



The use of real-life learning strategies in personal and career development situations by students at Eastern Idaho Technical College
by Daniel J Strakal

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education
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Abstract:

The purpose of this study was to investigate the relationship between learning strategies used in personal life learning situations and career development learning situations by students at Eastern Idaho Technical College (EITC) in Idaho Falls, Idaho. The study involved five components. First, the study investigated the relationships between uses of learning strategies in career development and personal life learning situations. Secondly, the study analyzed the following demographic information as it pertained to students' learning strategies: Age, gender, and type of program (certificate or degree) in which enrolled. Thirdly, the study investigated whether adult students enrolled in different occupational areas used different learning strategies. Fourth, the study determined if trends emerged that showed the potential for clusters of characteristics relating to learners. Fifth, the study investigated what learning strategies potential employers of adult students preferred in entry-level employees.

Data were collected from scores generated on the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS) instrument, information collected on demographic surveys, and data collected from student participant focus groups. Participants included 219 students and 65 employers.

Statistics used in the study were descriptive statistics using frequency counts and statistical comparisons, discriminant analysis, and cluster analysis.

It was concluded that (a) SKILLS is a practical tool to determine whether students at EITC use different learning strategies in personal life and career development learning situations, (b) SKILLS may be an effective tool to assist adults enrolled at EITC to complete their programs of study, (c) knowing the learning strategies employers prefer may help EITC students obtain employment, (d) age, gender, level and type of program in which enrolled all influence learning strategy selection, (e) EITC students are not necessarily using the same strategies preferred by employers, (f) distinct learning groups exist among full-time students at EITC.

Recommendations included that an adult learning strategies course be implemented at EITC; that in-service or other training be given to career development trainers/counselors to alert them that EITC students use different learning strategies; that this study be replicated at the five other technical colleges in Idaho; that further research be conducted at the secondary, undergraduate, and graduate levels to determine if learning in career development situations varies in these settings; that any future SKILLS studies using focus group interviews carefully plan them in the initial research design; and that further research be performed in the area of which learning strategies are preferred by employers in the Idaho Falls, Idaho region.

THE USE OF REAL-LIFE LEARNING STRATEGIES
IN PERSONAL AND CAREER DEVELOPMENT SITUATIONS
BY STUDENTS AT EASTERN IDAHO TECHNICAL COLLEGE

by

Daniel J. Strakal

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of a thesis submitted by

Daniel J. Strakal

This thesis has been read by each member of the graduate committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

11-2-95
Date

Robert A. Felling
Chairperson, Graduate Committee

Approved for the Major Department

11/8/95
Date

James Mellis
Head, Major Department

Approved for the College of Graduate Studies

12/15/95
Date

Pat Brown
Graduate Dean

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ABSTRACT

The purpose of this study was to investigate the relationship between learning strategies used in personal life learning situations and career development learning situations by students at Eastern Idaho Technical College (EITC) in Idaho Falls, Idaho. The study involved five components. First, the study investigated the relationships between uses of learning strategies in career development and personal life learning situations. Secondly, the study analyzed the following demographic information as it pertained to students' learning strategies: Age, gender, and type of program (certificate or degree) in which enrolled. Thirdly, the study investigated whether adult students enrolled in different occupational areas used different learning strategies. Fourth, the study determined if trends emerged that showed the potential for clusters of characteristics relating to learners. Fifth, the study investigated what learning strategies potential employers of adult students preferred in entry-level employees.

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Statistics used in the study were descriptive statistics using frequency counts and statistical comparisons, discriminant analysis, and cluster analysis.

It was concluded that (a) SKILLS is a practical tool to determine whether students at EITC use different learning strategies in personal life and career development learning situations, (b) SKILLS may be an effective tool to assist adults enrolled at EITC to complete their programs of study, (c) knowing the learning strategies employers prefer may help EITC students obtain employment, (d) age, gender, level and type of program in which enrolled all influence learning strategy selection, (e) EITC students are not necessarily using the same strategies preferred by employers, (f) distinct learning groups exist among full-time students at EITC.

Recommendations included that an adult learning strategies course be implemented at EITC; that in-service or other training be given to career development trainers/counselors to alert them that EITC students use different learning strategies; that this study be replicated at the five other technical colleges in Idaho; that further research be conducted at the secondary, undergraduate, and graduate levels to determine if learning in career development situations varies in these settings; that any future SKILLS studies using focus group interviews carefully plan them in the initial research design; and that further research be performed in the area of which learning strategies are preferred by employers in the Idaho Falls, Idaho region.

CHAPTER 1

INTRODUCTION

Real-Life Learning

In fact, learning is a much more complex phenomenon than can ever be limited to a classroom. It is inextricably connected to how we live our lives, and to the excitement, challenge, motivation, and support woven through our daily experience. (Argyris, et al., 1994, p. S46)

In today's world it is becoming increasingly evident that a definite tie exists between the concepts of adult learning and real-life learning situations. Learning situations for adults enrolled in post-secondary vocational education programs include a myriad of complex and simple activities such as balancing family, work, and school; purchasing a household appliance; finding and keeping a job; planning a vacation; financial obligations; social and cultural responsibilities; studying for an exam; adapting to changing technologies; the list seems infinite.

Many adult learning tasks are performed with the intent of solving immediate problems or challenges in real-life situations. "Such learning usually involves problem solving, reflection on experience, or planning for one of the numerous tasks or challenges of adult life" (Fellenz, 1993, pp. 1-2). Conti and Fellenz (1991) stated that the skills adults use to perform various

learning tasks are learning strategies. "Learning strategies are the techniques or skills that an individual elects to use in order to accomplish a learning task" (p. 64).

Much of the current knowledge related to use of learning strategies by adults developed from research conducted on study skills. In higher education, study skills have been taught in various forms for nearly a century (Conti & Fellenz, 1991). However, McKeachie (1988) stated that "what is different today is that we have a better theoretical understanding of the reasons these study strategies work. Cognitive psychology has developed a set of laboratory research studies and theoretical concepts that are much closer to the natural learning settings in which study strategies have been applied" (p. 3). Mayer (1988) further stated "What is new with the current interest in learning strategies is that it can be based on an emerging cognitive theory of human learning and memory" (p. 21). While study skills focus on how to take notes, outline, and pass tests, learning strategies are used to solve real-life problems (Conti & Fellenz, 1991).

Because no instrument existed to measure adult learning strategies in real-life learning situations, the staff at the Center for Adult Learning Research at Montana State University developed the Self-Knowledge Inventory of Lifelong Learning Strategies or SKILLS instrument (Conti & Fellenz, 1991). "SKILLS is based upon five aspects of learning which are essential to the learning process and that have the potential for improvement through the

refinement of learning strategies. These are the constructs of metacognition, metamotivation, memory, resource management, and critical thinking." (p. 65). These five constructs each contain three associated learning strategies. A detailed discussion on SKILLS, learning strategies, and how they apply to real-life learning situations is presented in the Review of Literature, Chapter 2.

One real-life learning situation that continues to be important to many adults enrolled in post-secondary vocational education programs is finding and maintaining viable entry-level employment while attending school and upon graduation. Career development literature reviewed reflected growing evidence that the burden of seeking, locating, and maintaining such employment has become the responsibility of the individual, rather than the business or corporation. In *FutureWork, The Revolution Reshaping American Business*, Gordon, Morgan, and Ponticell (1994) stated:

The availability of qualified, well-educated, entry-level workers continues to wane across the United States. In 1991 the American Human Resource Association cited a \$6,000 average cost to recruit and train a new entry-level worker. In 1992, the average manufacturer rejected five out of six applicants because they were undereducated. (p. 208)

In regards to this concept of "career self-reliance", Betsy Collard, program director of the Career Action Center in Silicon Valley, California asserted, "You are responsible for your own career; we, your employer, will help provide you the experience and training to keep you marketable, but not necessarily a job forever" (Kiechel, 1994, p. 72). More companies are encouraging employees to assume a larger role in their own career

development. "We will offer opportunities for training and career development, but it's up to the individual to pursue them" (Caudron, 1994, p. 64).

In spite of all the changes in the workplace, the major goals of most businesses are to generate profits and remain viable in the marketplace. A major challenge for many businesses today is how they can create and maintain a profitable state while remaining competitive. One area that businesses are investigating heavily is the competitive skills their employees can bring into this equation (Waterman, Waterman, & Collard, 1994). In this era of downsizing, layoffs, and restructuring it is employees who make the critical and best-case decisions in regards to their own career development that will survive (Gordon, Morgan, & Ponticell, 1994).

There is a significant body of knowledge related to career development and practice. The roots of career development theory and practice are usually attributed to Frank Parsons, who founded the Vocation Bureau in 1908 in Boston, Massachusetts (Brown & Brooks, 1990). Parsons (1909) stated his premise of career development as follows:

In the wise choice of a vocation there are three broad factors: (1) a clear understanding of yourself, your aptitudes, abilities, interests, ambitions, resources, limitations and their causes; (2) a knowledge of the requirements and conditions of success, advantages and disadvantages, compensation, opportunities, and prospects in different lines of work; (3) true reasoning on the relations of these two groups of facts. (p. 5)

Factor 2, occupational information, of Parsons's views was upheld and

adhered to by most career guidance practitioners through the late-1930's. Between the 1920's and the 1950's the United States encountered several economic and social factors that caused a shift in emphasis from Parsons's Factor 2 to Factor 1, identification of individual traits (Brown & Brooks, 1990). The collapse of America's economy in the late 1920's and the resulting Great Depression that lasted throughout the 1930's, created a necessity to retrain dislocated workers and find new jobs for them. With the advent of World War II in the 1940's, the focus of job training shifted from retraining dislocated workers to the selection and training of personnel for the armed forces. A technique that evolved from this approach to job training was factor analysis. Stevens (1995) stated that "the general focus of factor analysis is to determine the skill aptitude and temperament requirements of particular occupations and match these with the characteristics of the individual" (p. 37). An additional concept in career guidance brought about by factor analysis was that of psychometric testing. Psychometric testing provides standardized measures to assist in the factor analysis process.

Such testing assumes that individual differences in ability and personality can be systematically related to the variations in occupational categories. It assumes also that workers in different occupations will have different psychological attributes and their adjustment to work is maximized where attributes and job demands are matched accurately. (Stevens, 1995, p. 37)

Further research in the area of factor analysis created several psychometric assessment tests that became popular with career development practitioners. Among the most popular and widely-used were the Minnesota aptitude tests,

the Army General Classification Tests, Meyer-Briggs Assessment, and other occupational-interest inventories, such as those developed by Kuder and Strong (Crites, 1978).

Factor analysis as a career guidance tool began to decline in the 1950's and has continued to decrease since then (Brown & Brooks, 1990; Gordon, Morgan, & Ponticell, 1994; Stevens, 1995). The use of measures of intelligence, aptitude, and temperament to assist in career development has been challenged in regards to its ability to adequately predict occupational success, satisfaction, and work performance (Brown & Brooks, 1990).

From the 1950's to the present the approach to career guidance has placed much more emphasis on counseling individuals to facilitate their own job search efforts (Brown, 1988; Stevens, 1995). Unlike factor analysis, use of this "self-reliant" approach demands that individuals develop skills in solving their own problems rather than relying on tests or counselors providing all the answers. This approach to career theory has been heavily influenced by a variety of psychological and educational sources including the neoanalytical thinking of Erikson and Maslow's needs theory (Brown & Brooks, 1990). A detailed summary of career development theory is presented in Chapter 2.

In summary, adults enrolled in post-secondary vocational education programs have a variety of learning needs and challenges related to career development and in their personal lives. Research dealing with approaches for successful career development has evolved from Parsons's (1909) "matching

men and jobs" approach to the concept of factor analysis which proposed that career satisfaction is based on a combination of the occupation and the individual. Newer trends in career guidance involve counseling individuals to develop a "self-reliant" approach which demands that they learn skills to deal with and solve their own career problems and challenges rather than assuming someone else will provide all the answers. Career development theories, concepts, and practices will be discussed in detail in the Literature Review, Chapter 2.

Statement of the Problem

Some research has been done in an attempt to forge a link between how adults learn and career development. However, these studies have mainly focused on models based on classical behaviorism, learning and personality traits, and factor analysis (Lea & Leibowitz, 1986; Mitchell & Krumboltz, 1984; Stevens, 1995). John Holland postulated the most heavily researched and widely used career choice content theory (Schlossberg, 1986). He stated that personalities of individuals can be categorized into the six types of realistic, investigative, artistic, social, enterprising, and conventional (Holland, 1985). Many other researchers and practitioners have followed Holland's approach and have developed complimentary theories related to self-assessment of the individual, usually based on some inherent trait or set of traits. This

approach of "trait and factor" theory is still the most widely applied by career development practitioners (Schlossberg, 1986).

New theories have emerged that oppose the trait and factor approach to career development. The key difference between these new theorists and the old, is the view "that vocational choice, adjustment, and coping is seen as a lifelong process. Self-concepts change, preferences alter, and the initial career choice is unlikely to be sustained throughout a working lifetime" (Stevens, 1995, p. 38). Given that individuals are not "locked in" to certain vocational choices due to inherent traits or styles suggests that approaches based on traits and styles may not be the best alternatives in assisting them in career development endeavors. Since a major concept of learning strategies is that they vary by individual and learning task, use of learning strategies may be a more efficient way to assist individuals in career development decisions.

Studies done in the area of how adults learn in career development situations using the concept of learning strategies are rare, if they exist at all. Sooner or later, adult students enrolled in post-secondary vocational educational programs will encounter career development learning situations. Simultaneously, they will be required to continue dealing with personal learning situations that occur in daily life. Such adults possess many learning strategies and apply these strategies to varying degrees, depending upon a given learning situation. Little, if any, research has been done to determine if adults use the same learning strategies in personal learning activities as they do

in career development situations. Subsequently, information related as to what learning strategies students in a post-secondary vocational education setting use, the associated demographic factors which may influence why these strategies are chosen, and differences in learning strategies used by various occupational programs is very limited. In addition, information related to what potential employers' expectations and preferences are in regards to learning strategies used by entry-level employees is also very limited or nonexistent.

There are several advantages to gaining information related to adults' use of learning strategies in personal life and career development learning situations. Since learning strategies are flexible, not fixed and stable as are traits, they may be better techniques to solve specific learning tasks encountered in personal life and career development situations. They may be better tools to assist people to learn how to assemble necessary data about themselves, to make career decisions, establish effective work and personal relationships, and be more successful in attaining promotions, transfers, or alternative employment.

Purpose of the Study

The purpose of this study was to investigate the relationship between learning strategies used in personal life and career development learning

situations. It was undertaken to determine if differences existed between learning strategy uses among students in various programs at Eastern Idaho Technical College. This information was collected to further determine if knowledge of learning strategies could be used to assist students in career development learning tasks, assist career counselors in various career exploration and placement activities, assist faculty in development of career-oriented curricula, and determine if employers prefer certain learning strategies in entry-level employees.

The study involved five components. First, the study investigated the relationships between uses of learning strategies in career development and personal life learning situations by adult students enrolled in post-secondary vocational education programs. Secondly, the study analyzed the following demographic information as it pertained to EITC students' learning strategies: Age, gender, and type of program (certificate or degree) in which enrolled. Thirdly, the study investigated whether adult students enrolled in different post-secondary occupational areas used different learning strategies. Fourth, the study determined if trends emerged that showed the potential for clusters of characteristics relating to learners. The fifth, and final component of the study, investigated what learning strategies potential employers of adult students enrolled in various post-secondary vocational education programs preferred in entry-level employees.

The study included two sets of participants: 1) students enrolled in

post-secondary vocational education programs on a full-time basis at Eastern Idaho Technical College in Idaho Falls, Idaho; and 2) representatives from various industries that have shown interest in EITC programs by hiring students in the past or that may hire students graduating from full-time programs at Eastern Idaho Technical College. These industry representatives were also from Idaho Falls, Idaho and the surrounding area.

Research Questions

This study investigated the relationship between learning strategies used in personal learning situations and career development learning situations by adult students at Eastern Idaho Technical College. It further investigated what potential employers are seeking in the way of learning strategies in entry-level employees. Five research questions were addressed in the study:

Research Question 1: Using a modified version of SKILLS, is it possible to determine differences in uses of learning strategies in personal life and career development learning situations among adult students at Eastern Idaho Technical College?

Research Question 2: Using a modified version of SKILLS, is it possible to discriminate in uses of learning strategies in personal life and career development learning situations by students at EITC based on the demographics of age, gender, and level of program in which enrolled

(certificate or degree)?

Research Question 3: Using a modified version of SKILLS, is it possible to distinguish differences in uses of learning strategies in personal life and career development learning situations by students at EITC in the following occupational areas of study: Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations?

Research Question 4: Is it possible to determine if distinct clusters or learning groups exist among students at Eastern Idaho Technical College based on SKILLS scores of learning strategies used in personal life and career development learning situations?

Research Question 5: Using a rank-order survey based on the learning strategies that comprise the SKILLS instrument, is it possible to determine the learning strategies preferred in entry-level employees by potential employers of students from the various occupational programs at Eastern Idaho Technical College?

Significance of the Study

Information gathered in this study related to how adult learners use learning strategies in personal life and career development situations has the potential to significantly impact teaching, training, learning, and development

circumstances and outcomes in both post-secondary and industry settings.

Further, knowledge about adult learning strategy use can be utilized to enhance career development curricula and assist career and job placement counselors in better determining the true needs and capabilities of their clients. In addition, knowing which strategies are preferred by potential employers can assist entry-level workers in their goals of gaining and retaining viable employment.

Would training in the use of learning strategies increase students' potential in college and the job market? Should career development college courses, corporate workshops, and job service counseling centers incorporate the approach of blending learning strategies assessments into their respective frameworks? Is the possibility of gaining and keeping employment enhanced by knowing one's own learning strategies as they relate to the job? This study added to the foundation of knowledge for these considerations by determining if there is a relationship between how students learn in personal life and career development situations. The study also investigated the variables of age, gender, and level of program in which a student is enrolled to determine if there are differences in what learning strategies are used by students.

Additionally, the study determined if distinct clusters or learning groups existed among students at Eastern Idaho Technical College. Finally, the study investigated the learning strategies employers prefer most in entry-level employees.

The link between learning and performance is being strengthened in the

workplace. Many experts believe that learning is the key to finding and maintaining viable employment into the 21st century (Argyris, et al., 1994). Along with job performance, most companies are also encouraging employees to take charge of their own career management. Learning how to work in teams, how to network among other professionals, and how to identify the next rung on the career ladder are increasingly up to the employee, not the employer (Caudron, 1994).

In addition to career responsibilities, adults are also in charge of their personal life learning challenges. Employment aside, the influx of technology, economic concerns, family responsibilities, leisure time activities, and other personal learning challenges must also be met by today's adult learner. This study determined how adults learned in personal life, as well as in career development situations. The information presented in the study can be used by managers and employees alike to better assist in motivation and performance, both in and out of the workplace.

The need for adults to adopt a "learn to learn" approach to life, both on and off the job, is critical (Argyris, 1994). Little research has been done on how adults apply learning strategies in career development and personal life situations. The significance of this study is it begins the process of defining learning strategies adults use in these situations, begins to list the learning strategies preferred by employers, and determines if assorted demographic variables determine which strategies adults use in these learning situations.

Definition of Terms

Career Development: The outcomes of interaction between individual career planning and institutional career management processes (Carnevale, Gainer, & Meltzer, 1990, p. 258). For the purposes of this study, the terms career development, career management, career planning, and career self-reliance were used interchangeably.

Critical Thinking: A reasonable, reflective thinking focused on deciding what to believe or do. Includes identifying and challenging assumptions, challenging the importance of context, imagining and exploring alternatives, and reflective skepticism (Brookfield, 1987, p. 12).

Employer Participants: Individuals who sat on 1 of the 13 advisory committees or were recommended by a member of 1 of the 13 advisory committees or had hired a graduate from 1 of the 13 full-time programs in an entry-level position within the previous 2 years.

Learning Strategies: The techniques and skills that an individual elects to use in order to accomplish a specific learning task. Such strategies vary by individual and by learning objective. Often they are so customary to learners that they are given little thought; at other times much deliberation occurs before a learning strategy is selected for a specific learning task (Fellenz & Conti, 1989a, p. 1).

Memory: Storage, retention, and retrieval of knowledge. Memory strategies associated with adult real-life learning are rehearsal, organization, external aids, and memory application (Fellenz, 1993, p. 18).

Metacognition: Thinking about the process of learning and emphasizing self-regulatory tactics to insure success in the learning endeavor (Fellenz & Conti, 1989a, p. 2).

Metamotivation: Tactics and techniques used by the learner to provide internal impetus in accomplishing learning tasks, not necessarily in an educational program (Fellenz, 1993, p. 10).

Resource Management: Identification of appropriate resources, the critical manner in which they are used, and/or the use of human resources in learning situations or activities (Fellenz, 1993, p. 27).

SKILLS: Acronym for the Self-Knowledge Inventory of Lifelong Learning Strategies. A learning strategies inventory with established validity and reliability which usually asks respondents to rate 15 learning strategies in 4 of 6 scenarios commonly found in everyday life and which call for a learning effort on the part of the respondent (Fellenz, 1993, p. 2).

Student participants: Full-time students who volunteered for the study and who met all entrance requirements for their program of study, were enrolled for 12 or more credits per semester, and remained in good academic standing throughout the length of this study.

Assumptions and Delimitations

Assumptions:

There were two sets of instruments used in the study, one for student participants and one for employer participants. It was assumed by the researcher that the most accurate and reliable responses to the instruments used in the study could be best obtained under controlled situations. Therefore, instruments were distributed to and completed by the participants and were reviewed for completion and collected by the researcher all within the same sessions. It was assumed that both sets of participants answered the instruments and biographical questionnaires truthfully and in an unbiased manner. All participants in this study volunteered to respond and complete the instruments.

Delimitations:

The study was delimited to full-time students enrolled at Eastern Idaho Technical College (EITC) during the spring semester 1995. Since traditionally over 75% of job placements come from employers familiar with EITC's programs, employer participants were delimited on the basis of the following criteria: The employer participant either sat on an advisory committee for 1 of the 13 full-time occupational programs, was recommended by a member of 1 of the 13 advisory committees, or had hired a graduate from 1 of the 13 full-time programs in an entry-level position within the previous 2 years.

Summary

This study focused on the different learning strategies used in personal life and career development learning situations by adult students enrolled in vocational education programs at Eastern Idaho Technical College. The study further investigated what learning strategies are preferred by potential employers of students graduating out of the various occupational programs at Eastern Idaho Technical College. The study utilized modified versions of the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS) instrument developed by the Center for Adult Learning Research at Montana State University. In addition, follow up focus group interviews dealing with learning strategies and behaviors utilized by various groups were also conducted. Detailed information on career development theory, the SKILLS instrument, and adult learning strategies is discussed in the Literature Review, Chapter 2. Information related to the choice and use of research methods involved in the study is presented in Chapter 3. Chapter 4 investigates the various research findings of the study. Finally, Chapter 5 presents a conclusion and summaries of the study and recommendations based on findings of the study.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Introduction

Many aspects in the world of work, including the uncertainty of finding and keeping viable employment, have become increasingly challenging for today's adult. In *The End of the Job*, William Bridges stated "We are told the only way to protect our jobs is to increase our productivity, but then we discover that reengineering, using self-managed teams, flattening our organizations, and turning routine work over to computers always makes many jobs redundant" (p. 62). Technological advancements, cultural diversity issues, company "right-sizing", global competition, and other issues continue to deluge employees and employers alike. Added to these increasing challenges in the workplace is the element that adults must also deal with day-to-day issues that occur outside of the job environment. Family, economic, social, and other responsibilities must also be met on a regular basis.

Many adults are finding it increasingly difficult to keep up with the various and sudden changes occurring in and out of the work environment. But it is the employee that can successfully learn to juggle career development and personal life challenges that will subsequently succeed both in and out of

the workplace. "Employees will have to anticipate where they can add value to their companies and take charge of their own destinies" (Richman, 1994, p. 47).

Learning to increase one's potential on the job is key to surviving on the job today and into the future. Change occurs so rapidly that people must constantly retool and rethink the things they are doing (Argyris, et al., 1994). Learning and performance have also become increasingly linked in the workplace. "Learning and performing will become one and the same thing. Everything you say about learning will be about performance. People will get to the point that learning is everything" (Argyris, et al., 1994, p. S38). If employees and organizations are to thrive, learning must become a force in strategic planning that educates people to their highest potential (Gordon, Morgan, & Ponticell, 1994).

Career Development

Occupational and Vocational-Based Career Development

Frank Parsons (1909) is generally credited with being the first to begin evolving a formal theory related to career development. He used his three-step schema as a conceptual framework for career decision making in the early 1900's. Parsons postulated that three factors were necessary to achieve job satisfaction: 1) a clear understanding of yourself, your aptitudes, abilities,

interests, ambitions, resources, limitations and their causes; 2) a knowledge of the requirements and conditions of success, advantages and disadvantages, compensation, opportunities, and prospects in different lines of work; 3) true reasoning on the relations of these two groups of facts (Parsons, 1909, p. 5). He reasoned that any worker's satisfaction and success would increase if that worker chose a vocation, rather than simply hunted for "just any job."

Parsons asserted that the employer of such a worker would also benefit by incurring decreased costs and increased efficiency related to the workers's performance (Brown and Brooks, 1990; Parsons, 1909).

In the early 1900's, America was emerging as a leading industrial nation. Parsons's (1909) approach to career development was based on the premise that there was a need to distribute workers, especially immigrants, across the occupations related to these emerging industries. In addition, he advocated that a better approach was needed in regards to preparing youths for the adult world of work.

Two major developments that evolved from Parsons's approach were vocational guidance and vocational education programs. Vocational education was developed in response to criticism from industry that public education had become too "bookish" and had little or no practicality toward the workplace. An offshoot of vocational education was vocational guidance, which was intended to help youth make rational, informed decisions about suitable occupations (Herr & Cramer, 1988; Parsons, 1909).

From the 1890's to the early 1930's, America was mainly concerned with the needs of industry and not the individuals who worked in industry. As a result, the primary focus of vocational guidance and education became the study of the occupation, rather than examining the "human side" of the workplace. The prevailing thought of the time was that simply knowing enough information related to an occupation was sufficient to know which vocation to choose. For the most part, this focus ignored any study of the psychological or sociological aspects of individual preferences, interests, and values related to the workplace (Brooks & Brown, 1990). This model of career development, mainly based on Parsons's theory, was dominant up until the 1940's, at which time new theories begin to emerge based on the study of both the occupation and the individual. This combination formed the basis for a new view of career development, the trait and factor model.

Trait and Factor-Based Career Development

The use of trait and factor as a means for career choice began early this century. Frank Parsons, a pioneer in the field of vocational psychology laid the basis for trait and factor theory when he postulated in his 1909 book, *Choosing a Vocation*, that optimal career choices required three steps: knowledge of self, knowledge of work environments, and some method of matching one's characteristics to those of the work environment. Further, Parsons stated that: (a) individuals differ in their job-related interest, needs,

and values; (b) jobs differ in the amount and nature of the rewards they offer and in the kinds of demands they make of the employee; and (c) vocational adjustment is directly proportional to the match between the characteristics of the worker and the characteristics of the environment. "Thus, the means for measurement of individual differences and a useful postulate relating these differences to important career outcomes were in place early in this century" (Betz, Fitzgerald, & Hill, 1989, p. 26).

The trait and factor approach to career development must contain and consider "the characteristics of the individual, those of the work environment, and the match or fit between the two sets of characteristics, often called the degree of congruence or correspondence" (Betz, Fitzgerald, & Hill, 1989, p. 28). This approach diverged from Parsons's (1909) postulations since Parsons was concerned mainly with the study of the occupation, and not with the individual's characteristics.

As World War I, The Great Depression, and World War II impacted the workplace the emphasis in career development theory shifted from Parsons's "vocational-occupational" model to the study of the individual in career development (Crites, 1978). During World War I, vocational psychologists and early career guidance counselors had begun using a modified version of Parsons's model to select and train soldiers. The Depression of the 1930's brought about the necessity to assist thousands of dislocated workers by retraining them to find new work. And the beginning of World War II again

brought about the need to select and train personnel for the armed forces. To meet these and other social and economic driven needs, researchers developed psychometrical approaches to identify and measure individual aptitudes and traits (p. 123).

As support for the trait and factor model of career development grew, so did the sophistication of methods to measure the characteristics of individuals for job selection and placement. The Minnesota aptitude tests (for spatial relations, clerical aptitude, and other work related abilities), the Army General Classification Tests, and several occupational-interest inventories, such as the Kuder Interest Survey and the Strong-Campbell Inventory, all stemmed from the trait and factor theory of occupational choice (Crites, 1978).

The best known modern proponent of the trait and factor model of career development is John Holland. Holland (1985; 1987) postulated that vocational satisfaction, stability, and achievement depended on the congruence between an individual's personality and the environment in which the individual worked. In Holland's model, job satisfaction, stability and achievement were tied to one or more of six personality types. Holland named these types realistic, investigative, artistic, social, enterprising, and conventional. The realistic type likes realistic jobs related to outdoor and technical interests. The investigative type likes jobs that require skills in the intellectual and scientific domains. The artistic type likes jobs in which he or she can be creative, expressive in literary, artistic, musical, or related areas.

The social type is interested in working with people, has social skills but often lacks mechanical and scientific ability. The enterprising type has interests in persuasion, leadership, and speaking. And the conventional type likes jobs that have a high level of detail, computational activity, structure involved.

