult learners' perspectives.

1.3 Research objectives

The research objectives in this thesis stem from several areas including the research questions, the conceptual framework, the research literature and the previous teaching experience of this researcher. Personal computers are employed by instructors and learners alike as teaching machines to help individuals learn new material, as learning tools to promote the formation of new ideas and as learning resources to access information. In this sense it can be said that these areas of computers are being used to assist learners to learn "with" the computer (Heermann, 1986). Other areas in literature focus on the computer to instruct learners in areas which deal with the technical areas of computers including computer programming and computer languages. In these areas computers are used to teach learners "about" computers. In a word processing software classroom learners can be seen to be involved in both the "with" and "about" components of computers since using a word processing software comprises both the functions of that software and knowledge of how to operate peripherals such as printers and disks.

As an instructor of technology this researcher has acquired twenty years of practical experience working with adult learners. This experience has been acquired throughout a career which includes various positions at a international computer organization, interim consulting positions in industry, and ten years as an instructor at a CEGEP. All of these positions included working with and instructing adult learners. As I observed these adults working I often wondered why certain events occur. For example, why does one learner hesitate a long time before proceeding with a function? Why does a second learner not remember a concept, when yesterday all appeared fine? Why is a third learner having a difficult time with one step when the previous three did not cause concern? How can I help these learners with these difficulties? It is questions like these that led me to this research.

The purpose of this research is therefore to explore, from the perspective of adult learners, in word processing course held in a classroom (a) the learning strategies of these adult learners and which strategies they find most useful in their learning of a word processing software; (b) their views of their control of learning; and, (c) which learning resources these adult learners prefer to use and how these resources assist them in their learning of a word processing software.

1.4 Review of literature

The following review of literature will present and synthesize empirical studies in five main areas which relate to the learning of computers: attitudes; experience; teaching approaches; learning approaches; and instructional aids. These areas are reflective of the main themes related to the studies presented. Although adult learners are of principal concern, several studies dealing with high school learners have been included for two main reasons: 1) it was felt these studies contributed to an understanding of some aspects not covered in studies dealing with adult learners including the self-perceptions of learners in relation to the degree of success they experience in computer courses and the reasons learners attribute for their proficiency; 2) these studies provide insights on teaching and learning approaches including the effect of using computers to assist with the learning of other subject matters as well as a comparison between learning in a computer based environment and a traditional classroom. While no studies were found which dealt specifically with adults' learning strategies or of their perceived control of these strategies in computer software courses, several studies are included dealing with learning a computer software in contexts such as self-described experiences and think-aloud protocols.

To assist in examining these areas the ERIC data bank was explored to conduct literature search on the topic. Miles and Huberman (1994) recommend the use of

data displays to visually present information. To this end, those studies referred to in this section are summarized in Appendix F.

The following sub-sections include information gathered through the readings done on the research topic. The aim is to explore the selection of readings for relevance to adult learners and the learning of a computer software. More specifically this review will: a) identify the role of adults' previous computer experience; b) examine how adult learners' attitudes toward technology and possible anxieties may effect their learning of a computer software; c) establish the various contexts of instruction available to learners; and, d) distinguish different learning resources such as manuals and buiit-in help files available to learners and the role of these resources in the context of learning a computer software.

1.4.1 Previous experience Various experiences with technology may come into the minds of inexperienced computer users as they approach their first encounter with a computer software. While some users have had experience with newer technologies, others may have actively avoided using them (Russell, 1995). Morris (1994) noted that a key ingredient for adults, especially older adults, in successful learning of a computer software is a positive initial experience with a computer to combat potential technological alienation. Findings of researchers related to previous computer experiences indicate that among adults of all ages,

previous computer related experiences were positive ones (Hunt and Bolin, 1993; Lewis, 1988; Morris, 1994). Among those persons with computer experience the vast majority of those experiences were reported as centered in the area of word processing and recreation (Hunt and Bolin, 1993). Findings further reveal that word processing software had the greatest variance in terms of experiences among participants. While nearly 40% of the 518 participants indicated more than thirty experiences with a word processing software, almost half had ten or fewer experiences with word processing. Thus, learners in word processing computer software class may encompass a great variability of previous knowledge and experience. A study where participants were categorized by their level of previous knowledge of word processing (some word processing; business students; and word processing instructors), and in which participants were permitted to ask any number of questions before completing a letter, revealed that overall participants did not ask many questions (Briggs, 1990). Those questions which were asked tended to center on visible features, such as printing and margins, as compared to hidden or unseen functions such as formatting codes. Results further reveal that diversity of experience, rather than extent of experience, may provide a greater ability to formulate and verbalize questions about what is not known. Another study, employing a similar question/response protocol, investigated participants' progress in learning a spreadsheet software (Kay, 1992b). Previous experience of participants was classified as falling into several categories including mathematical and programming knowledge, typing

skill, and the number of computer software learned previously. While knowledge of other computer software was predicted to be an advantage, findings proved contrary to the hypothesis. Those participants with the greatest number of previously learned computer software and with previous knowledge of mathematics and computer programming also experienced more difficulties with a number of basic software operations. Thus, it may be that previous knowledge may precipitate learners to question numerous possibilities when ruling out potential causes of problems.

Results of these studies hold some important implications. It may be that while learners have extensive experience with a single computer software, this knowledge may not ensure they are capable of exploiting a new software fully. Findings which reference learners' familiarity of multiple software or knowledge of mathematics or computer programming are less clear. While a familiarity of multiple software may provide learners with an overall informed perspective, this diversity may better prepare learners to ask questions. On the other hand, previous knowledge of computer software may also precipitate more questioning by learners, as compared to learners with little knowledge who possess a smaller repertoire of possible errors to check. While those learners with previous knowledge of mathematics and computer programming can recruit this knowledge to help them solve problems, this same knowledge can also interfere with more efficient ways. In Kay's study, participants' extensive background knowledge of

mathematics and computer programming prompted them to use a mathematical/programming problem solving approach. In a computer software environment this approach may prove to be a time consuming and effortful exercise when performing relatively straightforward tasks.

These findings may also hold implications for educational settings which provide computer software instruction. Some introductory computer courses may provide very highly specific and non-generalizable skills, however, many educational programs are based on the assumption that what is taught in the classroom will transfer to new situations (Beard, 1993). Nevertheless, experience alone may not be enough to give learners an understanding of the principles which govern the tasks they perform. Learners may be competent, and yet still unaware of the important variables making up a task. According to Briggs (1990), users may develop an implicit understanding of the task, without an explicit understanding of the concepts. In other words, while learners may be able to perform a task they may not have reached a point where they are able to fully describe reasons for their actions.

Some studies show that the ability to keyboard enables learners to concentrate on the task at hand and is the cause of motivation (Stoler, 1984; Wetzel, 1985). Kay's (1992b) research, on the other hand, reveals that while keyboarding by itself may be important to enter information, speed may not be especially helpful when

learning a new software. Thus, a slower pace may prove more effective, allowing learners to observe the effect of their keystrokes.

1.4.2 Attitudes Today some adults may have become familiar with computers during their formative years and may therefore be more able to view computers as a necessary and familiar part of their lives. Other adults, while acknowledging the value of computers and technology, may be less eager to become involved with computer in a hands-on manner (Baack et al., 1991). Adults, particularly older adults, need to maintain control over their lives in order to avoid feeling helpless. Thus, the more technology appears to lessen an adult's feeling of personal control or competence, attitudes toward such technology may be more apt to be negative. Studies examining adult learners' computer attitudes have produced mixed results. Several studies (Massoud, 1991; Raban, 1988) found no significant difference in computer attitudes within age groups of the learners. Massoud's inventory survey involved 252 basic education students ranging in age from 16 to over 45, and while it found that adult basic education students as a whole have fairly positive attitudes toward computers, it also found that males have more positive attitudes than females. Raban's self-report inventory study explored the relationship between computer attitudes and achievement. Seventy-nine undergraduates at a large public university participated in either tutorial based instruction or in guided exploration instruction. Results of this study found that the attitudes toward computers had no effect on learning outcomes.

In another study of adults with no previous computer knowledge Zandri and Charness (1989) found that adults' attitudes tend to be more negative with increasing age. In this study, two groups were categorized by age (20-39 years) and (58-84 years). Attitudes of participants were measured at the start of instruction as well as at the end. Findings reveal that while attitudes of all participants improved, the overall attitudes of older participants were less positive than the younger group. Participants were either partnered with another participant or worked alone. Among the four groups (older, younger / individual, partnered) only the attitudes of the older participants working alone, decreased. Thus, the social support provided from learning in small groups may prove more effective for all learners and may prove especially beneficial to older learners. Zandri and Charness point out that while the older group required more time to complete the instruction, their study found all adults capable of learning effectively, when instruction is structured to the needs of individuals. Zandri and Charness also found that across age groups, positive attitudes were related to higher test scores, less time required to complete instruction, and fewer requests for assistance. However, it should be noted that in this study, while attitudes were related to performance, it was not clear which was the cause and which was the effect.

When comparing attitudes and performance of traditional college students with re-entry adult learners, Klein (1993) found that the re-entry students (learners aged

over 25 or over who have been away from formal education for three or more years) had more positive attitudes toward learning about computers. According to Klein these findings lend support to the notion that re-entry students have greater confidence and somewhat more interest in learning about computers than do traditional learners. Among high-school learners, Durndell (1995) found that while young learners start off with positive views about computer technology, they become less positively disposed towards technology during their high-school years. Durndell's study found that positive attitudes were highest among the first-year students. A closer look shows that the boys are more positively disposed at all three levels (first, third, fifth) years of high school. In general, boys were found to make greater use of computers than girls, both in and out of school. Two exceptions should be noted. The first is that the use of commercial games at school showed no significant gender difference. The second regards the girls' use of word processing computer software outside of school. It may be that the recreational aspects of computer games appeals equally to both genders. Games may be a way of generating an interest in computers for both genders. Using a computer outside of school may also confirm that once girls recognize the usefulness of computers they continue to make use of this technology. While this study does not specifically answer the question why female high school students come to have less positive attitudes towards computers, it does reveal that the girls found computers less attractive than did the boys. This may partially explain the drop in attitudes among females in their fifth year, possibly as a result of less

involvement with computers and more interest in other areas. It may also be that females believe, that as a gender, they are less able than males when dealing with computers, which in turn, may lead to less positive attitudes towards computers.

1.4.3 Anxiety Anxiety is one of the most common teaching and learning issues involved in acquiring computer knowledge (Mruk, 1984). Computer anxiety is related to the fear of using the hardware and negative thoughts by an individual (Russell, 1995). Computer anxious persons may find the technological processes intrusive and need to overcome their fear before the technology can become invisible and allow learners to make effective use of the software (Lewis, 1988; Russell, 1995). This fear may be more relevant to adult learners who, in other domains, may be seen as experts in their fields. These adults may feel more threatened when learning computer software, especially in group situations, where the potential for embarrassment is greater (Mruk, 1984). The most acute concerns of novice computer learners appear to focus on judgments that instructors or peers may make of them. New users may feel stupid for having to ask questions and refer to manuals (Bloom, 1985).

Hunt and Bolin (1993) hypothesized, based on their previous classroom teaching experiences, that the learners who would exhibit high anxiety toward computer use would be older learners. Results of their study proved contrary to their hypothesis and may indicate that there may be a greater variance in older learner

anxiety towards using computers. Those adults who reported extensive experience with computer software corresponded with those with lower anxiety scores. As well, those adults with previous computer experiences correlated with those with positive attitudes towards using computers. These relationships would indicate that these previous experiences were likely positive ones in which learners felt a sense of accomplishment. At the same time, these results reinforce the need for a positive initial computer experience in order to combat alienation towards computer technology (Morris, 1994).

Several studies were conducted with adult basic education learners which determined learner anxiety towards computers (Lewis, 1988; Massoud, 1991). Basic adult education learners are representative of low literate adults and are often characterized as having low self-concepts and negative educational experiences. Results of both studies show that overall these learners felt positively disposed towards computers and appeared to feel little threat from this form of technology. It may be that basic adult education learners view computers as an enhancement to their learning and a way of increasing their entry into the field of technology. As well, computerized assisted instruction affords these learners the opportunity to interact with technology on a private and individual basis while increasing their literacy skills.

Russell (1995) conducted a 4-year study of more than 200 teachers who were introduced to e-mail. Each group of 8 teachers (novice e-mail users) was provided instruction during a 3-week course. Findings revealed that learners passed through six stages as the technology and process of e-mail changed from being intrusive to becoming invisible. Russell proposes that if learners identify with the process of passing through stages they are better equipped to deal with initial frustrations and view these as steps towards mastery and increasing competence. Two important points can be drawn from this study. The rate at which an individual learner may take with each stage may vary. Learners with previous computer experience may already possess an individual model which may be applied to new situations. The second important finding is that Russell's study is based on introducing learners, in this case teachers, to a tool, in this case e-mail, for the purpose of communicating with children (their potential students). When learners become involved in "real" experiences of e-mail, frustrations and negative reactions can be displaced by the sense of accomplishment which results from a positive experience.

1.4.4 Age The term "adult" may differ by definition. Cross (1981) and Mruk (1987) define an adult as someone twenty-five years or older. Similarity the definition of an older adult varies. Elias et al. (1987) base their definition of an older adult learner as those over 40; Zandri and Charness (1989) define "older" as those over 58; and, Twitchell et al. (1996) base their definition of an older adult

on those over 40. Studies comparing younger and older adults learning a word processing software found that as age increased, the questioning of the instructor, concern with the equipment, interest in training procedures, and time required by learners to complete the training also increased (Elias, 1987; Zandri and Charness, 1989). Twitchell reports that the rate at which older adults process information and transfer it to long-term memory is slower than that of younger adults.

While adults in general may experience anxiety or bewilderment when faced with newer computer applications, older adults are more likely to have received little, if any, formal instruction in how computers work and how to use them (Gattiker, 1991). Furthermore, older learners may see a weak link between improving current computer software knowledge or learning new ones and obtaining rewards and therefore, may have less incentive to upgrade their knowledge of computer software. James et al.'s (1996) study of 12 older learners with little or no previous computer experience involved learning to use a word processing software to enable participants to record personal life histories. While median age was not determined, the youngest participant was 56 and the oldest, 83. All of the participants gained sufficient abilities to use the word processing software to create, edit, print, save and retrieve documents. Benefits cited and ranked by the participants include social aspects (being part of a similar group of older adult learners); self-fulfilment (feelings of achievement); and, aspects specific to the course (usefulness of computers). Difficulties, as seen by the researchers, include

time to complete instruction which fall into several areas: hesitancy, and repeated mistakes. James et al. found that participants demonstrated uncertainty when returning to computer class, following a gap of some days. Mistakes made by participants were very frequent, but these repeated mistakes centered around typographical errors. While some adults would wait for assistance, when computers were available for independent work these same adults were able to proceed on their own. The most frequent behavior noted by researchers was that these learners sought assistance of their peers or from instructors before looking for information in the manual and they rarely used the on-line help function. It is important to note that in James study, the link to obtaining rewards with increasing computer software knowledge was the purpose for which the instruction was offered. Older adults often consider creating a journal of their lives or that of their ancestors. A word processing course offered these adults a means to achieve this objective while simultaneously providing them with instruction in a computer software.

In a report reviewing 12 computer-assisted instruction programs in adult basic and secondary education Rachal (1993) found that while age was treated in different ways. The general conclusion was that age was not a factor in achievement, and when it was, age tended to favour the older adults. Generally, the methods employed in computer-assisted instruction, as compared to non-computer assisted methods, promote privacy, feedback, and the opportunity to pace instruction.

Privacy permits learners to make errors free of embarrassment in front of a group of learners; the computer does not draw conclusions or pass judgment and permits learners the opportunity to repeat lessons as required. Learners are therefore able to restart a segment which is troublesome to them. As well, learners can return to instructional segments which they are uncertain of without delaying others or remaining at the same lesson while they wait for others. Benefits cited by learners of all ages include learning more and learning the material faster.

Other studies comparing re-entry adult learners with traditional college learners confirmed that older groups of adults demonstrated greater confidence and somewhat more interest in learning about computers in a practical manner through instruction of a computer software (Klein et al., 1993; Mruk, 1987). Regardless the various types of studies or their content, the above studies share in their view that age in not a factor to be considered, as all adult learners are considered to be capable of learning and using computers and computer software.

1.4.5 Method of instruction While Gruhn & Huhl (1979; see Morris, 1994) claim that individual instruction is more effective when teaching novice computer users because it accommodates individual differences more effectively than group instruction, other researchers (James et al., 1996; Zandri & Charness, 1989) found that learners in small groups demonstrated almost entirely positive results including increased self-confidence, social pleasure, and support derived from

group membership. These results are attributed to the opportunity for group problem solving and social reinforcement. Thus a small group environment may provide adults learners the opportunity to discuss material among themselves, the chance to learn from their peers and to reinforce their learning through group discussions.

Tutorials are a training method often provided with many software packages. This instructional method incorporates a controlled, step-by-step, hands-on introduction which provides on-screen explanations, demonstrates the basic functions of the system, and permits the learner to repeat lessons as needed. The advantages of this method include self-pacing, privacy, reusability, hands-on experience, and rapid feedback (Gist et al., 1988). Zandri and Charness (1989) found that self-paced learning provides an important component in achieving a high degree of accuracy. In addition this method affords adults the extra time they may need to complete assignments and review written materials (Twitchell et al., 1996). Another form of tutorials is the guided exploration training which includes on-line help facilities (Raban, 1988). Exploration encourages learners to take an active role by allowing them to learn the new system by exploring with the assistance of brief training materials. According to Catrambone and Carroll (1987) the minimal materials, which are deliberately incomplete, may help learners to better coordinate what is happening on the screen with what is provided in the manual. While both the guided exploration training and the

controlled hands-on tutorials involve "hands-on" active learning, a study comparing the two methods (Raban, 1988) found that novice computer learners performed better when using their preferred method.

Regardless the computer software being learned, before a software such as word processing, spreadsheet, database, E-mail, and graphics can be useful in a learning or employment setting, users need to know more than how to use the software itself. Effective computer use requires understanding subject-matter or work related concepts, recognizing problems and judging which, if any, software might be helpful for the problem solution (Lambrecht, 1993). In her study of adults with little or no previous computer experience learning an E-mail software Russell (1995) found that the self-reported learning experiences of the adults could be categorized into stages. The first half of these stages were concerned with initial frustration, lack of self-confidence and the need for extensive support as learners progressed toward understanding and applying the concepts to specific tasks. During the second section of the stages, learners were able to achieve a sense of confidence as they were able to solve many of their initial problems and were therefore able to focus on applications and apply the software to purposes other than the ones used in the instruction. Russell's findings underscored that not all learners began at the same stage of learning, nor did all learners spend equal amounts of time in the various stages. The rapid pace in computer software advances are evidenced by the ever decreasing time frames in which these new

products are introduced (Beard, 1993). What may have been current six months ago in one software domain may be replaced by an entirely new software or upgraded by the developer. Thus adult learners will likely be faced with mastering a software that is different from that which is available for their learning. The computer classroom learning environment may well provide the climate for more student-centered and individualized learning (Swan and Mitrani, 1993).

1.4.6 Learning Aids Because of the established use of printed materials, text remains the most pervasive form of instructional media (Kazlauskas and McCrady, 1985; Morris, 1994). Descriptions in printed media can be enhanced by graphics or photographs when the referent can be represented visually. However, many of these manuals are large and their size and structure encourage a passive learning experience where learners get into the mode of following directions in order to complete the task. Learners, in their desire to get through an exercise, may frequently come away with a less than clear comprehension of the relationship between the directions provided and the task at hand (Zandri and Charness, 1989). While manuals are reusable and represent an inexpensive way of providing information, many manuals are written by technical people who do not take the point of view of new users (Callaghan, 1985; Bloom, 1985; Gerver, 1984). Often learners do not read the training manuals because they would rather be shown and because they want to know how to do the task at hand and nothing

more (Baxter. 1984). To overcome these limitations Wedemeyer (1983) and Paxton and Turner (1984) recommend presenting written material in small incremental steps and using writing styles which incorporate short sentences with one idea per sentence. Twitchell et al. (1996) also stress that placing important ideas at the top levels in content structure may provide readers with target ideas around which to organize the remaining information.

