



Learning strategies and the learning-disabled adult student  
by Patricia Ann Hays

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education  
Montana State University

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Abstract:

The purpose of this study was to determine whether post-secondary learning-disabled students' learning strategies changed after academic and study skills intervention during one semester of classes and what impact learning strategies had on adult learning. The study also identified whether there were groups of learning-disabled adult learners who think and learn in a similar manner.

The data were collected from (a) the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS), (b) the Test of Adult Basic Education, (c) follow-up cluster focus groups, and (d) a demographic questionnaire. Learning strategies included metacognition, metamotivation, memory, critical thinking, and resource management.

Learning disabilities were defined as a heterogeneous group of disorders manifested by significant difficulties with listening, speaking, reading, writing, reasoning, or mathematical calculations. The sample consisted of 101 diagnosed and suspected learning-disabled students enrolled at Montana State University College of Technology-Great Falls during the fall of 1993. Learning strategies did not change after one semester of academic and study skills instruction. However, discriminant analysis indicated that male and female and diagnosed and suspected learning-disabled students learn differently due to the processes of Structured Learning and Rigid Planning respectively. Cluster analysis revealed five distinct groups of learners: Assisted, Hands-On, Sensitive, Persistent, and Balanced Learners.

It was concluded that (a) SKILLS and learning strategies are practical tools for educational improvement for learning-disabled students, (b) learning-disabled students generally experience academic skills deficiencies, (c) SKILLS is useful for 2-year college students, (d) gender and diagnosed/suspected learning-disabled status influence learning strategy selection, (e) short-term academic and study skills training does not change learning strategy usage, (f) distinct learning-disabled groups exist, (g) learning-disabled students need to advocate for services, and (h) learning-disabled students require accommodations in particular learning situations. Recommendations included providing special counselors, staff development for faculty, developing a learning strategies course, providing learning-disabled students with accommodations, and conducting further research related to learning disabilities, learning strategies, and academic and study skills.

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ADULT STUDENT

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## ABSTRACT

The purpose of this study was to determine whether post-secondary learning-disabled students' learning strategies changed after academic and study skills intervention during one semester of classes and what impact learning strategies had on adult learning. The study also identified whether there were groups of learning-disabled adult learners who think and learn in a similar manner.

The data were collected from (a) the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS), (b) the Test of Adult Basic Education, (c) follow-up cluster focus groups, and (d) a demographic questionnaire. Learning strategies included metacognition, metamotivation, memory, critical thinking, and resource management.

Learning disabilities were defined as a heterogeneous group of disorders manifested by significant difficulties with listening, speaking, reading, writing, reasoning, or mathematical calculations. The sample consisted of 101 diagnosed and suspected learning-disabled students enrolled at Montana State University College of Technology-Great Falls during the fall of 1993. Learning strategies did not change after one semester of academic and study skills instruction. However, discriminant analysis indicated that male and female and diagnosed and suspected learning-disabled students learn differently due to the processes of Structured Learning and Rigid Planning respectively. Cluster analysis revealed five distinct groups of learners: Assisted, Hands-On, Sensitive, Persistent, and Balanced Learners.

It was concluded that (a) SKILLS and learning strategies are practical tools for educational improvement for learning-disabled students, (b) learning-disabled students generally experience academic skills deficiencies, (c) SKILLS is useful for 2-year college students, (d) gender and diagnosed/suspected learning-disabled status influence learning strategy selection, (e) short-term academic and study skills training does not change learning strategy usage, (f) distinct learning-disabled groups exist, (g) learning-disabled students need to advocate for services, and (h) learning-disabled students require accommodations in particular learning situations.

Recommendations included providing special counselors, staff development for faculty, developing a learning strategies course, providing learning-disabled students with accommodations, and conducting further research related to learning disabilities, learning strategies, and academic and study skills.