In summary, trait and factor theory is still the most popular approach to career development theory and practice. It addresses the concept that occupational choice, adjustment, and success are products of the individual and the environment in which that individual functions. An in-depth study done by Betz, Fitzgerald, and Hill (1989) on trait-factor theories in career development prompted the following conclusion:

Optimal career outcomes for the individual can best be facilitated through a congruence between the individual's characteristics and the demands, requirements, and rewards of the environment. The joining of concepts and of individual differences with matching models of career choice led to "trait-factor" approaches to career development. More recently, widespread interest in models of behavior has served to continue and broaden this tradition. (p. 26)

Sociological-Based Career Development

As stated above, the predominant influence on career development theory developed from the trait and factor model. However, the literature reviewed also showed that researchers have considered sociological approaches to career development as well. Hollingshead (1949) assessed how career patterns were affected by socioeconomic status and academic ability of

individuals. His study showed that the very poor and the very wealthy found that entry into occupations near the end of the socioeconomic scales farthest from them were virtually closed. Sewell, Haller, and Strauss (1957) studied the relationships of workers between their parents' status, their amount of schooling, occupational status at their first job, and occupational status at their current job. Musgrave (1967) offered a sociological-based theory of occupational choice. More recently, Krumboltz (1979) postulated the theory of a social learning approach to career decision making. He stated that individual personalities and behavioral repertoires of people stemmed from their unique learning experiences, rather than from innate developmental or psychic processes.

Relatively little research has been done in the sociology of career development and most theories and approaches to career development "adhere to psychology and focus on the individual, rather than sociology [which] focuses on social variables that influence choices and career status" (Brown, 1990, p. 4). However, as will be described in the following subsection, many researchers have begun to develop theories based on sociological and other approaches to career development.

Current and Emerging Trends in Career Development

Rapidity of change has become the central issue facing most businesses and employees today (Gordon, Morgan, & Ponticell, 1994; Lee, 1992;

Stevens, 1995). Changes that have occurred in the workplace include an increased number of female, minority, disabled, and older workers; expansion in the development and use of technology, such as computers and telecommunications equipment; and the "right sizing" of businesses.

Steinmetz's (1976) study revealed that between 1750 and 1900 human knowledge doubled. From 1900 to 1950, it doubled again. Each decade since 1960 has seen a further acceleration in the pace of change.

Many researchers have challenged the trait and factor model as the best approach to assist workers in dealing with these changes. Brown (1990) asserted that career development professionals must assist people in dealing with the various circumstances of their entry, and continuation, into the world of work. "To be effective in assisting people with the diverse and challenging needs in career development today and in the future, sound theoretical and practical applications will need to be developed and evaluated" (p. 511).

Hackett and Betz (1981) postulated a theory based on "self-efficacy."

They stated that

while gender differences in vocational behavior are often supposed to be the result of differential sex-role socialization processes, career development theories have failed to specify the mechanisms through which societal beliefs and expectations affect women's vocational behavior. (p. 228)

Hackett and Betz also stressed that the limited position of women in the workplace was due to a lack of strong career-related personal efficacy.

Gottfredson (1981) postulated a developmental theory of occupational

aspirations. Her model contained several basic tenets that were based, at least to some degree, on sociology. She stated that people differentiate occupations based on several human factors or "dimensions." These dimensions were (a) sex type, level of work, and field of work; (b) that people assess the suitability of occupations according to their self-concepts and the amount of effort they are willing to put forth to enter the occupations; (c) that elements of the self-concept that are vocationally relevant are gender, social class, intelligence, interests, values, and abilities; (d) that vocationally relevant elements of the self-concept are developed during four stages of cognitive development; (e) that as people progress through these four stages, they successively reject occupations as unsuitable on the basis of self-concept; (f) that people's occupational preferences are the product of job-self compatibility and judgements about the accessibility of jobs; and (g) because the jobs people view as suitable for themselves are not always available, they must compromise. Gottfredson's explanation of why women were in lower-status, lower-level positions was that these occupations were compatible with their self-concepts and views about accessibility.

Farmer (1985) developed a multidimensional social learning-oriented model that proposed career motivation in adolescents develops through the three interacting influences of background variables (gender, race, social status, school location, age); personal and psychological variables (self-esteem, success attributions, values, homemaking commitment); and environmental

variables (support from teachers and parents, support for women working).

Another multidimensional model developed by Fassinger (1985) incorporated a set of variables similar to that of Farmer's (1985) model. These included background variables of previous work experience and academic success; environmental variables of role-model influence and perceived encouragement; and psychological variables of attitudes toward work and sex-role attitudes. Fassinger's model hypothesized that ability, instrumentality, feminist orientation, and family orientation influenced career orientation and mathematics orientation, and the latter two variables in turn influenced career choice.

In summary, even though the literature reviewed showed that most past and current career development theory is based on psychology and the trait and factor approach, new research is being done with more sociological and environmental factors in mind. This seemed to be a prevailing belief as many experts in career development today echo the sentiments of nationally certified career counselor and career development researcher Duane Brown who stated that

career development theory is inadequate because of its individualistic, nonenvironmental focus and its failure to attend to the role of psychological deficits in career problems. There is a need to integrate systems theory with the individualistic psychological perspectives usually taken by career development theory. (Brooks, 1990, pp. 392-393)

Learning in the WorkplaceCareer Self-Reliance

The literature reviewed indicated that more of the responsibility for seeking, locating, and maintaining employment has fallen on the individual, rather than on the business sector, and that employees must become career self-reliant. "Companies around the nation are passing the bulk of responsibility for career-management on to employees. We believe employee career advancement is a joint responsibility. We will offer opportunities for training and career development, but it's up to the individual to pursue them" (Caudron, 1994, p. 64B).

As the workplace continues to become dominated by computerization, improved machinery, and new ways of organizing work, many blue- and white-collar jobs have been permanently lost. Between 1982 and 1992 the country's 500 largest manufacturers cut nearly 4 million jobs, with 70% of those being white-collar jobs (Myers, 1992). During the 1980's new technology enabled United States industries to increase output by 30% and decrease labor rolls by 4%. In 1993 this trend extended from manufacturing into other industries, affecting skilled workers such as computer designers and programmers (Zachary & Ortega, 1993). "Lifelong education for all American workers who will continuously experience job obsolescence is one of the realities of advancing technology" (p. A1).

As global competition increases, the American workforce must keep up with learning in the workplace to remain competitive. Gordon, Morgan, and Ponticell (1994) stated that there were up to 84 million currently undereducated employees in the United States, many of whom were incapable of handling almost any job in a high-tech workplace. In 1992, American businesses invested over \$40 billion in employee training and development, mainly to become more competitive (Lee, 1992). However, Boyett and Conn in *Workplace 2000* (1992), estimated that only 10 to 15 percent of all knowledge and skills related to this training was retained and used on the job. They further estimated that an 80 percent retention rate of training-related knowledge and skills is necessary if America hopes to beat its global competition.

Skills Employers Want

Another aspect of individuals taking the responsibility of learning in the workplace is identifying what skills are needed and desired by potential employers. The literature suggested that the workplace is becoming more technical and employees will need to keep pace with technological advances. There are even modified definitions of learning that deal with the technical environment. For example, in *Dynamics of Technological Change*, Girifalco (1991) stated that "learning is the improvement in the efficiency of people as they gain experience with a new product or process, and the learning curve is

the functional relation between human efficiency and experience" (p. 48).

In 1992, United States Secretary of Labor Lynn Martin distributed the Secretary's Commission on Achieving Necessary Skills (SCANS) report *Learning a Living: A Blueprint for High Performance*. It contained five competencies and a three-part foundation of skills and personal qualities needed for high performance in the workplace. The five workplace competencies were: resources--knowing how to allocate time, money, materials, space, and staff; interpersonal skills--being able to work on teams, teach others, serve customers, lead, negotiate, and work well with people from culturally diverse backgrounds; information--being able to acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information; systems--having the ability to understand social, organizational, and technological systems, monitor and correct performance, and design or improve systems; and technology--can select equipment and tools, apply technology to specific tasks, and maintain and trouble shoot equipment. The three foundation skills included basic skills--reading, writing, arithmetic and mathematics, speaking, and listening; thinking skills--ability to learn, to reason, to think creatively, to make decisions and to solve problems; and personal qualities--individual responsibility, self-esteem and self-management, sociability, and integrity (p. 6).

In *Workplace Basics: The Essential Skills Employers Want*, Carnevale, Gainer, and Meltzer (1990) reported that

today's workplace demands not only a good command of the 3 R's, but a new kind of worker with a broad set of workplace skills--or at least a strong foundation in the basics that will facilitate learning on the job. For employers, the basic workplace skills challenge has been coming into focus for some time. Reading, writing, and math deficiencies have been the first to appear in the workplace; but increasingly, skills such as problem solving, listening, negotiation, and knowing how to learn, as well as teamwork, self-esteem, leadership and motivation/goal setting, organizational effectiveness, employability/career development, oral and listening skills, and creative thinking are also viewed as essential. (p. 2)

The literature reflected that today's adult faces many challenges related to learning in, and about, the new workplace. According to Gordon, Morgan, and Ponticell (1994), "In order to perform the elastic, evolutionary jobs of the future, more employees than ever before must develop leadership abilities that require higher-level thinking and problem-solving skills. Static jobs for life have become a relic of the historic past" (p. 1).

Another aspect employers wanted in employees was that of transferable or transitional skills that can be applied to various situations and workplace activities. As can be seen from the literature referenced thus far, adaptability is a key element in career development and learning in the workplace. Transferable skills are important for the development of such adaptability. Transferable skills are "broadly applicable, widely useful, and durable skills in which relatively high levels of proficiency have been attained" (Pratzner & Ashley, 1985, p. 14). A list of transferable skills would include categories such as communications, computation, problem solving, decision-making, planning, reasoning, and interpersonal skills (p. 14).

Literature in regards to learning in the workplace suggested that, although companies are willing to help, most employees are at least in some measure, responsible for their own career development. In addition, it is becoming more apparent that employers are more likely to hire and keep employees who have transitional, basic, and technical skills required in today's workplace. Meg Wheatley, author of *Leadership and the New Science: Learning About Organization From an Orderly Universe*, summed it up this way:

We would be hardpressed, from where we sit today, to imagine the transformation of learning in the workplace that will occur during the next decade. At present, too many of us view learning as a nice addition to our lives, but not as the essential characteristic that contributes to our ability to prosper in business. Yet in the workplaces of the future, learning will be ubiquitous, unavoidable, constantly challenging, and frequently chaotic. Learning will be a description of how we live--the difference between our survival and our demise. (Argyris, et al. 1994, p. S47)

Learning Strategies and the SKILLS Instrument

Adults enrolled in post-secondary vocational education programs have a variety of learning needs and challenges related to career development and in their personal lives. Career development pertains to situations in which "real-life learning" is involved. Fellenz (1993) stated that "real-life learning usually involves problem solving, reflection on experience, or planning for one of the numerous tasks or challenges of adult life" (pp. 1-2). Real-life learning tasks

encompass a myriad of possibilities, from shopping at the grocery store to studying for a real estate exam. However, much of the time real-life learning situations are "complicated, involved, and long-enduring" (Fellenz, 1993, p. 2).

How can individuals solve problems and overcome challenges related to career development learning situations? One way may be through the use of learning strategies. "Learning strategies are the techniques or skills that an individual elects to use in order to accomplish a learning task" (Fellenz, 1993, p. 1). Several researchers have investigated and contributed to the use of learning strategies (Weinstein, 1988; McKeachie, 1988; Mayer, 1988). Weinstein (1988) and McKeachie (1988) have focused mainly on learning strategy use in traditional post-secondary settings. Mayer (1988) stated, "What is new with the current interest in learning strategies is that it can be based on an emerging cognitive theory of human learning and memory" (p. 21).

After an exhaustive study of the literature in the fields of adult education and cognitive psychology, Fellenz (1993) identified five important areas of learning strategies (p. 3). These were critical thinking, memory, metacognition, metamotivation, and resource management. Each of these five areas is composed of three learning strategies, for a total of 15 learning strategies that an individual may use in various real-life learning situations. These 15 learning strategies flow from the 5 specific learning areas of critical thinking, memory, metamotivation, metacognition, and resource management

mentioned above. Following are the five areas and their associated learning strategies. Critical thinking is composed of the strategies of testing assumptions, generating alternatives, and conditional acceptance; memory is composed of the strategies of organization, external aids, and memory applications; metacognition is composed of the strategies of planning, monitoring, adjusting; metamotivation is composed of the strategies of attention, reward/enjoyment, confidence; and resource management is composed of the strategies of identifying resources, critical use of resources, use of human resources.

Critical Thinking

Many skills have become increasingly important in the workplace and in career development for adults. One of these skills mentioned frequently in career development literature is critical thinking. Adults are being constantly asked to process and evaluate information both in and out of the workplace. Researchers that have investigated various facets of critical thinking include Argyris (1982), Brookfield (1987), Meyers (1986), and Stice (1987). These researchers all have declared that the development of critical thinking skills is essential in today's schools and the workplace. In adult education and adult learning circles, Brookfield (1987) is probably the acknowledged leader in the study of critical thinking. He defines critical thinking as "a reasonable, reflective thinking focused on deciding what to believe or do. This includes

identifying and challenging assumptions, challenging the importance of context, imagining and exploring alternatives, and reflective skepticism (p. 12).

Bloom (1956) is usually given credit for an educational definition of critical thinking. This definition stemmed from his studies in learning taxonomy. Bloom described analysis as breaking down an idea into its various parts so affiliations between ideas are made clear. Synthesis, on the other hand, was described as the operation of assembling items to make up new patterns or structures. And evaluation was described as the ability to judge the value of ideas or related entities using appropriate criteria.

The SKILLS critical thinking strategies used in this study were testing assumptions, generating alternatives, and conditional acceptance. Testing assumptions refers to the adult learner's decision to critically judge assumptions used in the learning task and to evaluate information accumulated concerning the assumptions relative to the learning task (Fellenz, 1993). Generating alternatives refers to the adult learner's ability to create additional alternatives for task resolution within the context of the learning task. Conditional acceptance refers to the adult learner's continual review of information after tentatively deciding on a solution. With conditional acceptance, the learner reflects on the solution to determine if adjustments are needed after acceptance.

Memory

"Memory is the mechanism by which information is stored and retrieved. It is a more abstract process than learning." (Huber, 1993).

There is an inextricable link between memory and learning. If one does not learn, one cannot remember and without remembering, there is no evidence of learning (Long, 1983).

To understand the effect of memory in personal life and career development learning situations, the various roles of memory must be reviewed. These include memory processes, memory structures, and mediating or influencing factors (Paul & Fellenz, 1993). Memory processes are mental activities that store information in memory and the activities that make use of that information (p. 13). Zechmeister and Nyberg (1982) state that mental processes entail encoding or acquisition, storage or retention, and retrieval or recall of information.

The encoding or acquisition process occurs when a mental stimulus is received and interpreted and a representation of that interpretation is stored in memory (Seamon, 1980). "Encoding occurs on many dimensions, including physical, semantic, and syntactic features" (Paul & Fellenz, 1993, p. 14). The type and level of encoding depends on what requirements are necessary to accomplish a task.

Storage or retention occurs when it is necessary for a person to use the information as the basis for the later act of remembering. Retention involves

the acts of storing and forgetting encoded information. "Forgetting may be due to the competition for attention produced by prior learning or learning that occurs following the information targeted for retention" (Paul & Fellenz, 1993, p. 14). Retention is affected by three factors. These are the nature of the material, the use of the material, and the way the material is encoded.

Retrieval consists of the four processes of recognition, recall, recollection, and reconstruction. In general, recall and recognition are the two most important aspects of remembering. The ability to remember through recognition is greater than that by recall (Paul & Fellenz, 1993, p. 14).

The SKILLS memory strategies used in this study were organization, external aids, and memory application. A fundamental task of memory is to organize knowledge. Organizational strategies used in SKILLS include structuring, such as grouping, mnemonics, and creation of memory patterns (p. 19). Strategies which rely on manipulation of the environment, such as external aids are useful to reinforce memory tasks. SKILLS evaluates if this strategy is used by checking to see if one uses such aids as appointment books, lists, or asking to be reminded of certain tasks. Memory application strategies used by SKILLS include remembering and recalling mental images in order to make decisions or solve problems.

Metacognition

Metacognition is an individual's ability to plan, monitor, and evaluate his or her progress in a learning or problem solving task (Deiz & Moon, 1990): "It is a degree of awareness of the skills, strategies, and resources needed to perform a task effectively" (p. 175). Flavell (1976) introduced the concept of manipulation and control of thinking ability in the learning process. Brown (1982) further refined the definition of metacognition as the knowledge and control one has over one's thinking and learning.

From an educational perspective, McKeachie (1988) defined metacognition as an "individual's awareness of and knowledge about cognition and control and regulation of cognition" (p. 3). This emphasis on individual awareness of how one learns effectively, of what the nature of a task is, and the appropriate strategy to use is important in solving problems or making decisions related to real-life learning tasks (Flavell, 1979). Most researchers agree that the processes of metacognition can be grouped into the three areas of planning, monitoring, and adjusting. However, Flavell (1979) and Brown (1983) assert that all of these processes are interactive and interdependent.

Planning, as it relates to metacognition, centers on the best way for one's self to proceed with a specific learning task. Techniques associated with planning are overviewing, skimming, the use into one's personal learning style, and determining the purpose of learning tasks (Counter & Fellenz, 1993). Monitoring involves periodic assessment of how well one is

proceeding through a learning task or project to determine if the learning goal is being addressed. Learning strategies used in monitoring situations are self testing, comparing progress from previous learning situations, asking for feedback, checking new resources for information, and keeping track of diverse steps in learning. Adjusting involves examining information to determine what relationship, if any, it bears to the learning task and revising the learning process if necessary. Effective learning calls for such modification in order to fine-tune or revise the learning situation.

The SKILLS metacognitive strategies used in this study were planning, monitoring and adjusting. Planning in relation to a learning task can be viewed as overviewing, skimming, and various other approaches to assess planning strategies. Examples of monitoring strategies include reviewing of learning plans, assessing if the learner is still on task, and comparing progress to standards or models. Adjustment strategies are seeking feedback, changing one's approach, and deciding when a learning task is complete.

Metamotivation

Motivation is a difficult concept to define as it is described from many different philosophical, psychological, and educational viewpoints (Conti & Fellenz, 1991). Major educational philosophies argue whether a learner can be externally motivated or whether motivation can only occur from within. In adult education, discussion has centered on participation in educational

activities rather than on motivating students to learn.

"Meta" in the term metamotivation "was given to the component to identify it specifically as motivation of the individual to learn and to distinguish it from factors relating to reasons for participation in educational programs" (Fellenz & Conti, 1994, p. 10).

A popular approach to motivation developed by Keller (1987) was the Attention, Relevance, Confidence, and Satisfaction or ARCS Model. Attention focuses an individual's learning abilities on material to be learned. Relevance is the determination of whether or not the learner will continue attending to a learning task. Relevance can be specific and goal directed or can relate to a general feeling of increased competence, self-efficacy, or control over a learning environment. Both Keller (1987) and McCombs (1988) state that a certain level of confidence within learners is necessary for the successful completion of a learning task. To be successful, learners must be confident in their abilities to determine which approaches and strategies will work best for them. "It is clear that continuing motivation to learn is in large part a function of the learner's perceptions of self-efficacy and self-control in learning situations" (McCombs, 1988, p. 142). Meaningful ways of utilizing new knowledge or skills, positive outcomes, and a fulfilling of personal expectations are suggested strategies for instilling satisfaction. Enjoyment and reward include the fun of learning and the satisfaction with the outcome of the learning activity. Wlodkowski (1985) asserted that if learners enjoy a learning

project or task, they are more likely to be, and continue to stay, motivated.

The SKILLS metamotivation strategies used in this study were attention, reward/enjoyment, and confidence. Attention is a process that focuses a learner's abilities toward a learning task. Many factors can determine the time a learner will pay attention to a given learning situation. These range from curiosity and previous experience to a recognition of needing to learn. Reward and enjoyment are related strategies. Reward describes the anticipation of or the recognition of value to oneself after learning a task. Enjoyment includes the fun of learning and satisfaction with the outcome of the learning activity. Confidence in one's abilities to learn is an important motivational strategy. The strategies used in SKILLS remind the learner of past successes or appeal to feelings of confidence in learning situations.

Resource Management

According to Fellenz (1993), resource management is the "identification of appropriate resources, critical use of such resources, and the use of human resources in learning situations" (p. 3). In today's world, learners are challenged with a wide array of informational resources and it is necessary that they be able to choose the appropriate resources in order to make decisions and solve problems.

Effective strategies for resource management begin with identifying and

locating resources. The learner must be able to evaluate which resources to use; decide whether they are worth the time, effort, and possible expense required; and assess their own willingness to use a particular resource. For example, there are many materials readily available in a public library, yet Shirk (1983) has noted that less than 25% of American adults use the library with any degree of regularity. Some prefer computer information, newspaper or magazines, television, or other people as learning resources.

Shaaden and Raiford (1984) discovered that most adults do not possess the necessary educational or informational processing skills to cope with information associated with technological change. This includes the use of computers and television, magazines, and "how-to" books available from various public and private sources.

Tough (1971) found that many adults had significant problems with utilizing learning resources. He observed that, "Certain persons would not or could not give the required help, and certain printed materials were useless. Even when beneficial help was received from certain resources, much of it cost the learner a great deal of time, money, effort, or frustration" (p. 105). Unexpected barriers can emerge during learning projects. For example, learners may not understand written directions, be able to obtain resources, have little or no study time, find that crucial tasks are too difficult, and lack family support related to their learning projects (Smith, 1982). In addition, Smith noted that adult learners found "more printed or audiovisual materials

available on a topic than they know what to do with...[and] reading materials were overly technical or too detailed" (p. 103).

The SKILLS resource management strategies used in this study were identifying appropriate resources, critical use of resources, and use of human resources. Identification of appropriate resources in a learning situation must be accompanied by a willingness to use such resources. Selection of resources always varies according to individual learning goals. Some sources for consideration are print sources, people or models, professionals, and agencies. Critical use of resources involves the need to distinguish between recent and most recent information. Much information today is provided through businesses or agencies having a vested interest in the use made of such knowledge. Human resources can have a powerful impact on learning. Communication skills such as critical listening are essential when dealing with other people as potential resources. Other factors include forming a support mechanism, getting and sharing appropriate information with others, and having an outlet for discussion of potential problems with others in the networking chain.

Summary

In reviewing the literature related career development, learning in the workplace, adult learning, and learning strategies; it appears that the learning

strategies contained in SKILLS may be a useful and viable tool in assisting adult learners in career development situations. There is also a potential use for SKILLS in regards to learning in the workplace and assessing the strengths and weaknesses of adults seeking or looking to maintain employment.

Many facets of the literature overlap, adding support that SKILLS is a viable approach in assisting people to better prepare and attain suitable jobs and/or careers. The fact that many employers are seeking employees with abilities in critical thinking, interpersonal communication, information processing, monitoring, problem-solving, memory techniques, self-motivation, and networking skills is a positive move in the direction of using SKILLS as a career development tool. This is further supported by emerging theories in career development that are beginning to investigate social and demographic variables, such as gender, age, length of time in the workplace, and other aspects of the employee population.

CHAPTER 3

METHODOLOGY

Introduction

This descriptive case study investigated the relationship between learning strategies used in personal life and career development learning situations by adult students at Eastern Idaho Technical College, located in Idaho Falls, Idaho. It further investigated what potential employers of these students preferred in the way of learning strategies in entry-level employees. Gay (1987) stated that descriptive research studies involve "collecting data in order to answer questions concerning the current status of the subjects" (p. 189). Merriam (1988) stated that a case study is a "bounded system which is an examination of a specific phenomenon such as a program, an event, a process, an institution, or a social group" (p. 10). This study involved a social group comprised of 219 full-time students located at a specific institution, Eastern Idaho Technical College. Therefore, participants in this case study were the 219 full-time students at Eastern Idaho Technical College. To measure their learning strategies used in personal life and career development situations and to gather information on certain demographic variables, these students were given a modified version of the SKILLS

learning strategies instrument and a biographical survey under controlled conditions. Results from the learning strategies instrument were also used to generate five distinct clusters of learners. A random sample of learners in each cluster was taken and used to form focus groups to further evaluate differences between the learning groups in a qualitative manner. In addition, potential employers of the full-time students were given a rank-order survey based on the SKILLS learning strategies instrument to determine what learning strategies employers preferred in entry-level employees.

The Setting

Eastern Idaho Technical College (EITC) is a public two-year vocational/technical college located in eastern Idaho. With a service area of nearly 23,000 square miles, encompassing a population of approximately 90,000 people, and serving 17 school districts, EITC has a unique mission and offers a range of programs and services.

Students come from a variety of backgrounds. These may include entering the college directly out of high school, coming from Adult Basic Education and high school equivalency (such as GED) programs, displaced homemakers and/or workers, part of the Job Training Partnership Act program, and other sources.

There were 13 full-time accredited programs at EITC at the time of this

study. Program names were Business and Office Technology, Chemical Laboratory Technician, Computer Network Support Technician, Dental Assisting, Electronic Service Technician, Environmental Technician, Insurance Customer Service Representative, Marketing and Management, Mechanical Trades, Medical Assistant, Practical Nursing, Radiation Safety Technology, and Welding.

In the past several years enrollment in these full-time programs ranged from 280 to 450 students. Enrollment in full-time programs during the duration of this study was 289 students. Most programs offer the options of attaining a Certificate of Applied Science, typically a one-year program, or an Associate of Applied Science Degree, typically a two-year program. In addition to the 13 full-time programs listed above, EITC offers a variety of services including Adult Basic Education, Community Education, Industry/Academic Partnerships, Secondary School Vocational Programs, Short-term Training, and a variety of part-time programs.

Due to the close relationship of EITC to the business community and the placing of students from programs at EITC in these businesses, this case study was particularly relevant to students about to enter the regional workforce and to employers about to hire them. Only full-time students participated in the study. To be classified as full-time, students must have met all entrance requirements for their program of study, been enrolled for 12 or more credits per semester, and remained in good academic standing.

Population

The total population of full-time students during the duration of this study was 289 students. There were 129 males and 160 females enrolled. The average age of this group was 27 years with an age range of 17 to 55. Of the total group, 244 held high school diplomas and 45 had GED equivalency certificates at time of acceptance into EITC. There were 179 members of the total group enrolled in Associate Degree programs and 110 were enrolled in Certificate programs.

Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS)

An instrument to measure various components of adult real-life learning strategies has been developed by researchers at Montana State University. Entitled the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS), the instrument consists of different scenarios representing real-life learning situations which require various types and levels of learning (Fellenz, 1993). Following each scenario are 15 questions intended to evaluate which learning skills or techniques (learning strategies) an individual would use to resolve a particular learning task. The SKILLS instrument was developed to measure important parts of the adult learning process as it takes place when adults address real-life learning needs. It emphasizes a process

rather than a componential approach. The 15 questions of SKILLS are used to distinguish specific applications of the 15 learning strategies of the SKILLS instrument. These 15 learning strategies flow from the 5 specific learning areas of metacognition, metamotivation, memory, critical thinking, and resource management (p. 2). These five areas and their associated learning strategies can be seen in see Table 1.

Table 1. Components of Self-Knowledge Inventory of Lifelong Learning Strategies.

Metacognition

Definition: Knowing about and directing one's own thinking and learning processes.

Strategies: **Planning**--analyzing the best way for one's self to proceed with a specific learning task.

Examples: Follow own learning style, skim or overview, determine purpose or focus, plan.

Monitoring--assessing how one is proceeding through a learning project.

Examples: Review plans, check if on task, compare to accepted standard or model.

Adjusting--directing and improving one's learning processes.

Examples: Evaluate, seek feedback, change approach, decide when done.

Table 1 (continued)

Metamotivation

Definition: Awareness of and control over factors that energize and direct (motivate) our learning.

Strategies: **Attention**--focusing on material to be learned.
Examples: Set aside time for learning, resolve to learn, avoid distractions.

Reward--anticipating or recognizing the value to one's self of learning specific material.

Examples: Recognizing learning as relevant or useful, important or worthwhile, problems of not knowing.

Confidence--believing that one can complete the learning task successfully.

Examples: Feel confident or reassured, remind self of past success, get support from.

Memory

Definition: The storage, retention, and retrieval of knowledge.

Strategies: **Organization**--structuring or processing information so that material will be better stored, retained, and retrieved.
Examples: Elaborate or translate, image, chunk, pattern, summarize, or fit together, memory devices.

External Aids--using external aids to reinforce memory.

Examples: Write down or list, put or display, ask another to remind.

Memory Application--using remembrances, mental images, or other memories to facilitate planning or problem-solving.

Examples: To avoid mistakes, to know what to expect, to select methods, to provide background information.

Table 1 (continued).

Critical Thinking

Definition: A reflective thinking process utilizing higher order thinking skills in order to improve learning.

Strategies: **Test Assumptions**--recognize and evaluate in relation to learning situation.

Examples: Examine accuracy of assumptions, identify relationships, spot inconsistencies, critical acceptance, questioning value sets.

Generate Alternatives--hypothesize but ground options within the given situation.

Examples: Brainstorm or envision future, hypothesize, rank order, identify other solutions.

Conditional Acceptance--reflective and tentative maintenance of principles.

Examples: Question simplistic answers, monitor or evaluate results, predict consequences.

Resource Management

Definition: The process of identification, evaluation, and use of resources relevant to the learning task.

Strategies: **Identification**--knowing how to locate/use best sources of information.

Examples: Modern information sources, print sources, people or models, professional or agencies.

Critical Use--using appropriate rather than available resources while recognizing their limitations.

Examples: Contact expert or outsider, check second source, observe or ask to check bias.

Human Resources--integrating others into the social and political process of knowing.

Examples: Dialogue or discuss, check opinions, listen to all, support from or network with others.

Source: Fellenz, R. A., & Conti, G. J. (undated). Modified from *Components of Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS)*. Bozeman, MT: Montana State University Kellogg Center for Adult Learning.