A primary aspect of learning computer software is the language or terminology which is associated with the domain. The use of technical terms or "jargon" is rampant and is perhaps the most frustrating aspect to the beginning user (Kazlauskas and McCrady, 1985). The result is that as the language becomes farther removed from natural language, it becomes more difficult for learners to master (Paxton and Turner, 1984). Kay's (1992a) research identified three aspects of technical computer terms used by adult learners. Vague terminology may deter learners from exploring a concept fully and may prevent learners from forming a clear understanding of their actions. Non-standard technical terms, sometimes coined by learners, may prevent them from seeking help as they may be unable to explain their term compared to the way other learners, instructors, or manuals describe the term. When learners employ a term which does not correctly identify the function to which it refers, the result may be heightened confusion for learners as they may use a known term to refer to a function which in reality is labelled by some other term. Thus unknown terminology, or terms which may mean one

thing in ordinary language, may refer to unfamiliar computer software functions and may cause stumbling blocks for learners. Twitchell et al. (1996) promote the use of checklists or notes to bypass any difficulties adult learners may encounter with memorization. Studies in which adult learners were provided with jargon sheets, that is, a sheet defining computer terminology and command summaries, resulted in better performance among those adults who received the data cards (Carroll and Mack, 1984; Zandri and Charness, 1989). Mack et al. (1983) cite the problems novice learners may have in finding or selecting information relevant to their concerns or problems. Thus providing learners with more explanatory material may not prove helpful to novice learners. Rather Mack et al. recommend reducing the amount of materials for learners and while screening materials for technical jargon through experienced user testing.

In an effort to help users with their questions most computer software packages provide assistance in the form of on-line help. These on-line help systems commonly advise users about the syntax of an interaction, or about the meanings of various keys, or menu choices, but seldom offer advice about higher level problems which are likely to arise as the users do not have a general task description available (Briggs, 1990; Kazlauskas and McCrady, 1985). Help systems assume that users comprehend the general principles which underlie the process of interaction. In a study of office workers learning to use a word processing software Mack et al. (1983) found that the help facility did not prove

useful. At times the learners could not understand the terminology of the information provided; at other times learners were unable to describe their problems well enough to use the help function. Thus, on-line help may be best used to provide answers to specific questions but novice learners often do not confront this kind of question. Briggs (1990) points out that even experienced users, when attempting to self-direct their learning of a new software, do not possess the metaknowledge of task and system to generate appropriate queries.

1.4.7 Presentation Methods Analogies are often used during the instruction of a computer software or by the learners themselves when learning new tasks on the computer. An analogy can be defined as "a mapping between objects and relation in two domains" (Greeno, 1983; see Galloway, 1992). If one domain is familiar to the learner, it may serve as a connection to understanding a new domain. Analogies can be used to great advantage with adult learners but the key may lie in the terms "familiar" and "relevant". If adults maintain a "typewriter" analogy of word-processing, this analogy may leave them ill-equipped to deal with hidden codes or when a procedure produces fast, extensive screen changes (Briggs, 1990; Elias, et al., 1987). As a result, some adults may experience difficulty suppressing knowledge that is now inappropriate or irrelevant. Carroll and Mack (1984) point out that if the analogy must be explicitly taught to the learners, it contributes to the amount of material that must be learned instead of relieving this burden. Analogies work when they relate something already well learned to new

information. The best analogies are those that are suggested by the learners themselves as learners reinforce a concept by attaching it to something familiar and therefore relate to the experiences of the learner (Twitchell et al., 1996). Understanding computer concepts with the help of analogies can provide a deeper comprehension of the concept and improve the internal representation or models of ideas (Galloway, 1992). In a study in which three groups of preservice teachers were provided varying levels of analogies (full, simple, none) to teach novices computer software applications, Galloway's results of pre- post-tests and interviews demonstrated that the group provided with full analogies showed greater increases in the use and comprehension of analogies. The subjects' conceptual understanding of computing, their ability to discuss and explain computing conceptually, and the degree to which they spontaneously generated and relied on analogies in explaining computing seem to be positively affected by the proper use of analogies.

Despite advances in technology and educational media, the lecture and text based model of education remains strongly entrenched. Cross (1981) points out that those people who have advanced further in formal schooling are most likely to prefer structured classes and lectures. According to Feuer and Geber (1988), when adults, who are fully responsible for their own lives, enter an education based environment, they revert to their previous roles as passive learners. The past educational experiences of adults learners may have been pedagogically

based and adults as learners may not be initially prepared to take on the role of active learners. Feuer and Geber propose the concept that when a topic is extremely technical and a "best way" method exists to perform a certain task, the encouraging options in the context of the classroom may not prove advantageous to adult learners. However, this structure and direction is recommended up to a point where learners can provide more input and take on more responsibility for their own learning. Swan and Mitrani (1993) make a case for a partnership among the computer, the instructor, and the learner. In this kind of an alliance the technology may assist by providing the learner with feedback through visual on-screen evidence of the degree of successful work attainment. The instructor's role becomes one of a guide for student learning and for meeting complex individual and pedagogical needs. The learner, in turn, becomes more responsible for his or her own learning. Thus computers, through their interactivity with learners, may assist in altering the structure of the classroom and this may reflect in an environment which is more student centered and learning which is more individualized. While this partnership may be changing the role of the instructor from that of a knowledge provider to that of a learning facilitator, it nevertheless remains a required element in the computer software classrooms.

The previous pages have provided a view of adult learners and the way in which they interact with computers when first learning a computer software or while increasing their knowledge of a computer software. In the preceding literature

review I have addressed several areas relating to learning and technology. Specifically, instructional methods such as the use of analogies and lectures through which learners may gain computer software knowledge have been addressed. As well, the area of learners' previous experience with computes has been examined as has that of learners' anxiety and attitudes towards computers. Through this literature review it has been possible to identify several types of learning aids including printed materials, terminology aids, and on-line software help systems which adults may encounter when learning a computer software.

While discussion of each of these areas has been presented as separate entities, in the context of a classroom environment these categories are not independent but may be highly interrelated. The information gathered has therefore led me to propose the objectives outlined in Chapter 1, Section 1.3, Research objectives.

CHAPTER 2 -METHODOLOGY

This section describes the overall design of the study. In separate sub-sections we will discuss the research method, the study participants and the setting, the data collection methods and techniques, and the analysis method.

2.1 Research Method

The research method selected in this study reflects the research topic. This study is concerned with adult learners, their learning strategies, and the way in which adult learners perceive their control over these strategies. As well, the study examines the way in which adult learners employ the learning resources available to them in a word processing computer software course. A qualitative methodology is the adopted method as it places emphasis on processes and meanings of study participants (Denzin and Lincoln, 1994). In this research importance is placed on the way in which adult learners formulate and apply their learning strategies and their internal control of this learning process, rather than the evaluation or assessment of an end result. Thus a qualitative research methodology is necessary for this study as it draws in part to the naturalistic conceptions of human experience. In a naturalistic design, the researcher's aim is to portray the understandings and the particular constructions of the participants without seeking to generalize these findings to a larger population (Guba and Lincoln, 1994).

2.2 Sampling

Sampling choices within and across cases are powerfully determinative of just which data will be considered and used in analysis. Miles and Huberman (1994) recommend the use of small samples of persons studied within their context and studied in-depth. Patton (1990) advocates the use of *purposive* samples which involves selecting informants felt to be information rich--that is those participants from which a great deal can be learned about issues of central importance to the purpose of the research. McMillan (1993) also advises the use of purposeful sampling to increase the utility of information obtained from small samples. Miles and Huberman (1994) and Patton (1990) identify sixteen variations of purposeful sampling. Adult learners bring rich and diverse experiences to the classroom. This study will use a *maximum variation* sample to represent key participants whose previous experience with and knowledge of computers reflects overall experience diversity among adult learners. Maximum variation sampling has been selected for two main reasons: a) it is proposed that a maximum variation sample facilitated the capture of participants self-reflections based on their individual experiences when learning a word processing software in the context of the classroom; and, b) maximum variation sampling assisted in the emergence of shared patterns of experiences which participants may encounter when learning a word processing software in a classroom environment.

The purposive sample in this investigation will target adult learners enrolled in a word processing computer software course. Six adult learners, from a class size of thirteen, will be selected based on their ability to provide insights on their classroom learning experiences as well as their ability to articulate these events. The purposive sample in this investigation was directed to those adult learners with numerous computer experiences and those with little previous computer experience. This sampling process was achieved with the assistance of the director of Continuing Education at Champlain Regional College. Participants were interviewed by the director prior to enrolling in the program or course and the director was aware of participants previous computer experience, as well as their ability to reflect upon and to articulate their thoughts. The information provided by the director was a valuable source in determining a sample selection capable of addressing the needs of this study.

2.3 Research instruments

Two instruments were used in this study. Naturalistic nonparticipant observation and structured open-ended interviews. The combination of these two data sources assisted in validating and cross-checking findings and served to increase the validity of the findings. Employing more than one method for gathering data is referred to as triangulation (Janesick, 1994). According to Gall and Borg (1996, p.574), multiple data-collection methods assist researchers in checking the validity of study findings and helps "...to eliminate biases that might result from relying

exclusively on any one data-collection method, sources, analyst, or theory". This study was based on a classroom word processing course. Many of the participants responses reflected events which took place in this environment. Observing all fourteen classes permitted this researcher to make repeated observations of the phenomenon and therefore to increase the reliability of the findings.

2.3.1 Observation Naturalistic nonparticipant observation was selected for several reasons: (a) this form of data gathering is unobtrusive, does not require direct interaction with participants, and can be conducted inconspicuously; (b) nonparticipant observation offers the flexibility to yield insight into new realities or new ways of looking at existing realities; (c) combined with the two interviews, nonparticipant observation provides the opportunity for depth and breath and enhances consistency and validity.

In this study I observed each of the 14 classes. I took field notes noting participant activity and actions during the instructional portion of the class as well as interactions among the participants during the practice time following instruction.

During the first class session I used a paper and pen to record notes, however I found writing with a pad on my lap awkward and the turning of the page made some noise which caused participants close to me to turn around. All future

observation notes were keyboarded using a laptop computer, which enabled me to observe and keyboard simultaneously. While I remained in the same seated position throughout each observation, so as to not cause disturbance, I did sit in several different points of the room to gain a better perspective of all participants. The position which afforded the best observation of all participants was at the back center point of the class, where I remained for most of the observations.

Observations were reviewed following each class. From the first observation session, a number of themes began to arise and included the instructor's teaching practices as well as individual and group participant actions. Following each class, I reviewed each observation session for these themes and abstracted themes on a contact summary sheet (Appendix C). The data from the observations were used primarily as a means of quality control for the interview data, and to audit and provide support for the categories developed from the interview data.

According to Gall and Borg (1996), in the role of nonparticipant observer "the researcher acts primarily as an observer, entering the setting only to gather data and interaction only casually and nondirectly with individuals or groups while engaged in observation" (p. 345). My presence in the room seemed not to affect the participants. During the interviews with each of the four participants, I asked the question, "Has my presence in the class affected your learning?" The participants were unanimous in their obliviousness to me. "We don't even know

you're there half the time, you're so quiet. I have sometimes turned around and wonder, when did she come in. No. Not at all. You're as quiet as a church mouse."

As a researcher my presence in the class was that of observer. However, given my previous experience as an instructor in Office Systems Technology, I have taught numerous courses in word processing. It was therefore an effort on my part at times not to slip into the instructor mode, especially when I would observe a participant struggle repeatedly with some key or function with which I could have easily assisted.

2.3.2 Interviews As a method of data gathering, Fontana and Frey (1994) describe the interview as the most common and the most powerful means of understanding other people. While the basic purpose of the interview method is to gather data, it also allows for greater depth than other methods of data collection. A dual rationale engenders the use of structured open-ended interviews: a) the structure requires exact wording and sequence of questions and ensures that participants are asked the same basic questions in the same order; b) the open-ended nature of the questions provides a frame of reference for participants' answers, while placing a minimum of restraint on participants' responses. Recorded interviews also ensure the gathering of descriptive data in participants' own words.

Two separate in-depth interviews were conducted with six adult learners who were enrolled in a 45-hour credit word processing course held in an Anglophone CEGEP in Montreal. Study participants ranged in age from 27 to 49 years of age and varied in level of previous education, amount of computer experience, and demographics. Participants used personal computers installed with WordPerfect 6.0. Each participant worked at an individual computer. The instructor was an office systems technology teacher with a bachelor's degree and several years of teaching experience The objective of the first interview was to gather data regarding the participants' backgrounds, previous learning experiences, previous computer experiences and to concentrate on participants' initial experience in this computer class. The goal of the second interview was to gather additional data regarding the participants experiences in this computer class, their meaning to participants, and understandings of these experiences by the participants. The interview schedule that guided this inquiry arose from the review of the literature and the from the conceptual framework. The questions contained in the interview schedule are also based on this researcher's previous twenty years of experience gained while instructing adults learners in various computer technology and softwares. While a complete pilot study was not performed prior to this research, smaller groups of these questions have been used with different adult learners. The interview schedule for both interviews is included in the Appendix A.

I intended to transcribe the interview tapes following each interview. I was not able to accomplish this. Transcription units, that is units equipped with earphones and foot control to start and stop a tape, were in use by a class of students and were be available only at the end of the semester. All tapes were transcribed the following January. Transcription time took from 4 to 5 hours per tape.

2.4 Data collection

The data was gathered in the following manner. Throughout the duration of a word processing software course this researcher arrived in advance of the class time and remained seated at the back of the room in which the course is held and remain at this point during the entire class time. This procedure continued for the entire course duration (14 class sessions, totalling 45 hours). In order to ensure that the researcher's presence in the classroom did not jeopardize the effectiveness of this course, the following procedure was observed. At the beginning of the week during which this course began, all participants were given a letter from the director of Continuing Education (see Appendix D) informing them of the intent to conduct research. On the first day of the class, the instructor of the course introduced the learners to the researcher. At that time, this researcher provided a letter of introduction (see Appendix E) outlining the purpose of the research and emphasizing the confidentiality and anonymity of the data. During the observation of each class, notes were taken and transcribed following each class.

The structured open-ended interviews were conducted with the help of an interview schedule, through individual, face-to-face verbal interchanges with six participants. The first set of interviews took place approximately at the mid-point of the course. The second set of interviews were conducted towards the completion of the course. Both interviews were conducted in an informal and friendly environment to: enable capturing participants' individual experiences; and, provide an understanding of participants' learning strategies and of participants' perceptions of their internal control of learning a word processing software.

Each interview lasted from sixty to ninety minutes and all interviews were scheduled at the convenience of the participants. Prior to every interview participants were asked for their informed consent (Appendix B) and their responses were tape recorded to facilitate data collection and to ensure accuracy of information.

2.5 Data analysis

Field notes of classroom observations were reviewed following each session. In addition general notes based on each session were made directly following each classroom observation. Notes collected were gathered and organized through the use of a *contact summary* sheet (Miles and Huberman, 1994) which provided an

overall summary of the main points in the contact. A sample contact sheet is provided in Appendix C.

I used the procedures of inductive data analysis as my means of analyzing the interview data (Janesik, 1994). Following transcription of the tapes, I explored the data and watched for categories, themes and patterns to emerge from the data. I looked for and considered the data in terms of units of relevant meaning. While working with the data and a personal computer, I created an additional document and when I saw a relevant theme emerge, I added a group heading. As I came to confirming quotes in the data I used the copy-and-paste method to copy the appropriate text to this group. In this way I identified 48 themes in the data. The next step in the data analysis process was to take these emerging themes and define broad categories from the original themes. I took the printed 48 themes with the supporting text, each printed on a separate sheets and participated in a kind of large card game. By moving individual pages around and placing similar themes together into piles, I emerged with eight salient categories.

Through research in their work on the Cognitive Learning Strategies Project, Weinstein, Zimmerman and Palmer (1988) developed an instrument, the Learning and Study Strategies Inventory (LASSI), which among others reflects the state of learning strategy research. Development of this instrument came about in part as previously developed instruments addressed conditions under which students

learn rather than how students learn. The project also sought to broaden previous inventories which dealt chiefly with consistent and regular study rather than another primary factor, namely the component of active learning. This instrument was not applied in a quantitative methodology, however, seven of the ten scales used in the Learning and Study Strategies Inventory reflect the salient categories which emerged in this study. One category of LASSI, test strategies, reflects the approach learners form toward taking tests and exams. As this study did not focus on assessment, this category was not relevant and was not used. Two additional categories of LASSI, scheduling and concentration, respectively reflect learners' systematic planning and use of time, and learners' ability to listen carefully and think about what is being said. This study seeks to identify how learners view and reflect on their own learning and how they create meaning through involvement in their learning and their integration of new ideas and information. Thus the categories of scheduling or use of time and concentration or thinking are reflected in the theme of control in learning and are encompassed in this theme.

The eight final categories correspond with repeated reports form the participants on how (a) these participants employed learning strategies, and which strategies they found most useful in their learning of a word processing software; (b) these participants viewed their control in learning this word processing software; and (c) these participants preferred to use learning resources available to them, and how

these resources assisted them in their learning of a word processing software. The findings are presented within these eight major categories

- Study aids
- Motivation
- Selecting main idea
- Information processing
- Anxiety
- Attitudes
- Self-testing
- Control in learning

Discussion of each theme begins with a brief review of how participants in this study learn word processing in relation to the findings discussed within each theme. Quotes by each participant are included to provide support for the findings within each theme. Participants real names have been replaced by pseudonyms. Participants own words permit readers to further understand participants' feelings, diction, and experiences.

The fore-mentioned procedures enabled this researcher to arrive at a better understanding of and to provide "thick descriptions" of the way in which adult learners conceptualize and describe their learning strategies and their perceived control in learning as well as their preferences in their use of learning resources in a course designed to promote the learning of a word processing software.

CHAPTER 3 - FINDINGS

The data from the participants' interviews and observations fell into eight major themes. The findings are presented and discussed separately within those eight major themes: Study aids, Motivation, Selecting the main idea, Attitudes, Self-testing, and Control in learning. Each theme is first discussed in terms of its relationship to the literature and how this literature relates to the participants in this word processing course. A summary of the findings is presented as the final section in this chapter.

3.1 Study aids

Study aids include those items through which participants make use of a broad approach to learning and include aids identified by participants to assist them in their learning (Weinstein, Zimmerman, and Palmer, 1988) Primary among these aids, in this word processing software course, is the instructor. In this course the instructor used a direct method of instruction which both she and the participants referred to as a "walk-through" method. Winograd and Hare (1988) break down the definition of direct instruction into several component parts. Itemized units include: (1) structuring learning in terms of clear academic goals which are broken down for maximal content coverage into manageable steps; (2) brisk pacing and selection of sequenced, structured materials; (3) providing detailed instructions and explanations with sufficient examples; (4) asking many questions and offering

numerous overt active practice opportunities; (5) giving immediate, academically focused feedback and correction, especially when new material is being learned; and (6) active monitoring of student progress. In this study, at the start of each class the instructor wrote a list of functions to be covered on that day. The instructor began by explaining the objective of that day's class and drawing an outline of a page on the white board at the front of the room. In a step-by-step manner the instructor added text and an overview of a word processing software function to the document on the board. Participants were instructed to perform the steps required to achieve this initial objective. This series of steps was also included in the textbook. If a participant missed a step, or asked a question, the instructor helped that participant or answered the question at that time. Once this portion was completed, the instructor continued with another section of that day's lesson. The walk-through portion usually took from 45 to 60 minutes of the class time. Thus the instructor-guided portion of the lesson was broken down to several parts, and the end of each instructional part was followed by the application of these steps by the learners on individual computers. The remainder of the time was given over to practical work which related to the lesson and which referred to assignments at the end of the chapter. Participants were free to complete the work on their own and the instructor would circulate the room to assist individuals with any questions. All participants had a high regard for the instructor and many viewed the instructional method employed as essential.

> Paul: "Oh it's basically the thing [laughter] that help me to do everything, you know, because, if she didn't do her walk-through

> OK, I will have to, I will have to go myself and doing it. And now, you know, oh, it would be more heavy for me. So thanks to the walk-through that she did, you know, I can follow everything."
>
> Robert: "Ah, yes, I think Dawn is doing a good job. She's slow, she's, she looks all around, she makes sure everybody's following. Well, I think the way that she does it, she explains what she wants. We walk through the chapter and then she's still there to guide us if we run into trouble."
>
> Yolande: "It's the way that she teaches. You know, some people just know how to teach. Some people have this knack that keeps your attention through the whole thing. It's just the way that she teaches it. Like you understand. You understand it, right away. You know. And if one person, maybe this is it too, if one person or two people don't understand, everybody has to redo it. Not just that one person. That's what I think what it is."