## CHAPTER I

## INTRODUCTION

The goal of adult education should be life fulfillment. If this is indeed a goal, then adult educators should be involved in meeting the needs of the learning disabled adult.  
(Stubblefield, 1981, p. 12)

It is no secret that the problems learning-disabled individuals face in education are enormous. Traditionally, these individuals perform poorly in the post-secondary education setting. Many factors contribute to this such as an early history of academic problems in school or cognitive delay (Cranney, 1983), behavioral problems (Gilmore, 1975; Matson, 1988), socioeconomic factors (LaBuda, DeFries, & Pennington, 1990), educationally disadvantaged backgrounds where intervention services were not available or students were taught only basic, essential academics (Harrington, 1982), a lack of adequate study and time management skills (Maugrum & Strichart, 1984), and poor self-esteem (Neault, 1983; Polloway, Smith, & Patton, 1983; Shaw et al., 1989).

Writers such as Alley and Deshler (1979) have stressed that as learning-disabled children reach adolescence, the educational focus and the types of services they receive must change. The need for such change becomes even more

significant in adulthood as the complexity and interaction of the variables associated with disabilities are further magnified (Schumaker, Alley, Warner, & Deshler, 1980).

Educators face many problems in providing post-secondary programs for learning-disabled students (Johnston, 1984). A survey by Schumaker, Deshler, Denton, Alley, Clark, & Warner (1982) reported that 67% of young adults diagnosed as learning-disabled while in public school had plans for post-secondary education. In fact, the number of learning-disabled students entering college has more than doubled since 1978 according to the Education of the Handicapped Amendments of 1983 (Shaw & Norlander, 1985, p. 4). Over 16 million adults with learning disabilities are potential candidates for post-secondary education with over 800 American colleges and universities offering services or programs for the learning-disabled student (Fielding & Moss, 1981). Estimates suggest that approximately 10% of incoming freshmen have a specific learning disability manifested in poor reading, writing, or problem solving abilities (Kanter, 1986; Richards, 1977; Sims & Kozall, 1974) with the most common difficulties found in the reading area (Ostertag, Pearson, & Baker, 1986). In the post-secondary vocational/technical setting, the percentage of learning-disabled freshmen may be even higher than 10% as the "open admissions" type of institution often accepts students who are unable to

compete academically at a four-year college. The population also contains many nontraditional older students not previously diagnosed with a specific learning disability during elementary or secondary school (Seitz & Scheerer, 1983, p. 20).

Since Hinshelwood's (1917) classic description of a condition he termed "congenital word blindness," learning disabilities have received much attention from professionals in medicine and many other fields; this is especially so in education. Despite over 60 years of research, the debate still continues concerning a proper definition, etiology, treatment, and prognosis of and for learning disabilities. Consequently, terms such as "learning dysfunctions" (Ross, 1976) or the more commonly accepted expression "learning disabilities" are used.

Early in this century, Charles Orton was the first to identify children of high or average intelligence who were unable to read; he coined the term "strephosymbolia" to describe the twisted confusion of symbols these children experienced. His work of 1937 is still the classic source for remedial training of dyslexics.

The learning that takes place in learning-disabled persons is unique (DeRuiter & Wansart, 1982). Learning-disabled individuals pass through the same qualitatively different developmental stages as those without learning disabilities (Piaget, 1977), but there appear to be

significant differences between learning-disabled individuals and their peers who do not experience learning disabilities (Entwisle, Forsyth, & Muuss, 1964; Gibson & Levins, 1975). These qualitative differences have been noted for decades (Hinshelwood, 1917; Orton, 1937).

A specific learning disability is a hidden disability resulting from a presumed neurological limitation or imbalance affecting an individual's ability to learn--to receive and express information. Recent medical and neuropsychological breakthroughs have revealed much about the nature of information-processing disorders. Learning disorders may occur in the areas of (a) visual perception--reversals or transposing words, (b) auditory-processing--hearing intermittent background noise or hearing only parts of what is said, (c) perceptual-motor--extreme difficulty in fine-motor coordination resulting in illegible handwriting or poor notetaking skills, and (d) reasoning skills. These deficits impair the student's ability to learn. As a result, learning-disabled students learn differently when compared to the norm.