When utilizing the SKILLS instrument, a participant is first asked to select a sample, usually four of six scenarios available, in which he or she is interested. The participant is then asked to assess and select from the list of 15 associated learning strategies the 5 they would Definitely Use, the 5 they would Possibly Use, and the 5 they would Not Likely Use in the various learning scenarios. They enter the appropriate corresponding numbers on a score sheet to be tabulated and evaluated later. This total general score determines which strategies participants generally prefer in the selected various learning situations.

Recent research using the SKILLS instrument suggests that modifying the instrument to specific research applications may enhance its measuring and evaluation of specific real-life learning scenarios and situations. McKenna (1990) compared the influences of personal and professional learning situations on real-life learning strategy utilization by school administrators in Wyoming. He required that his sample of school administrators choose three of the original SKILLS scenarios and did a comparison of learning strategy use on three professional scenarios he created for the study. Further research revealed that the validity and reliability of this approach remained intact. Fellenz, Conti, & McKenna (1994) noted that "researchers may either use the existing form of SKILLS or create specific scenarios using the established form of SKILLS as a model. Such a choice can allow researchers to tailor their learning strategies instrument to fit their distinctive need" (p. 263).

Yabui (1993) also chose to modify the SKILLS instrument to enhance his study on *Reflective Judgement and the Adult Learner's Use of Metacognitive Learning Strategies*. Moretti (1994) adjusted SKILLS to better understand the use of various learning strategies in real-life learning situations of presidents or chairpersons of volunteer nonprofit organizations.

This study used a modification of SKILLS as well. This was in an effort to best measure the use of real-life learning strategies in personal and career development situations by students in a post-secondary vocational education setting. These modifications included the pre-selected choice of two existing SKILLS scenarios: Cholesterol Level and Pet Care. These scenarios were chosen as representative personal life situations that students at Eastern Idaho Technical College have encountered or may encounter in their personal lives. Another modification was to develop two additional specific scenarios in the area of career development: Finding New Employment and Getting a Promotion. As was stated above, as long as "each of these [modified] scenarios is constructed using similar statements from matched scenarios from the original SKILLS scenarios, validity and reliability will remain intact" (Fellenz, Conti, & McKenna, 1994, pp. 261-263). Use of the SKILLS instrument by other researchers indicated that responses to learning situations may vary based on the type of learning activity called for such as planning, skill development, problem solving, and the other strategies associated with SKILLS. Therefore, the career development scenarios Finding New

Employment and Getting a Promotion were written to be consistent with the format and content of the strategies measured in Cholesterol Level and Pet Care. Examples of these scenarios may be reviewed in Appendix D. A third modification was to create a rank-order survey based on SKILLS to measure learning strategy preferences of potential entry-level employers (see Appendix F).

Validity and Reliability of the SKILLS Instrument

The degree to which an instrument measures what it is actually supposed to measure is called the validity of the instrument (Gay, 1987). There are two types of validity relevant to SKILLS, construct and content validity.

Borg and Gall (1989) stated that "construct validity is the extent to which a particular test can be shown to measure a hypothetical construct" (p. 255). Further, the Committee to Develop Standards for Educational and Psychological Testing (1985) stated that construct validity is "a theoretical construction about the nature of human behavior" (p. 9).

Construct validity for SKILLS was established through a literature review which documented the source of the concepts in SKILLS. In addition, an assessment on the constructs was done by a group of adult education and educational psychology professors. In addition to Robert Sternberg assessing the SKILLS instrument, a group of adult educators and Wilbert McKeachie

reviewed the constructs and accompanying strategies at a summer institute at the Center for Adult Learning Research (Conti & Fellenz, 1991, p. 69).

McKeachie provided an independent review of SKILLS and the group of adult educators performed a critique of the instrument in small groups. Those reviewing SKILLS indicated that the "instrument effectively addressed the five theoretical constructs of metacognition, metamotivation, memory, critical thinking, and resource management" (p. 70).

"Content validity is the degree to which the sample of test items represents the content that the test is designed to measure" (Borg & Gall, 1989, p. 250). In addition, content validity requires both item validity and sampling validity (Gay, 1987). Content validity of the SKILLS instrument was field tested in numerous settings including adult basic education programs, undergraduate and graduate university courses, museums, health-care providers, continuing education programs, and elderhostel programs (Conti & Fellenz, 1991). In the field test, a sample set of 253 participant responses confirmed the assessment of the group of adult educators mentioned above that the items in SKILLS adequately represented the five conceptual areas of the instrument (p. 70). Sternberg, McKeachie, and the group of adult educators also confirmed the content validity of SKILLS using a similar assessment as that performed in regards to construct validity.

"Reliability may be defined as the level of internal consistency or stability of the measuring device over time" (Borg & Gall, 1989, p. 257).

Reliability for the SKILLS instrument was addressed by calculating a coefficient based on two equivalent forms administered to the same group. This approach is the "most acceptable and most commonly used estimate of reliability" (Gay, 1987, p. 119). The Cronbach alpha coefficient of the scores was .71. The split-half test of reliability was computed using the Guttman method, with a resulting .83 correlation. Another .83 correlation was obtained by applying the Spearman-Brown formula. After statistical analysis was completed, it was determined that all correlations were in the acceptable range and SKILLS was judged to be "a reliable instrument for assessing adult learning strategies in real-life situations" (Conti & Fellenz, 1991).

Procedures

Permission to conduct this study was requested from the Director of Eastern Idaho Technical College (EITC) in March, 1995, so that SKILLS surveys could be completed by students and scored before students left the campus in mid-May. Permission was granted at that time after assurances were provided that the surveys and interviews would only include volunteer and anonymous participants (see Appendix A).

Data related to students' learning strategies were gathered through use of a modified version of the SKILLS instrument (see Appendix D). Two personal learning scenarios, Cholesterol Level and Pet Care, were preselected

from the SKILLS instrument and two career development scenarios, Finding New Employment and Getting a Promotion were written specifically for the study. Students were asked to list the strategies they would Definitely Use, Possibly Use, and Not Likely Use for each of the four scenarios. In addition, a one-page survey was attached to the modified version of SKILLS to collect the demographic information related to age, gender, type of program in which enrolled (certificate or degree), time and experience in the workforce, and whether participants enter EITC with a high school diploma or GED certificate (see Appendix C). To gather student-related data the researcher attended a regular class session for each of the 13 programs in which all students enrolled in a program were scheduled to attend. A brief explanation was presented to the students as to the purpose and intent of the session and the related research. Students were asked to fill out the appropriate instruments which were subsequently collected and checked for completion. The time required for each class session varied from 30 to 60 minutes.

Although all full-time students at EITC had an opportunity to fill out a survey, some chose not to participate and others were not in class on days the instrument was distributed. A second general class session was offered in which 17 students participated. A follow up message was also sent out via campus E-Mail, which resulted in six more students participating in one-on-one sessions. A total of 219 packets were completed out of a possible 289 full-time students registered for spring semester. This resulted in a

participation rate of 76%.

A second instrument was drafted and used to gather data on the learning strategies preferred in entry-level employees by potential employers of students from the various occupational programs at Eastern Idaho Technical College. This instrument was a survey based upon and following a similar format as the SKILLS instrument (see Appendix F). A list of 15 entry-level employee capabilities was compiled. These capabilities were based on the 15 learning strategies outlined in the SKILLS instrument. Participants for this part of the study included representative employers that had or were interested in hiring graduates from EITC. The researcher set up one-on-one meeting times around each employer's schedule. A brief overview of the study and its purpose was given and then employers were asked to fill out the survey. The participants were asked to select from the list of 15 capabilities the 5 they Definitely Prefer, the 5 they Possibly Prefer, and the 5 they Least Prefer in an entry-level employee they might hire. They entered the appropriate corresponding numbers on a score sheet. In addition, employer participants were asked to complete a survey to assess factors such as company size and the level of involvement the employer had in the interviewing and hiring processes (see Appendix F). This information was collected at the request of EITC's Administration as part of its tracking of regional employers and was not intended for use in the study. The researcher assessed each answer sheet for completeness before departing each employer participant's place of

business. A total of 65 employers participated in the study.

A cluster analysis was run to determine if differences could be found between the participants' uses of SKILLS learning strategies. Five cluster groups were identified in the cluster analysis run. In addition, a random sample of five people from each cluster was taken. These people were interviewed in focus groups to add a qualitative perspective to the quantitative data collected in the cluster analysis. Findings related to all data collected may be found in Chapter 4.

CHAPTER 4

FINDINGS

Participants

Of the 289 total full-time students enrolled during the time of the study, 219 students or 76%, participated in the study. Participants included 94 males and 125 females. Total full-time female students at EITC during the time of the study constituted 55%, while female participants in the study constituted 57%. Total full-time male students at EITC during the time of the study constituted 45% and male participants constituted 43%. Average age and age range of participants were identical to those of the total population at 27 years and 17 to 55, respectively. Of the total number of full-time students at EITC, 244 (85%) held high school degrees and 45 (15%) held GED high school equivalency. Of the participants, 187 (85%) held high school diplomas and 32 (15%) had GED equivalency upon acceptance to EITC. One-hundred and seventy-nine (62%) of the total full-time students were enrolled in associate degree programs and 110 (38%) were enrolled in certificate programs during the time of the study. Members of the participant group enrolled in associate degree programs totaled 134 (61%) and 85 (39%) were enrolled in certificate programs.

Since traditionally over 75% of job placements come from employers familiar with EITC's programs, employer participants were chosen on the basis of the following criteria. Each of the 13 occupational programs of study at EITC has an advisory committee. Those employers who were selected to participate in the study either sat on 1 of the 13 advisory committees, were recommended by a member of 1 of the 13 advisory committees, or had hired a graduate from 1 of the 13 full-time programs in an entry-level position within the previous 2 years. Five employer participants with an interest in each of the 13 programs were chosen to participate. This resulted in a total of 65 employers who participated in the study.

Data were collected from five sources. These were scores generated on the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS) instrument taken by student and employer participants, information collected on employer and student participant demographic surveys, and data collected from student participant focus groups. A total of 219 students and 65 employers participated in the study.

Three types of statistics were used in this study. Descriptive statistics using frequency counts and comparison of the resulting numbers were used to answer Research Questions 1 and 5:

Research Question 1: Using a modified version of SKILLS, is it possible to determine differences in uses of learning strategies in personal life and career development learning situations among adult students at Eastern Idaho Technical College?

Research Question 5: Using a rank-order survey based on the

learning strategies that comprise the SKILLS instrument, is it possible to determine the learning strategies preferred in entry-level employees by potential employers of students from the various occupational programs at Eastern Idaho Technical College?

Discriminant analysis was used to address Research Questions 2 and 3:

Research Question 2: Using a modified version of SKILLS, is it possible to discriminate in uses of learning strategies in personal life and career development learning situations by students at EITC based on the demographics of age, gender, and level of program in which enrolled (certificate or degree)?

Research Question 3: Using a modified version of SKILLS, is it possible to discriminate in uses of learning strategies in personal life and career development learning situations by students at EITC in the following occupational areas of study: Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations?

Finally, cluster analysis was used to answer Research Question 4:

Research Question 4: Is it possible to determine if distinct clusters or learning groups exist among students at Eastern Idaho Technical College based on SKILLS scores of learning strategies used in personal life versus career development learning situations?

Learning Strategies Measurements

Scores gathered by the Self-Knowledge of Lifelong Learning Strategies (SKILLS) instrument were used to determine the learning profiles of the student participants in the study. Four sets of scores were calculated from information gathered by the SKILLS instrument. One set of scores was based on individual EITC student learning profiles that flowed from the five specific

learning areas of metacognition, metamotivation, memory, critical thinking, and resource management. A second set of scores was based on individual EITC student learning profiles that flowed from the 15 SKILLS learning strategies. A third set of scores was based on learning profiles that flowed from the five learning areas in SKILLS and delineated by EITC programs. The fourth set of scores was derived from learning profiles that flowed from the 15 SKILLS learning strategies and was delineated by EITC programs.

Individual EITC Student Learning Area Profiles

Scores were computed for each of the five learning areas delineated in SKILLS and used by individual EITC students who participated in the study. The five learning areas measured by the SKILLS instrument were Critical Thinking, Memory, Metacognition, Metamotivation, and Resource Management. The 5 means of the SKILLS learning areas (see Table 2) fell within the range of 22.6 (Metamotivation) to 25.4 (Resource Management). Participants scored low in the Memory (22.70) and Metamotivation (22.60) areas. The score on Metacognition was 23.60. Based on these scores it appears that EITC students tended to use the learning areas of Resource Management and Critical Thinking more often than the other areas of Memory, Metamotivation, and Metacognition.

Table 2. Means of Learning Areas of SKILLS Used by Students at EITC.

Learning Areas	Mean Score	Standard Deviation	Range
Metamotivation	22.60	3.65	18 - 32
Memory	22.70	2.56	16 - 29
Metacognition	23.90	2.61	16 - 32
Critical Thinking	25.20	2.70	12 - 32
Resource Management	25.40	3.43	17 - 34

As the scores based on individual EITC student learning profiles that flowed from the five specific learning areas of Metacognition, Metamotivation, Memory, Critical Thinking, and Resource Management showed no trends or patterns of interest, further analysis was not performed.

Individual EITC Student Learning Strategy Profiles

Scores were computed for each of the 15 learning strategies measured by SKILLS and used by individual EITC students who participated in the study (see Table 3). These scores showed individual learning profiles of participants. Means of the individual learning strategies ranged from 6.25 for Metacognitive Adjusting to 9.60 for Metacognitive Planning. All strategies had a range of 4 to 12 except Metacognitive Planning, which ranged from 5 to 12. Learning strategies used most by EITC students who participated in the study were Metacognitive Planning (9.60), Metamotivational Attention (9.53), and Critical Use of Resources (8.65). Strategies scoring lowest were

Metacognitive Adjusting with a mean of 6.25, Metamotivational Reward with a mean of 6.48, and Metamotivational Confidence with a mean of 6.60.

Table 3. Means of Individual Learning Strategies Used by Students at EITC.

Learning Strategy	Mean Score	Standard Deviation	Range
Critical Thinking			
Test Assumptions	8.47	1.62	4 - 12
Generate Alternatives	8.45	1.58	4 - 12
Conditional Acceptance	8.23	1.90	4 - 12
Memory			
Organization	8.09	1.58	4 - 12
External Aids	7.44	1.65	4 - 12
Memory Applications	7.21	1.69	4 - 12
Metacognition			
Planning	9.60	1.64	5 - 12
Monitoring	8.00	1.50	4 - 12
Adjusting	6.25	1.54	4 - 12
Metamotivation			
Attention	9.53	1.74	4 - 12
Reward/Enjoyment	6.48	1.99	4 - 12
Confidence	6.60	1.67	4 - 12
Resource Management			
Identification	8.48	1.75	4 - 12
Critical Use	8.65	1.85	4 - 12
Human Resource Use	8.32	1.90	4 - 12

An analysis of the individual learning strategies used by students at EITC indicated two main areas of interest. First, in the learning area of Metacognition students scored highest on the associated learning strategy of Planning (9.60) and also scored lowest in the associated strategy of Adjusting

(6.25). In the learning area of Metamotivation students scored high on the associated learning strategy of Attention (9.53) and had the second and third lowest scores on the associated strategies of Reward/Enjoyment (6.48) and Confidence (6.60). As there were no other notable variations in the learning areas of Critical Thinking, Memory, and Resource Management no further analysis was performed.

Learning Area and Strategy Profiles by Program

Each of the 13 programs at EITC was summarized in regards to the learning strategies used by students in each specific program. The mean scores are listed by learning strategy areas in Tables 4 through 8. The program abbreviations are Business and Office Technology (BOT), Chemical Laboratory Technician (CLT), Computer Network Support Tech (CNST), Dental Assisting (DA), Electronic Service Technician (EST), Environmental Technician (ET), Insurance Customer Service Representative (ICSR), Marketing & Management (MM), Mechanical Trades (MT), Medical Assistant (MA), Practical Nursing (PN), Radiation Safety Technology (RST), Welding (WELD).

The Critical Thinking means as measured by EITC programs ranged from 24.00 for the Medical Assistant (MA) program to 27.09 for the Computer Network Support Technician (CNST) program (see Table 4). Mean scores for Testing Assumptions ranged from 7.17 in the Chemical Laboratory

Technician (CLT) program to 9.09 in the Computer Network Support Technician (CNST) program. Mean scores for Generating Alternatives as measured by program ranged from 7.38 in the Welding (WELD) program to 9.36 in the Electronics Support Technician (EST) program.

Table 4. Means of Critical Thinking Area and Associated Learning Strategy Use by EITC Programs.

EITC Program	Critical Thinking	Test Assumptions	Generate Alternatives	Conditional Acceptance
BOT	25.05	8.95	8.48	7.62
CLT	26.17	7.17	8.50	10.50
CNST	27.09	9.09	8.90	9.09
DA	24.50	8.83	8.33	7.33
EST	26.60	8.44	9.36	8.80
ET	25.50	7.90	8.83	8.80
ICSR	25.63	8.63	8.25	8.75
MM	24.68	8.32	8.53	7.84
MT	24.94	8.90	8.50	7.56
MA	24.00	8.50	7.89	7.61
PN	24.71	8.32	8.18	8.21
RST	24.42	7.58	8.17	8.67
WELD	24.38	8.13	7.38	8.88

Mean scores for Conditional Acceptance as measured by program ranged from 7.33 in the Dental Assistant (DA) program to 10.50 in the Chemical Laboratory Technician (CLT) program.

Analysis of the scores for Critical Thinking and the associated learning strategies of Testing Assumptions, Generating Alternatives, and Conditional Acceptance indicated that even though the Chemical Laboratory Technician program had the third highest Critical Thinking mean (26.17) and the highest mean (10.50) for the associated learning strategy of Conditional Acceptance of all 13 programs, it also had the lowest mean (7.17) for the associated Critical Thinking strategy of Testing Assumptions. As no other trends emerged from analysis of Critical Thinking and its associated learning strategy uses by EITC programs, no further analysis was performed.

The means as measured by program related to Memory strategy use ranged from 21.73 for the Computer Network Support Technician (CNST) program to 24.25 for the Radiation Safety Technology (RST) program (see Table 5). Mean scores for the Memory strategy of Organization measured by program ranged from 7.75 in the Welding (WELD) program to 9.50 in the Radiation Safety Technology (RST) program. Mean scores for External Aids as measured by program ranged from 6.50 for the Environmental Technician (ET) program to 8.33 in the Chemical Laboratory Technician (CLT) program. Mean scores for Memory Applications as measured by program ranged from 6.67 for the Chemical Laboratory Technical (CLT) program to 7.75 in the Insurance Customer Service Representative (ICSR) program.

Analysis of the Memory Area and its associated learning strategies of Organization, External Aids, and Memory Applications showed that the

Radiation Safety Technician program had the highest mean in both the learning area of Memory (24.25) and the associated strategy of Organization (9.50).

Table 5. Means of Memory Learning Area and Associated Learning Strategy Use by EITC Programs.

EITC Program	Memory Area	Organization	External Aids	Memory Application
BOT	22.52	7.76	7.95	6.81
CLT	23.00	8.00	8.33	6.67
CNST	21.73	8.00	6.73	7.00
DA	22.83	8.17	7.17	7.50
EST	22.68	8.12	7.16	7.40
ET	22.11	8.17	6.50	7.44
ICSR	22.50	8.00	6.75	7.75
MM	23.21	7.95	7.53	7.74
MT	22.61	8.06	7.22	7.33
MA	22.33	8.00	7.39	6.94
PN	23.36	8.25	7.89	7.21
RST	24.25	9.50	7.67	7.08
WELD	22.50	7.75	7.38	7.38

The Chemical Laboratory Technician program had the highest mean (8.33) for the learning strategy of External Aids and also the lowest mean (6.81) for the strategy of Memory Application. The Insurance Customer Service Representative program had the highest mean (7.75) for the strategy of Memory Application and also the third lowest mean (6.75) for the strategy of

External Aids. As no other trends emerged from analysis of Memory and its associated learning strategy uses by EITC programs, no further analysis was performed.

The means as measured by program related to Metacognition strategy use ranged from 22.95 for the Marketing and Management (MM) program to 25.00 for the Welding (WELD) program (see Table 6).

Table 6. Means of Metacognition Area and Associated Learning Strategy Use by EITC Programs.

EITC Program	Meta-cognition	Planning	Monitoring	Adjusting
BOT	24.19	9.50	8.33	6.36
CLT	24.33	10.00	8.00	6.33
CNST	24.27	9.73	8.09	6.46
DA	24.33	8.83	8.33	7.12
EST	24.52	9.88	8.24	6.40
ET	23.78	10.50	7.06	6.22
ICSR	23.25	8.63	7.38	7.25
MM	22.95	9.26	7.84	5.84
MT	23.22	9.56	7.94	5.72
MA	24.28	9.67	8.17	6.44
PN	23.39	9.29	7.86	6.25
RST	23.00	9.58	7.92	5.50
WELD	25.00	10.25	6.00	10.00

Mean scores for Planning as measured by program ranged from 8.63 in the Insurance Customer Service Representative (ICSR) program to 10.50 in the

Environmental Technician (ET) program. Mean scores for Monitoring as measured by program ranged from 6.00 in the Welding (WELD) program to 8.33 in the Business Office Technology (BOT) and Dental Assistant (DA) programs. Mean scores for Adjusting ranged from 5.50 in the Radiation Safety Technician (RST) program to 10.00 in the Welding (WELD) program.

Analysis of the Metacognition Area and its associated learning strategies of Planning, Monitoring, and Adjusting showed that the Welding program had the highest mean (25.00) for the learning area of Metacognition, the highest mean for the associated learning strategy of Adjusting, and the second highest mean (10.25) for the associated learning strategy of Planning. However, the Welding program also scored lowest in the associated learning strategy of Monitoring with a mean of 6.00. The Environmental Technician program scored fourth highest in the Metacognition Area with a mean of 23.78 but also scored highest of all programs (10.50) in the related strategy of Planning, and second lowest of all programs (7.06) in the related strategy of Monitoring. The Dental Assisting program scored high in the Metacognition Area (24.33) and associated strategies of Monitoring (8.33) and Adjusting (7.12). However, the Dental Assisting program scored second lowest in all programs in the associated learning strategy of Planning with a mean of 8.83. As no other trends emerged from analysis of Metacognition and its associated learning strategy uses by EITC programs, no further analysis was performed.

The means as measured by program related to Metamotivation strategy

use ranged from 20.67 for the CLT program to 24.50 for the ICSR program (see Table 7). Mean scores for the Metamotivation strategy of Attention as measured by program ranged from 8.50 in the Dental Assistant (DA) program to 10.50 in the Medical Assistant (MA) program.

Table 7. Means of Metamotivation Area and Associated Learning Strategy Use by EITC Programs.

EITC Program	Meta-motivation	Attention	Reward/Enjoyment	Confidence
BOT	22.79	9.69	6.55	6.54
CLT	20.67	8.83	5.17	6.67
CNST	23.27	9.82	6.00	7.45
DA	24.17	8.50	7.00	8.67
EST	21.00	8.64	6.32	6.04
ET	22.56	9.94	6.00	6.61
ICSR	24.50	9.63	7.63	7.25
MM	22.74	9.79	6.47	6.47
MT	23.72	9.50	7.28	6.94
MA	23.78	10.50	7.06	6.22
PN	21.75	8.96	6.57	6.21
RST	22.75	10.00	5.92	6.83
WELD	21.75	10.00	5.13	6.63

Mean scores for Reward/Enjoyment as measured by program ranged from 5.13 in the Welding (WELD) program to 7.63 in the Insurance Customer Service Representative (ICSR) program. Mean scores for Confidence as measured by program ranged from 6.04 in the Electronic Service Technician

(EST) program to 8.67 in the Dental Assistant (DA) program.

Analysis of the Metamotivation Area and its associated learning strategies of Attention, Reward/Enjoyment, and Confidence showed several items of interest. While the Dental Assistant program scored high in the Metamotivation Area with a mean of 24.17 and the associated strategy of Confidence with a mean of 8.67 this program also scored the lowest of all programs in the associated learning strategy of Attention (8.50). The Medical Assistant program had the third highest mean of all programs in the Metamotivation Area (23.78) and also scored high in the associated strategies of Attention (10.50) and Reward/Enjoyment (7.06) but scored low in the associated strategy of Confidence (6.22). Finally, the Welding program scored low in the Metamotivation Area (21.75) and the associated strategy of Reward/Enjoyment (5.13). However, the Welding program had the second highest score of all programs (10.00) in the associated of Attention. As no other trends emerged from analysis of Metamotivation and its associated learning strategy uses by EITC programs, no further analysis was performed.

The means as measured by program related to Resource Management strategy use ranged from 23.27 for the Computer Network Support Technician (CNST) program to 26.71 for the Practical Nursing (PN) program (see Table 8). Mean scores for the Resource Management strategy of Identification as measured by program ranged from 7.36 in the Computer Network Support Technician (CNST) program to 9.11 in the Practical Nursing (PN) program.

Mean scores for Critical Use of Resources as measured by program ranged from 8.04 in the Electronic Service Technician (EST) program to 10.00 in the Welding (WELD) program.

Table 8. Means of Resource Management Area and Associated Learning Strategy Use by EITC programs.

EITC Program	Resource Mgt	Identification	Critical Use	Human Resource Use
BOT	25.29	8.26	8.55	8.48
CLT	25.50	8.17	9.50	7.83
CNST	23.27	7.36	8.09	8.09
DA	24.00	7.50	8.17	8.33
EST	25.04	8.84	8.04	8.16
ET	25.83	8.67	8.78	8.39
ICSR	24.00	7.88	8.38	7.75
MM	26.37	8.32	9.16	8.90
MT	25.00	8.22	8.67	8.11
MA	25.44	8.78	8.78	7.89
PN	26.71	9.11	8.86	8.75
RST	25.50	8.92	8.08	8.50
WELD	26.38	8.50	10.00	7.88

Mean scores for Human Resource Use as measured by program ranged from 7.75 in the Insurance Customer Service Representative (ICSR) program to 8.90 in the Marketing and Management (MM) program.

Analysis of the Resource Management Area and its associated learning

strategies of Resource Identification, Critical Use of Resources, and Human Resource use showed that the Chemical Laboratory Technician scored high in Critical Use of Resources (9.50) but also scored low in relation to the other programs in the strategy of Human Resource Use (7.83). In addition, the Electronic Service Technician program scored high in relation to other programs in the strategy of Resource Identification and at the same time scored the lowest of all programs in the strategy of Critical Use of Resources. The Radiation Safety Technician program scored high on both strategies of Resource Identification (8.92) and Human Resource Use (8.50) but scored second lowest of all programs on the strategy of Critical Use of Resources (8.08). Finally, the Welding program scored second highest of all programs in the Resource Management Area (26.38) and highest on the associated strategy of Critical Use of Resources (10.00) but also scored low in relation to the other programs on the strategy of Human Resource Use. No further analysis was performed.

Personal Life and Career Development Learning Situations

This study investigated which learning strategies students at Eastern Idaho Technical College (EITC) used in personal life and career development learning situations. To determine if students at EITC did use differing learning strategies participants were given two sets of learning scenarios to

evaluate and scores were generated on which learning strategies participants used in each learning situation. One set of learning scenarios included two pre-chosen personal life situations taken from the SKILLS instrument. These scenarios were entitled Pet Care and Cholesterol Level. The other set of scenarios included two specially written learning situations dealing with career development. These were entitled Getting a Promotion and Finding New Employment.

The t-test With SKILLS Learning Strategies

The t -test was used to compare the means of the scores gathered in the personal life scenarios to the means of scores gathered in the career development scenarios. "Researchers use the t -test most often to compare the means of two groups" (Huck, Cormier, & Bounds, 1974, p. 50). The t -test was used to determine if there were significant differences in the mean scores for each of the 5 SKILLS learning areas and their 15 associated learning strategies used in personal life and career development learning situations. Table 9 summarizes the means and t -tests for the five learning areas of SKILLS. Table 10 outlines the means and t -tests for the 15 SKILLS learning strategies.

All of the personal life learning situation means fell within the range of 10.87 (Metamotivation) to 12.99 (Critical Thinking.) The career development learning situation means showed a different pattern and fell within the range of

11.08 (Memory) and 12.64 (Resource Management.) Significant differences were found between the personal life and career development scores in the areas of Critical Thinking, Memory, Metacognition, and Metamotivation. The only area that did not show significant difference was Resource Management.

Table 9. Means and *t*-tests for Learning Strategy Areas of SKILLS Used by EITC Students in Personal Life and Career Development Learning Situations.

Learning Area	Personal Life	Career Development	<i>t</i> Value	<i>p</i>
Critical Thinking	12.99	12.19	5.10	.001
Memory	11.66	11.08	3.64	.001
Metacognition	11.59	12.26	4.96	.001
Metamotivation	10.87	11.74	6.11	.001
Resource Management	12.80	12.64	1.10	.271

Analysis of the scores showed that students used the learning area of Critical Thinking the most (12.99) and Resource Management the second most (12.80) in personal life learning situations. Students used Resource Management the most (12.64) and Metacognition the second most (12.26) in career development learning situations. Based on the high scores and lack of significant difference, it appears that participants use Resource Management in both personal life and career development learning situations.

The individual scores for each of the 15 learning strategies were also compared for the personal life and career development learning situations (see

Table 10). For these, the means ranged from 3.09 (Confidence) to 4.62 (Test Assumptions and Attention) in Personal Life learning situations. In Career Development learning situations, means ranged from 2.93 (Adjusting) to 5.03 (Planning).

Table 10. Means and *t*-tests for 15 Learning Strategies of SKILLS Used by EITC Students in Personal Life and Career Development Learning Situations.