When participants were asked to describe what they considered to be a "best way" method to learn a word processing software all included the instructor, regardless of any previous knowledge.

> Diane: "Take a class. I find I've learned in the class. Like I already had the WordPerfect at home. Like I managed, but I didn't really know how to do it. So, this, with this class, it showed me exactly what it is and how it works, so.... . Having someone teach you. Show you how to do it. And doing it at the same time and having the chance to practice it."
>
> Ronald: "I would agree with a, having some sort of say with the teacher. Um, exactly how much, I'm not too sure, because I'm, I don't know maybe what's required for me to be able to fully understand what's expected of me in a work environment to be able to work with word processing. The teacher will better know what's, what a student should essentially know. And the teacher...so that point I'll leave it in the teacher's hand to tell me, like you need to know all this to be able to go into a work environment and work with WordPerfect. And from that point on when you know all this it's not any more difficult for you to learn more advanced functions of WordPerfect. The basics with the assistance of an instructor, all the way, in my case, up to chapter

> 12, 13 and then at that point I feel very comfortable to go on myself. I find I could, from that point, move on and learn any of the other details by myself."

Some participants in this word processing course gained in confidence as the course progressed and expressed the belief that they could accomplish some future learning on their own, without an instructor.

> Paul: [first interview] "Over there I took computer class. I have no experience. It was, the first one. It was... I took, long time ago. OK and,... it was very difficult for me. I don't know why. I didn't understand nothing about the teacher, the words that she was saying. It was, first of all, a lot of theory, very few practices, you know. ...That create like complex in me, so, you know, I was very uncomfortable. ...And, um, and obviously well, I said to myself...now I'm trying to have a different, different approach, you know. So really, you know, I'm progressing."

> Paul: [second interview] "Well, I can say right now, I have the basis to do a lot of things on my own, for example. ... But I think that if I had it, I will be able, you know, if it's not something complicated, it's a continuation of what I learned. You know, I think I will be able to do it (alone)."

However, other participants, while gaining from the initial experience, still felt the continuing requirement for the assistance of the instructor.

> Nicolas: [first interview] "In the past I take a course, that's a very long time ago...after a while I didn't like go any further...I didn't notice, like the importance of computers. Also, and I'm a bit scared of computers. ...I thought like maybe I can make a career inside, but I notice like, it's a bit hard for me, I give up."

> Nicolas: [second interview] ...I don't think so. Because I'm, if there is no teacher...I notice like, ah, I'm doing, I'm doing better with time. With the help of a teacher, and the advise of a teacher, but I know I could have done better, like, if, if like, ah, like learning something, and if you add something to it if you already have a good base. Like you add to it and you can go even higher than what I am doing now."

The instructor introduced each new topic through verbal explanations and made extensive use of the white board. By modifying a representation of a page on the board, the instructor provided participants with a visual depiction of the goal as well as an oral explanation. Participants found the white board diagram increased their comprehension.

> Robert: "I am French speaking so I sometimes have difficulties as to understand. But when she puts it on the board, it's there for me to look at."
>
> Yolande: "...I'm visual. So I like to, I look at it and then if there's something, that I try to figure it out myself by looking at it, and then it's just reinforced if it's, if she puts it on the board or she explains it, then I try to understand the concept of it. And then, it's registered. Like I said before, I have to, if I see it once, and explained to me properly, the concept, why it does this, why you do it for, now, how you do it. Then I understand it."
>
> Paul: "...sometimes I prefer when she can say when to do something but when she write it, it's better for me. Because first of all, I am always, you know, paying attention. Because it's not it's not a language I used to learn in, so when she talk, talk, talk, sometimes I have spelling errors, I miss words, you know, so when she put on the board, I am sure that I will get it."
>
> Nicolas: "I notice like, sometime when the teacher write it helps me in sometime to recall what I learn in the book. But also sometime it, it's like ah, it adds something on top of what like I learned. It's, it's like doing the thing two times."

The textbook used in this course was divided into 20 chapters, 10 of which were covered in this course. The beginning of each chapter included a visual representation of the completed project covered in that chapter and step-by-step instructions to complete the project as well as an explanation of each function included in the project. The end of each chapter provided both theory questions

and practical exercises covering the contents of that chapter. The instructor covered the content portion of the chapter during the direct instruction or walk-through portion of the class. Participants in this course had definite beliefs regarding both the theory and practical portions of this book. In general participants found the book useful and easy to read.

> Yolande: "It's a very good book. I mean, you can't get any better than that. It's all step by step by step. There's no, there's no questions there at all. You just have to look in the book. ... But it's not a really hard course. It's basically, you just follow in the book. I mean if you don't, if you don't understand, before you, um, ask her and you don't understand in the book, then you'd ask her. But basically, it's a step by step from the book, I mean..."

> Paul: "It's a good book. You know I can't complain too much about it. Because it's not a book that tells you a lot of theoretical things. I can't complain about it. "

How participants used the book in terms of its instructional content did vary. While most participants agreed the book was useful to them, they indicated strong preferences for verbal instructions from the teacher or from other participants.

> Robert: "I use it as a reference, afterwards. After the, Dawn has explained the thing, I would go, you go through the text with her. Slowly, and we have examples, and she writes on the board, and this, like we can catch more. But I use the book only if I get stuck. I go back to the book. Only as a reference, because I don't want to learn everything by heart. My head would explode. I have to learn what's practical." "...I don't like to read first. And I have to be concentrate on the book and then, I like it better when I get the explanations, do it on the machine, and then refer to the book if something's wrong."

> Paul: " there so many things to, so many instructions, so many vocabulary, every words, you know what I mean. That you have to

> ah, you know you have to, stand there and you have to analyse them and it's too technical, you know what I mean, so, it's the technicality of the software when you are reading them, and everything, so it's the only thing. ...But what could happen if I have something that I just don't understand, since right now I'm a little bit, you know, lazy to take that book to find out, to read, to read, to read, I'm going to lose time doing that, and if that person, you know, is a little bit advanced with me, I ask him. You know, I try to make sure that there's somebody like that with me and I ask him. Hey, how to do that thing, how to merge, how to do that stuff. And just tell me. And then right away I do and I make the application and, you know, and do a couple of my examples, and, you know, and I said to myself, this is solved. ...basically, I'm scared of, like, read, to read, um. But it's just in one aspect. It's only technical stuff. Computer. The only thing. But in the other aspects, I don't have any problem to read."

> Nicolas: "...the book can mess you up. Because the book want to give like everything one shot, but sometime you know you can mix up, you don't understand this word, or you don't understand that word, or you don't understand this concept. ...For me ah, the book, I, I didn't go through it, through the explanation itself. I just depend on the teacher's explanations. Because sometime like, like, I'm a person who, who is very slow, and I can't keep up to this, ah, sometime just reading, even like doing your homework, like I depend on the teacher's notes, in case I got any problem, I turn through the page, or if I don't have time I will just try to play around with the computer and see if I can find the answer to it."

Each chapter included a theory portion and concluded with theory questions. The majority of the participants considered the practical exercises section of the textbook to have greater value in their learning than the theory portion.

> Paul: "the theory questions, they have few impacts on my knowledge. It's basically the assignments that help."

> Robert: "As long as you know how to operate the computer, the definitions, I think it's too much. You see it. You read about it. You practice. You're getting something out of it. I think that's the best way to learn."

> Yolande: "I don't really think there's a need for it. As long as you fully understand what it does. And by doing it in the exercise, I find that you learn more than memorizing what the word means."

While most participants were not in favor of the theory, they had quite the opposite view of the practical exercises which followed each chapter.

> Yolande: "...it um, it just exercises on what you've just learned and it just reinforces it. Like I said, by doing and then seeing it and hearing it. It's the best way to do it."

> Robert: "I have to practice, and practice, and practice till it gets second nature. I wish there would be more exercises. ... I think it's the only way through."

> Paul: "Those chapters, you know, who basically gave me the knowledge that I have right now. Because the walk through in class is fine, you know, I understand it but I could of forget like, the next week, you know. ...the strategy is like is to, um, is to focus on the walk through and then the most, the better thing is to make the practice after. Because the practice involve everything, you know. Because if they give too much theory, I will cut that why I see that I am, you know, I am in contact with doing the assignments."

Beyond the view that these participants had of the actual exercises provided in the textbook, was the value which all participants in the study ascribed to these assignments.

> Paul: "The best way to learn a word processing software is to listen, and to apply. Practise. When you listen the class. To watch and then you apply it.. practise it all the time. You know, it's, learn it and apply it. It's application. What makes task easy. As soon you don't, you know, apply it, and everything, you won't basically have the full control of it and then, now you are starting to like having, you know, problems, you know. So it's pure application.... It's only, it's a question of sitting there in front of the screen, doing the stuff and trying to remember also some steps because there are some steps that you need to memorize. So how to memorize them. It's going and making more exercise, more application possible

> otherwise, you know, if you try to learn it and try to put it in your head like that, it's impossible. You're going to forget it."
>
> Nicholas: "I notice it was a bit challenging. But what happened is I try to practice it and learn from trial and error. I notice, more practise, means like being more ... ... comfortable with it. Especially if you like, you know it, or the teacher explain to you and you did it in the past, at least a few times. But one time is, it don't sink in right away."

Although participants felt practical application using the computer was the key to their learning of this word processing computer software, they felt more at ease with finding their answers through practice rather than researching alternative sources of information.

> Yolande: " I get in my head that it has to sink in and I try not to use Help. I think that, maybe I've used help maybe once or twice but ah, but other that. That, it's basically. Hands on with the computer." "...it was so long [using Help] and I figure I might as well try to figure it out myself. I succeeded, like I did twice. Once I found it right away. The second time, it took so long, so I basically tried it myself."
>
> Paul: "...personally I don't [make use of any other references]. I can't say that I am, I read probably 20% of the book, of my use from the book. So, no. I don't use..."

In the previous section participants in this study have identified themselves as visual and aural learners. As such, many of these participants have indicated their preference for direct instruction which incorporate both visual and aural methods. Regardless of amount of previous computer knowledge most participants indicated that would also prefer this same classroom format when acquiring further computer related knowledge.

3.2 Information processing

Weinstein, Zimmerman, and Palmer (1988) describe information processing as the way learners incorporate images and verbal elaboration; how they think about and interrelate new information with what they already know; what comparisons they may make; and, how they translate information into their own words. In this word processing course participants in this study described themselves as both visual and verbal learners. As visual learners, participants characterized visual learning as those activities in which they participated actively with a hands-on approach. While textbook images might present visual representation of a concept, most participants felt that applying the concept themselves on the computer was a determining factor in their learning.

> Diane: "I look at them. I try to see what it says underneath them. I try to remember them, but no, I do not think I...it's more the doing than the pictures."

These participants classified their visual and verbal learning by their activities, as well as those performed by the instructor, which assisted them in their learning. The verbal and visual were often a combination of the participant's action along with those of the instructor.

> Robert: "To hear it, sometimes you forget it, ah...could be a difference of language. When you have it written, you can review it later...a combination of both. ...you see what you learn, and you say what's it's all about. You get confirmation that you know what you say, what you did for homework, it gets deeper in your brain. You won't forget it because you talked about it. You learned it, you wrote about it, then you talk about it."

> Paul: " I don't know if it's because well my major learning experiences I did them a language who are basically not mine. Like in Spanish and now in English. So when I start reading I have like, you know, it's more heavy for me. So it's why I'm more visual and more auditive than, you know."

> Yolande: "...there's two girls in particular who are having problems and I help them out. At the same time I sit down there and cram with them. And, by showing them, it just like reinforces it, the learning in my head also. You understand it fully and by speaking out loud, I find that if I speak to them and explain it to them verbally I'm listening too and I'm registering."

> Yolande: "Um Like I said before I'm visual. So I like to, I look at it and then if there's something, that I try to figure it out myself by looking at it. And then it's just reinforced if it's, if she puts it on the board, or she explains it, then I try to understand the concept of it. And then, it's registered. Like I said before, I have to if I see it once, and explained to me properly, the concept, why it does this, why you do it for, now how you do it. Then I understand it."

Participants in this study stressed that applying word processing concepts to applications outside of the class assisted in strengthening their knowledge.

> Yolande: "I don't think there's anything hard to learn. Because outside of class time I do like, ah, try all the different...actually I'm showing the teacher things..."

> Paul: "But if I'm getting myself out of the homework, let's say how do I put something with a different color, and how to basically put italics, how to use subscript or superscript. You know, while I'm doing, I say, ah, let me put something where I can use the subscript and superscript. Let me basically put headers and footers. So I said to myself, we learn how to put a footnote, let's try to put a footnote there. You know what I mean. As soon I do that, out of the context of the homework and everything, you know I found the real necessity of it and that something was going to stay, more than ever."

While most participants attempted to incorporate word processing concepts in documents outside of the course, not all learners ventured beyond the assignments.

> Nicholas: "Once I tried to type a song, like the lyrics. I was really, like to use some basic thing. Like copy it, and enlarge it. Thing like that. And put the space. How much space, double space. That's really, like I didn't really try more than that. And I did once, like I take a picture, put a name inside, give it to a friend. That's all."

Most participants formed relationships with other class members and portrayed a team approach of mutual assistance.

> Yolande: "Everybody helps everybody out. Um basically we're all in the same boat. So we want everybody to succeed. .....everybody helps everybody, so, if they don't understand after the teacher has left for the day, somebody else will explain it to them."

However, Nicholas portrayed a different view.

> Nicholas: "I try not to depend on somebody else. ...some people, like they say they don't have time, or I'm doing something else, or I want to finish this. Always...you end up like something which will be not at their advantage."

By helping each other participants felt they could benefit from just observing others. This observation permitted learners to view how other class members were incorporating the word processing concepts and to compare this with their own application.

> Paul: "So sometimes, you know, I just watch how somebody else is doing something, to see if we are doing the same thing, or if I can learn something, you know, quicker way... Because every student has a different way to learn. And a different way to catch. And

> then they learn things different. The same thing. You can do the same thing two three different ways. You know. Maybe you're using a longer way, somebody is doing the shorter way. So you learn all those different ways. You know."

When faced with a question most participants first attempted to resolve it themselves. However if they failed to locate a solution their next course of action was to seek assistance from either the instructor or from another class member.

> Nicholas: "If I have a questions, usually like, if I go through a book and I have a question, I will ask the teacher. But in case I have a question for like myself, I just think about a question. I will, I usually I ask for the teacher too. Because if I can't recall. Like I saw it somewhere, I mean, usually when I ask a question it's not clear, or I forgot it, or like I want to clarify."

> Paul: "I try myself to figure out what's the answer is. Computer, that's something I can't do, or things like that, for example this morning I was on the computer and I have all capitals, major capitals, not capitals but the size was like more than cpi. For me it was something over 12 cpi. So I find out I use everything I learned on the computer, I figure everything was correct. Something wrong there. I check, I check. I spend at least 10, 15 minutes trying to solve it and I can't, so I asked somebody else in the class who probably was more experienced in that area than me and he found it was the same problem, so we couldn't solve the problem."

The instructor in this course encouraged and responded to all questions. Most participants felt that the questions others asked in class in turn helped them also.

> Nicholas: "...I may not have thought about asking this question. When someone ask the question is a way like to, to be able to know something which I don't know, like hearing something. Hearing an information, that's how I notice it."

At times the pace of conversation during questions concerned some learners. While some participants expressed the need for a slower pace, others felt questions should be left to end to end of the instruction.

> Robert: "...they're all ahead of me. I'm just trying to understand what she says and they're two chapters, too much ahead of me. So I think it's because of the age difference. They understand right away what's been said. Then they make comments about it. And I'm just trying to understand what the problem was. I think it's not very good, I don't like that."
>
> Yolande: "I think that, ah, if you have questions, you listen to her, and you have questions, then you ask her after. Because while you're, when you're asking, if you're continually asking questions, during the, you lose the, you lose people. You know people that are understanding it. Like if you're constantly interrupted all the time, you should try to understand a concept, put a little question mark next to your notes, or whatever, and then go back and say, can you explain this to me again, I don't understand it."

While all participants identified the potential benefits of taking notes during class, some participants found it difficult to keep pace with the verbal information being presented and making notes. While the instructor did not expect class members to keep pace with her instructions at the moment she was explaining a portion of the lesson, some participants were attempting to do just that. According to these participants, three areas were claiming their attention–that is listening to the instructor, following her visual depictions on the white board as well as those of the textbook and watching their own monitors to make sure they were keeping pace.

> Robert: "...that's the way I learn. I have to write it before...I don't know what kind of memory is that, but when I write, I learn. It stays there."
>
> Yolande: "I've always found that if I'm doing two things. Like if I'm writing and looking at the same time, it kind of reinforces it more than just by listening. I have to keep some kind of notes."
>
> Nicholas: "I'll write a note but I have no idea, I write a different word. Instead of saying like, read it, I say read something and I

> may write something else and I may not remember what...I put the wrong word there, and I can't remember my notes. I read them, sometimes like I keep them for a while, but when I get fed up I throw them in the garbage. So I notice maybe very important sometime to refer to it, but like, sometime I take, I don't take very much notes, but I accumulate the notes and I can't keep them any longer."
>
> Paul: "Even sometimes I don't take notes, because I said anyway, I'm going to do it all. And secondly since, also, I am focussing of the teacher's explanation, I can't take notes too much. Because if I take notes I'm concentrating in writing my notes in, in find the words to put the notes in. I can lose what the teacher is saying. So I said to myself, I don't know, this is something that I have to work on also. Work on taking notes at the same time I'm you know, looking at what the teacher is, you know. And probably if I was able to do that, when I had my program, just look at my notes and I could do it. But since I can't make that both combination..."

Asking participants to compare previous learning experiences with the learning of a word processing software in this course evoked very different responses. While no two participants viewed the question in quite the same light, overall participants cited their determination to succeed in this course regardless of any personal obstacles they had to overcome.

> Robert: "Well, I think it's tougher. Because of my age. Because the last time I took the course, I think it was...six, seven years ago. I think coming back to it is ah, its quite a gymnastic. Because, I find out that I am less concentration. I have to work harder on the concentration."
>
> Nicholas: "WordPerfect I notice like...it's kind of like...interesting but kind ... Also lot's of thing to remember and to take care, to take into consideration. Like how many space to leave. And... what type of, you can put a header, you can put a footer, you can put it left or right. And also like, you can change the style or you can change the page. If something was on page one, you can put it on

> page two, without erasing it and typing it again. It's look like interesting for me just being like, not like a computer literate."

One participant cited the freedom to explore with which he approached learning this word processing software.

> Ronald: "I know for WordPerfect I would go ahead, faster than the teacher, and wanting to, to get through the chapter and a desire to speed up the pace, at least for myself. I felt I could easily ah, ...disseminate the information for that chapter. As opposed to some other courses where I would just simply go with the pace of the teacher. I found it to be very user friendly and, with, since it was menu driven, I would just go and explore and if I didn't get the right, if I didn't figure out the first time, just keep playing with it and it was basically fun to explore and discover ahead of the teacher."

Only one participant had recently attended a computer course. Paul acknowledged his negative experience, his resulting adverse feelings, and the apprehension with which he approached this present course.

> Paul: " Well I think it's the best learning experience that I have. Because I took once, it's almost one year ago, I took a computer course, but it was only windows. I took it at another CEGEP, you know, just on Saturdays. The pont is I was working long hours during the week. And then on Saturday I was a little tired. The course was early in the morning. So, sometime I had, you know, I wasn't motivated, because, ah, I went because I had to go. The class was crowded, you know. And there's students who had more knowledge in computers. Maybe that was new for them, or whatever, they went, they had paid the course, and the teacher was speeding. So ah, and since that, I had nothing to boost me to stay there so... I couldn't understand what she says, she used to say. At the beginning I had the best intentions. And then I lost completely, you know track, you know. I was far away and everything, so, I found it was a waste of time, so, I decided to not even go. And I stopped going. And right now, at the beginning, I was scared, I said to myself, maybe the same thing is going to

> happen. You know I won't be able to, to, but you know, I was scared and everything. And since it's a smaller group and even in a different language. Because the other language I was doing in French. Even in English, you know I don't know why, but you know, I never get lost. And sometimes could happen that I have like, ok I work late, you know. I was supposed to, ok, to do the homework for today, and I'm a little late, because I was overloaded. I have special permission. She goes, ok give it to me next time. That's the worst situation that happened right now."