Because of the complexity of this hidden disability, it is often confused with other disorders; the most common of these is with mental retardation. However, many students with learning disabilities possess average to above-average intelligence and demonstrate the ability to succeed in college-level coursework (Biggs & Bullock, 1990;

Shaywitz & Shaw, 1988). In the 1950s and 1960s, learning-disabled students were commonly misdiagnosed as slow learners, underachievers, or mentally retarded. While students with learning disabilities may simply appear to lack basic skills, they are fundamentally different (Kanter, 1986). Learning-disabled students are a group of individuals with diverse psychological, academic, social/emotional, and vocational profiles (Cronin & Gerber, 1982); this is not unlike much of the non-disabled population. However, while many of the deficits or problem areas experienced by people without learning disabilities are alleviated by maturation and experience, the problems often persist for the learning disabled (Hughes & Brewer, 1985, p. 6). The true test of a learning problem may therefore be in its persistence (Blalock, 1981; Mercer, 1979). In the systems approach to diagnosis and remediation used at Northern Kentucky University, Johnson and Morasky (1977) found that what initially appeared to differentiate some learning-disabled students from academically underprepared students was the severity of their problems; even with average to above-average intelligence, learning-disabled students had tremendous difficulty in introductory classes requiring them to read extensively and take written examinations.

Follow-up studies present convincing evidence that learning-disabled adults do attain satisfactory educational

levels and vocational status commensurate with normal learners in the general population (Shaywitz & Shaw, 1988). It has been well-documented that (a) learning-disabled students can succeed in post-secondary education with proper academic support, (b) there is a need for qualified personnel to administer and teach in the programs available, (c) instruction includes the use of technology as well as clearly structured learning strategies, and (d) transition programs are needed to help bridge the gap between high school and college (Biggs & Bullock, 1990; Cherney, 1990).

MSU College of Technology-Great Falls conducts a Master Student class for new students which addresses study skills, learning strategies, interpersonal communication skills, test-taking, test anxiety, self-worth, and career development issues in a group setting. This is an attempt to bridge the gap between high school and college for both young and older students. Because learning-disabled students often have poor preparatory skills such as these (Maugrum & Strichart, 1984), it is especially important to provide transitional assistance. The majority of students completing Master Student have indicated that it was extremely helpful in addressing potential problems in core courses in their programs.

There is a need for more precise identification of learning disabilities (Hughes & Brewer, 1985). In 1981 the

National Joint Committee for Learning Disabilities

developed a definition that reads:

Learning disabilities is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical disorders. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions or environmental influences, it is not the result of these conditions or influences. (p. 8)

Therefore, those with learning disabilities receive inaccurate information from their senses and/or have trouble processing that information. Like static on a radio, the information becomes garbled as it travels from the eye, ear, or skin to the brain (Brown, 1981). This inaccurate sensory or perceptual information leads to problems with academic work. Adult students may have difficulty with one or more of the following: reading, writing, speaking, listening, or mathematical concepts and problem-solving. Either these skills have not been learned, have been learned after heroic work, or have been learned poorly (p. 1).

Much has been written concerning the benefits of the learner developing learning strategies. Knowledge of learning strategies can empower learners not only in their involvement in academic environments but also by informing them of the most effective methods and attitudes for

lifelong learning. Adult education emphasizes the need to not merely teach content but to teach broader knowledge about how to learn (Hill, 1992, p. 11). Students need to learn how to learn because

it is no longer realistic to define the purpose of education as transmitting what is known. In a world in which the half-life of many facts and skills may be ten years or less, half of what a person has acquired at the age of twenty may be obsolete by the time that person is thirty. (Knowles, 1975, p. 15)

Students need to be equipped with skills with which they can direct their own learning. "One of the goals for education is to provide people with the tools so they can learn on their own, without dependence on institutions or teachers" (Apps, 1981, p. 245). Acquisition of learning strategies can be a vehicle for this self-directed learning.