Learning Strategy	Personal Life	Career Development	<i>t</i> Value	<i>p</i>
Critical Thinking				
Test Assumptions	4.62	3.85	8.05	.001
Generate Alternatives	4.21	4.26	0.51	.613
Conditional Acceptance	4.15	4.08	0.69	.490
Memory				
Organization	4.54	3.55	9.93	.001
External Aids	3.78	3.66	1.32	.189
Memory Applications	3.34	3.87	5.79	.001
Metacognition				
Planning	4.58	5.03	5.49	.001
Monitoring	3.70	4.31	6.40	.001
Adjusting	3.32	2.93	4.47	.001
Metamotivation				
Attention	4.62	4.91	3.33	.001
Reward/Enjoyment	3.16	3.32	1.96	.052
Confidence	3.09	3.52	4.61	.001
Resource Management				
Identification	4.25	4.22	0.31	.758
Critical Use	4.38	4.27	1.18	.241
Human Resource Use	4.18	4.15	0.33	.743

Analysis of the mean scores showed several items of interest. The Metamotivation strategy of Planning scored high (4.58) while the Metamotivation strategy of Adjusting scored low (3.32) in personal life learning situations. Metamotivation strategies also showed interesting trends in personal life learning situations. The Metamotivation strategy of Attention scored highest (4.62) of all the 15 strategies. However, the other two Metamotivation strategies, Reward/Enjoyment and Confidence scored lowest of all 15 strategies with means of 3.16 and 3.09 respectively. In career development learning situations Metamotivation strategies showed a similar pattern to those in personal life learning situations. The Metamotivation strategy of Attention scored high (4.91) in career development situations. However, the Metamotivation strategies of Reward/Enjoyment and Confidence scored low with means of 3.32 and 3.52 respectively. As with personal life learning situations Metacognitive Adjusting also scored low (2.93), however, associated strategies of Planning and Monitoring scored high, 5.03 and 4.31 respectively. Since other trends did not emerge, further analysis was not conducted in this area.

Significant differences were found in 8 of the 15 learning strategies. These were Testing Assumptions, Organization, Memory Application, Planning, Monitoring, Adjusting, Attention, and Confidence. The strategy of Reward/Enjoyment was notable in that it showed a p score of .052. However, as it was over the .05 level of significance, it was not counted as a significant

difference. Finding a high number of significant differences in this study supported McKenna's (1991) study on the influences of personal and professional learning situations on real-life learning. In his study, McKenna also found significant differences between personal and professional learning situations. He concluded that "through the use of t-tests it was found that school administrators did differ at a statistically significant level in their use of learning strategies in personal learning situations from their use of learning strategies in work-related, professional settings" (McKenna, 1991, p. 95).

Discriminant Analysis

In addition to utilizing the univariate t-tests as a technique to measure the differences in learning areas and strategies used in personal life and career development learning situations, the multivariate technique of discriminant analysis was also used to further investigate the learning areas and strategies used by students at EITC. Discriminant analysis is "a statistical technique which allows the investigation of the differences between two or more groups in relationship to several variables simultaneously" (Klecka, 1980, p. 7). In discriminant analysis as with other multivariate techniques, the emphasis is upon analyzing the variables together rather than singly. In this way, the interaction of multiple variables can be considered. Discriminant analysis is useful when known and distinct groups exist.

Unlike univariate analyses which examine individual variables separately and allow them to be disassociated from the total person who is a synergistic composition of these variables, discriminant analysis examines people on a set of variables to determine if any of them interact in a combination that can explain the person's placement in the group. (Conti, 1993, p. 91)

There are two major uses for discriminant analysis in research situations. These are for the prediction of group membership or for the description of multivariate analysis of variance results (Huberty & Barton, 1989). Thus, discriminant analysis can be used either to describe the way groups differ or to predict membership in a group.

Each discriminant analysis produces one or more discriminant functions. The number of discriminant functions produced will always be one less than the total number of groups being analyzed. Therefore, if discriminant analysis is performed on two groups, one discriminant function is produced. For three groups, two discriminant functions are produced, and so on.

Although a discriminant function is produced, it may not be useful. The structure matrix is used to clarify and name the function (Conti, 1993, p. 91; Klecka, 1980 pp. 31-34). Researchers that have used discriminant analysis have indicated that these functions should be describable using structure coefficients with a value of .30 or greater (Conti, 1993; Hays, 1995; Hill, 1992; Moretti, 1994; & Yabui, 1993). Some value is necessary because the formula for discriminant analysis produces a discriminant function regardless of whether the function is meaningful. The structure matrix generated by each

discriminant analysis contains the coefficients which show the similarity between each individual discriminating variable and the overall discriminant function. In analyses which use a large number of variables, it is possible to get functions which have high predicative ability-but which correlate with so many of the discriminating variables that it is impossible to determine the meaning of the function. Therefore, using .30 as a criterion places a logical restriction on the interpretation of the statistical output (Conti, 1993).

In this study, discriminant analysis was used to determine if EITC students differed in uses of SKILLS learning strategies used in personal life and career development situations when they were divided into groups based upon selected demographic variables. Four separate discriminant analyses were performed. In each analysis, EITC student participants were divided into distinct groups to determine if they demonstrated different patterns of learning strategies. In one analysis, participants were divided into groups by age. In a second analysis, participants were grouped by gender. In a third analysis, participants were grouped by level of degree program in which they were enrolled. Finally, participants were grouped into occupational areas related to their programs of study.

The attributes used to distinguish among groups are called discriminating variables. "These variables must be measured at the interval or ratio level, so that means and variances can be calculated" (Klecka, 1980, p. 9). In this study, the same set of 30 discriminating variables was used in all 4

discriminant analyses. These 30 discriminating variables included the scores of student participant responses on SKILLS for the 15 learning strategies used in personal life and the 15 learning strategies used in career development learning situations. Separate scores for the personal life and the career development learning situations were used because the *t*-test analysis indicated that significant differences existed between a majority of the scores of the strategies used in personal life learning situations and the strategies used in career development learning situations.

SKILLS Learning Strategies and Age Groups

Participants were divided into groups according to age to determine if learning strategy usage differed among the groups. A discriminant analysis was performed relating SKILLS learning strategies and age. The range of ages for the 219 student participants was 17 to 55 years. The 219 participants were statistically divided into 4 distinct age groups based on the quadrants of this range. These age groups were divided as follows:

Group 1: 21 years and under included 60 participants

Group 2: 22 to 25 years included 54 participants

Group 3: 26 to 32 years included 49 participants

Group 4: 33 years and over included 56 participants.

The pooled within-groups correlation matrix of predictors was examined to determine how the 30 discriminating variables within each of the groups were interrelated. A pooled within-groups correlation matrix "is obtained by averaging the separate covariance matrices for all groups and then

computing the correlation matrix" (Norusis, 1988, p. B-5). The pooled within-groups correlation matrix of discriminating variables was examined because interdependencies among variables is important in most multivariate analyses (Klecka, 1980, pp. 31-32). That is, in order for multiple variables to be included in an analysis, they should not be sharing variance. A high correlation indicates that variables are accounting for the same variance.

The examination of the 433 coefficients in this analysis showed that they were at a sufficiently weak level to retain the variables in the analysis. Only one coefficient was at .46. The remaining 432 were all below the .30 level established as the interpretation criterion (Conti, 1993). Thus, the variables in this discriminant analysis were not related to each other and consequently were not sharing a common variance.

Stepwise selection was used to determine which of the 30 discriminating variables added most to the discrimination between the four age groups. Stepwise procedures produce an optimal set of discriminating variables. "One way to eliminate unnecessary variables is by using a stepwise procedure to select the most useful discriminating variables" (Klecka, 1980, p. 53). Although there are various methods of selecting variables for inclusion in the discriminant analysis, Wilks's lambda was chosen for this analysis because it takes into consideration both the differences between the groups and the cohesiveness within the groups (p. 54). Because of its approach to variable selection, Wilks's lambda is commonly used in discriminant analysis studies in

education (p. 13). As a result of this stepwise procedure, 13 variables were included in the discriminant function. The analysis stopped at Step 13 because the F levels indicated that any discrimination would have been insignificant beyond this step. The following discriminating variables and their corresponding Wilks's lambda values were selected: Reward Strategy Used in Career Development Learning Situations--.92; Testing Assumptions Strategy Used in Personal Life Learning Situations--.85; Planning Strategy Used in Career Development Learning Situations--.81; Critical Use of Resources in Career Development Learning Situations--.77; Confidence in Personal Life Learning Situations--.74; Organization as Memory Strategy Used in Career Development Learning Situations--.71; Monitoring Strategy Used in Career Development Learning Situations--.70; External Aids as Memory Strategy Used in Career Development Learning Situations--.68; Generating Alternatives in Career Development Learning Situations--.66; Attention Strategy Used in Personal Life Learning Situations--.65; Planning Strategy Used in Personal Life learning situations--.64; Critical Use of Resources in Personal Life Learning Situations--.63; and Monitoring Strategy Used in Personal Life Learning Situations--.62. The other 17 discriminating variables included in the analysis did not account for enough variance to be included in the discriminant function.

Standardized discriminant function coefficients generated by the discriminant analysis were used to determine which of the 30 discriminating

variables contributed most to the discrimination between the 4 age groups. By examining the standardized coefficients, the relative importance of each variable to the overall discriminant function can be determined (Klecka, 1980). In this analysis, the main contributing coefficients were .68 for Critical Use of Resources in Personal Life Learning Situations, .64 for Reward Strategy Used in Career Development Learning Situations, .63 for Testing Assumptions Strategy Used in Personal Life Learning Situations, .50 for Planning Strategy Used in Career Development Learning Situations, .41 for Confidence in Personal Life Learning Situations, .41 for Monitoring Strategy Used in Career Development Learning Situations, -.40 for Critical Use of Resources in Career Development Learning Situations, -.39 for Attention Strategy Used in Personal Life Learning Situations, -.38 for Planning Strategy Used in Personal Life Learning Situations, .34 for External Aids as Memory Strategy Used in Career Development Learning Situations, .32 for Organization as Memory Strategy Used in Career Development Learning Situations, .24 for Generating Alternatives in Career Development Learning Situations, and .24 for Monitoring Strategy Used in Personal Life Learning Situations.

To further measure the effectiveness of the discriminant function, one may also use the actual discriminant scores in the groups (Norusis, 1988). In this approach, the eigenvalue is used to define the separation between groups. The eigenvalue is the statistic that gives the ratio of the between-groups sums of squares to the within-groups sums of squares. When there are more than

two groups in the analysis, "the function with the largest eigenvalue is the most powerful discriminator, while the function with the smallest eigenvalue is the weakest" (Klecka, 1980, p. 34). "Large eigenvalues are associated with 'good' functions" (Norusis, 1988, p. B-14). In this analysis, there were four groups. Therefore, there were three functions obtained by the analysis.

Function 1 showed an eigenvalue of .34 and accounted for 63% of the possible 100% variance. This was considered to be a strong or meaningful function.

The structure matrix generated by the discriminant analysis contains the coefficients which show the similarity between each individual variable and the total discriminant function. Variables with the highest coefficients have the strongest relationship to the discriminant function (Klecka, 1980). These coefficients are used to name the discriminant function because they show how closely the variable and the overall discriminant function are related (p. 31).

In this study, discriminant analysis was used for descriptive purposes.

Therefore, these coefficients were the most important information related to the discriminant functions which satisfied the .30 level established as the acceptance criterion. Since the overall purpose of discriminant analysis is to describe the phenomenon that discriminate the groups from each other, this logical process of giving meaning to the discriminant function by interpreting the structure matrix is central and critical to the whole process. In this interpreting process, variables with coefficients of .30 and above are generally included in the interpretation (Conti, 1993; Hays, 1995; Hill, 1992; Moretti,

1994; & Yabui, 1993).

In this discriminant analysis, four variables had sufficient coefficients to be included in the interpretation of the meaning of the discriminant function. These were Reward Strategy Used in Career Development Learning Situations (.50), Planning Strategy Used in Career Development Learning Situations (-.45), Critical Use of Resources in Career Development Learning Situations (-.42), and Organization as Memory Strategy Used in Career Development Learning Situations (.31). It should be noted that all four variables are in the career development learning arena.

Based on the strength of these four variables, and the fact they were all in the career development area, this discriminant function was named Career-Experienced Learning. An analysis of the differences in learning strategies used by the four age groups of participants showed that, as the age and career experience of individuals increased, the use and reliance of Reward and Memory Organizational strategies used in career development learning situations decreased. The negative signs on the -.45 for Use of Planning and -.42 for Critical Use of Resources in Career Development Learning Situations indicated that as individuals mature, they also did not rely as much on uses of Planning and Critical Resource strategies but tended to trust their experience more than less mature individuals. Career-Experienced Learners developed or progressed from problems of not knowing how to proceed, rigidly planning, using memory devices, and contacting outside experts in career development

learning situations to relying on their own maturity, knowledge, and experience to accomplish learning tasks. The term "experienced" contained in the title emphasizes this trend toward relying on experience rather than the use of Planning and Critical Resources. It also refers to the apparent development from less mature individuals who tended to use Reward, Planning, Critical Use of Resources, and Memory Organization strategies than did more mature individuals who used them less. In career development learning situations and as individuals matured and gained experience, their reliance on these four strategies decreased. Table 11 shows a summary of the data and the means of these four strategies.

Table 11. Means of Learning Strategies by Age Groupings.

Learning Strategy & Value	Group 1 (21 & under)	Group 2 (22-25)	Group 3 (26-32)	Group 4 (33 & over)
Reward (.50)	3.67	3.48	3.29	2.80
Planning (-.42)	4.73	4.89	5.14	5.38
Critical Use (-.42)	3.88	4.26	4.22	4.71
Organization (.31)	3.82	3.52	3.59	3.27

The percentage of cases correctly classified showed how accurate the discriminant function was in grouping the participants. This discriminant function was 48.4% accurate in classifying cases. Of the 60 cases in Group 1,

the analysis correctly placed 51.7% (31). It correctly placed 22 of 54 (40.7%) in Group 2, 13 of 49 (26.5%) in Group 3, and 41 of 56 (73.2%) in Group 4. Thus, based on a chance placement of 1 in 4 (25%) for 4 groups, the discriminant function was a 23.4% improvement over chance placement. Consequently, it demonstrated that various age groups could be distinguished on the basis of the uses of SKILLS learning strategies in personal life and career development learning situations.

The discriminant function of Career-Experienced Learning indicated that age groups could be distinguished on the basis of SKILLS scores as follows:

$$D = .05 \text{ (Planning Strategy Used in Personal Life Learning Situations)} + .23 \text{ (Monitoring Strategy Used in Personal Life Learning Situations)} - .009 \text{ (Attention Strategy Used in Personal Life Learning Situations)} - .25 \text{ (Confident Strategy Used in Personal Life Learning Situations)} - .28 \text{ (Testing Assumptions in Personal Life Learning Situations)} + .13 \text{ (Critical Use of Resources in Personal Life Learning Situations)} - .38 \text{ (Use of Planning Strategy in Career Development Learning Situations)} + .08 \text{ (Monitoring Strategy Used in Career Development Learning Situations)} + .57 \text{ (Reward Strategy Used in Career Development Learning Situations)} + .30 \text{ (Organization as Memory Strategy Used in Career Development Learning Situations)} + .35 \text{ (External Aids as Memory Strategy Used in Career Development Learning Situations)} + .23 \text{ (Generating Alternatives in Career Development Learning Situations)} - .34 \text{ (Critical Use of Resources in Career Development Learning Situations)} - 1.82.$$

Since discriminant analysis is a multivariate statistic, individual mean scores are not useful in describing the interaction among variables. However,

the group centroid represents this interaction. The group centroid "is an imaginary point which has coordinates that are the group's mean for each variable" (Klecka, 1980, p. 16). The group centroids were as follows: .49--Group 1, .30--Group 2, .16--Group 3, and -.95--Group 4.

To summarize the relationship between groups and the discriminant function, the canonical correlation is used. This correlation is a "measure of association which summarizes the degree of relatedness between the groups and the discriminant function. A value of zero denotes no relationship at all, while large numbers (always positive) represent increasing degrees of association with 1.0 being the maximum" (Klecka, 1980, p. 36). The canonical correlation for this analysis was .50 for Function 1 and .37 for Function 2. Squaring these values yielded 25% and 14% for Functions 1 and 2 respectively. The variation resulting from Function 3 (3%) was negligible.

In summary, a discriminant analysis was performed to answer a portion of Research Question 2, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations based on age?" This portion of Research Question 2 was answered affirmatively since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents into age groups.

SKILLS Learning Strategies and Gender

To determine if learning strategy usage differed between male and

female students at EITC, participants were divided into gender groups. A second discriminant analysis involved investigating the relationship of SKILLS learning strategies and gender. As in the previous analysis, the pooled within-groups correlation matrix of predictors was examined to determine how the 30 discriminating variables within each of the groups were interrelated. Examination of the 433 coefficients in this analysis showed that they were at a sufficiently weak level to retain the variables in the analysis. Only 3 coefficients were above .30; they were .48, .32, and .31. The remaining 430 were all at or below the .29 level. Thus, the variables in this discriminant analysis were not related to each other and consequently were not sharing a common variance.

Stepwise selection was used to determine if any of the 30 discriminating variables discriminated between male and female learning strategy selection. As a result of this stepwise procedure, 15 variables were included in the discriminant function. The analysis stopped at Step 15 because the F levels indicated that the discrimination would have been insignificant beyond this step. The following discriminating variables and their corresponding Wilks's lambda values were included: External Aids as Memory Strategies Used in Personal Life Learning Situations--.94; Monitoring Strategy Used in Career Development Learning Situations--.92; Generating Alternatives in Career Development Learning Situations--.89; Confidence Strategies Used in Personal Life Learning Situations--.87; Conditional

Acceptance in Personal Life Learning Situations--.85; Adjusting Strategy Used in Career Development Learning Situations--.84; Planning Strategy Used in Personal Life Learning Situations--.83; Memory Application Used in Career Development Learning Situations--.82; Monitoring Strategy Used in Personal Life Learning Situations--.81; Testing Assumptions Strategy Used in Career Development Learning Situations--.81; Planning Strategy Used in Career Development Learning Situations--.80; Generating Alternatives in Personal Life Learning Situations--.80; Use of Human Resources in Personal Life Learning Situations--.79; Use of Human Resources in Personal Life Learning Situations--.79; and Confidence Strategy in Career Development Learning Situations--.78. The other 15 discriminating variables in the analysis did not account for enough variance to be included in the discriminant function.

Standardized discriminant function coefficients generated by the discriminant analysis explain which of the discriminating variables contributed most to the discrimination between males and females. In this analysis, the main contributing coefficients were .55 for Confidence Strategy Used in Personal Life Learning Situations, -.43 for Monitoring Strategy Used in Career Development Learning Situations, .42 for Conditional Acceptance in Personal Life Learning Situations, -.37 for Adjusting Strategy Used in Career Development Learning Situations, -.33 for External Aids as Memory Strategies Used in Personal Life Learning Situations, .31 for Monitoring Strategy Used in Personal Life Learning Situations, -.31 for Testing Assumptions in Career

Development Learning Situations, .30 for Generating Alternatives in Career Development Learning Situations, .28 for Planning Strategy Used in Personal Life Learning Situations, .25 for Memory Application Used in Career Development Learning Situations, .23 for Use of Human Resources in Personal Life Learning Situations, -.21 for Use of Human Resources in Career Development Learning Situations, .19 for Generating Alternatives in Personal Life Learning situations, -.18 for Confidence Strategy in Career Development Learning Situations, and .17 for Planning Strategy Used in Career Development Learning Situations.

In this analysis there were only two groups, males and females. Therefore, only one function and one eigenvalue was generated. The eigenvalue for this analysis was .27, and the discriminant function accounted for 22% of the variance, between the groups.

The structure matrix generated by the discriminant analysis contained the coefficients which showed the similarity between each individual variable and the total discriminant function. In this discriminant analysis, three variables had sufficient coefficients to be included in the interpretation of the meaning of the discriminant function. These were External Aids as Memory Strategies Used in Personal Life Learning Situations (-.44), Monitoring Strategy Used in Career Development Learning Situations (-.33), and Generating Alternatives in Career Development Learning Situations (.30).

Based on the strength of these three variables, this discriminant

function was named Prioritized Learning. An analysis of the differences in learning strategies used by male and female participants showed that males used both External Aids and Monitoring strategies less than females, and they used Generating Alternatives more than females. In career development learning situations, female Prioritized Learners tended to assess, review, identify other solutions, and rank order or prioritize their learning tasks while males tended not to use these strategies. Male Prioritized Learners tended to brainstorm, rank order, and identify alternate solutions more than female Prioritized Learners in career development learning situations. In personal life learning situations, female Prioritized Learners relied on external aids, checklists and other tools that support memory retention more than their male counterparts.

The term "prioritized" contained in the title emphasizes this use of monitoring or reviewing learning processes and implies that these individuals generate and review external memory aids such as lists and displays to assist in prioritizing and reinforcing memory as part of their learning tasks. In addition, Prioritized Learners generate and rank various alternatives when necessary. Table 12 shows a summary of the data and the means of these three strategies.

Table 12. Means of Learning Strategies by Gender.

Learning Strategy & Value	Males	Females
External (-.44)	3.47	4.00
Monitoring (-.33)	4.10	4.45
Alternatives (.30)	4.44	4.12

The percentage of cases correctly classified showed how accurate the discriminant function was in grouping the participants. This discriminant function was 67.6% accurate in classifying cases. Of the 94 total males, the analysis correctly placed 68.1% (64). It correctly placed 84 of 125 (67.2%) of females. Thus, based on a chance placement of 1 in 2 (50%) for 2 groups, the discriminant function was a 17.6% improvement over chance placement. Consequently, it demonstrated that male and female groupings could be distinguished on the basis of uses of SKILLS learning strategies in personal life and career development learning situations.

The discriminant function of Prioritized Learning indicated that gender could be distinguished on the basis of SKILLS scores as follows:

$$D = .26 (\text{Planning Strategy Used in Personal Life Learning Situations}) + .30 (\text{Monitoring Strategy Used in Personal Life Learning Situations}) + .53 (\text{Confidence Strategy Used in Personal Life Learning Situations}) - .29 (\text{External Aids as Memory Strategies Used in Personal Life Learning Situations}) + .18 (\text{Generating Alternatives in Personal Life Learning Situations}) + .35 (\text{Conditional Acceptance in Personal Life Learning Situations}) + .19 (\text{Use of Human Resources in$$

Personal Life Learning Situations) + .19 (Planning Strategy Used in Career Development Learning Situations) - .43 (Monitoring Strategy Used in Career Development Learning Situations) - .40 (Adjusting Strategy Used in Career Development Learning Situations) - .17 (Confidence Strategy in Career Development Learning Situations) + .24 (Memory Application Strategy in Career Development Learning Situations) - .28 (Testing Assumptions in Career Development Learning Situations) + .29 (Generating Alternatives in Career Development Learning Situations) - .18 (Use of Human Resources in Career Development Learning Situations) - 3.57.

The group centroid for this function was .60 for the males and -.45 for the females.

The canonical correlation for this analysis was .46. Squaring this value showed that the groups explained 21% of the variation in the discriminant function.

In summary, a discriminant analysis was calculated to answer a second portion of Research Question 2, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations based on gender?" This portion of Research Question 2 was also answered in the affirmative since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents by gender groups.

SKILLS Learning Strategies and Program Level

EITC offers both certificate and degree programs. To determine if differences in uses of learning strategies in personal life and career

development learning situations based on type of degree program (certificate or degree) in which enrolled exist, a third discriminant analysis was conducted. As in the previous analyses, the pooled within-groups correlation matrix of predictors was examined to determine how the 30 discriminating variables within each of the groups were interrelated. Examination of the 433 coefficients in this analysis showed that they were at a sufficiently weak level to retain the variables in the analysis. Only one coefficient was at the .32 level. The remaining 432 were all at or below the .20 level. Thus, the variables in this discriminant analysis were not related to each other and consequently were not sharing a common variance.

Stepwise selection was used to determine which of the 30 discriminating variables added most to the discrimination between degree and certificate strategy selection. As a result of this stepwise procedure, nine variables were included in the discriminant function. The analysis stopped at Step 9 because the F levels indicated that the discrimination would have been insignificant beyond this step. The following discriminating variables and their corresponding Wilks's lambda values were selected: Conditional Acceptance in Personal Life Learning Situations--.97; Planning Strategy Used in Personal Life Learning Situations--.94; Generating Alternatives in Career Development Learning Situations--.93; Critical Use of Resources in Career Development Situations--.91; Attention Strategy Used in Personal Life Learning Situations--.90; Generating Alternatives in Personal Life Learning Situations--.89;

Testing Assumptions in Personal Life Learning Situations--.88; Resource Identification Used in Personal Life Learning Situations--.87; and Use of External Aids as Memory Strategies in Career Development Learning Situations--.86. The other 21 discriminating variables included in the analysis did not account for enough variance to be included in the discriminant function.

Standardized discriminant function coefficients generated by the discriminant analysis were used to determine which of the 30 discriminating variables contributed most to the discrimination between those enrolled in certificate programs and those enrolled in degree programs. In this analysis, the main contributing coefficients were .60 for Conditional Acceptance in Personal Life Learning Situations, .47 for Planning Strategy Used in Personal Life Learning Situations, .43 for Attention Strategy Used in Personal Life Learning Situations, .41 for Generating Alternatives in Career Development Learning Situations, .39 for Generating Alternatives in Personal Life Learning Situations, .38 for Critical Use of Resources in Career Development Learning Situations, .31 for Testing Assumptions in Personal Life Learning Situations, -.24 for Resource Identification Used in Personal Life Learning Situations, and Use of External Aids as Memory Strategies in Career Development Learning Situations.

In this analysis there were only two groups--students enrolled in certificate programs or students enrolled in degree programs. Thus, there was

only one function and one eigenvalue generated. The eigenvalue for this analysis was .15, which accounted for 13% of the variance. This is a low value for classification into either certificate or degree program groups.

The structure matrix generated by the discriminant analysis contained the coefficients which showed the similarity between each individual variable and the total discriminant function. In this discriminant analysis, three variables had sufficient coefficients to be included in the interpretation of the meaning of the discriminant function. These were Conditional Acceptance in Personal Life Learning Situations (.43), Planning Strategy Used in Personal Life Learning Situations (.42), and Generating Alternatives in Career Development Learning Situations (.37).

Based on the strength of these variables, this discriminant function was named Careful Learning. An analysis of the differences in learning strategies showed that those enrolled in degree programs used all three strategies more often than those enrolled in certificate programs. In personal life learning situations, Careful Learners attempt to find the best way to proceed with, determine the focus of, question simplistic answers, and carefully hypothesize learning tasks and results. The term "careful" contained in the title implies the use of reflection, careful identification of possible solutions, and analyzing the best way to proceed with given learning tasks. Table 13 shows a summary of the data and the means of these three strategies.

Table 13. Means of Learning Strategies for Certificate and Degree Programs.

Learning Strategy & Value	Certificate Program	Degree Program
Acceptance (.43)	3.89	4.31
Planning (.42)	4.34	4.71
Alternatives (.37)	4.07	4.38

The percentage of cases correctly classified showed how accurate the discriminant function was in grouping the participants. This discriminant function was 66% accurate in classifying cases. Of the 84 total participants enrolled in certificate programs, the analysis correctly placed 66.7% (56). It correctly placed 88 of 135 (65.2%) of participants enrolled in degree programs. Thus, based on a chance placement of 1 in 2 (50%) for 2 groups, the discriminant function was a 16% improvement over chance placement. Consequently, it demonstrated that the type of degree program in which students enrolled could be distinguished on the basis of the uses of SKILLS learning strategies in personal life and career development learning situations.

The discriminant function of Careful Learning for enrollment in certificate or degree programs could be distinguished on the basis of SKILLS scores as follows:

$$D = .43 (\text{Planning Strategy Used in Personal Life Learning Situations}) + .37 (\text{Attention Strategy Used in Personal Life Learning Situations}) + .30 (\text{Testing Assumptions in Personal}$$

Life Learning Situations) + .35 (Generating Alternatives in Personal Life Learning Situations) + .50 (Conditional Acceptance in Personal Life Learning Situations) - .22 (Resource Identification Used in Personal Life Learning Situations) - .21 (Use of External Aids as Memory Strategies in Career Development Learning Situations) + .40 (Generating Alternatives in Career Development Learning Situations) + .32 (Critical Use of Resources in Career Development Learning Situations) - 10.0.

The group centroid was -.49 for participants enrolled in certificate programs and .30 for participants enrolled in degree programs.

The canonical correlation for this analysis was .37. Squaring this value showed that the groups explained only 14% of the variation in the discriminant function.

In summary, a discriminant analysis was calculated to answer a third portion of Research Question 2, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations based on type of degree program (certificate or degree) in which enrolled?" This portion of Research Question 2 was also answered in the affirmative, since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents into certificate or degree program groups.

SKILLS Learning Strategies and Occupational Areas

There were 13 full-time programs of study at EITC during the time of this study. These were Business and Office Technology (BOT), Chemical

Laboratory Technician (CLT), Computer Network Support Tech (CNST), Dental Assisting (DA), Electronic Service Technician (EST), Environmental Technician (ET), Insurance Customer Service Representative (ICSR), Marketing & Management (MM), Mechanical Trades (MT), Medical Assistant (MA), Practical Nursing (PN), Radiation Safety Technology (RST), Welding (WELD). These 13 programs were further classified into the five occupational areas of Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations. A fourth discriminant analysis was performed relating learning strategies and these five occupational areas.