The major difference between previous experiences and this one seems to the determination with which the participants in this study approached learning this word processing software. For these participants this course appears to have represented an opportunity towards a new start, with this course potentially brining them one step closer to a new job.

> Yolande: "I guess I'm more determined I tend to um, to really want to succeed in this. I guess I'm much more determined to learn something than when I was going to school before. Attitude. Attitude. You just want to, 'cause you know that, this all depends on, ah, this to finish this course It, it, you know, there's ah, there's ah, how can I say that in English, there's a goal at the end of it. There's like you know, you are there to find a job and there's a realism along the way. "

Within the information processing theme participants again characterized themselves as visual and aural learners. They related the visual aspects in their preference for a hands-on approach to their learning as well as listening to and observing the instructor. The visual and aural facets are also emphasized in the social interaction among learners when helping class members or when observing others. While most participants were at ease with the pace of the course, a few participants indicated the need for a slower rate and more instructor assistance.

3.3 Selecting the main idea

This category relates to the way learners are able to pick out and focus on key ideas and critical points in information they have read or heard. (Weinstein, Zimmerman, and Palmer, 1988). In this word processing course many participants cited a predominance for working with the software as compared with reading the materials associated with the course. This preference appears to be related to several factors including the visual nature of this computer software and participants' eagerness to attempt to apply their knowledge.

> Ronald: "Sometimes, actually it's only now in the WordPerfect class where, since it's all windows, I would explore by myself, clicking on, seeing all, you know, what happens if I do this, what happens if I do that. I do that for WordPerfect because I know that the worst thing is that the computer is going to tell me that you can't do it, or I know the program is not going to crash. So I just click. ...if there's something I have to look up in the book, and then I go first to the reference, so I can find precisely where it is in the book. Am, I would try to, for example, if I had to find out what the definition of a cursor or what, how to use the speller. Go find any reference. Why, how it is one enters into the speller. I look at the screen, click."

> Nicholas: "...But me usually what I do is, I read the instructions. If the instructions give an example, I will look at the example. But usually, like I read the whole chapter and to the homework or read a piece of a chapter, and if I do not have enough time, I will just start to do what I can and go back in case I get stuck and complete the instruction or the explanation."

> Paul: "I have a tendence to skip the directions, but when I, it depends, its not in general. For example, in some things, basically in things who are focused more in practical things, ok I have a tendency first to try to do it on my own. An then when I get stuck and I can't, I go back step by step, ok to see what..."

Other participants, however, indicated a need to confirm their comprehension before attempting to apply their knowledge.

> Yolande: "I read through and go back to see if I understood what I read the first time. I just confirm it again and then I do it."
>
> Robert: "Usually, before the course, I would read the next chapter, so I know what it's all about. I will answer the questions at the end of the chapter, just to see. Then when we get in class the teacher talks about it. I know what he is talking about, then if I have some questions about it, I look at it before, and then I ask questions."

Those participants who indicated a preference for taking notes during class also indicated a function for these notes and a system for organizing their notes.

> Yolande: "I've always found that if I'm doing two things. Like if I'm writing and looking at the same time, it kind of reinforces it more than just by listening. I have to keep some kind of notes. ...if I'm doing some kind of homework, I go back, I skim through and I look for what problem I have at hand. As I'm making the notes, I'll write out and say this is important, I'll put an asterisk or I'll highlight it, or I put important or else do a couple of asterisks or whatever. I use markers, I use asterisks, I have a system that, I have that I used. It's a kind of little legend."
>
> Diane: "I take lots of notes. Too much some times. They help me remember. As I write it down, it's like I try to understand what I'm writing at the same time. And I take lots of notes to help me remember what I'm supposed to go over it the same day or the same night to make sure I've gotten everything. ... I've always taken notes."

Participants indicated that the frequency of their experience with the same word processing concept increased their ease working with the concept. A consequence of encountering some word processing concepts less frequently, participants cited their dislike of these concepts and their confusion with them, even towards the

end of the course. Several participants questioned the utility of those concepts, regardless of their potential applications.

> Paul: "Each time I see, you know, it's a recall and I have it in my mind. If I see that function once, I won't remember it. I will learn it but after that I will forget it, you know. I have to several times use it, several times, and then, right now I know it's going to stay forever. ... Something that I did once and yet we practiced it a lot. I think the only thing I can say it's a little more difficult. Bit I know it's not something totally difficult. Because, if I go over the book, whatever, I will have it. But it's not something that I, they show it to me once and then we didn't have an exam and big homework on it, you know what I mean. So it's why I can say right now if you tell me, do it, I will not do it right away."
>
> Diane: "Sometimes one time is enough. I might not necessarily remember it enough not to use my notes the next time, if there's a big difference in the time I use it, but the more time I do it the more I'll remember it."
>
> Yolande: "That's a little confusing [button bar]. You might never get it back. I've tried that. I hate that, I'm telling you. I'd much rather leave it like it is on the, the way it is on default. [laughter]"
>
> Nicholas: "I notice, like, the more often I did some function, it helps me to remember, and specially sometimes like at the beginning I just do it often and later I need to redo it one more time to remember it again. But with time I will forget it. But I need to go back to it. It does cause me lots of problem. Sometime I forget them. Sometime, like there's a new function. I mean, I read it in the book but I can't remember it.

The participants in this course clearly indicated their preference for trying concepts on the computer rather than reading about them in a book. They also indicated that the more the experienced a concept the more comfortable they became with that concept and the more likely they were to remember it.

3.4 Self-testing

Weinstein, Zimmerman, and Palmer (1988) refer to self-testing as how learners review information, how regularly learners engage in reviews, as well as how learners prepare for classes and learning. In the context of this study the self-testing includes categories such as previewing materials before class and reviewing notes as well as the evaluating the chapters covered in the course and potentially redoing practical assignments. At the start of the course the instructor handed out a course outline which included a schedule of planned topics and chapters to be covered each week. Prior to concluding each class the instructor also indicated to class members the topic for the following week's class. Participants were therefore aware of the subject matter for each subsequent class. Two participants indicated that they previewed new material. Most participants concentrated on reviewing. Those who indicated they reviewed also contextualized their review time in terms of a review of their notes, the textbook, and the practical assignments.

> Robert: "I always want to see the chapter before the class. When I preview, I don't go too much into details. Just overview what's going to be talked about and then, if it's two days in advance then, I ask myself questions about it, when I get into class some explanations about this. ...most of the time it's a new thing, and I want to remember it so I listen to what the teacher says, and in the book I read about it, and it's the process of having previewed it before so I know the teacher would talk about it, so I know what he's talking about, then I go further on."

> Diane: "And ah, I preview when, ah, I know in advance that in a class we're going to be doing a chapter. I like to go through the chapter beforehand. I don't necessarily read word for word, but I like to see what's coming up."

The opportunity to review and preview appears to have served several purposes for the participants in this study. It assisted participants in feeling prepared for a class. It may also have prevented them from feeling awkward by not understanding the topic of the class. As well these participants may have benefited by confirming their understanding of a topic and thereby increasing their self-confidence.

> Paul: "After I go back. It's not for the same material, for example, computer it's practical. So I have to practice all the time to make an assignment and everything. So this makes a constant review. ...you have to review in order to do and to be ready, for example, to understand the next class, the following class... When I'm reviewing, ah, first of all I focus on what we did in class. Do step by step and everything and um, after that make the assignment of the teacher, if there is an assignment. But, ah, you know, it's easy when I'm focussing."
>
> Robert: "...I review for a short time, and then I go further on. I know all the procedures and everything. I do it, if it's a document, I print it and then I see, well ok, everything is right. But still I would have, I would have, I would like to have one more shot at it. Just to be sure that everything is ok. But later, just forget it a bit, and then you go back to it and if you have it, then it's going to stay."
>
> Nicholas: "I do review sometimes. But if I'm not, I do not understand the chapter very well, I will try to, to do the best, you know, in order to do the homework or just to remove a, remove the obscurity between the understanding of the material."
>
> Ronald: "...Normally speaking, yes I do. With WordPerfect...I haven't really because I found it pretty easy, and then when I go back to work it's all menu driven windows, from looking at the screen, I remember, Oh, this is how you do something."
>
> Yolande: "Let's say for a test. If I had to do a certain chapter, I would go through it and as I go along if there's something else that

> I haven't already highlighted or underlined or circled I would do that. So I would reinforce it."

In this study participants most participants used reviewing frequently. Their reviews frequently took the form of applying their knowledge to an application on the computer to confirm their ability to perform particular concepts. Only two participants indicated using previewing, and those who did indicated it was a strategy they had used in previous learning situations.

3.5 Motivation

According to Weinstein, Zimmerman, and Palmer (1988) motivation refers to learners willingness to work hard. This willingness implies that learners are seen to be responsible for attending to instruction and for actively constructing the mental elaborations that make learning personally meaningful. In order for learners to accept responsibility for their own learning, they must be motivated to actively engage appropriate learning strategies. In this respect all of the participants in this study demonstrated high motivation to learn word processing. The participants in this study enrolled in this program at a point in time when they thought the training was relevant to their extrinsic and intrinsic goals. All of the participants in this study identified the specific goal of future employment as their reason for their enrollment.

> Paul: "I was working in a company. And I lost my position. Part of it, it's because I had that, ok I was not computer literate and saw so much things in the company, really needed, you know, ok for the position and then I was a little frustrated. So I said to myself, ok right now, and I used to dislike computers so much because it

> was for me something that I don't understand how it works. It was hard, you know, it's very oh, I don't know, so, I used to hate computers. And I knew it was something very useful, you know helpful, and it was a base, basically, requirement to do everything. Right now in an office and when I lost the job, I decided to take ah, just computer courses like that and I said to myself, well if I just stick the computer courses, I have to apply in the field that I, you know, that I want to work in... and I spent, like maybe, a week looking for courses, ok with computer application, and finally I get, I get that course. And I mentioned to him that I want to do it in an English institution, you know, to be able to learn at the same time English, you know. So basically I was trying to solve all my problems. Language problem, computer problem, everything. And then I called Champlain, they said, ah we're going to have something in one month. I said exactly what I want."
>
> Diane: "Many years ago I quit my job, and when I went to stay home with my kids. When I decided to go back into the work force, there, was more difficult than I had remembered to get a job, and being off the market, my lack of experience over so many years, 5 - 6 years, I found it hard getting back in there, and I was working with WalMart, in reception, with boxes and stuff, 6 AM shift, on-call. Even if they scheduled me, it was like, they work with, they have a lot of sales one day, they give you more hours the next day, they don't have any sales one day, they cut your hours. So it's like, you never knew where you were and in January of last year they laid me off and so as soon as they laid me off I gave my name for a course, I said, I've got to recycle myself somehow and um, that's how I came to this course. And when they called, they, I was actually still on call with WalMart, they had called me back and I had been working like almost full time over the summer holidays. But I was so glad that they called me, I said, yes! [laugh] I couldn't see myself working with heavy boxes for the rest of my life at WalMart at minimum wage, you know, it was awful. So I'm really glad this course came about."

Participants in this study realized that while learning one word processing computer software could assist them in achieving their goal of employment, ultimately their longer term objective would be to maintain their technological knowledge.

> Paul: "But the only thing in computers, you know, you have constantly, you know, keep in touch with it, because today it's something that it makes here something new arrives, so that will change the whole prospect of everything, you know. So it's the only thing that I said to myself. Wow, it's moving too much, you know. It's a constant learning."

In addition to a visible goal, participants also enrolled for more personal, intrinsic reasons.

> Yolande: "I guess I'm more determined. I tend to um, to really want to succeed in this. I guess I'm much more determined to learn something than when I was going to school before. Attitude, I guess. Attitude, You just want to, 'cause you know that, this all depends on ah, this to finish this course it, it, you know there's ah, there's a, how can I say that in English, there's a goal at the end of it."

> Paul: "First, you know, to type [laughter], and secondly, it's to learn the maximum possible. You know, even things who are basically not even part of the program. Is to solve all my little ah, well ignorance, you know what I mean. And then also it's to try to be able to make my personal watch. Let's say I look at the book. Let's say if the teacher didn't cover a chapter for a particular reason. And if something new is coming, so to get that ability to read a computer instruction, ok software instruction, go over to the computer, you know what I mean, and try to, to make what they said."

While some of the participants in this study recognized the significance of their own self-assessment, nevertheless this word processing course was a credit course and the grades received were based on external evaluation. Many of the participants in this study cited this extrinsic factor as determining their success in this course.

> Yolande: "To get a perfect score. I know it sounds terrible. But I get so upset when I get one wrong or something. So far I've only

> got one wrong and I'm very upset. [laughter] I look at it this way...I'll be very honest. It's not that I have to be better than everybody else, I'm not that vain. The thing is that I have something to prove to myself and I think if I was to go to a job interview, and there was me and somebody else who had the same kind of qualifications, I basically think the way it is in today's age is really sad, that they would look at my marks and say which one had the best marks. So kind of like put a lot of pressure on myself. Undue pressure. But this is the way I may be basically. Maybe later I'll be a little be more lax with myself, but right now I'm, I have a lot of pressure to get almost all the time perfect. It's not good but...[laughter]."

> Diane: "From the grades I've been getting. Um, I know I've learned the program. So, I like, I know I've got a final exam with all the theory but I'm not going to worry about this course. So I know I've done well before. So if I mess one exam, from lack of knowing, remembering the terms and definitions, I do not care because I know I know it. So I know I can manage through it. And, so I'm not, for myself, I know that I'm grading myself, and I know that I know it."

> Roland: "Marks. The marks I get for the course. On a personal level on how comfortable I feel with ah, with WordPerfect, the program. And, ah, how easy, um, I find it is to work with.."

For many of the participants in this study their desire to master the word processing software in this course involved applying their knowledge through practical application. In turn, this practice involved additional time in the computer lab. These participants regarded the additional practice time in the lab time as a key component in their learning.

> Yolande: "I didn't think it was a hard course. I mean you learn and then after that you basically... But I think you have to do a lot of work on your own. I mean, to, to, a lot of extra reviews and everything to not to lose it. Because anything you don't use, you know, like you tend to, you don't put it in your head, you just use it and it's forgotten, you know. But this, I think, the more you practice, like anything, the more you. And you have to experiment, explore, go further [laughter] If I have to do, if I have to do a

> project, I tend to do it on that. I, right away, I'm on that. And I do a little extra, if I have some things to do. Am... I try to use the computer a lot instead of writing anything. Practice that way. Um, during lab time. Lunch hour. After school. Some Saturdays. Whenever I have time. I have no life [laughter] so like..."
>
> Nicholas: "Sometime, like I stay till 10 o'clock or 11 o'clock at night just to do my word processing. Like I did this week I did, like I put extra, like 10 hours on it this week. I need like, I think, I usually, like what I did is I do one extra or two extra. That's why, I mean, I spend like many hours extra this week, because I just want to make sure."

While all of the participants in this study had some previous experience with computers, for half of the participants word processing represented a new concept. Of particular interest to these new word processing users was the lack of restrictions and the flexibility that word processing represented.

> Yolande: "...in this course here, I like the freedom of using the computer. If there's certain exercises, but you never know. There's not a limit to what you can do. Like when I had in my jobs, there was only a limit you had to go to. There was no freedom of looking up a thing so I could create other things. So it was already using what was already there."
> Paul: "what I like, is I can do everything that I like to do. For example, I can even, if I want to, make my resume. I can, even if I want to, type a letter. I can even, you know, now I know. But things that I never used to, I never imagined that I will be able to do one day. I can do it. And the only thing is when, you know, when you learn something...I can say it's more good feeling."

To a considerable degree the motivation behind participants enrolling in a computer program appeared to be related to their attitude about computers.

3.6 Attitude

Weinstein, Zimmerman, and Palmer (1988) describe attitude as a learner's attitude about and interest in college. The participants in this study exhibited overall positive attitudes about computers and computer technology. Participants expressed confidence in their ability to learn word processing and their confidence level appeared to increase as the course progressed. These participants tended to deal with any doubts through a practical, hands-on trial-and-error approach.

Upon completing this course, all of the participants in this study hoped to find computer related employment. For most participants this goal was closely linked with the relevance they believed they were gaining from the word processing course.

> Yolande: " I think it's very important [word processing]. I mean, it's something that I'll probably use in the real world. I'm really, I really like the course."
>
> Robert: "I think 9 out of 10. Maybe ten on ten. Because it's practical and everyday. I think it's an everyday use. You use this program. You write letters everyday. If you're in business, you have to..."

Several participants described their earlier negative attitudes towards computers and computer technology. While these participants recognized their apprehensions, they also identified reasons for their present more positive views.

> Paul: "Well I think it's the best learning experience that I have. Because I took once in a while, once, it's almost one year ago I took a computer, maybe the same course but it was only windows. I took it at another CEGEP, you know, just on Saturdays. The point is I was working long hours during the week. And then on

> Saturday I was a little tired. The course was early in the morning. So, sometime I had, you know, and I wasn't motivated, because, ah, I went because I had to go. The class was crowded, you know. And there's students who had more knowledge in computers. Maybe that was new for them, or whatever, they went, they had paid the course, and the teacher was speeding. So oh, and since that, I had nothing to boost me to stay there so. I couldn't understand what she says, she used to say. At the beginning I had the best intentions. And then I lost completely, you know, track, you know, I was far away and everything so. I found it was a waste of time so. I decided to not even go. And I stopped going. And right now, at the beginning, I was scared, I said to myself, maybe the same thing is going to happen. You know I won't be able to, to but, you know, I was scared and everything and since it's a smaller group and even in a different language, because the other language I was doing in French, even in English, you know, I don't know why, but you know, I never get lost, and sometimes could happen that I have like, ok I work late, you know. I was supposed to, ok, to do the homework for today, and I'm a little late, because I was overloaded. I have special permission. She goes, ok give it to me next time. That's the worst situation that happened right now."
>
> Paul: "Right now I'm not scared of the computer, the way I used to. And I basically learn so many things. And I practice, you know I spent time practising and everything so, I can, I went over all my, you know, my problems, you know. But it's sure I still have problems to solve and everything, but ah, but now there's so many things that I learn ."
>
> Yolande: I like everything. I like the freedom of working on my own. Working on my own time. Freedom of expression. Naturally. I like to um, even if I don't have work to do, I'll go in a lab and try out new things on it."

Half of the participants in this study had previous experience with a lower level of this word processing software. These same participants had all acquired their knowledge without benefit of formal instruction and all owned a personal computer. While their fragmentary knowledge in some areas caused participants to employ the word processing software in limited ways, nevertheless their

previous experiences with this software appeared to provide participants with confidence as they had previously encountered some obstacles which they managed to overcome.

> Diane: "I knew the program a bit. I've got one on my computer at home but it's not the same thing and I've never had a course on it. Someone lent me the diskettes for the 5.1. WordPerfect 5.1. It's similar. ...I'd seen some of it before. I'd played around with it...tried out my errors and lost files. Some things I didn't know at all, like the double spacing. I didn't know how to do it. Like if I had an essay to do, and at home I went through like by line, and did like a double space, so it'll be useful. Um, now I know how to double space on it."
>
> Ronald: "If I look at my, I have WordPerfect 5.1 at home, while at school we have a later version. It's got this windows button bar, I find it easy to work with. I can't say I've had any concerns."
>
> Robert: "I have a computer at home, so I already practiced on it more. Some things I didn't know. I never used a mouse. I didn't know that the computer had reveal codes, I never had this thing. We're learning new things now, margins, tabs I never used that. It's been very good so far. Some of it has been just reviewing old things I learned before by myself. It's giving me more confidence in the machine. It's very practical. It's giving me a strong base and giving me confidence."
>
> Diane: "...is that having to follow step by step, because some people are slower and some things I already know and having to wait for the others. I'd like to play with it more."
>
> Ronald: "I have a tendency to go, during the walk through, to go ahead by myself. Ah, and to start doing the assignments, and sometimes I'll tune out of my assignment and tune into what's she's saying for some key things. I guess 'cause I'm looking forward to speeding on. 'Cause I know I can do it by myself. I can, for the most part, figure it by myself. Sometimes, actually it's only now in the WordPerfect class where, since it's all windows, I would explore by myself, clicking on, seeing all, you know, what happens if I do this, what happens if I do that. I do that for WordPerfect because I know that the worst thing is that the

> computer is going to tell me that you can't do it, or I know the program is not going to crash. So I just click."

Those participants for whom this course represented their first experience with a word processing software expressed a desire for a somewhat slower pace.