#### Problem Statement

Much of the research regarding learning-disabled students and the impact of skills intervention has been done with elementary and secondary children (Polloway, Smith, & Patton, 1983, pp. 179-185). This research indicates that problems experienced by adolescents persist in adulthood even though course-specific progress is experienced during elementary and secondary coursework. However, adults with learning problems should not be viewed simply as grown-up learning-disabled children (Travis,

1979). Their characteristics and needs should be viewed within the context of other adults' behavior and the demands of adulthood rather than in reference to their difficulties as children; this is particularly true since the nature of a disability may change with age (Meyen, Schiefelbusch, Deshler, Alley, Schumaker, & Clark, 1980).

Learning-disabled adult students have unique problems in learning. Published studies indicate that study skills and specific academic skills intervention can have a definite impact on post-secondary students' success in particular coursework (Idol-Maestas, 1981). Past history at Montana State University College of Technology also has demonstrated that study skills and academic skills intervention has an impact on a learning-disabled student's ability to learn and succeed in a post-secondary program; this has been indicated by lab instructors' assessments and course completion or graduation rates of learning-disabled students. However, it is not known what specific learning strategies these students use.

Learning strategies are the skills and techniques that an individual elects to use in order to accomplish a learning task. Given the fact that learning-disabled students have shown limited success throughout elementary and secondary school, it is possible that these students will continue to use previous unsatisfactory learning strategies when entering post-secondary studies and thus

often continue a pattern of failure (Polloway, Smith, & Patton, 1983, pp. 179-185). By providing study and academic skills intervention, the learning-disabled student may modify learning strategy patterns as a result of skills intervention and thereby increase the possibility of success.

It is critical that counselors, educators, and administrators discover ways to assist the learning-disabled adult learner. Little has been written (a) on the relationship between the post-secondary learning-disabled student's entry level learning strategies, skills intervention, and resulting learning strategies and (b) on the impact of this relationship on adult learning (Cordoni, 1982; Neault, 1983). It is possible that if people were followed past young adulthood, significant outcomes might appear. It is, therefore, important to give learning-disabled students the tools and techniques to accommodate their own disability.

#### Purpose of the Study

The purpose of this study was to describe the learning strategies used by learning-disabled students at Montana State University College of Technology-Great Falls. To accomplish this, the research was fourfold. First, it determined what learning strategies learning-disabled students used at MSU College of Technology. Second, it

assessed whether specific academic skills intervention in the form of academic skill building or study skills instruction had any impact on the resulting learning strategies. Third, it investigated if it was possible to discriminate between male and female students and between diagnosed and suspected learning disabled students in whether they exhibited a different pattern of learning strategies after skills intervention. Fourth, it explored whether there were identifiable clusters of learning-disabled students who thought and learned in a similar manner and how that impacted adult learning.

#### Research Questions

Little research has been done in the area of learning strategies and the learning-disabled adult. This study investigated the relationship between the post-secondary learning-disabled student's learning strategies measured by the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS), specific skills intervention, and post strategies measured by SKILLS. Four research questions were investigated in this study:

1. What is the learning strategy profile of a learning-disabled student?
2. Does skills intervention produce a significant change in the post-secondary vocational/technical learning-disabled student's learning strategies?

3. Do males and females and do diagnosed and suspected students have a different pattern of learning strategies?
4. Do distinct clusters of learning-disabled students exist? If cluster do exist, what are their characteristics?