Due to the differences in size and distribution, (see Table 14), it was not effective to execute a discriminant analysis using the 13 programs as distinct groups. Therefore, the 13 programs were combined into 5 occupational areas of study. Programs that were similar, such as Practical Nursing, Medical Assistant, and Dental Assisting, were combined into logical groupings. These five occupational areas were titled Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations. Combining the 13 programs allowed for a more uniform distribution of participants into the 5 occupational areas. These occupational areas became the five distinct groups upon which the discriminant analysis was performed.

Table 14. Participants in Occupational Areas and Associated EITC Programs.

Occupational Area and Programs	Number of Participants	
1. Health Occupations		52
- Dental Assisting	6	
- Medical Assistant	18	
- Practical Nursing	28	
2. Industrial Occupations		26
- Mechanical Trades	18	
- Welding	8	
3. Office Occupations		69
- Business and Office Technology	42	
- Insurance Customer Service Representative	8	
- Marketing and Management	19	
4. Science Occupations		36
- Chemical Laboratory Technician	6	
- Environmental Technician	18	
- Radiation Safety Technology	12	
5. Technology Occupations		36
- Computer Network Support Technician	11	
- Electronic Service Technician	<u>25</u>	
Total	219	219

The pooled within-groups correlation matrix of predictors was examined to determine how the 30 discriminating variables within each of the groups were interrelated. The examination of the 433 coefficients in this analysis showed that they were at a sufficiently weak level to retain the variables in the analysis. Only three coefficients were at or above .30; they were .47, .32, and .30. Thus, the variables in this discriminant analysis were

not related to each other and consequently were not sharing a common variance.

Stepwise selection was used to determine which of the 30 discriminating variables added most to the discrimination between the 5 occupational areas. As a result of this stepwise procedure, 14 variables were included in the discriminant function. The analysis stopped at Step 14 because the F levels indicated that the discrimination would have been insignificant beyond this step. The following discriminating variables and their corresponding Wilks's lambda values were selected: Generating Alternatives in Career Development Learning Situations--.90; Conditional Acceptance Used in Personal Life Learning Situations--.85; Confidence Strategy Used in Personal Life Learning Situations--.80; Planning Strategy Used in Career Development Learning Situations--.76; Testing Assumptions in Personal Life Learning Situations--.72; Organization in Memory Strategy Use in Career Development Learning Situations--.69; Using External Aids as Memory Strategies in Personal Life Learning Situations--.67; Resource Identification Used in Personal Life Learning Situations--.65; Monitoring Strategy Used in Personal Life Learning Situations--.63; Use of Human Resources in Career Development Learning Situations--.62; Use of Human Resources in Personal Life Learning Situations--.60; Adjusting Strategy Used in Career Development Learning Situations--.58; Attention Strategy Used in Personal Life Learning Situations--.56, and Conditional Acceptance Used in Career Development

Learning Situations--.55. The other 16 discriminating variables in the analysis did not account for enough variance to be included in the discriminant function.

Standardized discriminant function coefficients generated by the discriminant analysis were used to determine which of the 30 discriminating variables contributed most to the discrimination between the 5 occupational areas. In this analysis, the main contributing coefficients were .75 for Use of Human Resources in Personal Life Learning Situations, .62 for Adjusting Strategy Used in Career Development Learning Situations, .58 for Generating Alternatives in Career Development Learning Situations, -.56 for Generating Assumptions in Personal Life Learning Situations, .55 for Use of Human Resources in Career Development Learning Situations, .51 for Attention Strategy Use in Personal Life Learning Situations, .47 for Conditional Acceptance in Personal Life Learning Situations, .47 for Confidence Strategy Use in Personal Life Learning Situations, .42 for Planning Strategy Used in Career Development Learning Situations, .39 for Organization as Memory Strategy Used in Career Development Learning Situations, .37 for External Aids Used as Memory Strategies in Personal Life Learning Situations, .37 for Resource Identification Used in Personal Life Learning Situations, .35 for Monitoring Strategy Used in Personal Life Learning Situations, and .28 for Critical Acceptance in Career Development Learning Situations.

In this analysis, there were five groups. Subsequently, four functions

were generated. The eigenvalue for Function 1 was .37 and accounted for 56% of variance. The eigenvalue for Function 2 was .16 and accounted for 23% of the variance. The eigenvalue for Function 3 was .06 and accounted for 6% of the variance and the eigenvalue for Function 4 was .05 and accounted for 5% of the variance. The eigenvalues for Functions 3 and 4 were negligible in contributing to the variance. Only Function 1, which accounted for 56% of the variance--over twice that of Function 2, which accounted for 23%--was judged to be useful in the analysis.

The structure matrix related to Function 1 and generated by the discriminant analysis contained the coefficients which showed the similarity between each individual variable and the total discriminant function. Two variables had sufficient coefficients to be included in the interpretation of the meaning of this discriminant function. These were Conditional Acceptance in Personal Life Learning Situations (.42), and Planning Strategy Use in Career Development Learning Situations (.31).

Based on the strength of these variables, this discriminant function was named Critical Learning. An analysis of the differences in learning strategies used by participants in the five occupational areas showed that in personal life learning situations students in Science and Technology Occupations used Conditional Acceptance and its associated tactics of reflection, questioning simplistic answers, monitoring results, and predicting consequences the most of all five groups. In career development learning situations students in

Industrial and Office Occupations used Planning and its associated tactics of following one's own style, skimming learning material, and determining the purpose of learning tasks the most of all five groups.

Critical Learners carefully and critically analyze the best way to proceed, plan, and determine the focus of learning tasks. The term "critical" contained in the title emphasizes this reliance on planning which learning tasks individuals will address and how they will go about solving them. In addition, Critical Learners use conditional acceptance to question simplistic answers and monitor their progress on given learning tasks. Table 15 shows a summary of the data and the means of these two strategies.

Table 15. Means of Learning Strategies By Occupational Areas.

Learning Strategy & Value	Health	Industry	Office	Science	Technology
Acceptance (.42)	3.98	4.00	3.87	4.58	4.61
Planning (.31)	4.95	5.36	5.14	4.84	4.96

The percentage of cases correctly classified showed how accurate the discriminant function was in grouping the participants. This discriminant function was 47.5% accurate in classifying cases. Of the 69 cases in Office Occupations, the analysis correctly placed 44.9% (31). It correctly placed 21 of 36 (58.3%) in Science Occupations, 17 of 36 (47.2%) in Technology

Occupations, 23 of 52 (44.2%) in Health Occupations, and 5 of 26 (19.2%) in Industrial Occupations. Thus, based on a chance placement of 1 in 5 (20%) for 5 groups, the discriminant function was a 27.5% improvement over chance placement. Consequently, it demonstrated that occupational areas could be distinguished on the basis of differing uses of SKILLS learning strategies in personal life and career development learning situations.

The discriminant function of Critical Learning for occupational areas was as follows:

$$\begin{aligned}
 D = & -.18 \text{ (Monitoring Strategy Used in Personal Life Learning} \\
 & \text{Situations)} + .14 \text{ (Attention Strategy Used in Personal Life} \\
 & \text{Learning Situations)} + .46 \text{ (Confidence Strategy Used in} \\
 & \text{Personal Life Learning Situations)} - .22 \text{ (External Aids Used as} \\
 & \text{Memory Strategies in Personal Life Learning Situations)} - .22 \\
 & \text{(Testing Assumptions in Personal Life Learning Situations)} + \\
 & .40 \text{ (Resource Identification Used in Personal Life Learning} \\
 & \text{Situations)} - .11 \text{ (Use of Human Resources in Personal Life} \\
 & \text{Learning Situations)} + .46 \text{ (Use of Planning Strategy in Career} \\
 & \text{Development Learning Situations)} - .04 \text{ (Adjusting Strategy} \\
 & \text{Used in Career Development Learning Situations)} + .37 \\
 & \text{(Organization Strategy Used in Career Development Learning} \\
 & \text{Situations)} + .58 \text{ (Generating Alternatives in Career} \\
 & \text{Development Learning Situations)} + .23 \text{ (Conditional} \\
 & \text{Acceptance in Career Development Learning Situations)} + .18 \\
 & \text{(Use of Human Resources in Career Development Learning} \\
 & \text{Situations)} - 8.83.
 \end{aligned}$$

The group centroid for Office Occupations was -.42, for Science Occupations was 1.12, for Technology Occupations was .54, Health Occupations was -.42, and Industrial Occupations was -.34.

The canonical correlations for this analysis were .52 for Function 1 and

.37 for Function 2. Squaring these values yielded 27% and 14% for Functions 1 and 2 respectively. Together these functions explain 41% of the variance in the grouping. Variance resulting from Functions 3 and 4, 6% and 5% respectively, was negligible.

In summary, a discriminant analysis was calculated to answer Research Question 3, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations by students at EITC in the following occupational areas of study: Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations?" Research Question 3 was answered in the affirmative since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents into occupational areas.

Cluster Analysis

In addition to t-tests and discriminant analyses, this study also employed the use of cluster analysis to determine if distinctive groups of learners could be formed based on SKILLS learning strategy scores. Cluster analysis is a statistical technique that allows researchers to study relatively homogeneous groups or "clusters" that may share common characteristics (Aldenderfer & Blashfield, 1984). It can be used in the social sciences as an enhancement to quantitative research (Conti & Fellenz, 1989b; Hays, 1995;

Yabui, 1993). "The social sciences have long maintained an interest in cluster analysis. Although many of the theories and applications that served as the basis for clustering in the past have been repudiated by later generations of scholars, all social sciences now have strong modern traditions in the use of clustering methods" (Aldenderfer & Blashfield, 1984, pp. 8-9).

Cluster analysis is a generic name given to a variety of multivariate statistical procedures. These procedures may be used to create a group classification scheme (Aldenderfer & Blashfield, 1984, p. 7). Cluster analysis is "a process of sorting individual variables or objects into an end group which then can be categorized based on its unique characteristics" (cited in Lorr, 1983; Fellenz & Conti, 1989b). It is used to add a varied perception to data that are gathered in research studies. It can enrich a study by providing or discovering a structure that is not evident by simply crunching numbers. "Clustering methods are used to discover structure in data that is not apparent by visual inspection" (Aldenderfer & Blashfield, 1984, p. 76).

Cluster Analysis with SKILLS

Thirty variables were used to generate the cluster analysis included in this study. These were the SKILLS scores generated by participants comprised of the 15 learning strategies used in personal life learning situations and the 15 learning strategies used in career development learning situations. Data related to participants' learning strategies were gathered through the use

of a modified version of the SKILLS instrument (see Appendix D). Initially, all 219 participants were included in the cluster analysis. However, as relevant data were analyzed to determine the best number of clusters that would provide distinct groups of learners, 12 participants were eliminated from the study because they had extreme scores on at least one variable that prevented them from clustering with other groups. Cluster analysis using the Ward's method was conducted on the remaining 207 participants. The Ward's method is a technique used in cluster analysis for the formation of the clusters. It was used because "it is designed to optimize the minimum variance within clusters and tends to create clusters of relatively equal sizes" (Aldenderfer & Blashfield, 1984, p. 43). It is also a preferred method in social science research. "Ward's method has been virtually ignored in the biological sciences, but it has been widely used in many of the social sciences" (p. 43).

While cluster analysis is being used more widely and is accepted in general by researchers, it should be noted that there is no "right" method to determine the selection of cluster groups. Although the social sciences have attempted to adopt formal rules, heuristic approaches are most common in selecting clusters. Because there are no established correct procedures for choosing clusters, researchers are cautioned that different numbers of clusters from the same sample set may provide different results (Aldenderfer & Blashfield, 1984, pp. 54, 58).

Using the 30 variables comprised of the 15 learning strategies used in

personal life learning situations and the 15 learning strategies used in career development learning situations, three-, four-, and five-cluster solutions were run using the Quick Cluster process of SPSS/PC. The five-cluster solution was determined to be the most appropriate for this study based on the distribution of participants in each group. Participants were distributed among the five groups as follows: Mature Self-Assured Learners--21; Focused Contemplative Learners--26; Analytical Learners--67; Immature Attentive Learners--62; and Self-Directed Resourceful Learners--31. Rationale used in naming and classifying these groups will be discussed later in this section.

After the five-cluster solution was chosen, means for each of the 15 learning strategies used in personal life learning situations and the 15 learning strategies used in career development learning situations were calculated for each cluster group. A one-way analysis of variance was performed on each of these 30 variables to determine if there were significant differences among the 5 cluster groups (Hays, 1995; Yabui, 1993). Variables on which the groups differed significantly were retained in the analysis to characterize and assist in naming the groups. Participants significantly differed on 17 of the 30 variables. Results of the analyses are shown in Table 16. It should be noted that there were 202 degrees of freedom within the groups and 4 degrees of freedom between the groups.

Table 16. Variables Showing Significant Differences in Cluster Analysis.

Variable	F	p
Planning in Personal Learning	2.99	.0201
Attention in Personal Learning	7.18	.0001
Reward in Personal Learning	19.47	.0001
Confidence in Personal Learning	5.81	.0002
Memory Application in Personal Learning	2.49	.0447
Conditional Acceptance in Personal Learning	9.52	.0001
Resource Identification in Personal Learning	3.10	.0165
Use of Human Resources in Personal Learning	2.60	.0372
Attention in Career Learning	3.41	.0100
Reward in Career Learning	18.55	.0001
Memory Organization in Career Learning	5.95	.0002
Memory Application in Career Learning	2.50	.0439
Testing Assumptions in Career Learning	8.35	.0001
Conditional Acceptance in Career Learning	6.54	.0001
Resource Identification in Career Learning	5.10	.0006
Critical Use of Resources in Career Learning	8.10	.0001
Use of Human Resources in Career Learning	2.98	.0202

(NOTE: $df = 4/202$)

In personal life learning situations significant differences existed in use of Planning, Attention, Reward, Confidence, Memory Application, Conditional Acceptance, Identification of Resources, and Use of Human Resources learning strategies. Strategies used in career development learning situations that showed significant differences were Attention, Reward, Memory Organization, Memory Application, Testing Assumptions, Conditional Acceptance, Identification of Resources, Critical Use of Resources, and Use of Human Resources.

The one-way analyses also determined that there was a total of 13 learning strategy variables that did not show significant differences among the 5 clusters (see Table 17). Since these 13 variables did not show significant differences, they were not considered as characteristic and were not useful in classifying and naming the five groups determined in the cluster analysis. Variables showing no significant differences in personal life learning situations and therefore not included in classification or naming of cluster groups were Monitoring, Adjusting, Memory Organization, External Aids as Memory Strategy, Testing Assumptions, Generating Alternatives, and Critical Use of Resources. Variables showing no significant differences in career development learning situations and therefore not included in classification or naming of cluster groups were Confidence, External Aids as Memory Strategy, Generating Alternatives, Planning, Monitoring, and Adjusting in Career Learning.

Table 17. Variables Showing No Significant Differences in Cluster Analysis.

Variable	F	p
Monitoring in Personal Learning	2.01	.0950
Adjusting in Personal Learning	1.83	.1214
Memory Organization in Personal Learning	1.46	.2141
External Aids in Personal Learning	1.20	.3139
Testing Assumptions in Personal Learning	1.06	.3755
Generating Alternatives in Personal Learning	1.28	.2788
Critical Use of Resources in Personal Learning	2.23	.0664
Confidence in Career Learning	1.85	.1198
External Aids in Career Learning	1.90	.1111
Generating Alternatives in Career Learning	1.24	.2929
Planning in Career Learning	1.39	.2388
Monitoring in Career Learning	.974	.4228
Adjusting in Career Learning	1.58	.1805

(NOTE: $df = 4/202$)

Information related to the demographic variables of age, gender, level of program, years since participants left high school, years of experience in the workplace, occupational program in which enrolled, and whether participants-held a GED certificate or high school diploma was also analyzed to further assist in distinguishing between and naming of the five clusters.

This information was gathered by use of a demographic survey (see Appendix C). Two of these variables, occupational program in which enrolled and years of experience in the workplace, were withdrawn from further analysis for the following reasons. Since there were 13 occupational programs in which participants could be enrolled but no way to determine or quantify a priority method for student choice of enrollment, these data were considered categorical and were not pertinent to this part of the study. In addition, data related to years of experience in the workplace were not considered due to the incomplete and insufficient responses gathered by the survey. Results from this analysis showed that age was the only demographic variable that showed significant difference between the five groups. Therefore, along with the 17 learning strategies identified as significant, age was also considered in the classification and naming of groups.

The means of the 5 cluster groups for each of the 17 learning strategy variables and the demographic variable of age were selected as characteristic indicators of the cluster groupings. Tukey post hoc tests were used to identify the groupings for each of the significant variables. The means of these groupings are shown in Table 18. The following abbreviations were made in Table 18: Learning strategies used in personal learning were designated as "PL" followed by the strategy. The same format was used with career development strategies with "CD" as a designator.

Table 18. Means of Cluster Groupings on Learning Strategies and Age.

Variable	Cluster				
	1	2	3	4	5
Age	45.85	31.96	23.07	21.43	33.70
PL Planning	4.76	3.88	4.50	4.61	4.77
PL Attention	4.67	5.19	4.17	4.98	4.23
PL Reward	3.00	4.07	2.73	3.76	2.35
PL Confidence	3.14	3.42	2.71	3.45	2.80
PL Memory Application	3.80	3.50	3.41	3.27	2.90
PL Conditional Acceptance	3.95	3.65	4.79	3.72	4.41
PL Identification	4.33	4.38	4.08	4.06	4.80
PL Human Resources	3.85	4.38	4.17	3.98	4.70
CD Attention	4.83	5.40	5.09	4.75	4.70
CD Reward	3.83	3.42	4.41	3.26	2.67
CD Organization	3.13	2.97	3.77	3.85	3.72
CD Memory Application	4.40	3.68	3.70	3.85	3.83
CD Testing Assumptions	4.36	3.80	4.38	4.00	3.33
CD Conditional Acceptance	3.70	4.68	3.48	4.53	4.01
CD Identification	3.86	4.14	3.93	3.97	4.64
CD Critical Use of Resources	3.70	4.28	3.93	3.87	4.82
CD Use of Human Resources	4.26	3.65	4.12	4.07	4.45

Research Question 4 asked, "Is it possible to determine if distinct

clusters or learning groups exist among students at Eastern Idaho Technical College based on SKILLS scores of learning strategies used in personal life and career development learning situations?" The results of the cluster analysis on the 15 strategies used in personal life learning situations and the 15 strategies used in career development learning situations showed that five learning groups did have distinguishable characteristics that identified participants who used similar learning strategies. Therefore, Research Question 4 was answered in the affirmative since it was possible to determine that distinct clusters existed among students at Eastern Idaho Technical College.

Focus Group Interviews

In order to supplement the quantitative cluster analysis employed in this case study, focus group interviewing sessions were held with each of the five learning groups identified by the cluster analysis. "In case study research of contemporary education, some and occasionally all of the data are collected through interviews" (Merriam, 1988. p. 71). Researchers are finding that a combination of quantitative and qualitative analyses can add meaning to research studies. In his study, Yabui (1993) recommended that a qualitative follow-up method could be a useful addition when used with cluster analysis.

Interviews of participants after the data were analyzed would help in answering questions raised about the learning experiences of the participants and the reason they used the learning strategies they identified in SKILLS. It would also

contribute greatly in providing a better description of each cluster learner group. (Yabui, 1993, p. 128)

Likewise, Hays (1995) used this multi-faceted approach to provide further clarity to the nature of the clusters found in her study on learning disabled students. There is no one set of instructions or techniques available to determine the best or proper type of interview format for a given situation.

Researchers seeking guidance for interview construction find available an overwhelming array of instructions, suggestions, protocol frames, and prescriptions. Within this massive literature, contradictions abound. Consequently, researchers are best served by seeking and following guidelines for interview construction that are consistent with the goals and designs of particular research projects. (Goetz & LeCompte, 1984, p. 124)

The type of interview format chosen for this study was that of focus group interviews. Some advantages and disadvantages of group interviews are listed in Table 19.

Table 19. Advantages and Disadvantages of Group Interviews.

Advantages		Disadvantages	
1.	More efficient and economical than 1-on-1 interviews	1.	May intimidate and suppress individual differences
2.	Results reflect group behavior and consensus	2.	Fosters conformity
3.	Reveals group interaction patterns	3.	Intensifies group loyalties and can polarize opinions
4.	As with brainstorming, can stimulate productivity of others	4.	Rules out many face-to-face advantages, including visual impressions of learning setting

Source: Isaac, S. & Michael, W. B. (1990). Handbook in research and evaluation. (2nd ed.). San Diego: EdITS Publishers.

Group interviews can be also be useful in bringing the researcher into the domain of the participants of interest. In such a situation, a number of people are brought together and encouraged to talk about the subject of interest (Morgan, 1988). In addition, Isaac and Michael (1990) stated that

Although the "interview" is normally a one-on-one relationship, for many purposes interviewing in groups is appropriate. Not only does it save time, but, if the behavior one is trying to understand takes place in a group interaction setting, the group interview will yield a better picture of this phenomenon. (p. 131)

Interviewing performed in a group setting is similar to that performed in one-on-one settings in the sense that there is a back-and-forth dialogue of interviewer questions and participants' responses. The main difference in a group interview setting is that attention is paid to the interaction within the group rather than on the individual. It is this interaction along with the responses of group participants that can contribute additional information to the interview.

In group interviews, the researcher typically takes the role of a moderator or facilitator of a group discussion in an attempt to draw out participants' viewpoints. The basic data produced by focus groups are transcripts of the dialogue and discussion that takes place during the session (Morgan, 1988, pp. 10-11). In this study, focus group interviews were used to supplement the quantitative data collected in the cluster analysis and not meant to be a quantitative means of gathering information that could be empirically analyzed. The main goal of using focus groups was to gain verbal

perspectives from participants' points of view in an effort to enhance the quantitative data gathered in the cluster analysis.

Five members were randomly selected from each of the five clusters identified in the cluster analysis to participate in focus groups. Five randomly selected members from each of the clusters was determined to be an adequate representation based on criterion-based sampling where samples are chosen based on criteria rather than on numbers (Goetz & LeCompte, 1984).

Although many sampling techniques are available, criterion-based selection was used to choose participants for the focus groups. Criterion-based selection is a method of sampling that allows the researcher to establish the criteria, bases, or standards necessary for participants to be included in a case study (Merriam, 1988). In criterion-based sampling the researcher creates "a recipe of the attributes essential to one selected unit and proceed[s] to find or locate a unit that matches the recipe" (Goetz & LeCompte, 1984, p. 77). Since five distinct groups were identified by the cluster analysis, and since the cluster analysis was based on "a recipe of attributes" consisting of the significant variables identified in the cluster analysis, criterion-based sampling was selected as the basis to choose focus group members.

The five representative participants were asked to join in a small group discussion related to learning strategy use. Each of the five focus groups met separately and independently from the others. Permission to tape the focus group discussion was granted by participants in each group. Transcripts of

these recordings were then compiled for review.

Each group was lead through a discussion based on a list of seven questions (see Appendix G). These questions were developed with the intent of following Patton's (1980) approach to interviewing which is based on six factors that stimulate group interaction during interviews. These six factors are; (a) experience and behavior questions that elicit what respondents do or have done; (b) opinion and value questions that elicit how respondents think about their behaviors and experiences; (c) feeling questions that elicit how respondents react emotionally to their experiences and opinions; (d) knowledge questions that elicit what respondents know about their worlds; (e) sensory questions that elicit respondents' descriptions of what and how they see, hear, touch, taste, or smell in the world around them; and (f) background and demographic questions that elicit respondents' descriptions of themselves (Goetz & LeCompte, 1984, p. 125). Since the goal of the focus groups was to collect information that would enhance data gathered in the quantitative cluster analysis, the seven questions were used as a guide to stimulate discussion among focus group members and keep group discussions on track. The questions were not intended to be specific and all encompassing to gather quantitative data. It should be noted, however, that each question dealt with some aspect of learning, and some questions dealt specifically with personal life and career development learning situations.

Participation and input from all members of the focus groups were

substantial, with sessions lasting about an hour each. Naming of the five learning groups identified in the cluster analysis was mainly based on data collected in the cluster analysis. However, pertinent focus group comments have been noted where appropriate to substantiate cluster analysis information or to show contradictions between cluster analysis information and focus group interactions.

It was found that although the group interviews were helpful in general to keep group discussion alive, they did not necessarily add value to or clarify the cluster analysis. Several problems occurred during the focus group sessions that are worth noting. These were verbal domination of certain individuals during some group discussions, polarization of group members in some groups, guideline questions that may not have been relevant to the cluster analysis, and hostility on the part of some participants.

Learning Group 1: Mature Self-Assured Learners

This group was named Mature Self-Assured Learners because of their high average age and their apparent confidence in learning situations. There were 21 members in the Mature Self-Assured group. This group had the highest average age of all five groups at 45.85 years.

Mature Self-Assured Learners had high cluster means in Planning Strategy Used in Personal Life Learning Situations (4.76) and Attention Strategy Used in both Personal Life (4.67) and Career Development (4.83)

Learning Situations. These learners had low means in Reward Strategy Used in Personal Life Learning Situations (3.00), Confidence Strategy Used in Personal Life Learning Situations (3.14), and Organization Strategy Used in Career Development Learning Situations (3.13).

Mature Self-Assured Learners differed from the other four groups by scoring highest of all groups on Memory Application used in both Personal Life and Career Development Learning Situations. These scores indicate they tend to use remembrances and other mental images more than the other groups to assist in problem solving and planning activities. They also may rely more on their experience to avoid mistakes by knowing what to expect while performing learning tasks. Comments elicited from the group seemed to support this. For example, when asked about work experiences, most group members agreed with one participant who replied:

I've been working at [a supermarket] for about 2 years now. It seems like every time someone new comes on, I get the job of training them. I was getting a little tired of this, so one day I asked the manager why I always had to do it. She said that it seemed like I knew the best ways to get things done and don't make a bunch of mistakes. Her words were something like, you don't waste motion and you know what you are doing, so I like to have you train the "newbees."

The group also varied from the other groups by its low Use of Human Resources in Personal Life Learning Situations and on Identification of and Critical Use of Resources in Career Development Learning Situations. The low use of Human Resources in personal learning situations may indicate that these learners choose not to rely as much as the four groups do on support

from or networking with others to assist them in personal learning tasks. In career development situations these learners use the strategies of Identifying and Critically Using resources less than the other groups. This may indicate that they perceive the importance of networking in career development situations as a lower priority than do the other groups. There was general agreement among group members on this student's comment:

I usually try to find my own way to do things. I know we've had those classes on networking for jobs and stuff, but I really would just as soon do things my own way without having to count on somebody else. I've always found a job before and I probably won't have any trouble when I get out of here [college].

However, another group member commented that, "I've always found it helpful to find a study partner. I think it's valuable to bounce ideas off another person sometimes."

Based on their high average age and the high and low cluster means, the 21 members of this group can be described as the most mature and self-assured learners of the five groups. They tend to focus on the material to be learned, avoid distractions, and set aside time for learning in both personal life and career development situations. Mature Self-Assured Learners appear to rely on their experience and knowledge to analyze the best ways to proceed with specific learning tasks and plan these learning tasks accordingly. Possibly due to their age and experience, they also follow their own learning style rather than adopting others' suggestions. Their low score on the Metamotivational strategy of Reward may indicate that these learners are not

overly concerned with how others feel about the strategies they use to complete their learning tasks. In addition, their low score on Confidence may be due to their assurance that they will complete learning tasks successfully and have no need to remind themselves of past successes and getting support from others that they will succeed. One 55-year old commented:

I've learned that it doesn't matter what others think. You have to go your own way and stick by your own decisions, right or wrong. This gives me trouble sometimes with my teachers because some of them want me to do things their way. They'll say do this problem this way and get this answer. When I say something like but that's not how the real world works, they'll come back and say, no but it's how it works here. So I've learned that even though you sometimes have to do what others want to get what you want, you don't have to like it or believe it. I still say that in the real world, you should do things your own way, based on what you've learned from your mistakes.

Learning Group 2: Focused Contemplative Learners

This group was named Focused Contemplative Learners because of group members' apparent focused approach to and contemplation of learning task activities. There were 26 members in the Focused Contemplative group. They had high cluster means in Attention Strategy Used in both Personal Life (5.19) and Career Development Learning Situations (5.40) and Conditional Acceptance Used in Personal-Life Learning Situations (4.68). This group had low means in Confidence Strategy Used in Personal-Life Learning Situations (3.42), Memory Application Strategy Used In Personal-Life Learning Situations (3.50), Organization Strategy Used in Career Development Learning Situations (2.97), and Reward Strategy Used in Career Development Learning

Situations (3.42).

Like members of the Mature Self-Assured learning group, members of this group can be described as learners who focus on the material to be learned, avoid distractions, and set aside time for learning in both personal life and career development situations. However, they differ significantly from the Mature Self-Assured learners on their use of the Metacognitive strategy of Planning. While Mature Self-Assured Learners value and rely on Planning, Focused Reflective Learners choose not to use Planning in their learning activities. In career development situations, Focused Reflective learners use reflection and contemplation to consider aspects of learning activities. They also tend to question simplistic answers, monitor learning task results, and attempt to predict consequences of learning tasks. A student in the Computer Network Support Technician Program commented that

Even with computer networking you get going and you see one problem in one area and the whole system doesn't work. Rather than just skipping and working around it, I might devote 3, 4, or 5 weeks to it if I need to. I try to think about all different points to the problem and what I need to do to fix the whole system. I'll do whatever it takes to get the information I need.

One group member did not agree, she stated:

I don't know about that. I agree that it might be important to take a job step-by-step. But I think there's a point where you either need to move on or ask somebody for help. I'm not sure it's very smart to work weeks on a problem. If I can't solve it in a fairly short amount of time, I'll get help.

Another made the comment that, "If I get stuck on something, I don't waste much time trying to fight it. I either get help or forget about it."