> Yolande: "I only had a problem the first day, because I know that I found that the teacher was...the first day I had a lot of problems. I didn't understand anything...because I figured...I've already spoken to the teacher about it, but I figure that she was very overwhelmed with everybody. Especially when there was some that were different levels of knowledge of computers in the class. I was totally lost. I had to have somebody explain it to me for an hour. Re-do everything."

> Nicholas: "The teacher should explain less fast. So that I can note it and then it may help me like that. But otherwise, if the teacher go, go...sometime I notice is better like to, to, have a theory first, and second and try to remember what the theory are and do the practice afer, like key it after."

The participants in this study were all determined to continue learning word processing in the future. In part, participants felt that technology is changing at a rapid pace requiring continual learning. As well, these participants believed that their present knowledge level would make future learning easier. Thus, most participants believed they would take another class, likely a more advanced level of a word processing software. It is interesting that while most of the participants felt they would be able to learn on their own, they expressed a preference for a course in which they could interact with others and benefit from the assistance of an instructor.

> Robert: "Since I'm, I will be up-to-date, so I do not want to get back again and try to catch up after. It's hard. Since now you know it, so you are in there, so ah, you may as well go on with it."

> Yolande: "I understand it. And if there was another course on it, I would take it again. Like a continuance, you know. Like you know, there's a lot of things that I'd like to learn. Um, that I'd like to, we didn't learn everything in this course, and I'd like to learn if there was more, that I'd like to learn more. Basically it's a very interesting course. I'd like to continue if there was like a word processing II, or whatever, I'd like to do that."
>
> Ronald: "I liked, so far I've, I really enjoyed the class, being in class, class experience, that way of learning it. Um, I guess partly because the teacher is there to push you, push you along. So I really enjoyed the class experience."
>
> Diane: "Oh, actually I did, once or twice in the classes, I did go ahead and work by myself, that's true. I'd forgotten that. But ah, I prefer having her tell me how to do it. I do not know why. I guess it's simpler [laughter]. It takes less effort. I don't know I prefer that. But, ah, I could have. I could have taken the book and read step-by-step and learned it by myself."

In general participants in this word processing course exhibited positive attitudes towards learning this computer software. Any previous negative attitudes resulting from earlier experiences with technology were dispelled by the positive experiences participants described in this word processing course.

3.7 Anxiety

Weinstein, Zimmerman, and Palmer (1988) describe anxiety as concerns learners may have related to school work. Many of the descriptors used in this category correspond to learners' apprehensions related to grades and tests. Overall the participants in this course did not express great anxiety towards learning word processing. No common concerns were expressed by the participants. Those areas of apprehension which participants did identify focused on the technical

aspects of written materials. One participant compared his age with those of other class members.

While a number of participants in this study identified high marks as representative of their success in this course, only one participant, Nicholas, expressed worry about test and grades. Nicholas expressed his concern with succeeding in the course and compared himself to other class members several times during our interviews.

> Nicholas: "The question is myself, is more like having, having to do, if I'm going to pass it or doing well in it inside. But like to try to learn something and to be able to do it is two different things for me."

> Nicholas: "...it's complicated just to do it [word processing]. That's like hell for me. I noticed like that it, but people who know how to do it, they just got it like that. Not me, like I mean, I didn't get it."

This same participant voiced his fears of not being able to resolve problems and his need of frequent assistance from the instructor.

> Nicholas: "Sometime like it's, I did a mistake. I enter something extra or missing something and the computer just...understand the command differently, and it just panic me. Sometimes there's certain instructions like, I don't know, I just hit an extra button or enter the proper, I mean, the proper key, and I'm frustrated, get scared you know. I notice, it's like, really kind of, really I need someone beside me. It's hard to, like to wait and being in the class and find a help, 'specially."

Several participants indicated that they found reading the more technical aspects of the textbook to be challenging. For four of the participants in this study, English was not their first language. One participant in particular had lived and

studied in three countries, in three different languages. Paul cited the challenge that reading a word processing instruction manual represented.

> Paul: "...there so many things to, so many instructions, so many vocabulary, every words, you know what I mean. That you have to ah, you know, you have to, stand there and you have to analyze them, and it's too technical, you know what I mean. So, it's the technicality of the software when you are reading them, and everything. So it's the only thing. Basically, I'm scared of, like read, to read, um. But it's just in one aspect. It's only technical stuff. Computer. The only thing. But in other aspects, I do not have any problem to read."

During the lab time the instructor would circulate among the class members and assist individual learners with questions. As the instructor was frequently working with one individual, other learners would discuss their questions with one another. At times several small group discussions might occur simultaneously. Several participants in this study found this disturbing.

> Robert: "...if you do not know a thing you have to be, you have to concentrate, and I cannot concentrate in noise. If there's noise around, I can do it, but it will take more time. There is too much noise in the class. Some times I think of bringing some ear plugs, I need that. There's too much noise, we do not, I would almost say respect, but for them it's natural, I think."

> Ronald: "...if there is constantly disturbance in the class. That's ah, which breaks the flow of the teacher, or the student concentration. That doesn't help."

One participant, Robert, considered himself to be the oldest adult learner in this class. Robert indicated a preference for an age-segregated learning environment.

> Robert: "It's my age. I have life experience and I know what I'm here for. It seems like there is, like, ah, what's that sleeping and talking in the teacher's face. I do not like that. It's not the way I

> understand it. I mean, I have to, to ah, be ah, very, very, how can I say, very attentive and I do not think as a younger students do. I have to, it's slower for me to understand...For the young students, there are almost...they go too fast sometimes. It's really too fast. Too fast for me. If we were all people of the same age. There's one or two that's almost the same age as me. We understand each other, because we follow the same pace. The other ones are going fast. ...if we were all people, all the same age, or ten years, not bad but when we have twenty years, some people are twenty years younger than I am, some twenty-five years younger than I am, too much difference, I think, in the same group and it affect my learning because I have to work harder because I didn't understand."

Few participants in this study expressed concerns related to the learning of this word processing software. Individual concerns which were communicated were specific to the participants who voiced them.

3.9 Control in learning

Control in learning can be viewed from two perspectives-external and internal. External control reflects management functions and focuses on issues such as planning, directing, and evaluating education. Internal learner control is both a learner's cognitive process and a learner's predisposition to accept responsibility for learning. While the cognitive aspect is considered to be a private one, the responsibility for it implies that a learner is actively involved in the learning process. Thus the process is one in which a learner creates meaning through critical reflection to integrate new ideas and information (Candy, 1991; Garrison, 1993). In this study participants identified both those aspects which in their view made learning a word processing software complex and those aspects which

participants considered made learning easy. In most cases participants did not relate either of these areas to the software itself. That is participants did not state they considered a particular word processing function or concept to be easy. Rather participants identified other elements beyond the software which facilitated their learning of this word processing software. These elements were focused primarily in two areas: the opportunity to practice and apply word processing concepts in a hands on manner; and, the guidance and support of the instructor throughout the course.

> Paul: "...practice it all the time. You know, it's learn it and apply it. It's application. As soon as you do not, you know, apply it, and everything, you will not basically have the full control of it and then, now you are starting to like having, you know, problems, you know. So it's pure application."
>
> Ronald: "Basically practice. I think you have to do exercises, and repetition to then make it later on easier. When, when you are, when you actually have to do work with a program."
>
> Yolande: "...well if there's somebody able to teach you, that you listen and you learn and somebody is expressing, I find it's very easy if, if you just listen. Listen to what they're saying and not trying to, you know, like evaluate this in your head. Just listen, and after, basically break it down."
>
> Nicholas: "...Having a teacher who teach you the subject well, but not too fast. Specially like the teacher, usually if, if the teacher, if it happen the teacher go a bit fast it may be hard to catch up and especially for some, not everybody have a same pace. Some are more [computer] literate than others."

Thus while participants indicated confidence in their ability to succeed, they also stressed the need for ongoing support. During the second interview, which took place towards the end of the course, I asked participants what they considered

was the best way to learn a word processing software. All participants, even those who indicated they could continue to learn word processing on their own, stated a preference for an instructor led course.

> Yolande: "I understand it. And if there was another course on it, I would take it again. Like a continuance, you know. Like, you know there's a lot of things that I'd like to learn. Um, that I'd like to...we didn't learn everything in this course, and I'd like to learn if there was more, that I'd like to learn more. Basically, it's a very interesting course. I'd like to continue, if there was like a word processing II, or whatever. I'd like to do that."
>
> Diane: "Using the textbook more. I could have done it by myself. But ah, I prefer having her tell me how to do it. I don't know why, I guess it's simpler. I don't know. But I could have. I could have taken the book and learned it by myself.
>
> Paul: "I can say right now, I have the basis to do a lot of things on my own, for example. But I need to be very motivated to do it. You know, because you have, ok when they give you something, and they tell you what to do, and they expect results from you, and you have no choice. It's a pressure. But I think that if I had it, I will be able, you know, if it's not something complicated, if its's a continuation of what I learned. You know, I think I will be able to do it. I can't do that alone, alone. But sometime I would be able to do some of them alone and others of them I would have to go for some kind of help."
>
> Interviewer: " What do you believe is the best way to learn a word processing software?"
>
> Diane: "Having someone teach you. Show you how to do it. And doing it at the same time and having the chance to practice it. Even though sometimes I found there was a lot of repetition, the exercises. 'Cause sometimes they were long and the chapter 12, the merge, there's a lot of typing in and I guess I didn't like to type in all that stuff. But ah, that's how you learn it. That's how I remembered it. By doing it, over and over again. That helped me."

> Ronald: "I like, so far I've, I really enjoyed the class. Being in class, the class experience, that way of learning it. Um, I guess partly because the teacher is there to push you, push you along. If there are other methods, I'm not really fully aware of which might be better. So I enjoyed the class experience."

In this study participants identified less frequently experienced word processing functions as more complex. That is when participants considered they did not have the opportunity to practice a specific function or if they assessed a concept as less useful, it was considered more complex.

> Yolande: "...modifying the button bar. [laughter] That's a little confusing. You might never get it back. I've tried that. I hate that, I'm telling you. I'd much rather leave it like it is on the, the way it is on default. [laughter] It's a little harder, the button bar. You know, like you can really, I know you can go back to ah, the default one, but ah, I mean that's ah, you'd have to, but I do not know if you'd use that very often in the work place, changing your button bar all the time, you know, ah, so I think that would be more of a task than anything else."

> Robert: "Well, one we do not use much is the thing with the button bars. Create our own button bars, we do not use that much. Spacing, we do it, we did it often. And retrieve file, we do every day. So..."

Participants also associated complexity of a task with factors such as one missed step in a series or instances which required combining a number of functions together in one document. When problems arose under these circumstances, participants often favored an 'erase and start over' method of correction, despite the extra time this approach might involve. This may in part account for participants preference for practice time.

> Nicholas: "Especially when, I do my homework two days after [the class]. If I get stuck, like usually like nobody to help me. I try to check in the book, turn the page, but sometime I do not read even

> the chapter. I just depend on the teacher. What he or she explain in class. Like I try to figure it out, or I ask someone to help me but... . Sometime you really like...spend most of the time like doing, like garbage, and erase it and do it again."
>
> Diane: "I guess, when I'm by myself, not being sure of doing something, and trying it, and then losing everything, and trying to figure out what I did wrong. What I should have done."
>
> Robert: "When you do not, you cannot go on with this thing. You do not have any instructions on how to go on with the specific task. You try, you try. That's what I do. I go back, erase again, and do it again, and after a half an hour or an hour I say, well I'm stuck. I need instructions."

One participant identified the attitude a learner brings to the task as the component which could hinder learning.

> Yolande: "I think, I think the ah, anybody is able to learn something. It's when you put it in your head that you are not going to learn it, that's when a task gets complex."

In general participants were vague in describing the ways in which they mentally organized the information they had learned. However, all included application through practice on the computer as their single most important approach. In this regard, participants in this study considered the visual aspect of the computer and the software as intrinsically linked and one which permitted participants to elaborate their learning through active experimentation.

> Ronald: "Usually, seeing the menus. That's helped me to remember. And through repetition."
>
> Diane: "I've never really thought about, I do not know. It just um, it's just there, I guess. I've never thought about that. If I do not know something and I'm trying to remember it, when then I'll have to look at my program, but turning on the computer and trying it.

> That I can figure out, but actually how mentally, how does it work, I do not know."

One participant identified an elaboration approach in which he identified applying word processing concepts to applications beyond those assigned in class.

> Paul: "In another homework I had an assignment in business dynamics. So while I was doing business dynamics, oh, ok, I learn something in class. Let's try to make some application in it. Because I did it in homework. But if I'm getting myself out of the homework, let's say how do I put something with a different color, and how to basically put italics, how to use subscript or superscript. You know, while I'm doing, I say, ah, let me put something where I can use the subscript and superscript. Let me basically put headers and footers. So I said to myself, we learn how to put a footnote, let's try to put a footnote there. You know what I mean. As soon I do that. Out of the context of the homework and everything, you know I found the real necessity of it and that something was going to stay, more than ever."

Participants also experienced some difficulty in expressing recognition of their knowledge.

> Yolande: "It's just understood. I mean, I mean, there's no, it's just automatic. If I do not understand something, I'll ask it. But it's just automatic, you basically know."

> Robert: "When I'm ready to do something else. To advance, to another thing, another problem."

> Paul: "When I can even sit down, think about it and remember it, you know... I do not have to basically, you know, make x-ray. It's when I can say I know it."

> Nicholas: "Sometime it's a bit hard to say, really. Because sometime I was confident when I go in exam, when I do the exam, like it may be something easier, and I do not know it. Or like I just do it upside down. Thinking like to know it. Or, I notice it is not like this way, like to do it."

> Ronald: "When I know it's not one course which I feel I have to, to put more work into it. When I know already, when on all the exercises and tasks I'm already getting 90% or 95%. When, because I feel very comfortable with it."

During the second interview, which took place towards the end of the course, I asked the participants how they felt regarding learner involvement in planning and conducting the learning experience. I expected that these autonomous adults would have definite ideas and would endorse this principle, however while participants expressed agreement with the principle they also preferred to leave course direction to the computer teacher. It may be that for those participants for whom this course represented their initial introduction to word processing were willing to forego a more involved role and allow themselves the time to concentrate on gaining an understanding of word processing before assuming more direction in their own learning.

> Ronald: " I would agree with ah, having some sort of say with the teacher. Um, exactly how much I'm not too sure, because I'm, I don't know maybe what's required for me to be able to fully understand what's expected of me in a work environment to be able to work with word processing. The teacher will better know what's, what a student should essentially know. And the teacher, so that point I'll leave it in the teacher's hand to tell me, like you need to know all this to be able to go into a work environment and work with WordPerfect."

> Paul: "I could have, obviously. But as I said, since I'm taking all course, you know and...and gradually I was trained to like de-stress myself on the computer and everything. Because if I look at myself at the beginning from right now. At the beginning, I can't say that I had more things, but the point is it was, everything was totally new for me. You know, so I was spending more time, and right now, I'm spending a little more time in it. It's not of the, ok, I had like the, a lot more to do for the teacher, but it's part of it.

> But also it's the feeling that, you know, I want to know in a short period of time how much, the max possible in it."

While half of the participants in this study had previous word processing experience, none of these adults had used a word processing software in a work related environment. These participants may have been willing to cede adult autonomy in favor of a teacher-directed learning experience in part to ensure they understood how word processing concepts related to a business environment.

All of the participants in this study were determined to succeed. Towards this objective they took advantage of free time in the lab outside of the scheduled class time during the week and on week-ends.

> Paul: "I stayed here sometimes until like maybe the latest for that, I think 11 o'clock at night. And after class on Wednesdays, I leave at 9 o'clock, 9:30, 10:00 o'clock one night. You know, and oh yes, I stayed a lot of times to practice."

> Robert: "The amount of time depends on, like I said, the last three weeks, there, I had to put more in it. So regardless what I do at home, here well, I stayed after class, I'd say three day, I came in, I came in on Sunday, three hours on Sunday, I did last Sunday, to keep up with things."

> Yolande: "Um during lab time. Lunch hour. After school. Some Saturdays. Whenever I have time. I have no life [laughter] so like...If I have to do, if I have to do a project, I tend to do it on that. I, right away, I'm on that. And I do a little extra, if I have some things to do. Ah...I try to use the computer a lot instead of writing anything. Practice that way. And you know, you have to do, take the initiative, because nobody else is gonna. You know, you can do it in class but if...'cause a lot of people have computers at home. They practice at home, so you don't see them practicing, but a lot of people are on the computers."

Participants felt that this additional time afforded them the opportunity to apply their knowledge to work assigned in class, and to review previously covered material.

> Robert: "Once you don't know something, something in the past, you can not go further. You have to go around and then catch up with the program. We have to do the same thing two or three times in a week so we can remember it. Because I did that I think once. We learn something and I couldn't do it because of all the work we had. When I came back to it the next week, I didn't know what to do. But it came back pretty fast. Once I was in it, then I started remembering things. But I said to myself, if I had practice once or twice I would know it, no problem with that, I would keep on going. When I know all the procedures and everything. I do it, if it's a document. I print it, and then I see, well, ok, everything is right. But still, I would have, I would have I would like to have one more shot at it. Just to be sure that everything is ok. But later. Just forget it a bit, and then you go back to it, and if you have it, then it's going to stay."

In this study participants expressed components related to both their internal and external control in learning this word processing software. While they were willing to accept responsibility for their own learning, these participants were less inclined to exert control over the areas related to the planning and directing of a technology related course.

3.9 Summary of the Findings

The following section summarizes the findings in the eight themes identified in the previous section.

3.9.1 Findings regarding study aids

- Participants expressed a definite preference for teacher-directed instruction.
- Participants indicated a preference for dual instructional methods: oral instructions and visual explanations.
- Participants used the textbook mainly to apply new word processing software concepts through the exercises provided at the end of each chapter.
- Participants felt that the theory sections in the textbook which dealt with the terminology and definitions to be unnecessary.
- Participants used a trial and error approach when working through the assignments.

3.9.2 Findings regarding information processing

- Participants preferred to see their own results of an application on their computer monitor, rather than to view those presented in the textbook.
- Most participants indicated a willingness to assist other class members and to be assisted by them.

- Participants indicated that peer modelling helped them to consider alternate methods when applying word processing concepts to applications.
- Participants first tried to resolve their own questions but did not hesitate to seek the assistance of the instructor.
- Some participants felt that some alternate time should be set aside for class members with many questions.
- While most participants did not relate this word processing course with past learning experiences, all viewed it as bringing them one step closer to achieving their goal of future employment.

3.9.3 Findings regarding selecting the main idea

- Some participants read an entire chapter and followed directions by skimming through all of them, then going back and doing them. Others read the chapter and followed the directions sequentially without previewing them. Others preferred to skip both the chapter and the directions and proceed directly with the exercises.
- Most participants attempted to take notes during the walk-through portion of the class but indicated difficulty in listening to the instructor, trying to keep up with the instructions, and writing at the same time.
- Participants believed repetition was the best way to learn and remember new word processing software information.

3.9.4 Findings regarding self-testing

- Most participants reviewed previous class material using a combination of their notes and the textbook following a class but for most participants this review included hands-on application using the word processing software.
- Most participants experimented and applied word processing concepts to documents outside of the course material and believed this additional application strengthened and broadened their knowledge.

3.9.5 Findings regarding motivation

- Participants enrolled in this word processing course when they had identifiable goals which they felt this course would further enable them to accomplish–namely, finding new employment.
- Participants indicated that becoming technologically current represented a first step and that they wished to maintain this level through future courses.
- Most participants made extensive use of the lab outside of class time to experiment and practice.
- Participants were determined to succeed and this determination was proportionate to their level of effort.
- Participants identified internal and external motivational factors.
- Participants appreciated the flexibility and lack of restrictions that this word processing software afforded them.

3.9.6 Findings regarding attitude

- Those participants with previous negative attitudes towards computer technology related these attitudes to previous educational experiences.
- Participants gained in satisfaction and self-assurance when they were able to fix their own errors.
- Participants with previous self-taught knowledge of a lower level of this word processing software exhibited greater confidence and a desire to proceed at a quicker pace than those for whom this course represented an initial experience with word processing.
- All participants expressed a desire to continue learning more advanced word processing concepts.
- While many participants indicated they would feel capable of autonomous instruction when continuing to learn advanced word processing or new word processing software, all indicated their preference for another instructor-led course.

3.9.7 Findings related to anxiety

- Participants did not exhibit any common fears regarding computers or computer technology.
- Areas which individual participants identified as causing concern included reading technical materials and age.
- Only one participant compared his abilities to the abilities of other class members.