#### Significance of the Study

Information about a learning-disabled student's use of learning strategies and the relationship of learning strategies to study or academic skills intervention has the potential of impacting post-secondary education programs in a significant way. Instructors and administrators could use the knowledge about skills intervention and the learning-disabled student's learning strategies to improve the learning environment for students. Specific alternative methods of study as well as alternate assignments and testing could be provided by instructors. If a student's learning disability was documented initially, advisement would automatically include information regarding study skills intervention, study skills lab, or academic skills lab. A seminar in learning strategies could be accessible to all students. Students could use the information to identify their most useful strategies or explore additional learning strategies in the future. If a relationship between learning-disabled students, skills intervention,

and resulting learning strategies can be found, then more appropriate pre-advisement is possible to assist the post-secondary learning-disabled student succeed. ✓

Adult learning intersects with learning how to learn. ✓  
As an adult learns, the learning impacts motivation for further learning. This in turn affects the adult learner's potential to be a more efficient, effective, and meaningful learner (Smith, 1982, p. 58). Knowledge of learning strategies can empower learners not only in their involvement in academic environments but also by informing them of the most effective methods and attitudes for lifelong learning. Adult education is replete with the prescription to not merely teach content but to teach broader knowledge about how to learn (Hill, 1992, p. 11). ✓  
To encourage lifelong learning and lifelong self-directed learning, educators must assist people who want to break their ties with formal education and develop their own strategies for learning (Apps, 1981, p. 246). Indeed, if a learning-disabled adult can adapt by developing more effective learning strategies to further personal learning, the goal toward successful completion of a post-secondary program of study can be attainable.

#### Definition of Terms

**Academic Skills Intervention:** Providing instruction in basic skills training in the areas of reading,

arithmetic, English, or a combination of these when skills fall below the 10.0 grade level.

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

**Learning Disability:** This is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, and mathematical or problem solving concepts. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions or environmental influences, it is not the result of these conditions or influences. (Slavin, 1992, p. 409)

**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, 1989, p. 1)

**Master Student Class:** Based on Becoming a Master Student by Dave Ellis (1984), this course at Montana State University College of Technology-Great Falls deals with study skills, learning strategies, interpersonal communication, test anxiety, self-worth, and career development issues in a group setting.

**Memory:** Learning strategies which help adults in learning situations. These include rehearsal of information, organization and elaboration of information, use of external aids, and the application of self-knowledge about memory and use of mnemonic techniques. (Fellenz, & Conti, 1994, p. 5)

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

**Metamotivation:** Tactics and techniques used by the learner to provide internal impetus in accomplishing learning tasks. These are based on a model developed by Keller (1987) which emphasizes focusing attention, fostering confidence, anticipating reward, and enjoying learning activities. (Fellenz, & Conti, 1994, p. 8)

**Resource Management:** The identification of appropriate resources, critical use of such sources, and the use of human resources in learning. (Fellenz, & Conti, 1994, p. 3)

**SKILLS:** An acronym for the Self-Knowledge Inventory of Lifelong Learning Strategies. This is a learning strategies inventory with established validity and reliability which asks respondents to rate 18 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, & Conti, 1994, p. 2)

**Study Skills Intervention:** Providing a way for an individual to learn methods to solve a specific problem in a specific subject area in a classroom setting. These methods include things such as notetaking, memorization techniques, and developing critical thinking skills.

**Suspected Learning Disability:** In this study, those identified at or below the 10.0 grade level equivalence on the TABE as well as being referred for special services by faculty or counseling staff.

**TABE:** An acronym for the Test of Adult Basic Education. This instrument with a long history of use in secondary and post-secondary institutions through the United States is used to establish basic skills achievement levels for adults. The skill areas include reading, arithmetic, and language.

### Assumptions and Delimitations

It was assumed that accurate and reliable responses to the instruments used in the study could be best obtained under controlled conditions. Controlled conditions referred to testing in a classroom with a testing proctor.

SKILLS and TABE instruments were administered by the researcher following an initial intake interview. It was assumed that the participants answered questions under both conditions truthfully and in an unbiased manner. Because the counseling program was designed to help students who come in voluntarily, it was in the student's best interest to be honest during testing. The SKILLS instrument did not seek any confidential information, so there would be no reason for a student to feel a need for protection from disclosure. All participants in this study volunteered to respond and complete the TABE, pre- and post-SKILLS instruments, and participate in cluster focus groups.