Focused Contemplative Learners differed from the other four groups by scoring highest on Attention strategy used in both Personal Life and Career Development Learning Situations. To assist them in learning their endeavors, members of this group tend to focus on tasks and are more resolved to learn material more than the other groups appear to do so. In addition, this group tends to question simplistic answers, monitor learning task results, and attempts to predict consequences of learning more than the other four groups. The group also varied from the other groups by its low use of the Memory strategies of Memory Application and Organization. This indicates they may be less likely than the other groups to structure or process information and use remembrances or mental images to assist in their learning activities. Their low use of Confidence and Reward strategies may indicate that they are not as apt as the other groups to rely as much on support or networking with others and are not aware of the value of their own learning of material to assist them in learning tasks. Another distinction between the Focused Contemplative Learners and the other groups is their low use of Memory Organization in career learning situations. They appear less likely than the other groups to structure, summarize, form patterns, or process information so that material will be better stored, retained, or retrieved from memory. One student commented that

I would sit down and I'd try to memorize what I had to do to pass the test. But I was never very good at memory. Like my sister, she took anatomy and had these index cards with, like, a muscle on one side and the tendon or bone or whatever, where the muscle hooked on to, on the

other side. She always did good at that kind of stuff, but I guess I'm just too lazy to do it. Or else I just have a bad memory.

Based on the high and low cluster means, the 26 members of this group can be described as the most focused and contemplative learners of the five groups. They tend to focus on the material to be learned, avoid distractions, and set aside time for learning in both personal life and career development situations. Their low score on the Metamotivational strategies of Confidence and Reward may indicate that these learners are not worried whether or not they will complete learning tasks.

Learning Group 3: Analytical Learners

This group was named Analytical Learners because of their apparent learning approach of planning, focusing, and questioning. There were 67 members in the Analytical group. They had high cluster means in Planning Strategy Used in Personal Life Learning Situations (4.50), Conditional Acceptance in Personal Life Learning Situations (4.79) and Attention Strategy Used Career Development Learning Situations (5.09). These learners had low means in Reward Strategy Used in Personal Life Learning Situations (2.73), Confidence Strategy Used in Personal Life Learning Situations (2.71), and Memory Application Used in Personal Life Learning Situations (3.41).

Analytical Learners differed from the other four groups by scoring highest on Conditional Acceptance in Personal Life Learning Situations and Reward and Testing Assumptions in Career Development Learning Situations.

Scoring high in these areas may indicate that this group tends to question simplistic answers, examines the accuracy of assumptions, spots inconsistencies, evaluates results, and predicts consequences of learning when solving learning problems and planning activities. More than the other groups, they also may anticipate or recognize the value of themselves in the learning specific material. The group also varied from the other groups by its low use of Attention and Confidence strategies in Personal Life Learning Situations. The low use of these strategies may indicate that these learners may not rely on them as much as the other groups do to solve problems or accomplish tasks. In addition, they are not as likely as the other groups to gain reassurance or get support from others on learning tasks. Group members agreed with one student's comment that

I hate it when someone comes up with a broad statement that tries to cover everything. That's not the way the world works. It's not how it works on getting a job and it's not how it works if you have to buy a new car. You've got to have a plan of attack that is specific to what you want to achieve or get. You've always got to be checking on your progress and figuring out the next step. I get real peeved at people in class who say things like, well all you've got to do is go along with the flow and you'll learn what you need to do to get by. That's just not how it is. You've got to focus on what you need to learn to pass any class.

Based on the high and low cluster means, the 67 members of this group can be described as the most analytical of all the groups in regards to learning activities. They tend to analyze the best ways to proceed with learning tasks, focus on the material to be learned, and question or analyze simplistic answers. Analytical Learners rely on their ability to analyze the best ways to

proceed with specific learning tasks and to plan these learning tasks accordingly. Their low score on the Metamotivational strategy of Reward indicates that these learners are not overly concerned with how others may feel about the strategies they use to complete their learning tasks. In addition, their low score on Confidence may be due to their assurance that they will complete learning tasks successfully and have no need to remind themselves of past successes and getting support from others that they will succeed. In regards to confidence one student stated that

All through high school and my younger life I had no self-esteem, no self-confidence. Then when I learned how to study the way I wanted to, not how someone else wanted me to, I started to get good grades. I think before that time I was just making the decision that I wasn't any good at anything. Now I've learned that I can get as good of grades as anybody else can and that if people don't like the way I study, because it's slow and step-by-step, that's tough. I don't care if the rest of the class gets ahead of me, as long as I know I'm learning, that's all that matters. To me anyway.

Another group member agreed, "I think there's something to that. I think that people can make or break themselves by how they treat themselves. If you think you can, you can. And if you think you can't, you can't."

Learning Group 4: Immature Attentive Learners

This group was named Immature Attentive Learners because of the young average age and group members' apparent high level of attention to learning situations. There were 62 members in the Immature Attentive group. This group had the lowest average age of all five groups at 21.43 years.

Immature Attentive Learners had high cluster means in Planning Strategy Used in Personal Life Learning Situations (4.61) and Attention Strategy Used in both Personal Life (4.98) and Career Development (4.75) Learning Situations. These learners had low means in Confidence Strategy Used in Personal Life Learning Situations (3.45), Memory Application Strategy Used in Personal Life Learning Situations (3.27), and Reward Strategy Used in Career Development Learning Situations (3.26). Ironically, the Immature Attentive Learners were similar to the Mature Self-Assured Learners in that each group used the same three learning strategies most often in personal life and career development learning situations. However, two main differences existed between the two groups. These were age and learning strategies least used by each group. The Mature Self-Assured Learners had the highest average age and tended not to use Reward Strategies in Personal Life Learning Situations and Organization Strategies in Career Development Learning Situations. The Immature Attentive Learners had the lowest average age, and tended not to use Memory Application in Personal Life Learning Situations and Reward Strategy in Career Development Learning Situations. Group members agreed with a nursing student who commented that

I guess that since I just got out of high school last year I don't really feel like I know a lot about life yet. I did good in high school on the things I was interested in because I paid a lot of attention to them. Things I wasn't so interested in, like math and history, I didn't do very well at. I probably could have, but I didn't think they would go toward anything in college. I knew I wanted to be a nurse, so I just paid

attention to the things I liked or that I thought would help me.

Immature Attentive Learners differed from the other four groups by scoring highest on Confidence strategy use in both Personal Life Learning Situations and Organization Used in Career Development Learning Situations. They tend to use remembrances and other mental images more than the other groups to assist in problem solving and planning activities. The group also varied from the other groups by its low score on the Resource Management strategy of Identifying Appropriate Resources. The low score on Identifying Appropriate Resources may indicate that these learners do not have as much maturity or understanding as the other four groups on how to identify appropriate resources to assist in their learning activities. In addition, due to their youth, this group's high score on Confidence may indicate that they must continually be reassured and get support from others to complete their learning tasks.

Based on their low average age and the high and low cluster means, the 62 members of this group can be described as the least mature but most attentive learners of the five groups. Possibly, to make up for their lack of maturity and experience, they tend to focus more on the material to be learned, avoid distractions, and set aside time for learning in both personal life and career development situations. Immature Attentive Learners rely on planning and focusing on the material to be learned to successfully complete tasks. One group member made the observation that

I like it when someone says I did good at something. Like when we did that interview workshop and I had to play the part of the interviewer. I didn't really know that much about it, but I paid attention to what the teacher told me to do. After we were done, she said that I had done a great job. That's what it's all about for me, knowing that I've done good at something. And who doesn't feel good when they get on A on a test or paper or something?

Learning Group 5: Self-Directed Resourceful Learners

This group was named Self-Directed Resourceful Learners because of their displaying a high amount of purpose and their apparent use of resource management strategies in learning situations. There were 31 members in the Self-Directed Resourceful group. They had high cluster means in Planning Strategy Used in Personal-Life Learning Situations (4.77), Resource Identification Used in Personal-Life Learning Situations (4.80), and Critical Use of Resources in Career Development Learning Situations (4.82). This group had low means in Reward Strategy Used in both Personal-Life (2.35) and Career Development Learning Situations (2.67), and Confidence Strategy Used in Personal-Life Learning Situations (2.80).

Self-Directed Resourceful Learners differed from the other four groups by scoring highest of all five groups on Planning strategy used in Personal Life Learning Situations. In addition, they scored highest of all five groups on the Resource Management strategies of Identification and Use of Human Resources in both Personal Life and Career Development Learning Situations, and Critical Use of Resources in Career Development Learning Situations.

They tend to direct and follow their own learning style and determine the purpose of their own learning activities more than the other four groups. They also appear to rely more on knowing how to locate and use the best sources of information, use appropriate rather than available resources, and gain support from or network with others to assist them in their learning tasks. The group also varied from the other groups by its low use of Reward strategy used in both Personal Life and Career Development Learning Situations, Memory Application in Personal Life Learning Situations, and Testing Assumptions and Attention in Career Development Learning Situations. The low use of Reward strategy may indicate that these learners choose not to rely as much on anticipating the value of themselves of learning specific material as do the other four groups. In career development situations these learners use the strategy of Attention less than the other groups. This may indicate that they perceive the importance of focusing on material to be learned and setting aside time to learn as lower priorities than do the other groups. They also do not use the strategy of Testing Assumptions as much as the other groups in Career Development Learning Situations. This may indicate that they do not take as much time as other groups to examine the accuracy of assumptions, spot inconsistencies, or question value sets related to learning activities. Finally, they do not use the strategy of Memory Application as much as do the other four groups. This implies they do not use remembrances, mental images, or other memory aids as often to assist in learning tasks or problem-solving. One

student in marketing and management student stated that

I don't care what anybody says it's still not what you know but who you know. If you can learn how to network, you'll never have a problem getting a job. All this stuff about writing resumes and interviewing and stuff, none of it matters if you target where you want to go and find out who it is that can hire you. That's the way it works if you're in the Marketing Program or if you're in construction.

However, most group members agreed with a different group member who stated that, "I don't think it's necessarily just who you know. I think you've also got to have the skills to back it up. You can't just get a job by who you know, at least not a job you're going to keep very long."

Based on the high and low cluster means, the 31 members of this group can be described as the most self-directed and resourceful learners of the five groups. They tend to take control of their learning activities, know how to locate and use the best sources of information, and use appropriate rather than available resources to accomplish their learning tasks. Their low score on the Metamotivational strategy of Reward indicates that these learners are not overly concerned with how others may feel about the strategies they use to complete their learning tasks. In addition, their low score on Confidence may be due to their assurance that they will complete learning tasks successfully and have no need to remind themselves of past successes and getting support from others that they will succeed. While discussing what college students are supposed to be learning, one student stated that

It's really up to each person what he wants to learn. They can give you a million assignments in college, but if you don't want to do them,

they won't get done. If you're into grades, maybe that'll motivate you to do them. Or if you have a scholarship or something. But if a person decides not to do something, it probably won't get done. It's really a matter of each person making up his mind to get something done before it will get done.

Employer Data

A final purpose of the study was to survey employers to ascertain if it was possible to determine the learning strategies preferred in entry-level employees by potential employers of students from the various occupational programs at Eastern Idaho Technical College. This information was gathered using a survey based on the SKILLS instrument (see Appendix F).

Employer participants were chosen according to the following criteria. Each of the 13 occupational programs of study at EITC has an advisory committee. Those employers who were selected to participate in the study either sat on 1 of the 13 advisory committees, were recommended by a member of 1 of the 13 advisory committees, or had hired a graduate from 1 of the 13 full-time programs in an entry-level position within the previous 2 years. Five employer participants with an interest in each of the 13 programs were chosen to participate. This resulted in a total of 65 employers who participated in the study.

Scores gathered by the Employer Survey were used to determine the learning strategies preferred in entry-level employees by employer participants.

These scores indicated which of 15 learning strategies employers preferred in entry-level employees. Unlike the student instrument, which had four sets of questions related to the two personal life and the two career development learning scenarios, the employer instrument had only one set of questions. However, the employer survey was based on the same set of 15 strategies outlined in the original SKILLS manual. This allowed for a comparison between the students' and employers' scores. To provide further consistency for this comparison, scores generated by the employer survey were multiplied by 4 to better compare with scores generated by the student surveys.

Employer Preferences of Learning Strategies

Scores were computed for each of the 15 learning strategies preferred in entry-level employees by employers who participated in the study. Means of these scores may be found in Table 20. Means of employer preferred learning strategies ranged from 5.79 for Metamotivation Attention strategy to 10.64 for Human Resource Use. All strategies had a range of 4 to 12. The top 3 learning strategies that employers preferred in entry-level employees were Human Resource Use, Metamotivational Reward, and Metacognitive Monitoring. These had means of 10.64, 9.29, and 9.10 respectively. The 3 least preferred strategies were Metamotivational Attention with a mean of 5.78, Testing Assumptions with a mean of 6.46, and Metacognitive Adjusting with a mean of 6.70.

Table 20. Means of Learning Strategies Preferred by Employers.

Learning Strategy	Mean Score	Standard Deviation	Range
Critical Thinking			
Test Assumptions	6.46	2.89	4 - 12
Generate Alternatives	8.37	2.80	4 - 12
Conditional Acceptance	7.57	3.47	4 - 12
Memory			
Organization	8.37	3.22	4 - 12
External Aids	8.49	3.04	4 - 12
Memory Applications	7.01	3.53	4 - 12
Metacognition			
Planning	8.37	3.06	4 - 12
Monitoring	9.10	3.12	4 - 12
Adjusting	6.70	3.17	4 - 12
Metamotivation			
Attention	5.78	2.91	4 - 12
Reward/Enjoyment	9.29	3.32	4 - 12
Confidence	7.57	3.25	4 - 12
Resource Management			
Identification	8.43	2.92	4 - 12
Critical Use	7.20	3.09	4 - 12
Human Resource Use	10.64	2.48	4 - 12

Based on the high and low means, it appears that employer participants prefer entry-level employees who are able to discuss options with others, check opinions, and get support from or network with others to accomplish learning tasks. Further, entry-level employees should be able to anticipate or recognize the value of themselves in learning specific material and recognize learning as worthwhile or useful. Finally, employers are interested in

employees who can assess how they are proceeding through learning projects by reviewing plans, checking to determine if they are on task, and are able to compare to accepted standards. Strategies that employers are not concerned with are Metamotivational Attention, Testing Assumptions, and Metacognitive Adjusting. This lack of preference may indicate that employers are not concerned that entry-level employees set aside time for learning, examine the accuracy of assumptions, and change approaches or decide when they are done with learning tasks.

In summary, Research Question 5 asked, "Using a rank-order survey based on the learning strategies that comprise the SKILLS instrument, is it possible to determine the learning strategies preferred in entry-level employees by potential employers of students from the various occupational programs at Eastern Idaho Technical College?" Research Question 5 was answered in the affirmative since it was possible to determine learning strategies preferred by employers.

Comparison of Student and Employer Learning Strategy Preferences

The primary purpose of this study was to gather data related the learning strategies used by Eastern Idaho Technical College (EITC) students and learning strategy preferences of employers. However, to supplement these data, a comparison using the t -test was performed between learning strategies used by EITC students and learning strategies preferred in entry-level

employees by employers to determine if any trends emerged. Table 21 summarizes the means and t-tests of the 15 learning strategies measured by the SKILLS instrument for student and employer participants.

Table 21. Means and t-tests for 15 Learning Strategies of SKILLS Used by EITC Students and Preferred by Employers.

Learning Strategy	EITC Students	Employer Preferences	t Value	p
Critical Thinking				
Test Assumptions	8.46	6.46	7.18	.001
Generate Alternatives	8.48	8.37	0.40	.686
Conditional Acceptance	8.22	7.56	1.98	.048
Memory				
Organization	8.09	8.36	0.95	.343
External Aids	7.43	8.49	3.64	.001
Memory Applications	7.21	7.01	0.61	.540
Metacognition				
Planning	9.60	8.36	4.27	.001
Monitoring	8.00	9.10	3.92	.001
Adjusting	6.24	6.70	1.61	.109
Metamotivation				
Attention	9.53	5.78	12.83	.001
Reward/Enjoyment	6.47	9.29	8.46	.001
Confidence	6.60	7.56	3.23	.001
Resource Management				
Identification	8.47	8.43	0.15	.880
Critical Use	8.64	7.20	4.65	.001
Human Resource Use	8.32	10.64	8.04	.001

Means for learning strategies used by EITC students ranged from 6.24 (Metacognitive Planning) to 9.60 (Metacognitive Adjusting). Means for learning strategies preferred by employers ranged from 5.78 (Metamotivational

Attention) to 10.64 (Human Resource Use). Analysis of the mean scores showed several items of interest. In learning strategies used by EITC students, the Metacognitive strategy of Planning scored highest (9.60) while the associate Metacognitive strategy of Adjusting scored lowest (6.24).

Metamotivation strategies also showed interesting trends in learning use by EITC students. The Metamotivation strategy of Attention scored second highest (9.53) of all 15 strategies. However, the other two Metamotivation strategies, Reward and Confidence, scored low with means of 6.47 and 6.60 respectively. In strategies preferred by employers both Metacognitive and Metamotivational strategies showed similar trends. While Metacognitive Monitoring scored very high (9.10), the associated strategy of Metacognitive Adjusting scored very low (6.70) in relation to the other strategies. Similarly, Metamotivational strategy of Reward scored second highest (9.29) of all 15 strategies preferred by employers while Metamotivational Attention scored lowest (5.78) of all 15 strategies.

Significant differences were found in 10 of the 15 learning strategies. These were Testing Assumptions, Conditional Acceptance, External Aids as Memory Strategy, Planning, Monitoring, Attention, Reward, Confidence, Critical Use of Resources, and Human Resource Use.

In summary, while this *t*-test analysis was not meant to add conclusive information to the study, some interesting trends did emerge. These trends were related to the differences in learning strategies used by students enrolled

in various occupational programs at Eastern Idaho Technical College and learning strategies preferred by potential employers of those students. Such trends lend themselves to further investigation and research to determine if this gap in student strategy uses and preferences of employers could be narrowed to assist students in seeking employment opportunities.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Finding and keeping viable employment is a major challenge facing adults enrolled in post-secondary vocational education programs. More companies are encouraging employees to assume a larger role in their own career development (Caudron, 1994; Kiechel, 1994; Stevens; 1995). At the same time, adults must deal with many personal life challenges such as raising a family and meeting economic, personal, and social responsibilities. Most career development theory and practice in this century has been based on vocational and trait and factor models. However, this view has begun to change and new theories based on sociology, self-efficacy, occupational development, and other factors have emerged (Brown, 1988; Brown and Brooks, 1990; Stevens; 1995). The concept of learning strategies may offer a new approach to assisting adults in career development and personal life learning situations attain their workplace and personal goals.

This descriptive case study investigated the relationship between learning strategies used in personal life and career development learning situations by adult students at Eastern Idaho Technical College (EITC). It also investigated what learning strategies employers preferred in entry-level

employees. The study was conducted using 219 full-time students enrolled during spring semester 1995. Of these, 94 were male and 125 were female. The age range of participants was 17 to 55 and the average age was 27 years. A total of 187 participants held high school diplomas and 32 held GED equivalency certificates upon acceptance into EITC. There were 134 participants enrolled in associate degree programs and 85 enrolled in certificate programs.

There were 65 employer participants in the study. They were chosen according to the following criteria. They either sat on 1 of the 13 advisory committees or were recommended by a member of 1 of the 13 advisory committees or had hired a graduate from 1 of the 13 full-time programs in an entry-level position within the previous 2 years. Five employer participants for each of the 13 programs were chosen to participate, for a total of 65 employers who participated in the study.

Data were collected from five sources. These were scores generated on the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS) instrument taken by student and employer participants, information collected on employer and student participant demographic surveys, and data collected from student participant focus groups. One portion of the study, in which 219 students participated, used t-tests and discriminant analyses to investigate the data collected. A second portion of the study involved a cluster analysis of student participants. Initially, all 219 participants were included in the cluster

analysis. However, as relevant data were analyzed to determine the best number of groups that would provide distinct groups of learners, 12 participants were eliminated from the study because they had extreme scores on at least one variable that prevented them from clustering with other groups. Therefore, cluster analysis was conducted on the remaining 207 participants.

Multivariate analyses were used in this study. The multivariate procedure of discriminant analysis was used to describe the combination of variables that could be used to distinguish differences in uses of SKILLS learning strategies used in personal life and career development situations by students at Eastern Idaho Technical College (EITC). Four separate discriminant analyses were performed. In each analysis, EITC student participants were divided into distinct groups to determine if they demonstrated different patterns of learning strategies. In one analysis, participants were divided into groups by age. In a second analysis, participants were grouped by gender. In a third analysis, participants were grouped by type of degree program in which they were enrolled. Finally, participants were grouped into occupational areas related to their programs of study. Cluster analysis was utilized to discover if there were clusters or learning groups of participants that thought and learned in a similar manner. Five cluster groups were identified and members of each group were interviewed in focus group settings to determine if such interviews could add information to the quantitative data collected in the cluster analysis. Scores gathered by the Employer Survey

were used to determine the learning strategies preferred in entry-level employees by employer participants. These scores indicated which of the fifteen learning strategies employers preferred in entry-level employees.

Discussion of the Findings

It should be noted that findings are delimited to full-time students enrolled at Eastern Idaho Technical College (EITC) during spring semester 1995. In addition, employer participants either sat on 1 of the 13 EITC advisory committees or were recommended by a member of 1 of the 13 advisory committees or had hired a graduate from 1 of the 13 full-time programs in an entry-level position within the previous 2 years.

Personal Life and Career Development Learning Situations

The t -test was used to compare the means of the scores for student participants on the personal life scenarios to the means of scores gathered on the career development scenarios. This study utilized the t -test to determine if there were significant differences in the mean scores for each of the 5 SKILLS learning areas and their 15 associated learning strategies used in personal life and career development learning situations.

An analysis of the learning area results showed that all of the personal life learning situation means fell within the range of 10.87 (Metamotivation) to

12.99 (Critical Thinking) and the career development learning situation means showed a different pattern and fell within the range of 11.08 (Memory) and 12.64 (Resource Management.) Significant differences were found between the areas of Critical Thinking, Memory, Metacognition, and Metamotivation. Students used Critical Thinking and Memory learning areas more often in personal life learning situations and used Metacognition and Metamotivation learning areas to a greater in career development learning situations. No significant difference was found in the Resource Management learning area.

In learning strategy use, means ranged from 3.09 (Confidence) to 4.62 (Test Assumptions and Attention) in personal life learning situations and in career development learning situations scores ranged from 2.93 (Adjusting) to 5.03 (Planning). Significant differences were found between learning strategy uses of Testing Assumptions, Organization, Memory Application, Planning, Monitoring, Adjusting, Attention, and Confidence. Testing Assumptions, Organization, and Adjusting were all used more often in personal life learning situations, while Memory Application, Planning, Monitoring, Attention, and Confidence strategies were used to a greater degree in career development learning situations.

Results of the Discriminant Analyses

Discriminant analysis was used to describe the combination of variables that could be used to distinguish differences in uses of SKILLS learning

strategies used in personal life and career development situations by students at Eastern Idaho Technical College (EITC). Discriminant analysis is "a statistical technique which allows the investigation of the differences between two or more groups in relationship to several variables simultaneously" (Klecka, 1980, p. 7). In discriminant analysis as with other multivariate techniques, the emphasis is upon analyzing the variables together rather than singly. In this way, the interaction of multiple variables can be considered.

In this study, discriminant analysis was used to determine if EITC students differed in uses of SKILLS learning strategies used in personal life and career development situations when they were divided into groups based upon selected demographic variables. Four separate discriminant analyses were performed. In each analysis, EITC student participants were divided into distinct groups to determine if they demonstrated different patterns of learning strategies. In one analysis, participants were divided into groups by age. In a second analysis, participants were grouped by gender. In a third analysis, participants were grouped by type of degree program in which they were enrolled. Finally, participants were grouped into occupational areas related to their programs of study.

The attributes used to distinguish among groups are called discriminating variables. "These variables must be measured at the interval or ratio level, so that means and variances can be calculated" (Klecka, 1980, p. 9). In this study, the same set of 30 discriminating variables was used in all 4

discriminant analyses. These 30 discriminating variables included the scores of student participant responses on SKILLS for the 15 learning strategies used in personal life and the 15 learning strategies used in career development learning situations.

In the first discriminant analysis, participants were divided into groups by age to determine if different patterns of learning strategies were exhibited by each group. The range of ages for the 219 student participants was 17 to 55 years and participants were statistically divided into 4 distinct age groups based on the quadrants of this range. These age groups were divided as follows:

- Group 1: 21 years and under included 60 participants
- Group 2: 22 to 25 years included 54 participants
- Group 3: 26 to 32 years included 49 participants
- Group 4: 33 years and over included 56 participants.

In this discriminant analysis, four variables had sufficient coefficients to be included in the interpretation of the meaning of the discriminant function. These were Reward Strategy Used in Career Development Learning Situations (.50), Planning Strategy Used in Career Development Learning Situations (-.45), Critical Use of Resources in Career Development Learning Situations (-.42), and Organization as Memory Strategy Used in Career Development Learning Situations (.31). Based on the strength of these four variables, and the fact they were all in the career development area, this discriminant function was named Career-Experienced Learning. Analysis of this group indicated that as the age and experience of individuals increased, the use and

reliance of Reward and Memory Organizational strategies used in career development learning situations decreased. The negative signs on the -.45 for Use of Planning and -.42 for Critical Use of Resources in career development learning situations indicated that as individuals mature, they also did not rely as much on uses of Planning and Critical Resource strategies but tended to trust their experience more than do less mature individuals. Career-Experienced Learners developed or progressed from problems of not knowing how to proceed, rigidly planning, using memory devices, and contacting outside experts in career learning situations to relying on their own maturity, knowledge, and experience to accomplish learning tasks. The term "experienced" contained in the title emphasizes this trend toward relying on experience rather than the Use of Planning and Critical Resources. It also refers to the apparent development from less mature individuals who tended to use Reward, Planning, Critical Use of Resources, and Memory Organization strategies than did more mature individuals who used them less. As individuals matured and gained experience, their reliance on these four strategies decreased in Career Development Learning Situations.

In summary, a discriminant analysis was performed to answer a portion of Research Question 2, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations based on age?" This portion of Research Question 2 was answered affirmatively since the analysis did produce a recognizable discriminant

function which was accurate in classifying respondents into age groups. The discriminant function for Career-Experienced Learning was 48.4% accurate in classifying cases which was a 23.4% improvement over chance placement.

In the second analysis, participants were grouped by gender to determine if different patterns of learning strategies were exhibited by males and females. In this discriminant analysis, three variables had sufficient coefficients to be included in the interpretation of the meaning of the discriminant function. These were External Aids as Memory Strategies Used in Personal Life Learning Situations (-.44), Monitoring Strategy Used in Career Development Learning Situations (-.33), and Generating Alternatives in Career Development Learning Situations (.30).

Based on the strength of these three variables, this discriminant function was named Prioritized Learning. An analysis of the differences in learning strategies used by male and female participants showed that males used both External Aids and Monitoring strategies less than females, and they used Generating Alternatives more than females. In career development learning situations, female Prioritized Learners tended to assess, review, identify other solutions, and rank order or prioritize their learning tasks while males tended not to use these strategies. Male Prioritized Learners tended to brainstorm, rank order, and identify alternate solutions more than female Prioritized Learners in career development learning situations. In personal life learning situations, female Prioritized Learners relied on external aids,

checklists and other tools that support memory retention more than their male counterparts.

The term "prioritized" contained in the title emphasizes this use of monitoring or reviewing learning processes and implies that these individuals generate and review external memory aids such as lists and displays to assist in prioritizing and reinforcing memory as part of their learning tasks. In addition, Prioritized Learners generate and rank various alternatives when necessary.

In summary, a discriminant analysis was calculated to answer a second portion of Research Question 2, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations based on gender?" This portion of Research Question 2 was also answered in the affirmative since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents by gender groups. The discriminant function for Prioritized Learning was 67.6% accurate in classifying cases, which was a 17.6% improvement over chance placement.

In the third analysis, participants were grouped by type of degree program in which they were enrolled to determine if different patterns of learning strategies were exhibited by those enrolled in certificate programs and those enrolled in associate degree programs. In this discriminant analysis, three variables had sufficient coefficients to be included in the interpretation of

the meaning of the discriminant function. These were Conditional Acceptance in Personal Life Learning Situations (.43), Planning Strategy Used in Personal Life Learning Situations (.42), and Generating Alternatives in Career Development Learning Situations (.37).

Based on the strength of these variables, this discriminant function was named Careful Learning. An analysis of the differences in learning strategies showed that those enrolled in degree programs used all three strategies more often than those enrolled in certificate programs. In personal life learning situations, Careful Learners attempt to find the best way to proceed with, determine the focus of, question simplistic answers, and carefully hypothesize learning tasks and results. The term "careful" contained in the title implies the use of reflection, careful identification of possible solutions, and analyzing the best way to proceed with given learning tasks.

In summary, a discriminant analysis was calculated to answer a third portion of Research Question 2, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations based on type of degree program (certificate or degree) in which enrolled?" This portion of Research Question 2 was also answered in the affirmative, since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents into certificate or degree program groups. The discriminant function Careful Learning was 66% accurate in classifying cases, which was a 16% improvement over chance

placement.

In the fourth analysis, participants were grouped into occupational areas related to their programs of study to determine if different patterns of learning strategies were exhibited by those enrolled in health occupations, industrial occupations, office occupations, science occupations, and technology occupations. Two variables had sufficient coefficients to be included in the interpretation of the meaning of this discriminant function. These were Conditional Acceptance in Personal Life Learning Situations (.42), and Planning Strategy Use in Career Development Learning Situations (.31).