3.9.8 Findings related to control in learning

- Participants did not believe they had assisted in planning their learning experience, nor did they think it was appropriate that they should help plan it.
- Participants stated their learning was directly linked to their hands-on use of the computer.
- Participants identified that being able to make the computer do what they wanted it to confirmed their learning.
- Participants did not relate their learning of word processing to the software itself.
- Participants believed that practice and repetition represented key components in their learning of a word processing software.
- Participants were not overly concerned with memorizing individual keys or keystrokes as they believed they were able to accomplish a task when working with this word processing software.
- Participants relied on the support, encouragement, and direction provided by the instructor.

The following section presents a further discussion of the findings and computer related theoretical and empirical literature and identifies how that literature compares to these findings.

CHAPTER 4 - DISCUSSION OF FINDINGS AND LITERATURE

The previous section presented the findings of a study that explored, from the perspective of adult learners: (a) the learning strategies of the participants and which strategies the found most useful in their learning of a word processing software; (b) their views of their control in learning a word processing software; and, (c) those learning resources which the participants preferred to use , as well as how these resources assisted them in their learning of a word processing software.

This section discusses the literature that deals with adults and computer instruction as it relates to the findings.

The findings were presented in the form of eight themes: study aids, information processing, selecting the main idea, self-testing, motivation, attitude, anxiety, and control in learning. As much as possible, the discussion of related literature is presented using those same themes to assist with understanding the findings and existing literature. However, it should be noted that the categories are not independent but highly interrelated.

4.1 Study Aids

Participants in my study used a variety of study aids to help them learn this word processing software. While most of the participants depended on the instructor to provide an overall course direction, they also expressed and demonstrated their

preference for active experimentation without reference to course materials, even when this approach meant frequent retrials of the same work.

The participants in my study relied on the instructor to plan and direct their instruction. While half of the participants had previously completed some self-directed word processing training, most participants indicated that the instructor was best placed to select, sequence, and introduce instructional events. Participants also felt that not bearing the responsibility for this task permitted them to concentrate on the instruction provided. While it is somewhat surprising that these participants, who are autonomous decision makers in most areas of their lives, preferred an instructor-led class, literature reveals that preference for an instructor-led class is not unusual. Feuer and Geber (1988) report that adult learners, when entering an educational-based environment, may first revert to their previous roles as passive learners. Cross (1981) also points out that adults who have advanced further in formal schooling are most likely to prefer structured classes and lectures. According to Bouclavas (1989) this suggests that adults may operate on one level in their area of expertise but at other stages in domains with which they are less expert.

In this study the instructor provided learners with direct instruction, included a walk-through or step-by-step guide of the day's lesson, a visual depiction of the overall objective on the white board and significant time and material with which

to practice the content. The walk-through provided learners with guided instruction, and enabled them to actively participate in achieving the lesson objective. This learning experience provided an environment with multiple cues including hands-on experiences, experiential learning and audiovisual aids, to support learning of this word processing software (Twitchell, 1996).

The participants in my study expressed a preference for oral and visual instruction provided by the instructor. According to most participants, the walk-through methodology, which consisted of an oral explanation by the instructor, a visual drawing on the white board, and an instructor-led, and learner executed step-by-step guided tour through the lesson, provided a comprehensive overview. If they encountered a problem during the walk through, participants indicated they were able to call on the instructor for assistance and correction at that moment.

Participants also indicated that they did not relate to the theory provided in the textbook as they might not be experiencing that particular concept at the time of reading about it in the book. Referring to the textbook was not reflective of a preferred study method by most participants in my study. When they did refer to the textbook for information participants indicated they found searching for information in the textbook a long process which did not always lead to the desired results. In this respect participants may have preferred brief one-page jargon sheets or additional help sheets to assist them remember concepts. These

types of learning aids which rank the information, usually use short sentences with one idea per sentence, thus reducing the processing load (Twitchell, 1996; Wedemeyer, 1983). In their study Zandri and Charness (1989) found that those adults provided with these types of sheets took less time to complete the instructional classes and asked fewer questions.

As well, participants in my study observed that the language and terminology found in the textbook at times led to confusion. These findings reflect research which shows that learners use of terminology affected their acquisition of computer-related topics (Kay, 1992b; Carroll and Mack, 1984). Kay found that if learners use terminology that is vague, they may not be able to find the words which describe their desired actions. As well, non-standard terminology, while clear, may clash with appropriate computer terms causing confusion. Alternatively, using incorrect terminology, that is mis-labeling terms and definitions, may lead to learners' bewilderment.

4.2 Information Processing

Information processing refers to the way which learners elaborate their learning. In this study learners described themselves as visual and verbal learners. Their information processing strategies centered on an active hands-on approach and depended on applying their word processing software knowledge in a practical way using the computer and the word processing software.

In explaining their preferences, participants stated that a practical problem-solving approach permitted them the opportunity to try to find solutions to the applications provided in the textbook rather than reading technical explanations. What was important to these participants was the ability to perform the tasks expected in relation to possible future jobs. These participants believed what the literature reflects, namely their concern for instruction that is directly related to their immediate needs and goals (Beard, 1993; Russell, 1995).

Participants in my study preferred to resolve problems through a trial and error approach. If this approach proved unsuccessful their next alternative was to seek assistance from the instructor. When working outside of class time or if the instructor was unavailable, participants sought help from another class member. These findings reflect the research which shows that the majority of learners tend to turn to others before looking for information in the textbook and the on-line help software tool was an absolute last resort for those who would use it at all (James et al., 1996; Paxton and Turner, 1984).

Participants in this study held various views regarding questions posed by other class members. While some viewed these questions as ones they may not have thought of asking themselves and thus a way of learning, others perceived these questions as slowing the class down and felt they should be left to end of the class.

Literature which relates learners' questions with their previous knowledge is somewhat conflicting. On one hand Briggs' (1990) findings show that new software learners may posses an insufficient understanding of knowing what they know. As a result their questions revolve around visible tasks as compared with hidden or unseen tasks. On the other hand, Kay (1992b) proposes that an extensive knowledge of a number of software may lead learners to seek multiple reasons when solving relatively simple problems which, in turn, may result in confusion and frustration for learners.

Briggs' study investigated learners' implicit and explicit task relevant knowledge and examined three user groups ability to generate queries about an unfamiliar word-processing system. One group, secretarial students, had six-months of a secretarial course; a second group, business students, had limited word processing experience but had experience with other business software. The third group, were studying to become trainers and had experience with a variety of word processing software packages. Participants were asked to type a letter using a new word processing system. While no direct instruction or manual was provided, participants were permitted to ask as many questions as necessary in order to complete the task. Responses were categorized into four categories: Visible features of the task, visible features of the system, hidden features of the task (the interface), and hidden features of the system. Results revealed that overall participants did not ask many questions, with average numbers at five for

secretarial students, eight for business students and fourteen for secretarial trainers. Briggs postulates that the secretarial students were not able to make use of their secretarial training as the majority of their questions fell into the visible task category. As new users of word processing the secretarial students were unable to ask questions because they lacked a sufficient metastructure of knowing what isn't known. Without a suitable generalizable model these participants concentrated on obvious aspects of the task to generate questions. The second group, the business students, while less experienced with word processing than the secretarial students, nevertheless had learned how to accomplish different tasks using the same system. Thus they possessed a greater diversity of experience, rather than extent of experience, which may account for the greater number of questions. The business students were also able to ask questions about hidden tasks. The secretarial trainers, while generating the most questions, were also able to draw upon their experience to ask useful questions about both the task and the interface. Briggs concludes that extensive experience with one word processing software may not induce full exploitation of its capacities, while familiarity with other software offers learners a more informed perspective on the potential of such systems.

Kay also used a question-asking protocol in a study of six adults learning to use a spreadsheet computer software. These adults varied in experience and ability: two beginners, three intermediate, and one advanced user. Kay's results, contrary to

Briggs', indicate that at times a little knowledge is better than extensive knowledge, particularly with simple problems. In Kay's study the participant with an advanced knowledge of software packages also had an extensive knowledge of error types. When a problem arose, this participant proceeded with an exhaustive search for a cause and a solution, whereas participants with less knowledge had less of a repertoire of potential errors to verify.

Half of the participants in my study had some elementary knowledge of a previous version of this same word processing software. Those who had no previous knowledge of this software indicated that they would first ask the instructor if they had a question. Those with previous knowledge with this software indicated they would first attempt to find the answer themselves. Failing this they would then ask the instructor for assistance. These findings reflect those of Scapin (1981; see Paxton and Turner, 1984) who examined the differences between new and experienced computer users. Both groups were asked to learn the commands definitions of a hypothetical computer editing system and to recall them one week later. Scapin found that the new users learned computer terms better when computer-oriented command words were used in the definition, than when more usual words were used. Findings also revealed that the meaning of computer commands was recalled better by the experienced users. The experienced users were also able to recognize computer commands and definitions when they were described differently, while new users were not. Scapin's findings suggest that

new users' learning might be facilitated by teaching them the operational definitions of the computer commands first and then the functional definition.

Participants in my study indicated that they valued the walk-through method of instruction since it permitted them a guided learning opportunity. However, these same participants also indicated that they appreciated the chance to observe their peers at work. Observing another class member afforded participants a further occasion to both reflect on their own learning as well as to pick up other ways to achieve the same result. In this respect observation is similar to the modeling method found in two studies (Gist et al.1988; Morris, 1994). Participants in my study reflect several findings found by Gist and Morris. First, that the opportunity to observe a model correctly demonstrate the proper execution of each computer task enhances learning. Second, that by observing a model, learners may experience vicarious learning and reinforcement from the model's successful accomplishment of each task.

In my study most participants indicated that the small class size allowed them the opportunity, at times, to break into smaller groups to help and learn from one another. The literature reflects the finding that working in small groups provides learners with the opportunity to learn from their peers. Research among older adults found that learners interacted with the computer more efficiently in small group settings as opposed to large groups or individually because the small groups

created a situation of social reinforcement (James et al., 1996; Paxton and Turner, 1984; Zandri and Charness; 1989). The constructivist approach to learning recommends incorporating social activities to help learners shape their understanding. Interacting with others through speech enables learners to express and share their ideas and seek clarification by asking questions. Such dialogue assists learners to view multiple perspectives and in turn can lead to conceptual growth (Nicaise and Barnes,1996).

In my study over half the class time was given over to the learners to apply the concepts introduced during that class. While the instructor was available to assist learners, this interaction meant the instructor's time was dedicated to that class member. Each interaction could occupy the instructor and learner for a time ranging between three to seven minutes. Often those learners waiting to see the instructor would form small groups of two or three and assist one another. Participants in my study indicated that collaborating with other class members enabled them to observe their peers thus gaining alternative views of their own understandings, and to question their peers when uncertain of their own knowledge, and to interact and share ideas with other class members.

4.3 Selecting the main idea

Participants in my study demonstrated a preference to try things rather than to read about how to do them. While each chapter in the textbook provided a theory section on the concepts and included a how to segment on incorporating concepts, many participants indicated that they tended to skip these instructions, even if they were unsure about how to accomplish assignments.

In this regard participants in my study had a form of self-paced instruction available to them. Self-paced, or tutorial instruction, usually refers to a list step-by-step directions which the learner is expected to follow. Today many software manuals include self-paced guides which suggests that learners don't require additional assistance. Advantages of this form of instruction include allowing learners to proceed at their own rhythm, and repeating sections at their discretion (Twitchell, 1996; Zandri and Charness, 1989). A disadvantage, however, is that learners are expected to faithfully follow all the instructions. Learners may not understand why certain steps are required and detailed explanations are frequently absent. In their study, which made use of self-pace manuals, Carroll and Mack found learners impatient to get on with it which prompted them to avoid getting bogged down with following precise instructions. By skipping the instructions and going ahead, these learners encountered situations which were not explained at that point in the manual, nor did these learners know how to find assistance in the manual. Carroll and Mack also found that learners struck out on their own

because their specific goals did not match those implied by the manual designers. At other times learners became so engrossed in following instructions they appeared to experience a loss of task orientation. These learners expressed frustration at not understanding the purpose of the exercise, only that numerous steps were required. This may account for the reluctance among participants in my study to use any alternate printed instructional sources. One example that participants cited was their reluctance to use the on-line software help tool. While participants acknowledged that on-line help provided by the software was a useful tool they also indicated that finding answers using on-line help to be longer than asking the instructor or a peer for assistance. Since several participants indicated that they had only partially made use of the textbook, they may have also been reluctant to use alternate sources to supplement their learning. Thus participants in my study reflect the literature (Briggs, 1990; Kazlauskas and McCrady, 1985; Mruk, 1987) which indicates that as new users of a software these participants may not yet possess the knowledge to generate appropriate queries. Briggs in particular makes the link between implicit and explicit knowledge. While individuals can learn to perform a task successfully they may not be explicitly aware of the principles which govern the task. Even when these individuals are provided with instructions regarding the principles, improved performance may not necessarily result. Briggs points out that increased performance is therefore not necessarily associated with increased knowledge. The underlying issue Briggs brings forth is that new learners of a computer software may not possess the

metaknowledge which tells them what it is they don't know. While Briggs suggests that more experienced learners would possess this metaknowledge, she cautions that in light of dissociation of implicit and explicit knowledge even experienced users may not possess the metaknowledge to guide their learning process if their experience is not available in an explicit, verbalisable form. Thus experience alone may not help these learners formulate questions, since performance alone does not guarantee learners are able to verbalize knowledge of the principles governing the task.

While all participants in my study acknowledged the use of note-taking, most found it difficult to attend to the multiple tasks of listening to the instructor, viewing their monitors, following instructions and writing at the same time. Those who indicated they were making notes during class also indicated that this was a strategy they had used in previous learning experiences. Twitchell (1996) reports that adults may find it difficult to attend to more than one task at a time and recommends providing frequent pauses for note-taking and discussion to allow additional processing time. The findings in my study reflect those of other researchers who found that the speed at which explanations are given may be too fast for notes to be made and as a result the information is subsequently forgotten (James et al., 1996).

All of the participants in my study strongly believed that repeated practice using the computer and the software in a hands-on manner helped them remember and understand this word processing software. While over half the time in each class was given over to individual practice, most participants revealed that, in addition, they used the computer lab for extra practice whenever it was available and they were free. Mruk's (1987) study of traditional and non-traditional college students found that both groups rated hands-on and the practical use of computers as the most desirable learning activities. Based on the results of a study among re-entry and traditional college students Klein et al. (1993) found that both groups performed equally well on computer skill objectives. In her study of student teachers learning to use an e-mail package, Russell (1995) found that new learners can go through six-stages as the technology and processes change from being intrusive to becoming invisible. An important aspect of this study is that, depending on their previous knowledge, not all learners started at stage one and further that not all learners spent the same time at each subsequent level. Thus the opportunity to practice, beyond class time, can assist learners based on their individual needs (Klein, 1993). Participants in my study stressed that the repetitive nature of the practice enabled them to comprehend various components of this word processing software and reflects the literature which states that information that has been learned and used regularly can be recalled after a long period of disuse (Twitchell, 1996). It should also be noted that areas of literature dealing with the learning English as a second language report that the two most

frequently used strategies of beginning and intermediate learners are repetition and notetaking (O'Malley et al., 1988).

4.4 Self-testing

Two participants in my study indicated previewing of printed materials before class. Half stated that they reviewed printed materials and indicated they reviewed by using the word processing software and the exercises. Those participants who did preview identified previewing as a strategy they had used in previous learning experiences.

While literature on computers and computer software does not focus on previewing in a computer software learning context, it appears fairly common for adult learners to preview learning materials. In a study of different age groups learning a word processing software Elias et al. (1987) found that almost half of the older group requested take-home material. Another form of previewing is the advance organizer. Twitchell (1996) refers to advance organizers as short, clearly worded abstracts of information to be presented, which can help learners relate to different parts of a presentation. Twitchell cites a study by Thompson, Diefenderfer, and Doll (1987) which found that advance organizers improved the comprehension of learners, specifically older learners with limited verbal ability. O'Malley's study of English as a second language found that of the planning strategies used by learners, only one beginner and none of the intermediate

learners reported using advance organizers. In my study. it may be that more participants did not preview materials as they were not specifically instructed to do so. It may also be that since most participants indicated they did not use the textbook as a study tool they might also not have been inclined to use it for previewing new material.

Of those participants in my study who indicated they reviewed the material, only two indicated that they used the textbook to assist them in this strategy. While the remaining participants did indicate using review as a strategy, they also indicated that this review was accomplished with the computer and the software. That is for these participants, reviewing indicated applying the concepts in a practical hands-on manner.

4.5 Motivation

The findings in my study regarding motivation relate primarily to the reasons that motivated these participants to partake in a word processing software course. These include employment-related reasons, a determination to become technologically current and once attained, to maintain this level, and a desire to succeed in this specific software application.

Adults who enroll in adult education programs do so primarily for employment reasons (Cross, 1981; Rydell, 1983). A number of the participants in my study

had previously worked in positions where they observed the role of technology in the workplace and had come to the conclusion that many employment positions required knowledge of computers and computer applications. Others had become unemployed for various reasons and believed they needed to acquire or improve their computer application skills for further opportunities. Thus these participants were motivated to attend this course at a time they believed it would assist them in achieving their goals. According to Gerver (1984) when adults participate in learning on a voluntary basis they are, at least initially, highly motivated. In my study, participants' motivation was sustained throughout the course as they believed the knowledge they gained would assist them attain their goal of employment.

Participants in my study also believed that the knowledge they acquired in this word processing software course would be relevant to their future employment needs. These findings are consistent with those of Russell (1995) who reported that adults in her study were determined to learn to use a computer software that would be relevant to their work. In Russell's study, teachers participated in training involving real-world application (e-mail) that teachers indicated they would apply directly to their work

Participants in this study were prepared to work hard in order to succeed in this word processing course. All the participants indicated that they had dedicated

extra time outside of the class to learning this word processing software and that they believed their success would be due to their efforts. As well, these participants appreciated the freedom and flexibility when they were able to use the lab to practice and apply their knowledge in a hands-on manner. Thus these participants believed what research shows, namely that adult learner motivation is usually under the active control of the individual and adults are more likely to be committed to situations in which they have greater freedom (Candy, 1991; Conti and Felenz, 1991).

For most participants in my study, this course marked a change from previous employment where working with computers played, if any, a minor role, to seeking employment where working with a computer could represent a significant amount of a working day. As these participants considered they had worked hard to bring about this change, they were also keen to remain technologically current. Research shows that for adults of all ages keeping up with technology seems to be important to understanding and maintaining a sense of personal control over their environment (Baack et al., 1991; Gist, 1988). One caveat to this appears that the willingness of adults to participate in educational pursuits hinges on their expectation that they believe that mastery is attainable.

4.6 Attitude

The participants in my study were eager to learn this word processing software. The attitudes of these adults were positive overall in relation to their experience in this word processing course. Their attitudes were related to their liking of the course, their confidence in their ability to succeed, their belief in the relevance of this instructional experience as it related to their goal of future employment, and their determination to continue to learn additional word processing concepts. The few concerns that participants expressed related to earlier experiences with computer instruction.

The participants in my study indicated confidence in their abilities and satisfaction when they were able to solve a problem on their own. In this regard participants viewed themselves as capable of learning word processing. Research shows that persons who expect they can perform a computer task are usually more successful than those who believe themselves to be less capable (Campbell and Williams, 1990; Raban, 1988; Swan and Mitrani, 1993). Paxton (1984) found that learners with more negative attitudes took longer to complete the instruction and made more errors. Zandri and Charness (1989) on the other hand, found that those with more positive attitudes requires less time and help to complete instruction.

In their study, based on 160 high school students, Campbell and Williams (1990) examined the relationship between computer attitude variables and computer

attribution variables. Findings related to proficiency appeared to be related to students' perceptions of their personal experience with computers. That is, those students who appeared to perceive themselves as having a greater degree of computer proficiency also perceived that their own talents contributed to development of that proficiency, rather than simply that the task was easy. Campbell and Williams' propose that if learners develop positive attitudes they may be more likely to persist in the study of computers.