The research was delimited to learning-disabled post-secondary students who were entering MSU College of Technology for the first time and were planning to begin a program in the fall of 1993. Participants were excluded from this research if there existed known neurological or emotional problems or uncorrected visual or auditory acuity deficits.

## CHAPTER 2

## LITERATURE REVIEW

Introduction

The rights of learning disabled students to a post-secondary education are specifically guaranteed under Section 504 of the Rehabilitation Act of 1973, yet very little is known about how to best accommodate the learning-disabled student in a college environment. A vicious cycle results because for the learning-disabled student, the prospect of attempting college without a support system is terrifying (Cordoni, 1982). Some institutions are making specific efforts to identify and meet the needs of learning disabled students, but it appears to be a slow word-of-mouth process. This rate of accommodation is disappointing because with the appropriate system of support services, the learning-disabled student can progress through the college experience and can productively and professionally enter the world of work (Neault, 1983, p. 16). However, little research has been done with the learning-disabled college population; definitive data is lacking in the areas of needs identification and appropriate assessment measures (p. 6). Therefore, little has been written regarding a

relationship between study skills and academic skills intervention and learning strategies particularly in higher education.

Most of the literature focuses on children through 12th grade and concludes that deficits in basic skill functioning are enduring for most learning-disabled children, but most transition programs from secondary to post-secondary institutions have been successful in seeing students complete programs, given appropriate support services (p. 5).

Seidenberg (1985) suggests that the transition phase for learning-disabled students from secondary school to college cannot be accomplished in one step. Rather, she describes a three-stage process that includes high school instruction, planning for transition, and placement into an appropriate college program. The results of a survey comparing the perceptions of high school and college faculty regarding the characteristics and preparatory needs of secondary learning-disabled students indicate that both high school and college teachers agree on the characteristics and preparatory needs of secondary learning-disabled students (Seidenberg & Koenigsberg, 1986).

Open admissions policies, new federal laws regarding individuals with disabilities, and attempts to enroll a broader spectrum of the population in higher education have

begun generating publications on the problems of learning-disabled students. For instance, Cross (1971, 1976) surveyed community college programs and analyzed their remedial course offerings and curricula designed to meet the needs of learning-disabled and underprepared students in the lowest third of scores on academic-skills testing. Cross has been at the forefront in recognizing the need to accommodate learning-disabled students and underprepared students, and she has influenced the policies and goals of many programs.

### Learning Disabilities

What is a learning disability, and how does learning occur for those that are learning-disabled? An authoritative definition of this syndrome was proposed by experts working on a project sponsored by the National Institute of Neurological Diseases and Blindness (Clements, 1966). There have been a few revisions to the definition since that time. In response to the educational mandate of PL 94-142 in 1973, which guarantees a public education to all children, the U.S. Office of Education developed the following definition of learning disabilities:

Specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions

as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or environmental, cultural, or economic disadvantage.

This definition is currently the one most widely accepted. One concept central to the definition is a significant discrepancy between potential ability as measured by tests of academic aptitude or intellectual functioning and actual achievement in the classroom or on standardized tests. Another key concept is intra-individual differences, which address adequate achievement in all but one or two subject areas. These concepts distinguish learning disabilities from mental retardation (Kanter, 1986, p. 18; Ludlow, 1982).

The causes of learning disabilities are not yet fully understood. The problem of distinguishing physiological and psychological conditions from environmental factors that affect learning makes it difficult to attribute learning disabilities to specific causes (Ludlow, 1982).