Based on the strength of these variables, this discriminant function was named Critical Learning. An analysis of the differences in learning strategies used by participants in the five occupational areas showed that in personal life learning situations students in Science and Technology Occupations used Conditional Acceptance and its associated tactics of reflection, questioning simplistic answers, monitoring results, and predicting consequences the most of all five groups. In career development learning situations students in Industrial and Office Occupations used Planning and its associated tactics of following one's own style, skimming learning material, and determining the purpose of learning tasks the most of all five groups.

Critical Learners carefully and critically analyze the best way to proceed, plan, and determine the focus of learning tasks. The term "critical" contained in the title emphasizes this reliance on planning which learning tasks

individuals will address and how they will go about solving them. In addition, Critical Learners use conditional acceptance to question simplistic answers and monitor their progress on given learning tasks.

In summary, a discriminant analysis was calculated to answer Research Question 3, "Is it possible to determine differences in uses of learning strategies in personal life and career development learning situations by students at EITC in the following occupational areas of study: Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations?" Research Question 3 was answered in the affirmative since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents into occupational areas. The discriminant function Critical Learning was 47.5% accurate in classifying cases, which was a 27.5% improvement of chance placement.

Results of the Cluster Analysis

Cluster analysis procedures were employed to determine if distinctive groups of learners could be determined among students at EITC. Thirty variables were used to generate the cluster analysis included in this study. These were the SKILLS scores generated by participants comprised of the 15 learning strategies used in personal life learning situations and the 15 learning strategies used in career development learning situations.

Three-, four-, and five-cluster solutions were run using the Quick

Cluster process of SPSS/PC. The five-cluster solution was determined to be the most appropriate for this study based on the distribution of participants in each group. After the five-cluster solution was chosen, means for each of the 15 learning strategies used in personal life learning situations and the 15 learning strategies used in career development learning situations were calculated for each cluster group. A one-way analysis of variance was performed on each of these 30 variables to determine if there were significant differences among the 5 cluster groups. Variables on which the groups differed significantly were retained in the analysis to characterize and assist in naming the groups. Participants significantly differed on 17 of the 30 of the learning strategy variables. In personal life learning situations significant differences existed in use of Planning, Attention, Reward, Confidence, Memory Application, Conditional Acceptance, Identification of Resources, and Use of Human Resources learning strategies. Strategies used in career development learning situations that showed significant differences were Attention, Reward, Memory Organization, Memory Application, Testing Assumptions, Conditional Acceptance, Identification of Resources, Critical Use of Resources, and Use of Human Resources.

Although not used to generate the cluster analysis, information related to the demographic variables of age, gender, level of program, years since participants left high school, years of experience in the workplace, occupational program in which enrolled, and whether participants held a GED

certificate or high school diploma was also analyzed to determine it could be used to further assist in distinguishing between and naming of the five clusters. Two of these variables, occupational program in which enrolled and years of experience in the workplace, were withdrawn from further analysis as occupational program was deemed to be categorical and therefore not relevant for this analysis and data related to years of experience in the workplace were not considered due to the incomplete and insufficient responses gathered by the survey. Results from this analysis showed that age was the only demographic variable that showed significant difference between the five groups.

The means of the 5 cluster groups for each of the 17 learning strategy variables and the demographic variable of age were selected as characteristic indicators of the cluster groupings. Tukey post hoc tests were used to identify the groupings for each of the significant variables. After analyzing these data, participants were distributed among the five groups as follows: Mature Self-Assured Learners--21; Focused Contemplative Learners--26; Analytical Learners--67; Immature Attentive Learners--62; and Self-Directed Resourceful Learners--31.

Mature Self-Assured Learners differed from the other four groups by scoring highest of all groups on Memory Application used in both Personal Life and Career Development Learning Situations. These scores indicate they tend to use remembrances and other mental images more than the other groups to assist in problem solving and planning activities. They also may rely more

on their experience to avoid mistakes by knowing what to expect while performing learning tasks. The group also varied from the other groups by its low Use of Human Resources in Personal Life Learning Situations and on Identification of and Critical Use of Resources in Career Development Learning Situations. The low use of Human Resources in personal learning situations may indicate that these learners choose not to rely as much as the four groups do on support from or networking with others to assist them in personal learning tasks. In career development situations these learners use the strategies of Identifying and Critically Using resources less than the other groups. This may indicate that they perceive the importance of networking in career development situations as a lower priority than do the other groups. Based on their high average age and the high and low cluster means, the 21 members of this group can be described as the most mature and self-assured learners of the five groups. They tend to focus on the material to be learned, avoid distractions, and set aside time for learning in both personal life and career development situations. Mature Self-Assured Learners appear to rely on their experience and knowledge to analyze the best ways to proceed with specific learning tasks and plan these learning tasks accordingly. Possibly due to their age and experience, they also follow their own learning style rather than adopting others' suggestions. Their low score on the Metamotivational strategy of Reward may indicate that these learners are not overly concerned with how others feel about the strategies they use to complete their learning

tasks. In addition, their low score on Confidence may be due to their assurance that they will complete learning tasks successfully and have no need to remind themselves of past successes and getting support from others that they will succeed.

Focused Contemplative Learners differed from the other four groups by scoring highest on Attention strategy used in both Personal Life and Career Development Learning Situations. To assist them in learning their endeavors, members of this group tend to focus on tasks and are more resolved to learn material more than the other groups appear to do so. In addition, this group tends to question simplistic answers, monitor learning task results, and attempts to predict consequences of learning more than the other four groups. The group also varied from the other groups by its low use of the Memory strategies of Memory Application and Organization. This indicates they may be less likely than the other groups to structure or process information and use remembrances or mental images to assist in their learning activities. Their low use of Confidence and Reward strategies may indicate that they are not as apt as the other groups to rely as much on support or networking with others and are not aware of the value of their own learning of material to assist them in learning tasks. Another distinction between the Focused Contemplative Learners and the other groups is their low use of Memory Organization in career learning situations. They appear less likely than the other groups to structure, summarize, form patterns, or process information so that material

will be better stored, retained, or retrieved from memory. Based on the high and low cluster means, the 26 members of this group can be described as the most focused and contemplative learners of the five groups. They tend to focus on the material to be learned, avoid distractions, and set aside time for learning in both personal life and career development situations. Their low score on the Metamotivational strategies of Confidence and Reward may indicate that these learners are not worried whether or not they will complete learning tasks.

Analytical Learners differed from the other four groups by scoring highest on Conditional Acceptance in Personal Life Learning Situations and Reward and Testing Assumptions in Career Development Learning Situations. Scoring high in these areas may indicate that this group tends to question simplistic answers, examines the accuracy of assumptions, spots inconsistencies, evaluates results, and predicts consequences of learning when solving learning problems and planning activities. More than the other groups, they also may anticipate or recognize the value of themselves in the learning specific material. The group also varied from the other groups by its low use of Attention and Confidence strategies in Personal Life Learning Situations. The low use of these strategies may indicate that these learners may not rely on them as much as the other groups do to solve problems or accomplish tasks. In addition, they are not as likely as the other groups to gain reassurance or get support from others on learning tasks. Based on the high

and low cluster means, the 67 members of this group can be described as the most analytical of all the groups in regards to learning activities. They tend to analyze the best ways to proceed with learning tasks, focus on the material to be learned, and question or analyze simplistic answers. Their low score on the Metamotivational strategy of Reward indicates that these learners are not overly concerned with how others may feel about the strategies they use to complete their learning tasks. In addition, their low score on Confidence may be due to their assurance that they will complete learning tasks successfully and have no need to remind themselves of past successes and getting support from others that they will succeed.

Immature Attentive Learners differed from the other four groups by scoring highest on Confidence strategy use in both Personal Life Learning Situations and Organization Used in Career Development Learning Situations. They tend to use remembrances and other mental images more than the other groups to assist in problem solving and planning activities. The group also varied from the other groups by its low score on the Resource Management strategy of Identifying Appropriate Resources. The low score on Identifying Appropriate Resources may indicate that these learners do not have as much maturity or understanding as the other four groups on how to identify appropriate resources to assist in their learning activities. In addition, due to their youth, this group's high score on Confidence may indicate that they must continually be reassured and get support from others to complete their learning

tasks. Based on their low average age and the high and low cluster means, the 62 members of this group can be described as the least mature but most attentive learners of the five groups. Possibly, to make up for their lack of maturity and experience, they tend to focus more on the material to be learned, avoid distractions, and set aside time for learning in both personal life and career development situations. Immature Attentive Learners rely on planning and focusing on the material to be learned to successfully complete tasks.

Self-Directed Resourceful Learners differed from the other four groups by scoring highest of all five groups on Planning strategy used in Personal Life Learning Situations. In addition, they scored highest of all five groups on the Resource Management strategies of Identification and Use of Human Resources in both Personal Life and Career Development Learning Situations, and Critical Use of Resources in Career Development Learning Situations. They tend to direct and follow their own learning style and determine the purpose of their own learning activities more than the other four groups. They also appear to rely more on knowing how to locate and use the best sources of information, use appropriate rather than available resources, and gain support from or network with others to assist them in their learning tasks. The group also varied from the other groups by its low use of Reward strategy used in both Personal Life and Career Development Learning Situations, Memory Application in Personal Life Learning Situations, and Testing Assumptions and

Attention in Career Development Learning Situations. The low use of Reward strategy may indicate that these learners choose not to rely as much on anticipating the value of themselves of learning specific material as do the other four groups. In career development situations these learners use the strategy of Attention less than the other groups. This may indicate that they perceive the importance of focusing on material to be learned and setting aside time to learn as lower priorities than do the other groups. They also do not use the strategy of Testing Assumptions as much as the other groups in Career Development Learning Situations. This may indicate that they do not take as much time as other groups to examine the accuracy of assumptions, spot inconsistencies, or question value sets related to learning activities. Finally, they do not use the strategy of Memory Application as much as do the other four groups. This implies they do not use remembrances, mental images, or other memory aids as often to assist in learning tasks or problem-solving. Based on the high and low cluster means, the 31 members of this group can be described as the most self-directed and resourceful learners of the five groups. They tend to take control of their learning activities, know how to locate and use the best sources of information, and use appropriate rather than available resources to accomplish their learning tasks. Their low score on the Metamotivational strategy of Reward indicates that these learners are not overly concerned with how others may feel about the strategies they use to complete their learning tasks. In addition, their low score on Confidence may

be due to their assurance that they will complete learning tasks successfully and have no need to remind themselves of past successes and getting support from others that they will succeed.

In summary, Research Question 4 asked, "Is it possible to determine if distinct clusters or learning groups exist among students at Eastern Idaho Technical College based on SKILLS scores of learning strategies used in personal life and career development learning situations?" The results of the cluster analysis on the 15 strategies used in personal life learning situations and the 15 strategies used in career development learning situations showed that five learning groups did have distinguishable characteristics that identified participants who used similar learning strategies. Therefore, Research Question 4 was answered in the affirmative, since it was possible to determine that distinct clusters existed among students at Eastern Idaho Technical College.

Focus Group Interviews

In order to supplement the quantitative cluster analysis employed in this case study, focus group interviewing sessions were held with each of the five learning groups identified by the cluster analysis. The main goal of using focus groups was to gain verbal perspectives from participants' points of view in an effort to enhance the quantitative data gathered in the cluster analysis.

Five members were randomly selected from each of the five clusters

identified in the cluster analysis to participate in focus groups. Five randomly selected members from each of the clusters was determined to be an adequate representation based on criterion-based sampling. Since five distinct groups were identified by the cluster analysis, and since the cluster analysis was based on "a recipe of attributes"--the significant variables identified in the cluster analysis--criterion-based sampling was preferred as the basis to choose focus group members. Participation and input from all members of the focus groups were substantial, with sessions lasting about an hour each. Naming of the five learning groups identified in the cluster analysis was mainly based on data collected in the cluster analysis. However, pertinent focus group comments were noted where appropriate to substantiate cluster analysis information or to show contradictions between cluster analysis information and focus group interactions.

It was found that, although the group interviews were helpful in general to keep group discussion alive, they did not necessarily add value to or clarify the cluster analysis. This was thought to be due mainly to domination of certain individuals during some discussions, polarization of groups members in some groups, questions that may not have been relevant to the cluster analysis, and hostility on the part of some participants.

Results of Employer Surveys

Scores were computed for each of the 15 learning strategies preferred

in entry-level employees by employers who participated in the study. Means of employer preferred learning strategies ranged from 5.79 for metamotivation attention strategy to 10.64 for human resource use. All strategies had a range of 4 to 12. Strategies scoring high on employer preference were Human Resource Use (10.64), Metamotivational Reward (9.29), and Metacognitive Monitoring (9.10). Least preferred by employer participants were Metamotivational Attention with a mean of 5.78, Testing Assumptions with a mean of 6.46, and Metacognitive Adjusting with a mean of 6.70.

Based on these high and low means, it appears that employer participants prefer entry-level employees who are able to discuss options with others, check opinions, and get support from or network with others to accomplish learning tasks. Further, entry-level employees should be able to anticipate or recognize the value of themselves in learning specific material and recognize learning as worthwhile or useful. Finally, employers are interested in employees who can assess how they are proceeding through learning projects by reviewing plans, checking to determine if they are on task, and are able to compare to accepted standards. Strategies that are of less importance to employers are Metamotivational Attention, Testing Assumptions, and Metacognitive Adjusting. This lack of preference may indicate that employers are not concerned that entry-level employees set aside time for learning, examine the accuracy of assumptions, and change approaches or decide when they are done with learning tasks.

A comparison using the t-test was performed between learning strategies used by EITC students and learning strategies preferred in entry-level employees by employers to determine if any trends emerged. Analysis showed that means for learning strategies used by EITC students ranged from 6.24 (Metacognitive Planning) to 9.60 (Metacognitive Adjusting) while means for learning strategies preferred by employers ranged from 5.78 (Metamotivational Attention) to 10.64 (Human Resource Use). Analysis of the mean scores showed several items of interest. In learning strategies used by EITC students, the Metacognitive strategy of Planning scored highest (9.60) while the associate Metacognitive strategy of Adjusting scored lowest (6.24). Metamotivation strategies also showed interesting trends in learning use by EITC students. The Metamotivation strategy of Attention scored second highest (9.53) of all 15 strategies. However, the other two Metamotivation strategies, Reward and Confidence, scored low with means of 6.47 and 6.60 respectively. In strategies preferred by employers both Metacognitive and Metamotivational strategies showed similar trends. While Metacognitive Monitoring scored very high (9.10), the associated strategy of Metacognitive Adjusting scored very low (6.70) in relation to the other strategies. Similarly, Metamotivational strategy of Reward scored second highest (9.29) of all 15 strategies preferred by employers while Metamotivational Attention scored lowest (5.78) of all 15 strategies.

Significant differences were found in 10 of the 15 learning strategies

used by EITC students and preferred by employers. These were Testing Assumptions, Conditional Acceptance, External Aids as Memory Strategy, Planning, Monitoring, Attention, Reward, Confidence, Critical Use of Resources, and Human Resource Use.

In summary, Research Question 5 asked, "Using a rank-order survey based on the learning strategies that comprise the SKILLS instrument, is it possible to determine the learning strategies preferred in entry-level employees by potential employers of students from the various occupational programs at Eastern Idaho Technical College?" Research Question 5 was answered in the affirmative since it was possible to determine learning strategies preferred by employers.

Conclusions

The following conclusions were drawn from the findings. It should be noted that conclusions are delimited to full-time students enrolled at Eastern Idaho Technical College (EITC) during spring semester 1995. In addition, employer participants either sat on 1 of the 13 EITC advisory committees or were recommended by a member of 1 of the 13 advisory committees or had hired a graduate from 1 of the 13 full-time programs in an entry-level position within the previous 2 years.

SKILLS and Learning Strategies

SKILLS is a practical tool to determine whether students in post-secondary vocational/technical institutions, such as Eastern Idaho Technical College, use different learning strategies in personal life and career development learning situations. Based on the use of the t-test, it was determined that Eastern Idaho Technical College students used different strategies in personal life and career development learning situations. Significant differences were found in 8 of the 15 learning strategies. These were Testing Assumptions, Organization, Memory Application, Planning, Monitoring, Adjusting, Attention, and Confidence. Students used the strategies of Testing Assumptions, Memory Organization, and Metacognitive Adjusting more often in personal life learning situations. Students used the strategies of Memory Application, Metacognitive Planning and Monitoring, and Metamotivational Attention and Confidence more often in career development learning situations than in personal life learning situations. Recent research using the SKILLS instrument suggests that modifying the instrument to specific research applications may enhance its measuring and evaluation of specific real-life learning scenarios and situations. McKenna (1990) compared the influences of personal and professional learning situations on real-life learning strategy utilization by school administrators in Wyoming. He required that his sample of school administrators choose three of the original SKILLS scenarios and did a comparison of learning strategy use on

three professional scenarios he created for the study. Further research revealed that the validity and reliability of this approach remained intact. Fellenz, Conti, & McKenna (1994) noted that "researchers may either use the existing form of SKILLS or create specific scenarios using the established form of SKILLS as a model. Such a choice can allow researchers to tailor their learning strategies instrument to fit their distinctive need" (p. 263). Yabui (1993) also chose to modify the SKILLS instrument to enhance his study on *Reflective Judgement and the Adult Learner's Use of Metacognitive Learning Strategies*. Moretti (1994) adjusted SKILLS to better understand the use of various learning strategies in real-life learning situations of presidents or chairpersons of volunteer nonprofit organizations. For this study, SKILLS was modified to determine whether students at EITC used different learning strategies in personal life and career development learning situations. Analysis of the data collected showed that SKILLS was a practical tool to determine differences in learning strategy use in personal life and career development learning situations.

The SKILLS instrument and concept of learning strategies may be effective tools to assist adults who enroll at Eastern Idaho Technical College (EITC) complete their programs of study. As the workplace and economic outlook in Southeast Idaho become more unsteady, many adults are turning to vocational/technical schools such as EITC to enter training or retraining programs. These adults come from varied backgrounds with a wide range of

knowledge and experience, however many of them do not know how to take this "real-world" knowledge and experience and convert it to the classroom setting. Other adults, such as displaced homemakers, are entering post-secondary education for the first time. Both these examples explain in part why the average age of students in most post-secondary institutions is high. For example, EITC's average student age is 27 years old and this is expected to increase over the next two years as more regional businesses begin to reduce the size of their workforces. Gaining self-knowledge of their learning strategies may be a good foundation for many of these students to begin their education. Weinstein (1988) maintained that "research has demonstrated that one way to influence the manner in which students process new information and acquire new skills is to instruct them in the use of learning strategies" (p. 25). In her study on learning disabled students, Hays (1995) concluded that the SKILLS instrument is a practical tool for use in learning settings such as 2-year colleges. SKILLS is a tool that could help individuals begin learning how to learn and to capitalize on their cognitive strengths, thereby increasing the likelihood of their successfully completing a one-year certificate or two-year degree program at EITC.

Knowing the learning strategies employers prefer in entry-level employees may help EITC students obtain entry-level positions in the workplace. Based on an analysis of the survey completed by employers participating in the study, one could conclude that various employers prefer

certain learning strategies in entry-level employees. It was shown that representative employers in the Idaho Falls, Idaho area preferred the SKILLS strategies of Human Resource Use, Metamotivational Reward, and Metacognitive Monitoring in entry-level employees they may hire. Based on this information it appears that these employers prefer entry-level employees who are able to discuss options with others, check opinions, and get support from or network with others to accomplish learning tasks. Additionally, entry-level employees should be able to anticipate or recognize the value of themselves in learning specific material and recognize learning as worthwhile or useful. Finally, employers are interested in employees who can assess how they are proceeding through learning projects by reviewing plans, checking to determine if they are on task, and are able to compare to accepted standards. This information is important since in most technical colleges, such as EITC, the success of an occupational program continuing is directly linked to job placement rates. Therefore, EITC has a vested interest in assisting students with job placement and career development activities. According to the Idaho State Division of Vocational Education, if the training-related job placement rate for graduates from a post-secondary vocational/technical college occupational program falls to less than 75% for two consecutive years, the occupational program may be officially discontinued (M. Rush, Director of Research Idaho State Division of Vocational Education, personal communication, July 10, 1995). Incorporating SKILLS into career

development activities could assist EITC students' employment opportunities and further assist in occupational programs continuing at EITC.

EITC students are using learning strategies different from those preferred by regional employers. Information in the study showed that EITC students do not necessarily use the strategies desired by regional employers. In fact, use of the t-test revealed that of the 15 learning strategies, 10 had significant differences on strategies employers preferred and strategies EITC students used. These were Testing Assumptions, Conditional Acceptance, External Aids as Memory Strategy, Planning, Monitoring, Attention, Reward, Confidence, Critical Use of Resources, and Human Resource Use. Students who have the opportunity to learn their own learning strategy profile and also know which strategies regional employees prefer may have an advantage in gaining employment. Reconciliation between student strategy use and strategies preferred by employers could assist students in job placement and career development situations.

Results of learning strategies preferred by employers surveyed in this study varied from other surveys conducted to determine employer preferences of employee skills. The literature review showed that several major studies conducted in recent years indicated that most employers prefer certain sets of skills in employees they may hire. The 1992 United States Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) report *Learning a Living: A Blueprint for High Performance* contained an in-depth

analysis of business and industry that included five competencies and a three-part foundation of skills and personal qualities needed for high performance in the workplace. The five workplace competencies were: resources--knowing how to allocate time, money, materials, space, and staff; interpersonal skills--being able to work on teams, teach others, serve customers, lead, negotiate, and work well with people from culturally diverse backgrounds; information--being able to acquire and evaluate data, organize and maintain files, interpret and communicate, and use computers to process information; systems--having the ability to understand social, organizational, and technological systems, monitor and correct performance, and design or improve systems; and technology--can select equipment and tools, apply technology to specific tasks, and maintain and trouble shoot equipment. The three foundation skills included basic skills--reading, writing, arithmetic and mathematics, speaking, and listening; thinking skills--ability to learn, to reason, to think creatively, to make decisions and to solve problems; and personal qualities--individual responsibility, self-esteem and self-management, sociability, and integrity (p.

6). Further, in another national assessment of employers, *Workplace Basics: The Essential Skills Employers Want*; Carnevale, Gainer, and Meltzer (1990) reported that

today's workplace demands not only a good command of the 3 R's, but a new kind of worker with a broad set of workplace skills--or at least a strong foundation in the basics that will facilitate learning on the job. For employers, the basic workplace skills challenge has been coming into focus for some time. Reading, writing, and math deficiencies have been the

first to appear in the workplace; but increasingly, skills such as problem solving, listening, negotiation, and knowing how to learn, as well as teamwork, self-esteem, leadership and motivation/goal setting, organizational effectiveness, employability/career development, oral and listening skills, and creative thinking are also viewed as essential. (p. 2)

The review of literature further revealed that today's adult faces many challenges related to learning in, and about, the new workplace. According to Gordon, Morgan, and Ponticell (1994), "In order to perform the elastic, evolutionary jobs of the future, more employees than ever before must develop leadership abilities that require higher-level thinking and problem-solving skills. Static jobs for life have become a relic of the historic past" (p. 1).

The literature also showed that employers wanted employees to possess transferable or transitional skills that can be applied to various situations and workplace activities. Transferable skills are "broadly applicable, widely useful, and durable skills in which relatively high levels of proficiency have been attained" (Pratzner & Ashley, 1985, p. 14). A list of transferable skills would include categories such as communications, computation, problem solving, decision-making, planning, reasoning, and interpersonal skills (p. 14).

From the review of literature related to the skills employers prefer in the workplace one can conclude that they are similar to the learning strategies outlined in SKILLS. All national surveys reviewed showed that at a minimum employers preferred employees who possessed communication skills, problem solving abilities, decision making capabilities, planning skills, critical thinking skills, interpersonal skills, knew how to appropriately use human resources,

teamwork skills, and had the ability to process information. Employers surveyed in this study indicated they mainly preferred the Resource Management strategies of Use of Human Resources and Identification of Appropriate Resources, the Metamotivation strategy of Reward, the Metacognitive strategy of Monitoring, and the Memory strategy of Use of External Aids. While it may be concluded that the SKILLS strategies of Use of Human Resources, Identification of Appropriate Resources, and Monitoring are close in definition and intent to the preferred skills measured by the surveys mentioned in the literature review, it may be further concluded that the other two SKILLS strategies, Use of External Aids and Reward, preferred by employers in this survey are not related. Further, it is important to note that critical thinking is a high priority on virtually all surveys reviewed related to skills preferred by employers. However, the SKILLS Critical Thinking learning strategies of Testing Assumptions, Generating Alternatives, and Conditional Acceptance measured in this study were ranked in the least preferred category by employer participants. Based on this information one may conclude that employers in Southeast Idaho vary significantly from employers surveyed from around the United States on which strategies they prefer in entry-level workers. One may also conclude that employer participants did not fully understand the intent, logic, and content of this study. This may have occurred for several reasons including inadequate or improper survey design or explanation by the researcher of employer participant

expectations and input.

Learning Strategies and Discriminant Analysis

Age influences learning strategy selection. By analyzing the Career-Experienced Learning function of the first discriminant analysis, one can conclude that as the age and experience of individuals increase, they differ in using the strategies of Reward, Planning, Critical Use of Resources, and Organization in career development learning situations. Since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents into age groups, it can also be concluded that it is possible to determine differences in uses of learning strategies in personal life and career development learning situations based on age. The discriminant function implies that while younger individuals tend to rely on the strategies of planning, using memory devices, and contacting outside experts; more mature individuals disregard these strategies and tend to trust their experience to accomplish learning tasks in career development learning situations.

Gender influences learning strategy selection. An analysis of the Prioritized Learning function of the second discriminant analysis leads to the conclusion that male and female students differ in using the strategies of External Aids, Monitoring, and Generating Alternatives. Since the analysis did produce a recognizable discriminant function which was accurate in classifying respondents by gender groups, it may be concluded that it is possible to determine differences in uses of learning strategies in personal life

and career development learning situations based on gender. The discriminant function implies that in personal life learning situations, males use the strategy of External Aids less than females. In career development learning situations, males use Monitoring less than females but use the strategy of Generating Alternatives more. To accomplish learning tasks, females tend to rely on external memory aids, such as checklists and other tools to support memory retention and also tend to assess and review progress as they proceed with learning tasks. Males tend to generate and rank various alternatives when necessary to accomplish learning tasks.

EITC students enrolled in certificate programs use different patterns of learning strategies than students enrolled in associate degree programs. An analysis of the Cautious Learning function leads to the conclusion that EITC students enrolled in certificate programs use different strategies than those enrolled in associate degree programs. Students enrolled in associate degree programs used the strategies of Conditional Acceptance, Planning, and Generating Alternatives more often in both personal life and career development learning situations than did students enrolled in certificate programs. Since the analysis produced a recognizable discriminant function that was accurate in classifying respondents into certificate or degree program groups it may be concluded that it is possible to determine differences in uses of learning strategies in personal life and career development learning situations based on type of degree program (certificate or degree) in which

students are enrolled.

Students at EITC enrolled in different occupational areas use different learning strategies. An analysis of the Critical Learning function leads to the conclusion that students at EITC enrolled in the occupational areas of Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations use different strategies. Since the analysis produced a recognizable discriminant function that was accurate in classifying respondents into occupational areas, it may be concluded that it is possible to determine differences in uses of learning strategies in personal life and career development learning situations by students at EITC in these occupational areas of Health Occupations, Industrial Occupations, Office Occupations, Science Occupations, and Technology Occupations.

Learning Strategies and Cluster Analysis

Distinct learning groups exist among full-time students at Eastern Idaho Technical College. From results of the cluster analysis one can conclude that five distinct clusters or learning groups exist at EITC. These five groups were named Mature Self-Assured Learners, Focused Contemplative Learners, Analytical Learners, Immature Attentive Learners, and Self-Directed Resourceful Learners.

Mature Self-Assured Learners need little help or guidance on learning tasks. These individuals tend to use their own set of mental images and remembrances to assist in problem solving and planning of learning activities.

As such, they do not necessarily rely on support or networking with others to accomplish their learning goals. They are confident in both personal life and career development learning situations. Since they rely on their experience and knowledge to analyze the best ways to proceed with specific learning tasks and to plan these learning tasks, they perceive they are able to handle most learning situations on their own with little help or guidance. These learners are not overly concerned with how others feel about the strategies they use to complete their learning tasks and are confident they can complete such tasks on their own. They prefer to ask for help only when they need it and do not appreciate unwanted or unsolicited advice during learning activities.

Focused Contemplative Learners need the freedom necessary to consider all aspects of a learning challenge. They are frustrated when people come up with seeming elementary solutions to difficult problems. They are willing to invest substantial time and energy to solve difficult problems and they feel that others should be equally willing. They also work best when they can periodically evaluate their progress on difficult tasks. These learners do not like to process or structure information too rigidly and tend not to use mental images or remembrances as they perceive them as limiting factors in solving problems or accomplishing tasks. These learners are most confident when they are given control to solve problems or accomplish tasks and do not rely on others to assist them. They prefer to work in isolation and only ask for input when it deals with the problem at hand.

Analytical Learners appreciate being given as much time as it takes to complete learning tasks or solve problems. They spend a lot of time planning and analyzing the best ways to proceed on tasks. These learners do not like to make assumptions and prefer to get as much information as possible before making decisions or proceeding to the next step in a learning activity. They get frustrated when asked to solve problems or accomplish tasks but they perceive they have not been given enough information to do so. They are confident in their abilities to complete tasks if they perceive they have been given enough time and the necessary information to do so. These learners are very committed to completing tasks accurately and do not appreciate working with people who procrastinate.