Participants in my study were confident that knowledge of word processing would assist them with future employment. These findings are contrary to research studies looking at computer instruction which found negative attitudes among employed adults (Bloom, 1985; Gist, et al., 1988; Mruk, 1984; Paxton and Turner, 1984; Zandri and Charness, 1989). Employers may place great pressure on employees to learn new software quickly. This pressure may result in concerns among staff members. A common concern for new users is that of breaking expensive equipment or entering information which may cause irreparable damage. Highly paid professionals may also feel discouraged when they consider relinquishing working time to learning time. If employees experience difficulties with computers they may become skeptical and resist learning new software. Comprehending error messages can perplex and frustrate workers and may cause them to avoid the computer. Thus a negative attitude toward computers may

result in users exaggerating small problems into larger ones (Paxton and Turner, 1984).

Concerns expressed by participants in my study related to earlier computer educational experiences. One participant in particular, Paul, sited a previous word processing course he had attended about a year earlier. Paul described several factors which left him feeling disconnected from the course and he eventually stopped attending. As he began this course Paul was wary of a similar experience. Another participant, Yolande, expressed her concerns on the first day of class.

> "The first day I had a lot of problems. ... I found that I was totally lost. I had to have somebody explain it to me for an hour. Re-do everything."

The experiences of these participants reflects the research which highlights the importance of a positive initial experience with a computer (Morris, 1994; Zandri and Charness, 1989). While some literature suggests introducing learners to computers through recreational games, others caution that games do not address the most acute concerns of employees which focus on judgments that supervisors and peers will make (Bloom, 1985; Klein et al., 1993).

Participants in my study indicated they believed learning a word processing software would be relevant in their future employment. As part of the exercises included in this course, participants were instructed in various business

applications concepts including letters, memos and reports. The positive attitudes of the participants in my study reflect those found in research which demonstrate that positive attitudes resulted when real-world applications are incorporated in computer instructional classes (Campbell and Williams, 1990; James et al., 1996). While word processing was the application in the James et al. study the purpose was to write life histories.

Baack et al.'s (1991) study reports that adults who are motivated by other than employment-related reasons as having neative attitudes toward computers. Baack et al. (1991) compared 184 older with 235 younger adults using a 20-item Attitudes Toward Computer Usage Scale. The results indicated that while the older adults exhibited less positive attitudes about actual hands-on use of the computer than did younger adults, there was no significant difference in their attitudes towards computer technology. It is interesting to note that negative attitudes have been found in studies relating to age are not limited to adults. Literature on training older adults suggests that attitudes toward computers tends to be more negative with increasing age (Zandri and Charness, 1989). Durndell et al. (1995) found that among high school students, attitudes of both genders declines with age.

4.7 Anxiety

While Weinstein, Zimmerman and Palmer (1988) describe anxiety as the fears learners may have related to school work, other researchers include anxiety as a

factor which impacts learners attitudes (Bloom, 1985; Massoud, 1991; Mruk, 1984). Computer anxiety is seen as relating to "the technology of computers, thoughts about computers or attitudes toward the technology" (Russell, 1995). Most participants in my study did not express apprehensions towards computers or this word processing software. However, one participant, Nicholas, indicated that by asking what he believed to be more questions than others, he would be viewed negatively by them. Researchers have found that anxiety related to computers can effect adult computer learning (Bloom, 1985; Mruk; 1984). Their research shows that while adults are skilled in other areas of their lives, when faced with learning about computers they find themselves in positions where they must begin again. Tantamount to beginning is stumbling. Embarrassment or the fear of it may be a real problem, especially in group situations where adults risk trying new skills in front of their peers. Awkwardness when using unfamiliar software can bring expectations of being judged harshly and new computer users may feel stupid for having to ask questions.

As a result of their anxieties some adults may fall into unproductive cycles. Despite having the necessary abilities, learners may distrust their abilities. They anticipate poor evaluations from others and from themselves. Their confidence to learn to use computers is low. These learners may experience stress, which draws attention toward themselves and away from learning. As a result, computer-

attention toward themselves and away from learning. As a result, computer anxious adults can take longer to learn a software and can cause learners to resist change and thus impact learning negatively.

Researchers recommend several ways to assist learners overcome their anxiety. Russell (1995) suggests applying computer software to a meaningful task. In Russell's study teachers used e-mail and corresponded with actual students. These participants reported that their initial frustrations and negative expectations were displaced by the positive experiences. Paxton and Turner (1984) report that anxiety may reduce short-term memory and impair performance. To assist new computer software users, Paxton and Turner recommend implementing more shorter exercises applications rather than one longer assignment. In this way learners may complete more sections and these smaller operations may result in more frequent opportunities to achieve closure than may be possible with fewer larger applications. Russell suggests that if learners are made aware of the stages they are likely to experience when learning a new software before the process becomes invisible, they may accept the process and realize that understanding will follow.

Several participants in my study indicated some frustration when referring to the textbook and as a result they tended to use it only when completing exercises at the end of each chapter. This finding is consistent with research which shows that

because of the technical and quantitative nature of computers learners often liken them to math, a subject which many dislike (Bloom, 1985; Mruk, 1984; Paxton and Turner, 1984)). This dislike may extend to the support materials which accompany most software. Learners may fear having to decipher unclear or inconsistent instructions. This may not be an unrealistic fear as many manuals are frequently written by technical persons who may not take the point of view of new learners. Learners may also fear appearing stupid as a result of searching through a manual. As a result learners may look to the computer itself and hope to find their answers in a trial and error approach.

One participant, Robert, believed himself to be the oldest learner in the class and indicated that he would have appreciated a class composed of learners of his own age. Robert considered that his age made him slower than other class members and thus required him to work harder to keep up. These findings are consistent with those of Morris (1994). In a study in which adults between the ages of 60 and 79 were given introductory computer training, participants indicated their satisfaction that the class consisted of adults of similar ages. Participants in Morris' study indicated that they did not wish to learn in an environment that placed them in direct comparison with younger learners. Other research in which age was a variable found that age is not a factor as all adult learners are considered to be capable of learning and using computer software (Elias, 1987; James et al. 1996; Twitchell, 1996; Rachal, 1993; Zandri and Charness, 1987). However,

some research does indicate that as age increases, the time to complete instruction and the rate which information is transferred to long-term memory is slower than that of younger adults.

While anxiety is most frequently viewed as a negative factor in learning, some researchers describe the potential positive contribution of anxiety (Campbell and Williams, 1990; Russell, 1995). Campbell and Williams relate their finding to those of other researchers who state that the "highest levels of achievement occur for some students only when they are challenged to perform at levels just beyond their actual levels of competence, thereby creating a moderate degree of performance anxiety" (page 287).

4.8 Control in learning

While the words "control" and "learning" at times are associated with teacher-directed education, this concept has increasingly become linked with learners and the degree of control they exert over certain instructional events. Control of instructional events represents the external aspects of control and relates to management functions in education including planning, directing, and evaluating education. The literature shows that the while it is possible to have differing levels of learner-control over external events, it is also possible for learners to demonstrate differing levels of commitment for learner-control (Candy, 1991; Garrison, 1993; Pratt, 1988). There is, however, another facet to learner-control.

This aspect of learner-control relates to the way learners construct meaning and is referred to as internal control. In this respect internal learner control is concerned with learners awareness of themselves as learners, their views of their perceived abilities to exercise control in learning and learners predisposition to accept responsibility for their own learning. Garrison (1989, p. 58; see Garrison, 1993) defines learners internal-control as their process of critical reflection or their "internal change of consciousness".

In my study participants identified aspects related to both external and internal learner control. In terms of their external control in this word processing course participants related their preference for an instructor led course. Half of the participants in this study had acquired some knowledge of this word processing software through self-directed instruction. All the participants indicated their intention to continue to acquire advanced word processing knowledge, however, while they stated they could learn on their own, their preference was for the same type of instructor-led format. Even those participants who believed they would be able to complete some learning on their own, expressed the need for an experienced resource person who could assist them. These findings reflect those of Kay (1993). In Kay's study, 647 pre-service teachers were administered a Computer Ability Survey, one component of which was designed to measure participants perceived control. Respondents highest rating indicated that while they believed they could probably teach themselves most things they needed to

know about computers, at the opposite end, the lowest rating indicated that they preferred to learn on their own. In other words, while respondents believed they were able to teach themselves, their least preferred method of instruction was to teach themselves. The literature sites a number of reasons for these preferences. Adult learners may have received years of formal education in more structured passive environments and thus do not associate learning with more active roles. As well, adult learners may have figured out requirements for success in traditional education conditions and may have difficulty figuring out what instructors want in more learner-controlled environments (Candy, 1991; Cross, 1981). The case for increasing learner control is made by Campione and Armbruster (1986). By modeling various forms of control, instructors can assist learners to internalize the control required in independent thinking and problem solving. The research cautions, however, that ceding external control is a gradual process and which may vary based on individual differences among learners.

It may be that learners in my study indicated their preference for instructor directed learning because the concept of greater external learner control was not included as part of the course structure. In their research Nicaise and Barnes (1996) set out to increase students abilities to transfer learning skills in a undergraduate math class into practice. In the first part of the course learners were introduced to instructional and learning paradigms. Using constructivist principles, learners were assigned the task of building their own curriculum.

Building a curriculum is considered to be an authentic task which, in contructivist terms, constitutes a situation designed to stimulate the active knowledge construction in learners. Nicaise and Barnes caution that to succeed at the authentic task learners must first understand the nuances of constructivism. Potential benefits of increased learner control includes more favorable attitudes toward independent work and greater inclination for further self-directed learning beyond formal instructional settings (Candy, 1991).

In my study participants indicated that they controlled their own learning primarily through a active hands-on approach. Their ability to achieve objectives was accomplished when they could make the computer do what they wanted it to. Their objectives were two-fold. The first related to completing the exercises assigned by the instructor which reflected the course content. The second referred to work that participants attempted beyond the scope of the course. Paul's statement reflects the feelings of the participants when they had accomplished this objective.

> Paul: "But if I'm getting myself out of the homework, let's say, how do I put something in a different color, and how to basically put italics.... As soon I do that. Out of the context of the homework and everything, you know I found the real necessity of it and that something was going to stay, more than ever."

Most participants indicated that they devoted significant time to practice. Thus they indicated belief in their ability to impose significance to their knowledge by applying word processing to applications beyond those directly related to course.

Being able to do so provided these participants with confirmation of their competence. In this respect participants actively constructed personal meanings and transformed their own understandings of word processing in a constructivist manner.

The previous section discusses each of the eight categories which correspond with the participant data found in this study and relates each of these themes with empirical and theoretical literature. In essence this discussion deals with adults' learning strategies, their control in learning, and how they use the resources available to them when learning a word processing software. Seven of the themes presented are based on research which relates to learning strategies (Weinstein, Zimmerman, and Palmer, 1988). These categories were seen to be appropriate as this research was based on exploring the how of student learning and the active component in learning. The eighth theme, control in learning, explores how adults both manage and monitor their own learning. My study applies these categories in a qualitative methodology which seeks to draw out the experiences of adult learners and to portray their understandings when learning a word processing software.

CHAPTER 5 - CONCLUSION

The present research was undertaken to explore how adults learn to use a word-processing software. Today adults form the largest segment of the population in our society. Many adults are continuing to participate in education in ever-increasing numbers and frequency. At the same time, innovations in computers and computer software are being reflected in the rising number of computers both in the workplace and in the home. While a number of studies have been conducted with adults and technology, many of these studies have centered on comparing different groups of learners or have isolated specific aspects such as gender or the age of learners. Most studies reflect data gathered through questionnaires or from data derived through research conducted in laboratory environments or other controlled environments. Thus, in many of these studies the research is conducted at arm's length from the researcher or in an environment designed for the purposes of the study. This study employed a qualitative methodology and drew in part on the naturalistic conceptions of adults' learning experiences in a word processing course. In this respect the study permitted the researcher to work in the natural setting of a classroom. The aim was not to generalize the results of this research to a wider population but rather to allow a forum for participants' realities in the current context.

Using a qualitative methodology, this study explored the learning strategies of these adult learners, addressed their control of learning, and inquired into the resources the participants used when learning a word processing software in a classroom environment.

Two separate in-depth interviews were conducted with six adult learners who were enrolled in a 45-hour credit word processing course held in an Anglophone CEGEP in Montreal. Study participants ranged in age from 27 to 49 years of age and varied in level of previous education, amount of computer experience, and demographics. All classes were observed.

Interview data and observations were analyzed using inductive data analysis and resulted in eight categories. Findings were organized around those themes of study aids, motivation, selection of main idea, information processing, anxiety, attitudes, self-testing, and control in learning.

While the findings in my study may have potential implications for adult learning, it is important to note that this study was restricted in ways that may limit its applicability to other adults who are learning a word processing computer software. This study examined only one course of word processing with only six participants. The participants learned to perform introductory and intermediate word processing concepts. The participants in this study were learning to use

word processing primarily in view of future employment and may not be typical of other adults in other settings.

The findings in this study demonstrate much of what the literature reveals about adult learners. In their use of strategies, participants indicated that they rehearsed their knowledge by applying word processing concepts in a hands-on manner using the computer to practice, to repeat, and to review their skills. Participants also indicated that they elaborated their knowledge by asking both the instructor and their peers questions, and by observing their peers model the execution of computer tasks. All participants acknowledged the value of notes, however, those who used this strategy indicated it was a strategy they had used in other learning situations. Strategies such as making notes reflect participants organizational schemes. In this study participants indicated that the way in which they built connections in their knowledge was through practical application of word processing concepts to other applications beyond those included in this course. While all the participants in this study made considerable use of the computer lab beyond class time to practice and review word processing concepts, few ventured beyond the concepts included in this course.

In terms of how they viewed their control in learning, participants described themselves as visual learners. The visual aspect was reflected in their desire to work with this word processing software, in their preference to try to find answers

by working on the computer rather than by attempting to search out answers in printed documentation, and in their use of the computer for reviewing concepts. Participants also indicated that assistance from the instructor as well as from peers served as resources to correct or confirm their understandings.

In terms of learning resources participants cited the instructor's role and their use of printed materials. Participants in this study regarded the instructor as an integral part of their learning both as a resource person and as the person best equipped to plan and direct learning. While all participants were motivated to learn this word processing software as they believed it would assist them with their goal for future employment, they also felt that the instructor offered support and guidance they needed at this point in their learning. Even those learners who believed that they would be able to continue learning advanced word processing on their own, indicated that they would prefer a similar instructor-led environment. Most of the participants choose to use the textbook only for the assignments provided at the end of each chapter. As visual learners participants preferred to try to solve any difficulties in a hands-on manner working on the computer and indicated their satisfaction when they were able to do so. This may also account for their reluctance to seek out alternate printed resources.

It appears that a constructivist approach to learning may hold particular implications for adults who are learning to use word processing. Constructivism

views learners as self-interpreting individuals who continuously strive to make sense of their experiences. When learners engage in instructional experiences related to learning of a computer software such as word processing, they participate in learning events in a direct hands-on manner. Interacting with the technology in this way provides opportunities for active engagement. Working directly with the computer and the software, learners have the opportunity to apply a word processing concept within a text and view it on the computer screen. This event enables learners to receive an immediate visual response to their actions and thereby to derive reinforcement from this activity.

In constructivism learners are deemed to be self-aware and by extension autonomous. Not all adults in my study viewed themselves as capable of the same autonomy. Two of the participants expressed a desire to proceed beyond the scope of the course. At the opposite end of the spectrum one participant expressed anxiety related to asking questions. A constructivist approach recognizes that the degree of autonomy varies among learners and is concerned with an individual's self-constructs. While recognizing that not all individuals are always able to actualize such autonomy in every learning event, in a contructivist learning environment the instructor is regarded as the facilitator of greater or lesser independent learning.

In constructivism learners are considered active participants in the learning process. As such, it is the responsibility of learners to develop internal schemes through which they can interpret events and ideas and which will enable them to build meanings. Building meanings, in constructivism, requires more than copying or duplicating. In constructivst terms knowledge is constructed by learners when they come to know reality by acting on it. Thus "the forms and content of knowledge are constructed" by acting upon it (Candy, 1991, p. 263). Knowledge, thus shifts from an external body of facts to be memorized to an internal construction in which learners propose meaning and significance on events and ideas.

While recognizing the private internal aspects of knowledge construction, constructivism also acknowledges the social character of learning. Participants in my study, while each working at an individual computer, would stop and consult with one or more class members regarding a question or a problem. Several participants reported that by working with others or by viewing the actions of others they strengthened and confirmed their own understandings. Constructivism regards social interaction as critical to individual understanding and knowledge construction.

In constructivist learning environments teacher-centered instruction of predetermined plans and content is inappropriate. Rather in a constructivist

classroom the instructor creates authentic tasks or problems and provides support as a coach, and a facilitator. While the instructional format in my study was instructor-directed, participants reported that by applying their knowledge to problems outside of the course they tested and confirmed their understandings.

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APPENDICES

Appendix A

Interview Schedule

INTERVIEW SCHEDULE

First Interview

Prelude to Interview

--Thank participant for agreeing to participate;
--Ensure participant is aware of purpose of the research;
--Review procedure for the interview;
--Request permission to tape record interview;
--Review interviewer's role regarding confidentiality and participant's anonymity;
--Obtain participant's signature on consent form;
--Respond to any participant questions.

Demographic Information

--Age
--Education level
--Previous occupation
--Cultural background

Previous Learning Experiences

1. Tell me a little about your background focusing on your learning experiences.

2. Pick one of the learning experiences.
   --How did you go about learning it?

3. If you were to describe yourself as a learner what four words or phrases would describe the kind of learner you are?

Previous / Present Learning Strategies

4. How do you use pictures in learning?

5. How do you read and follow directions in learning?
   --Read through, go back and do all?
   --Read one, do one?
   --Read, re-read and do one?
   --Read some, do all?

6. When learning new material do you take notes?
   --If so, for what purpose?
   --If so, what do you do with your notes?
   --If not, what is the reason you don't?

7. Do you preview or review material you are learning?
   --If so for what purpose?
   --If so, in what manner?
   --If so, which material do you focus on?
   --If not, what is the reason you don't?

8. When you are introduced to a function you may encounter it in several ways--from the instructor, in the theory section of the manual, in an exercise, in a review question, in a review session.
   --How does the number of times you experience a function affect your learning of it? (enough to remember, too few, too many, just enough)

9. When you have a question, how do you go about answering that question?
   --Ask another learner.
   --Look up the response in the book.
   --Ask the instructor.
   --Use the computer and try it out
   --Use the software help function

10. What areas caused you to have questions?
    --Course structure
    --Course content
    --Course work

Learning Process / Computer and The Class

11. What experience do you have with computers?
    --How did you go about gaining this experience?
    (On the job, through courses, self-taught)

12. What are your expectations for yourself in this course?

13. At this point in the course how would you summarize your learning experience in this class?

14. How do you approach learning this computer software?
    --What do you like about it?
    --Dislike about it?

15. At this point in the course what do you think is the most difficult concept to learn?
    --What do you think makes it difficult?
    --How do you approach learning this concept?

Instructional Methods in This Class - Views and Preferences

16. How does the use of the white board affect your learning?

17. How does the walk through method of introducing new concepts affect your learning?

18. How does the division of the time between the walk through portion and the time for working through the exercises affect your learning?

19. How do the review questions in the book affect your learning?

20. Were there any instruction strategies that were particularly effective?
    --Detrimental?

Learner and Relation to Other Learners

21. How does the number of other learners in the class affect your learning?

22. How do the actions of the other learners in the class affect your learning?
    --The questions they ask?
    --The comments they provide?

23. How have you relied on others in the class for assistance? How have others relied on you for assistance? Please describe how this has affected your learning.

Instructional Aids

24. How do you feel about the manual that was provided for this course?
    --Have you supplemented this manual with materials (books, notes, help screens)

25. How have the practical computer assignments affected your learning?
    --How have the theory questions affected your learning?

26. Did you find a preference for either verbal or written instructions?
    --What caused you to favor one over the other?

INTERVIEW SCHEDULE
Second Interview

Background

1. How did you come to attend the Computerized Financial Management program?

2. Where there other programs from which you could have chosen?
   --If so, what made you decide on this one?

Links to Previous/Future Knowledge

3. In comparison with the other courses you are following at this time, how would you rate word processing in terms of its overall usefulness?

4. Beyond this course how have you used the word processing skills you have gained from this course?

5. How does your learning experience in this class compare to previous learning experiences?

6. Are there any relationships between this computer software and what your already know?

Goals/Process

7. What are your specific goals in this course?

8. If, in the future, another word processing software program was available to you would you learn it?
   --If so, how would you go about learning it?
   --If not, why not?

9. What do you consider makes a task easy? Complex?

10. How would you rate the challenge level of this course for you?

11. Have you spent additional time outside of class practising the computer software functions?
    --If so, how much time?
    --When have you practised?
    --Did you practice alone or with other course participants?
    --How has practice time affected your learning?
    --If not, why not?
    --How would you rate practice time in the class with practice time outside of the class?

12. How does the length of each class and the frequency of the classes affect your learning?

Strategies/Cognition

13. Of the following three concepts which you have learned in this course, which of the three would you say is the most difficult:
    - Setting Line Spacing
    - Modifying Button Bars
    - Retrieving a file

14. Can you identify any ways in which you mentally organize what you learn?
    --Any ways that help you to learn?

15. How do you know when you've learned something?

16. What are the things that are particularly helpful to your learning?
    --detrimental?
    --How does that compare with the way you've learned other things?

17. How have you used the information in the textbook?
    --To review learning?
    --To perform the required assignments?
    --Aside from the exercises in the book, when do you refer to the textbook?

18. How will you determine your success in this course?

Control in Learning

19. If you had been provided with a computer and the necessary software, would you have been able to complete the learning of this software on your own?
    --If yes, how would you have gone about it?
    --If no, why not?

20. What do you believe is the best way to learn a word processing software?
    --Why?

21. Could you or should you have more influence on your training in this class?

22. If, in the future, another word processing software program was available to you, would you learn it?
    --If so, how would you go about learning it?
    --If not, why not?

Appendix B

Consent Form

CONSENT FORM
Consent to Participate in Research Project

Purpose: I _____, understand that the above research is being done as part of the researcher's masters thesis at the Université de Sherbrooke.

Procedure: I understand that the researcher will observe the computer class which I am attending, and tape-record two interview with me.

Duration: I understand that I may spend from one to two hours outside of class sessions with the researcher as part of this project.

Confidentiality: I understand that all the information I provide the researcher will remain confidential, including my name. I also understand that the tape recordings will be confidential and will be erased after this research.

Voluntariness: I understand that participation in this research is voluntary and not a condition for enrollment in the computer class. I understand that I can discontinue my participation in this research project at any time with no penalty form the researcher and without any effect in my participation in the computer class.

Information: I understand that I may call or write the researcher or the researcher's advisor if I have any questions about the research. I understand I can reach them at these addresses and numbers.

Advisor:
M. Louis-Marie Ouellette
Université de Sherbrooke
Faculté d'éducation
Sherbrooke, Québec
(819)821-7467

Researcher:
Ms. Theresa Sliz
42 Gray Crescent
Baie d'Urfé, Québec
(514)457-3208

I freely agree to participate in the above research.

_____ _____
Date Participant

I have fully explained the research to the above participant.

_____ _____
Date Theresa Sliz

Appendix C

Contact Summary Form

CONTACT SUMMARY

Class #: _____/14 classes

Date of class: _____

Today's Date: _____

PAGE	SALIENT POINTS	THEMES/ASPECTS

Appendix D

Letter of Introduction

September 16, 1996

To all class members in the Computerized Financial Management course Introduction to Word Processing 412-541.

We welcome you to the program and to the course in word processing which begins on September 18, 1996. We trust you will be as satisfied with what you learn as previous participants in this course.

There is an added dimension to this course. A graduate student, Theresa Sliz, is doing research about the processes which adults use when they learn a computer software. She has asked permission to observe this course. She has also asked permission to interview the participants in this class. This is voluntary on your part.

Dawn Redman, the instructor, has taught courses in several programs for adult learners for a number of years. Dawn has worked with Theresa previously and knows that Theresa will not in any way interfere with the class or make any participants uncomfortable.

Champlain St-Lambert at times participates in research projects. This is part of our role to assist and promote quality education for all population segments.

Theresa Sliz will be available 15 minutes before class on Wednesday, September 18, 1996 to discuss her research and answer any questions you may have.

Nancy Kelly
Director, Continuing Education

Appendix E

Letter of Introduction of Researcher to Class Members

September 18, 1996

Dear Class Member in Course 412-541:

I am a student at the Université de Sherbrooke, working on a master's degree in education. I'm working on research that looks at the processes which adults use when learning a computer software in a classroom environment.

To do my research I will observe each of the classes in this course. I will position myself in the classroom to be as unobtrusive as possible as I do not wish to interfere with your instruction. My intention is not to evaluate, in any way, how well or how fast you learn. I only wish to observe how you as an adult learn to use this computer software.

I also wish to interview you individually about your experiences as you learn to use this computer software. I understand that your schedules are quite full as you are completing a full time program and are in class all day. The interviews will be scheduled at your convenience. The interviews can be held in a room available at the college or at a place that is convenient to you. The interviews can take place after class or on a weekend. I am willing to provide transportation for the interview if you require it. I would like to meet with you twice over the period of this course, once at the mid-point of the course and once towards the end of the course. Each interview should take no more than an hour, and with your permission I will audio tape the interviews to ensure accuracy and so as not to spend extra time taking notes. These audio tapes will be destroyed following the completion of the research.

I will have a consent form for you to sign that assures you I will protect your confidentiality and anonymity. If you have any questions regarding this research, please feel free to call me at home at (514) 457-3208 or you may leave a message for me at Continuing Education.

Thank you for the opportunity to introduce myself and this research. I look forward to talking with you about how you learn.

Yours sincerely,

Theresa Sliz

Appendix F

Summary of Computer Studies

Author/Year	Purpose of Study	Sample Description	Instrument/s	Training Content	Development of material	Findings
Baack, S.A., Brown, T.S., Brown J. T. 1991	To examine the attitudes of older adults toward computers and compare them with attitudes of younger adults	235 college students and 184 retired persons	-20 item questionnaire (Attitudes Toward Computer Usage Scale)	none	none	-young adults revealed more positive attitudes toward computers and computer applications than did the older adults.
Briggs, P. 1990	To examine: -the role of experience in a user's ability to generate queries about the task; -extent to which this correlates with performance; - extent to which the mental task descriptions available to the experienced user map onto those anticipated by formal analyses	18 adult volunteers three groups: -secretarial students (6 mos. w.p. experience); -business studies students (limited w.p. experience, also had experience of other softwares; -secretarial trainers (experienced secretaries--used variety of w.p. softwares);	-participant questions and comments audio-taped; -complete log of participant's actions was recorded in shorthand; -pulses generated by the keyboard recorded by counter; -practical 10 item post-test;	-personal computers using commercial word-processing package (Superwriter	-participants were provided with an application (letter) and permitted to ask as many questions as required to successfully complete the task	-overall groups did not ask many questions; -secretarial students strategy similar to that of naive users, questions concentrated on the visible features of the task; -business students able to verbalize additional queries based upon their experience of the task of word processing; -secretarial trainers were able to draw upon experience to construct questions about both visible and hidden features of the task and hardware; -Keystroke performance showed no differentiation among groups on either main task or post-test. -Observations of performance showed a very poor learning curve;

Author/Year	Purpose of Study	Sample Description	Instrument/s	Training Content	Development of material	Findings
Campbell, N. J. Williams, J. E. 1990	To study the relationship of computer attitudes and computer attributions to enrollment in high school computer courses and self-perceived computer proficiency	160 high school students in grades 10, 11 and 12	-32 item Computer Attribution Scale developed by researchers	-not specified	-not specified	-Variability in enrollment in computer courses partially explained by two computer attitudes of usefulness and effectance motivation and computer attribution of failure ability; -Variability in self-perceptions of computer proficiency partially explained by three computer attributions: success-ability, success-task, and failure-environment and computer anxiety.
Durndell, A., Glissov P., Siann, G. 1995	To investigate into experience of , and attitudes to computers	5 secondary schools; classes of 1st, 3rd and 5th year; 429 students.	-questionnaire (2 parts) computer usage and attitudinal variables.	none	none	With the exception of computer games played at school, boys made more overall use of computers than girls; with the exception of word processing use of computers outside school, boys were significantly more inclined to own computers and to use them more generally and more frequently than girls; females in this study conformed to established trends in finding computers less attractive than males did.

Author/Year	Purpose of Study	Sample Description	Instrument/s	Training Content	Development of material	Findings
Elias, P. K.,, Elias, F.E., Robbins, M. A., Gage, P., 1987	To evaluate the performance of older, middle-age and younger trainees under conditions that have been shown to be optimal for older workers.	45 learners in three age groups (younger 18-28, middle-age 37-48, older 55-67)	-pre training: keyboarding test, WONDERLIC personnel test, wide range achievement test (WRAT-reading and spelling),30-item multiple choice computer vocabulary test 2nd session: learning efficiency test; end of training: -oral review test (23 items) 5 point Likert scale; -practical assessment of a long document -learners interviewed; -trainer completed four rating scales for each learner	-basic word processing with SuperSCRIPSIT (Radio Shack) audio (tape cassette) and visual (text and figures) training program)	-7 sessions x 3.5 hrs each; at learners' convenience--all training completed within 2 weeks; -self-paced learning with trainer and assistant available	-all participants, regardless of age, mastered fundamentals of word processing with this software; -error rates were very low; -age differences emerged only in time measurements for subunits of training and for performance on testing; -older learners required many more trainer interventions which increased the time required for these learners to complete the program; -older learners exhibited more concern with caring for and not harming equipment; -older learners appeared to have difficulty retaining information when the procedure produced very rapid or extensive screen changes; -assistance given older learners was directed to may of the same content areas that proved difficult during testing.
Galloway, J.P. 1992	To examine a particular approach to teaching computers using analogies	39 (inexperienced computer users) preservice teachers (three groups)	-pre and post tests; -pre and post test personal interviews	four software applications (word processing, database, spreadsheet and graphics) and BASIC programming	One semester course	-in written tests and interviews the group using full analogies showed greatest improvement in use and understanding of analogies in relation to computers

Author/Year	Purpose of Study	Sample Description	Instrument/s	Training Content	Development of material	Findings
Gist, M. 1988	To examine the effects of training approach and trainee age on the acquisition of computer skills	146 adults (volunteers) median age 40.	2 x 2 field experiment. Two independent variables-training approach (tutorial or modelling) and trainee age (younger or older) -specific task test at end of training	Spreadsheet software program	3 hour training. either tutorial or modelling approach	-Those learners in modelling training (both older and younger) registered higher scores in post test compared to learners in the tutorial group; -Younger learners (-45) attained greater computer software mastery compared to older learners;
Hazari, S. I. Reaves R.R. 1994	To analyze student preference toward word processing software running under two different operating systems	102 university students in five sections of a technical writing course	-Survey instrument developed by researchers and completed at the end of the semester	-Word processing. students used either DOS Microsoft Word 3.0 or GUI Microsoft Word 4.0	-One semester technical writing course; 3x week x 15 weeks.	-The majority of students indicated a preference for the GUI versus the CLI and those using the GUI achieve a comfort level for this interface far sooner than those using the CLI. -No difference was found in the performance score of students using command line interface and those of students using graphical user interface systems
Hunt, N. P., Bohlin, R. M., 1993	To determine if gender or past computer experiences had any effect on measures of students' enjoyment of computer use, anxiety and perceived confidence	518 (394 female, 108 male, 16 not reported) college students	-Computer Attitude Scale (CAS); demographic data; and five questions about prior experiences using computers	college computer courses designed for preservice classroom teachers (not specified further)	One semester course (data gathered during first week of class)	-a significant number of students had never interacted with a computer prior to this class; previous computer experiences correlated with positive student attitudes towards computers; recreational use of computers was the strongest predictor for the liking and confidence subscale scores; gender did not correspond with any significant differences in attitudes.

Author/Year	Purpose of Study	Sample Description	Instrument/s	Training Content	Development of material	Findings
James, D. T., Gibson, F., McAuley, G., McAuley, J. 1996	To introduce older learners to information technology through life history writing	12 older learners (56-88 yrs); compared to younger group (18-45 yrs); comparison used to investigate ease of learning and ease of use of technology.	-observation; note taking; 3 questionnaires--mental health, attitudes to advanced technology, and ease of learning and ease of use.	commercial word processing software (Microsoft Works)	13 week course (1/wk x 2/hr x 10/wks); informal with min of 2 tutors in every class	-GHQ scores were mostly so high as to be incapable of significant improvement; attitudes towards computers and advanced technology similarly showed a ceiling effect; ease of use statements showed significantly greater confidence by younger group.
Kay, R.H. 1993	To test a practical, useful, multi component computer ability measure that could be used for research	647 preservice teachers (21-52 years) in 4 Ontario universities	-Computer ability Measure (CAM); software ability subscale; awareness of computers in society subscale; perceived control subscale	none	none	The expectation that higher ability would correlate significantly with mathematical ability, attitudes toward computer and other measures of computer ability was confirmed.
Kay, R. H. 1992	To examine the process of knowledge construction in a computer environment	6 grad. students aged 25 - 31 yrs 2 beginners 3 intermediate 1 advanced	-think aloud protocol -videotaped (60 min) -questionnaire	commercial software spreadsheet (Lotus 1-2-3, version 2.2)	-protocol analysis; self-directed learning	Previous computer knowledge did not guarantee success and often inhibited learning; subjects used a variety of metaphors to ground new knowledge; a subject's global perception of a learning activity had considerable influence on success of task completion; use of computer terminology effected their progress through certain tasks.

Author/Year	Purpose of Study	Sample Description	Instrument/s	Training Content	Development of material	Findings
Klein, J. D. Knupfer, N. N. Crooks, S. M. 1993	To compare the attitudes and performance of re-entry and traditional college students enrolled in a computer literacy course.	213 (63 male, 150 female) college students; 59 re-entry students; 42% classified as older learners	-Computer attitude survey (3 subscales--general attitude toward computers, self-efficacy in learning specific computing skills and interest in learning specific skills) material gathered before course. -Performance on computer skills and knowledge examined at the end of the course.	course included computer knowledge and skills in four units (word processing, spreadsheets databases and computer graphics)	16 week course -large group lectures 2/week (75 min); small-group labs included practices exercises included instructions on how to complete exercises.	-Re-entry students had more positive attitudes toward learning about computers than did traditional students. -Re-entry student performed significantly better than traditional students on each of the four knowledge tests. -No significant differences found between re-entry and traditional students on any of the application projects.
Lambrecht J. J. 1993	To test whether the assumption that the visual display and rapid recalculation capabilities of spreadsheets would positively affect the learning of mathematics concepts	Two groups; group 1- 8 academy of finance students; group 2- 20 secondary-level business program students	-Pre and Post-tests	spreadsheet software; included tutorial spreadsheet templates developed for student use as drills	not specified	-Drills resulted in achievement gains

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Lewis, L. H. 1988	To determine: -attitudes of low-literate adults; -determine if the construct "computer anxiety" characterizes this group of adults; -if there are differences in adults' attitudes toward computers based on selected variables of gender, age, education level or prior computer use	666 adult basic education students	-Adults' attitudes toward computers inventory (prior to introduction of computers) 15 statements (5 point Likert scale); one open ended question;	-not specified	-not specified	-Results indicated very positive attitudes toward computer with little variation in the attitudes of this group; -this population appears to feel little threat from technology;
Mack, R. L., Lewis, C. H., Carroll, J. J. 1983	To provide a better understanding of how people learn to use computer systems and the problems they experience.	10 office temporaries	-think aloud protocol -tape-recorded -screen interaction video-recorded	-Four half days (four were asked to learn a full-screen editor- with a command based interface) (six were asked to learn a dedicated word-processing system - with menus)	Participants were provided with a self-study manual written by researchers but patterned on a commercial word processing system	-Learners experienced frustration and learning took longer than expected; learners did not know what is relevant to understanding and solving problems; learners made interpretations of their experiences and this may prevent problem solving; learners do not always read or follow directions; learners confused by feedback messages; help facilities do not always help.

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Massoud, S. L. 1991	To investigate the relationship between computer attitudes (anxiety, confidence, and liking and the selected variables of age, gender and computer knowledge among adult basic education students	252 adult basic education students	-Participant inventory survey; -Computer attitude scale; -Computer competence instrument (4 point Likert scale);	-not indicated	-none	-All basic education learners were found to have fairly positive attitudes, however males were found to have more positive attitudes than females toward computers; -No significant relationship in the mean level of the Computer attitude scale was found with respect to age; -Computer knowledge was found to be significantly related to all of the attitudes studied;
Morris, J. M. 1994	To uncover the attitudes that older adults bring to and take out of a basic computer course	12 adults aged 60+ -three groups accommodated	-pre post attitudes instrument (5 point Likert scale) -learners asked to keep computer interaction diary to log specific problems	not indicated	-Basics of personal computer including hardware, software, DOS interface. Introduction to desktop publishing and spreadsheets	-Attitudes survey results indicate many positive attitudes before the course, with most negative attitudes disappearing after course. -Diary entries indicate frustration and feeling of being overwhelmed in the beginning; participants were also happy that class consisted of only older learners.
Mruk, C.J. 1987	To compare the learning patterns of nontraditional adult learners who were learning to use basic computer skills with those of traditional college students	Two groups 55 students in each	-survey of expectations (at start of course) -follow-up survey (at end of course) -Kolb Learning Style inventory	Traditional learners were full-time college students; Nontraditional learners attended part-time evenings	Introductory computer course; focussed on basic computer terms, introduction to a personal computer and introductory programming in BASIC	-Both groups encountered the computer as anxious learners. -Hands-on time and practical uses (word processing, spreadsheets) rated most desirable by all. -Traditional learners spent more time studying than nontraditional learners -More nontraditional learners indicated enjoyment of the class and far more nontraditional learners indicated they experienced increased self-esteem as a result of the course

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Raban, A. 1988	To explore the relationship between computer attitudes and achievement	79 undergraduates at a large public university	three self-report inventories to assess learners previous experience with computers, learning preferences and attitudes toward computers Post- training performance and knowledge tests	Two types of training materials: guided exploration and instruction-based -Tutorial participants were provided with two printed instructions sheets and a checklist of tutorial topics. -Guided exploration based training participants explored the system, utilizing built-in Help while working on the actual word processing program. An initial guidance included four printed instruction sheets.	-Word Processing system (Word Star). -2 sessions x 1.5 hrs each; groups of 8 learners at each session	-Learning by guided exploration led to training outcomes which were better than those resulting from instruction-based learning; -Learners performed better after training when assigned to their preferred learning method; -Results related to computer attitudes were all nonsignificant.
Russell, A. 1995	To understand the learning stages of naive adult email users	8 adult teacher librarian students	-self described explanations of how students learn to use the technology; replies from researcher encourages further metacognitive reports.	commercial email software	For 3 weeks students learn (process not described but support from experienced users provided) email software and apply it by taking on role of fictional characters and replying to children's letters.	-Six stages of learning identified; not all learners commenced at stage 1 not did they take the same time to pass through each stage; in early stages technical and moral support required by learners; early frustrations were displaced by satisfaction of positive experiences when applying technology to "real" world applications.

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Swan, K. Mitrani, M. 1993	To study possible differences between student-teacher interactions occurring during computer-based learning and student-teacher interactions occurring during traditional classroom instruction	185 at-risk students; 13 teachers and para-professionals; in two high schools; seven remedial reading and seven remedial mathematics classes	-observation (schedules devised by researchers using a descriptive rating scale and a frequency-count to record all student-teacher interactions during 15-minute periods) -26 observations--6.5 hours total	-two different integrated learning systems, CCC and CNS (both systems competency based, hierarchial systems--both provide immediate feedback to students, track student progress and provide reports for teachers)	-Reading or Mathematics--remedial classes -No further details provided	-Student-teacher interactions were more student-centered and individualized during computer-based teaching and learning than during traditional teaching and learning.
Zandri E., Charness N. 1989	To determine effective methods for training older adults to use application software; to discover how training techniques influenced attitudes toward computers	Forty-six computer novices; 22 (20-39 yrs old) 24 (58-84 yrs old)	-20-item computer attitude questionnaire pre- and post training (5 point Likert scale) -one question assessed preference for learning alone or in a group -test at end of course	-Three small rooms- each with personal computers -Participants were either partnered or worked alone;	-Four sessions of 3 hours each; -self-paced method used. -Jargon sheets delivered to half of the participants 3 days before training but returned on first day of training.	-Partnered subjects received half the hands-on training and achieved equal or higher test scores -Older adults required twice the amount of time to complete session compared to younger learners and required four times more help -Those who received jargon sheets took less time and asked fewer questions; younger learners who received jargon sheets had lower test scores than those who did not; -Poorest attitudes were held by older learners working alone who did not receive jargon sheet. Most favorable attitudes were held by young partnered learners with a jargon sheet.