Immature Attentive Learners lack experience and are sometimes not sure of the best ways to proceed on tasks. They appreciate reassurance and guidance on learning tasks, however, they are often reluctant to ask for or unsure as to where to go to receive guidance. To make up for their uncertainty, these learners pay particular attention to instructions. They are attentive to persons they perceive know more than they do and are willing to listen. They also apply what they have learned in the past to assist them with present activities by using mental imaging and remembrances often to assist in learning tasks.

Self-Directed Resourceful Learners like to direct and follow their own learning styles rather than taking suggestions from others on how to proceed

with tasks. These learners are also very good at identifying, locating, and critically using resources that can assist them in completing tasks or solving problems. They often network with others for this reason. These learners do not appreciate being told what to do. Rather, they prefer being told what the "big picture" is and then left alone to decide the best way to go about accomplishing what needs to be done. Because of this holistic, self-directed approach, these learners do not set a priority on focusing on the material to be learned and to set aside time to learn. They need to be cautious that they pay attention to details and are keeping on schedule.

Recommendations

It is recommended that researchers using SKILLS in the future specifically modify the instrument as part of their research design. As shown in this study, SKILLS surveys may have been even more effective and less confusing to participants had they been worded specifically for the participants' domains of learning and working. It is strongly recommended that future researchers modify or develop scenarios that are distinctly related to their studies and the data they are attempting to gather. This study may have been more effective and conclusive had I tailored the fifteen questions related to which capabilities employers definitely, possibly, or least preferred in entry-level employees (see Appendix F), rather than asking the questions in a

generic way. It may have been more effective and less confusing to participants had the questions been tailored to mirror realistic situations that may occur in their industry. For example, when questioning employers in a nursing setting it would be more meaningful to ask them to list whether they would definitely, possibly, or least prefer employees with specific nursing skills. "An entry-level nurse in the intensive care unit should be able to monitor and record hourly blood pressure readings against given standards" is more meaningful than the more generic statement of "An entry-level employee should be able to monitor how he or she is proceeding through a given task against a given standard." As long as such tailored statements are written and "constructed using *similar* [emphasis mine] statements from matched scenarios from the original SKILLS scenarios, validity and reliability will remain intact" (Fellenz, Conti, & McKenna, 1994, pp. 261-263).

It is recommended that individuals using SKILLS in future research related to career development or the workplace align the wording and terms in the five learning areas of SKILLS--Critical Thinking, Memory, Metacognition, Metamotivation, and Resource Management and the fifteen learning strategies that flow from these five areas--with similar terms used in business and industry. This and other studies have shown that specifically modifying and tailoring SKILLS questions and scenarios can enhance the quality and appropriateness of the data gathered. It is further recommended to researchers interested in collecting data related to the workplace or career development

that they align and define as closely as possible terms that may overlap between SKILLS and these domains. For example, both SKILLS and the literature related to career development and the workplace use the term critical thinking. However, it is important to distinguish and reconcile, if necessary, any inconsistencies between the use of such terms early in the research design. Such preliminary work in the research design will assist researchers in defining the terms used in a study, will eliminate confusion participants may have on overlapping terms, and add more meaning to the data collected.

It is recommended that an adult learning strategies course be designed and offered to students and faculty at Eastern Idaho Technical College (EITC).

Since the majority of students at EITC are nontraditional adult students, faculty and students can benefit by a course that explains the importance of knowing what learning strategies are and how they may be applied to academic and career development situations. Knowledge of adult learning principles and strategy use will enhance the curricula, teaching methods, and the learning potential for students at EITC.

It is recommended that EITC career development trainers and counselors be given in-service or other training to alert them that EITC students use different learning strategies in career development learning situations. In addition, they should be made aware that the learning strategies used by EITC students are not necessarily the strategies preferred by employers. Information related to EITC learning strategy uses may be used by

trainers and counselors to better allow them to assist students in their career development and planning activities.

It is recommended that a version of this study be replicated in the other five post-secondary vocational/technical institutions in Idaho to determine the learning strategy profiles of students at these institutions and learning strategy preferences of employers in each institution's region. Information from these studies could be used to assist students graduating from the various institutions to obtain entry-level positions with employers in their regions. Further, information collected in the studies could be compiled and analyzed to determine if the State of Idaho Post-Secondary Career Guidance Model currently in use at all six post-secondary vocational/technical institutions in Idaho should be updated to include a component on learning strategies used in career development situations.

It is recommended that further research be conducted at the high school, undergraduate, and graduate levels to determine if learning in career development situations varies in these settings. Such research can determine if better job preparation curricula should be developed to assist students with job placements upon graduation.

It is recommended that continuing research be performed in the area of which learning strategies are preferred by employers in Southeast Idaho and the Idaho Falls region. Information gathered from such studies would be very helpful to ensure that curricula developed or updated at EITC will include the

needs and preferences of employers.

It is recommended that researchers using cluster analysis and including focus group interviews in their studies carefully plan the components of the group interviews in the initial research design. In this study it was found that although the group interviews were helpful in general to keep group discussion alive, they did not necessarily add value to or clarify the cluster analysis. Several problems occurred during the focus group sessions that are worth noting. These were verbal domination of certain individuals during some group discussions, polarization of group members in some groups, guideline questions that may not have been relevant to the cluster analysis, and hostility on the part of some participants. By planning focus group interviews early in the research design phase such problems are likely to be decreased or eliminated. There are many factors to be taken into account when planning for focus groups as part of a research project. Important factors to be considered are (a) size of focus groups; (b) type of sampling of clusters to get representative samples; (c) goals of focus group sessions; (d) guidelines for focus group members' conduct during interview sessions; (e) time required for verbatim transcription of recorded interview sessions; (f) format of interview sessions; (g) logistics with regard to time, place, and number of interview sessions; and (h) how data gathered in interview sessions is to be evaluated and subsequently used in the study. Following is a brief discussion of several of these factors with associated citations where researchers interested in

incorporating group interviews into their studies may find more information. It is strongly recommended that researchers spend significant time becoming familiar with interviewing techniques through literature review or actual training. This will ensure that the data gathered in focus group interviews will be relevant and useful to the study.

Goals of focus group sessions. When planning one or more focus group interviews, one needs to determine the goal of each session. In research situations, the goal of interviews is usually to obtain supplemental information related to the project. "The hallmark of focus groups is the explicit use of the group interaction to produce data and insights that would be less accessible without the interaction found in a group" (Morgan, 1988, p. 12). Greenbaum (1988) stated that the first step in preparing for focus group research is to write a brief document that specifies why the research is being implemented and what information is expected to be gained from it. He recommends that five key areas be covered. These are:

1. Background of information about the project so that a person not closely involved can be brought up to date on the most important facts that have led up to the decision to conduct the focus groups.
2. Objective should describe the most important information the researcher hopes to obtain from the process.
3. Utilization describes how the researcher plans to use the information generated by the focus group session(s).
4. Composition of groups describes the people whom the researcher believes should be included in the focus group(s). Relevant demographics of the population or sample to be studied

should be included in this section.

5. Budget should be considered to provide an estimation of the cost of implementing the research.

Developing such a document has three main benefits (Greenbaum, 1988). It is particularly beneficial to graduate students pursuing theses or dissertations and their associated research committees. These benefits are:

1. It forces the researcher to think through the objectives of the research in a much more thorough manner than if he or she was permitted to conceive the focus groups verbally. Almost always the result will be more effective research plans, which in turn will generate more effective research.
2. It facilitates the involvement of others in the organization regarding the research objectives and scope. This is a very helpful step because the researcher must seek approval for the research from others in the organization.
3. It provides the researcher with a succinct document to use in briefing the key people about the research plan and to gain approval for the study from committee chairpersons, management, or others who need to be kept informed. (Greenbaum, 1988, p. 26)

Format of interview sessions. Once the purpose or goal of a focus group session is defined, the format must be determined. There are a variety of formats one can use in focus group interviews (Greenbaum, 1988; Merriam, 1988; Morgan, 1988; Patton, 1990; Stewart & Shamdasani, 1990). Rigidly written closed-ended questions may be used but are usually not as effective as open-ended questions written with the intent to "bring out" group members' perceptions and attitudes related to the specific research goal. Just as the goal of each focus group session is specifically tied to a specific, individual

research design so is the format. It is generally related to what information the researcher is attempting to gain.

Size of focus groups. "There is no generally accepted guideline regarding the size of the ideal focus group" (Greenbaum, 1988, p. 38). From any researcher's viewpoint, there are both practical and substantive considerations in selecting the size of groups (Morgan, 1988).

On the practical side, there are some economics of scale to running larger groups, if only because it takes fewer groups to hear from the same number of participants. On the substantive side, the dynamics of discussions in smaller groups are likely to be different from those in larger groups. The usual conclusion is to use "moderate sized" groups, which is somewhere between six and ten, depending on what source you read. (Morgan, 1988, p. 43)

Stewart and Shamdasani (1990) advocated that focus groups should be composed of six to twelve people. "Fewer than six participants makes for a rather dull discussion, and more than twelve participants are difficult for the moderator to manage." (p. 57) Most advocates of focus group research stress that it is a good idea to recruit more individuals than required as it is generally better to over-recruit slightly than to cancel a group because too few individuals are present.

Type of sampling of clusters to get representative samples. By their nature focus groups are often conducted with systematically selected samples. All participants may come from one limited source while others may be omitted from the data collection. Again, it comes down to the individual researcher and his or her project. In this study the purposive sampling

technique of criterion-based sampling was employed. "Criterion-based sampling requires that one establish the criteria, bases, or standards necessary for units to be included in the investigation; one then finds a sample that matches these criteria" (Merriam, 1988, p. 48). Probability sampling, simple random sampling being the most familiar example, may also be used to attain focus group samples. This type of sampling allows the researcher to generalize the results of the study from the sample to the population from which it is drawn. Focus group research is usually employed in qualitative rather than quantitative designs. As such, it is usually not the goal of such research to provide statistical data and probability sampling is rarely used in focus group selection (Merriam, 1988). However, Stewart and Shamdasani (1990) maintained that

The limitations on the generalizability of focus group results have at least one advantage--that convenience sampling can be employed. Indeed, convenience sampling is the most common method for selecting participants in focus groups. This type of sampling saves both time and money, but it does not eliminate the need to consider the characteristics of the group. The intent of virtually all focus groups is to draw some conclusions about a population of interest, so the group must consist of representative members of the larger population. Thus, convenience sampling does not free the researcher from matching the sample used in the focus group to the objectives of the research. (p. 53)

Number of focus group interview sessions. In this study, there was one focus group session for each of the five clusters determined by the cluster analysis. Each focus group session included five members of the cluster as participants. This part of the study would have been enhanced by holding additional numbers of focus group sessions for each cluster. For example,

instead of only five people representing each cluster, I could have held two or three focus group sessions for each cluster. There are some advantages to this (Goetz & LeCompte, 1984; Merriam, 1988; Morgan, 1988; Patton, 1990). For example, the researcher may have a more representative sample for each cluster. Also, if a total sample size has been selected for the cluster, it is not so imperative if all members meet at one time, this may be an advantage in scheduling meeting times. Further, a multiple session approach allows for more flexibility in terms of group behavior and input. For example, if one focus group has an individual or individuals intent on dominating or disrupting the session, data from subsequent sessions may be added to give a better overall picture of what the cluster looks like. Disadvantages to a multiple meeting approach are expense in terms of time, money, and resources. It may not be logistically possible to have more than one focus group meeting per cluster. If this is the case, the researcher would want to ensure that he or she has an adequate sample, in terms of numbers and demographics, for the one session (Greenbaum, 1988).

Interview questions that are relevant to the study. Some researchers feel that questions to be asked during focus group interviews should grow directly from the research questions that were the impetus for the research (Goetz & LeCompte, 1984; Merriam, 1988; Patton, 1990; Stewart & Shamdasani, 1990). Further, it is important to determine these questions early in the research design phase of a project. Such an approach is particularly

helpful to researchers not familiar with focus group structure and flow.

Preparing a list of questions in a research study serves two purposes: It is a means of translating the research objectives into specific and perhaps even measurable language; and it is a way of motivating respondents to share their knowledge of the phenomenon under study. (Merriam, 1988, p. 78)

Patton (1980) lists six kinds of questions that can be used to get different types of information from respondents:

1. Experience/behavior questions are aimed at eliciting descriptions of experiences, behaviors, actions, and activities that would have been observable had the observer been present.
2. Opinion/value questions try to find out what people think about the world or about a specific program. They tell us people's goals, intentions, desires, and values.
3. Feeling questions are aimed at understanding the emotional response of people to their experiences and thoughts.
4. Knowledge questions find out what a respondent considers to be factual information regarding the research topic.
5. Sensory questions determine what sensory stimuli--sight, sound, touch, taste, or smell--respondents are sensitive to.
6. Background/demographic questions locate the respondent in relation to other people. Age, education, race, residence/mobility questions, and the like are standard background questions. (Patton, 1980, pp. 207-209)

How questions are worded is also crucial to ensure that desired information is extracted from the interview. A reconciliation of needs, vocabulary, terms, and intent of the interview are helpful in making sure that the interviewer and interviewees all understand what is necessary (Merriam, 1988).

Using words that make sense to the interviewee, words that reflect the respondent's world view, will improve the quality of the data obtained

during the interview. In many cases, without sensitivity to the impact of particular words on the person being interviewed, the answer may make no sense at all--or there may be no answer. (Patton, 1980, p. 227)

In summary, it is strongly recommended that researchers interested in using focus group interviews as part of their research designs plan their strategies early in the design phase. Use of focus groups can enhance quantitative research such as cluster analysis, but only if the approach to focus group research is carefully and strategically planned in the initial stages of the research design and is periodically evaluated during the project to ensure that the approach remains viable and meaningful to the study.

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APPENDIXES

APPENDIX A

PERMISSION TO CONDUCT RESEARCH



Eastern Idaho Technical College

March 15, 1995

Dr. Grace Guemple, Director
Eastern Idaho Technical College

Dear Dr. Guemple,

This letter is to formalize permission to conduct an educational survey at Eastern Idaho Technical College (EITC) as part of my doctoral dissertation research. I would like to survey a population of volunteer participants of full-time students at EITC. The survey consists of a questionnaire that asks participants to rank which learning strategies they would use in various real-life learning situations. This information will then be compiled to indicate each student's learning profile. The participants will only be asked to identify themselves if they would like a copy of their personal learning profiles. These will in turn be mailed to these students upon completion of the scoring process.

Data will be collected during regularly scheduled class periods. I have received indication from faculty in all programs that they are supportive of the study and all have indicated that they will allot the 30 to 45 minutes necessary for the survey to be completed. I am proposing to collect data between April 20 and May 12, 1995, with possibly one or two follow up sessions during the week of May 15 if necessary.

Please indicate by your signature that you concur to grant approval for the study. Thank you very much for your support and encouragement.

Best regards,

Dan Strakal
Career Services

I grant my approval for the study mentioned above:

Dr. Grace Guemple, Director
Eastern Idaho Technical College

APPENDIX B

STUDENT PARTICIPANT STATEMENT

Eastern Idaho Technical College
Learning Strategies Study

Directions: Eastern Idaho Technical College (EITC) is conducting a study to better understand the learning strategies used by students at the college. One part of the study is to obtain a general overview of the different learning strategies used by EITC students in personal life and career development situations. Another part of the study is to determine if different variables; such as gender, age, level of program, and length and type of experience in the workplace, influence students' learning strategy choices. Therefore, if you are willing to complete the attached survey and biographical data sheet, it is understood that you are granting permission for the researcher to link strategy uses and biographical variables to determine your learning profile.

All information which is reported in this study will be reported as group data; therefore, your responses will remain totally anonymous. However, if you would like a personal and private copy of your learning strategies results, please indicate so on the appropriate space on the Biographical Survey.

Thank you very much for your participation.

APPENDIX C
STUDENT BIOGRAPHICAL SURVEY

Biographical Survey

This Biographical Survey compliments the research project conducted on learning strategies used in personal and career development situations. Your answers are confidential. Thank you for your assistance.

Would you like a copy of your learning profile? Yes No

1. Gender: Male Female

2. Age:

3. You are currently enrolled with the intent of obtaining:

A Certificate of Applied Science

or

An Associate of Applied Science

4. Please check which program you are currently enrolled in:

Business and Office Technology

Mechanical Trades

Chemical Laboratory Technician

Medical Assistant

Computer Network Support Technician

Marketing & Management

Dental Assisting

Practical Nursing

Electronic Service Technician

Radiation Safety Technology

Environmental Technology

Welding

Insurance Customer Service Representative

5. How long since you left high school? _____

6. Did you obtain a GED Certificate or a High School Diploma ?

7. How much work experience do you have related to your current program of study? Please give an approximate timeframe and brief summary of this experience. (Use back of page if necessary.)

8. Please give a brief summary of other prior work experience:

APPENDIX D

SKILLS INSTRUMENT AND ANSWER SHEET

CHOLESTEROL LEVEL

You have recently visited the doctor and discovered that your cholesterol level is well above a healthy level. You have been advised to regulate this condition through diet. You are now left with the task of learning about proper nutrition and of changing your eating habits. Your next checkup is in six weeks. **How likely are you to use the following strategies in learning what you need to do in order to change your eating habits?**

Directions: Select the 5 strategies from the following list of 15 that you feel you would definitely use and place the number of these strategies on the lines in the **Definitely Use** box of the answer sheet. Select 5 other strategies that you might possibly use and place the number of these strategies in the **Possibly Use** box of the answer sheet. Select 5 other strategies that you would least likely use and place the number of these strategies on the lines in the **Not Likely Use** box of the answer sheet.

- | | |
|---|--|
| 1. Making a plan that will help you learn enough about cholesterol and eating habits | 9. Organizing high cholesterol foods into certain categories to help remember what foods to avoid |
| 2. Focussing on learning about good diet practices instead of just worrying | 10. Calling several friends who have had high cholesterol to discuss what lifestyle changes worked best for them |
| 3. Getting a book that has recipes for a low cholesterol diet and information on cholesterol from your local book store | 11. Placing a cholesterol information sheet on your refrigerator as a reminder to change your eating habits |
| 4. Checking for other ways of lowering your cholesterol besides changing your diet | 12. Studying various eating habits so you can set priorities on which changes will have the most impact on lowering your cholesterol |
| 5. Reminding yourself how nice it would be to reduce your cholesterol significantly by your next visit to the doctor | 13. Reflecting on previous experiences you have had with diets to know what techniques and attitudes work for you |
| 6. Setting up an appointment with a dietitian to help you make sense of all the information you have been receiving and hearing about | 14. Revising your learning method if you find you are becoming confused |
| 7. Checking to see if what you are learning is actually helping you solve your cholesterol problems | 15. Deciding to implement a specific low-cholesterol diet with the understanding that you will periodically check its effectiveness |
| 8. Reminding yourself you have been able to learn new health practices before | |

GETTING A PROMOTION

Assume you have been employed at the same company in the same position for two years but now you desire to attain a promotion. A recent performance appraisal indicates that to gain the promotion you desire, you will need to study relevant material to increase your skills and knowledge related to the new job position. **How likely are you to use the following learning strategies to study the necessary material to increase your skills and knowledge?**

Directions: Select the 5 strategies from the following list of 15 that you feel you would definitely use and place the number of these strategies on the lines in the **Definitely Use** box of the answer sheet. Select 5 other strategies that you might possibly use and place the number of these strategies in the **Possibly Use** box of the answer sheet. Select 5 other strategies that you would least likely use and place the number of these strategies on the lines in the **Not Likely Use** box of the answer sheet.

- | | |
|--|--|
| 1. Starting the learning by looking at materials to determine what is most important to study | 9. Developing visual images in your mind, such as picturing the work station, to help you remember |
| 2. Making up your mind to study the required material because you want the promotion | 10. Finding another person who is knowledgeable about the position you want to quiz over material related to the new position |
| 3. Asking your supervisor whether the company has prepared material to help people gain the necessary knowledge and skills | 11. Making a list of things you have trouble remembering about skills and knowledge related to the new position |
| 4. Thinking about the advantages and disadvantages of staying where you are or going for the promotion | 12. Asking yourself if there might be better ways to gain the skills and knowledge you need for the new position |
| 5. Reminding yourself periodically that you would like to get the promotion | 13. Thinking about past experiences you have had in gaining promotions successfully |
| 6. Check with a specialist in the company to make sure you are actually gaining new skills and knowledge | 14. Deciding to stop studying when you feel you have gained the necessary skills and knowledge |
| 7. Stopping to ask yourself questions while studying to see if you are remembering specific information | 15. Thinking through the difference between things you learn that may help you gain the promotion and those that actually increase your knowledge and skills |
| 8. Studying confidently because you are sure you will get the promotion if you do study | |

PET CARE

You have agreed to watch your friends' pet during their extended vacation. Your friends love their pet. The pet unexpectedly begins to act very strangely, and you do not know what to do. **How likely are you to use the following strategies in finding out how to care for the pet?**

Directions: Select the 5 strategies from the following list of 15 that you feel you would definitely use and place the number of these strategies on the lines in the **Definitely Use** box of the answer sheet. Select 5 other strategies that you might possibly use and place the number of these strategies in the **Possibly Use** box of the answer sheet. Select 5 other strategies that you would least likely use and place the number of these strategies on the lines in the **Not Likely Use** box of the answer sheet.

- | | |
|--|--|
| 1. Identifying what you need to know in this unexpected situation to care for the pet | 9. Watching for patterns in the pet's behavior so you will remember exactly how the pet is acting |
| 2. Admitting to yourself that you need to begin immediately paying close attention to the pet's behavior | 10. Discussing the pet's behavior with someone who has a similar type of pet |
| 3. Beginning to form a list of resources you might use to check the pet's behavior | 11. Writing down changes in the pet's behavior so you will be able to describe them to others |
| 4. Questioning whether there are things other than illness that could be causing the pet's strange behavior | 12. Checking whether the pet's behavior could be due to your friend's absence |
| 5. Reminding yourself of how hard it would be to tell your friends that something happened to their pet | 13. Recalling similar experiences with other pets to figure out what to look for |
| 6. Checking with several other people who should be knowledgeable about this type of pet to see if all give similar advice | 14. Deciding if you have enough information to make a decision to begin to care for the pet |
| 7. Checking to see if what you are finding out is helping you understand the pet's behavior | 15. Testing one of the suggestions you have gotten to see if it changes the pet's strange behavior |
| 8. Reflecting on your experience with other pets to reassure yourself that you can take control of this matter | |

FINDING NEW EMPLOYMENT

Assume you are enrolled in a program of study at a vocational/technical college and will graduate in two months. A recent article in your local paper states that the opportunities within the job/career that you were planning to enter have sharply decreased and are not likely to make a comeback in the near future. **How likely are you to use the following learning strategies to search out new employment opportunities?**

Directions: Select the 5 strategies from the following list of 15 that you feel you would definitely use and place the number of these strategies on the lines in the **Definitely Use** box of the answer sheet. Select 5 other strategies that you might possibly use and place the number of these strategies in the **Possibly Use** box of the answer sheet. Select 5 other strategies that you would least likely use and place the number of these strategies on the lines in the **Not Likely Use** box of the answer sheet.

- | | |
|---|---|
| 1. Making a plan that will help you learn what related employment opportunities exist | 9. Organizing low possibility employment opportunities to help remember where not to look |
| 2. Focussing on learning about new job search techniques instead of just worrying | 10. Calling several friends who have had to look for work in the past to discuss what strategies worked best for them |
| 3. Getting a book from a local bookstore that has ideas on how to find work and other information on job hunting | 11. Placing a job hunting information sheet on your desk as a reminder to keep looking for work |
| 4. Checking to make sure there are not going to be opportunities in your field | 12. Studying various job hunting techniques so you can set priorities on which ones will have the most impact on finding new employment opportunities |
| 5. Reminding yourself how nice it would be to get a job by the time you get out of school | 13. Reflecting on previous experiences you have had in job hunting situations to know which techniques and attitudes work for you |
| 6. Setting up an appointment with a job counselor to help you make sense of all the information you have been receiving and hearing about | 14. Revising your learning method if you find you are becoming confused |
| 7. Checking to see if what you are learning is actually helping you to find new employment opportunities | 15. Deciding to implement a specific job hunting practice with the understanding that you will periodically check its effectiveness |
| 8. Reminding yourself you have been able to learn new job hunting skills before | |

**Directions and Answer Sheet for
the Personal Life and Career Development
Learning Strategies Survey**

Student ID (Social Security) #: _____ Mailing Address: _____

There are four real-life scenarios to be examined. Two of these (PET CARE and CHOLESTEROL LEVEL) deal with personal situations and two others (FINDING NEW EMPLOYMENT and GETTING A PROMOTION) deal with career development situations that might be encountered by students in, or that have graduated from, a vocational/technical college.

First: Read the four scenarios dealing with personal and career development situations.

Second: For each scenario, select the 5 learning strategies that you would **Definitely Use**, 5 that you might **Possibly Use**, and 5 that you would **Not Likely Use**. Enter the number for each of these 5 items in the proper box below.

Cholesterol Level	Getting a Promotion	Pet Care	Finding New Employment
Definitely Use	Definitely Use	Definitely Use	Definitely Use
Possibly Use	Possibly Use	Possibly Use	Possibly Use
Not Likely Use	Not Likely Use	Not Likely Use	Not Likely Use

APPENDIX E
EMPLOYER DATA SURVEY SHEET

Employer Data

This information compliments the research project conducted on learning strategies used in personal and career development situations by entry-level employees. Your answers are confidential. Thank you for your assistance.

Name: _____

Title: _____

Company size (# employees): _____

1. Please check which program most relates to your organization:

- | | |
|--|--|
| <input type="checkbox"/> Business and Office Technology | <input type="checkbox"/> Mechanical Trades |
| <input type="checkbox"/> Chemical Laboratory Technician | <input type="checkbox"/> Medical Assistant |
| <input type="checkbox"/> Computer Network Support Technician | <input type="checkbox"/> Marketing & Management |
| <input type="checkbox"/> Dental Assisting | <input type="checkbox"/> Practical Nursing |
| <input type="checkbox"/> Electronic Service Technician | <input type="checkbox"/> Radiation Safety Technology |
| <input type="checkbox"/> Environmental Technology | <input type="checkbox"/> Welding |
| <input type="checkbox"/> Insurance Customer Service Representative | |

Very Somewhat Not Involved

- | | | | |
|---|-------|-------|-------|
| 2. How involved are you in the interviewing of entry-level employees? | _____ | _____ | _____ |
| 3. How involved are you in the day-to-day supervision of entry-level employees? | _____ | _____ | _____ |
| 4. How involved are you in the performance appraisal process involving entry-level employees? | _____ | _____ | _____ |

APPENDIX F

EMPLOYER CAPABILITY INSTRUMENT AND ANSWER SHEET

Select the 5 capabilities from the following list of 15 that you feel are most important in an **entry-level employee** you might hire and place the number of these capabilities in the boxes under the *Definitely Prefer* heading of the answer sheet. Select 5 other capabilities that you feel are of medium importance in an **entry-level employee** you might hire and place the number of these capabilities in the boxes under the *Possibly Prefer* heading of the answer sheet. Select 5 other capabilities that you feel are least important in an **entry-level employee** you might hire and place the number of these capabilities in the boxes under the *Least Prefer* heading of the answer sheet.

- | | |
|---|--|
| 1. An entry-level employee should be able to plan the best way to proceed with an on-the-job learning task | 8. An entry-level employee should use checklists, displays, and/or other job aids to reinforce memory of tasks |
| 2. An entry-level employee should set aside an appropriate place and time to avoid distractions when learning a new task | 9. An entry-level employee should be able to identify a range of solutions to problems related to the job |
| 3. An entry-level employee should be able to organize and process job-related information so that it will be better remembered | 10. An entry-level employee should recognize when to contact an expert or check a reference when necessary to complete a task correctly |
| 4. An entry-level employee should be able to examine the accuracy of assumptions in testing appropriateness of given information | 11. An entry-level employee should seek feedback and change his or her approach to a task as well as be able to decide when a task is complete |
| 5. An entry-level employee should know how to locate and use the best source(s) of information related to a given on-the-job task | 12. An entry-level employee should have the confidence that he or she will be able to complete a task successfully |
| 6. An entry-level employee should be able to monitor how he or she is proceeding through a given task against a given standard | 13. An entry-level employee should be able to use his or her past experiences to facilitate planning or problem solving on the job |
| 7. An entry-level employee should have a feeling of satisfaction and recognize his or her value upon the successful completion of a required task | 14. An entry-level employee should question solutions and, if necessary, develop new approaches to problems on the job |
| | 15. An entry-level employee should be able to discuss opinions with, get support from, and network with others on developmental tasks |

**Directions and Answer Sheet for
the Entry-Level Employee Capability Survey**

Select the 5 capabilities from the preceding list of 15 that you feel are most important in an **entry-level employee** you might hire and place the number of these capabilities in the boxes under the *Definitely Prefer* heading of the following table. Select 5 other capabilities that you feel are of medium importance in an **entry-level employee** you might hire and place the number of these capabilities in the boxes under the *Possibly Prefer* heading of the following table. Select 5 other capabilities that you feel are least important in an **entry-level employee** you might hire and place the number of these capabilities in the boxes under the *Least Prefer* heading of the following table.

Entry-Level Capabilities
Definitely Prefer
Possibly Prefer
Least Prefer

APPENDIX G
FOCUS GROUP QUESTIONS

FOCUS GROUP QUESTIONS

As a group, please respond to the following questions. I will tape record your answers to review later.

1. What are some things you like to learn about?
2. What do you feel is the best way for you to learn about these things?
3. What kind of circumstances have given you trouble when learning something new?
4. Describe a "good" learning experience, in your personal life or at work, you've had in the past 6 months.
5. Describe a "bad" learning experience, in your personal life or at work, you've had in the past 6 months.
6. What do you think are the three most important things you must learn to get and keep a good job?
7. What does lifelong learning mean to you?

THANKS FOR YOUR HELP WITH THIS PROJECT!!!!

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