Most studies involving learning disabilities have been done with children. Because the elementary school is a natural place to observe children and their behaviors, it is easy to conclude that most studies with learning-disabled individuals have been done with children because they have been available and observable in a controlled

school setting. Because the how, when, and why of learning changes once outside the controlled elementary/secondary school setting and into the real-life setting, the adult learner has not been as available to assess or to observe in groups. However, one thing is sure. Learning disabilities may start at a very early age, but they do not disappear at a particular age either. Learning disabilities continue into adulthood (Kanter, 1986, p. 18).

Learning disabilities can make academic achievement difficult. Learning to read is not easy for people with visual perceptual problems or those having difficulty coordinating what they see with what they hear, which is often the case with learning-disabled individuals. Even when these students learn to read, it is sometimes at a low level; this in turn may make it more difficult to complete assignments, or it may take more time.

Some learning-disabled individuals have trouble with the concept of time. They do not feel the passage of time in a normal way and may have difficulty estimating how long it will take to achieve a task or may have trouble getting to a certain place by a certain hour (Brown, 1981, p. 3). Additionally, learning-disabled students are generally lacking in good work and study habits, which can set the pattern for poor academic progress (Maugrum & Strichart, 1984).

Writing requires fine motor skills which some learning-disabled students do not have. Perceptual problems often affect the student's cognitive abilities. Visual and auditory sequencing problems can cause difficulty in thinking in an orderly, logical way. Information must be perceived properly before it can be remembered and in turn be transcribed into legible notes.

Hands-on experience requires good perception as well. Visual perception is often necessary for such tasks as measuring chemicals in a beaker in a laboratory class. If care is not taken to move cautiously through activities step-by-step, frequently checking work, this person might tend to jump to conclusions.

In spite of the difficulties learning-disabled students face, it is evident that these students are motivated to learn but must be made aware of their deficiencies and ways to overcome them.

### Learning Strategies

#### Introduction

There are many different definitions of learning strategies (McKeachie, Pintrich, Lin, & Smith, 1989, p. 24). Emphasizing college students, Weinstein (1990) deals with processing and transforming the information that comes to the learner through comprehension monitoring, knowledge acquisition, active study skills, and support

strategies. McKeachie et al. (1989) focuses on students using appropriate strategies and upon how much they know about what learning strategies work well for them. Fellenz (1988) defines important learning strategies for real-life learning as being composed of metacognition, metamotivation, memory, resource management, and critical thinking.

Of primary concern is how does the learning-disabled student process information and learn? Learning processes can be organized under five major areas of attention, perception, memory, cognition, and encoding (DeRuiter & Wansart, 1982). That is where learning strategies come in.

Learning strategies are considered to be a vital part of learning research by a number of researchers (Mayer, 1988; McKeachie, 1988; Weinstein, 1988). Research has demonstrated that learning strategies are effective ways to increase learning and to assist in the production of information by adolescents with learning disabilities in a variety of content areas and academic tasks (Graham & Freeman, 1986; Lee & Alley, 1981; Montague & Bos, 1986; Schumaker et al., 1982; Smith & Friend, 1986). The concept holds promise for improving classroom achievement (McKeachie et al., 1989) as well as for learning which takes place outside educational institutions (Fellenz, 1988).

There is a growing body of research (Ellis, Deshler, Lenz, Schumaker, & Clark, 1991; Harris, 1988; Pressley,

1989) to support the contention that one of the major differences between effective students and ineffective students is their understanding and use of successful learning strategies. A number of strategy training models have been proposed and researched, including academic strategy training (Lloyd, 1980), reciprocal teaching (Brown & Palincsar, 1984), and specific learning strategies (Deshler & Schumaker, 1986). Although there are differences in the models, all agree on two major points. First, there are a number of students who are deficient in their use of learning strategies. The choice of which learning strategies to use in a given situation is affected by many factors which in turn affect the quality and end product of the learning experience (Hill, 1992, p. 27). Second, these students can be taught learning strategies that will help them approach tasks more efficiently and effectively, thus improving their chances for success.

*Pin-trick;  
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Learning strategies include any thoughts or behaviors that help the learner acquire new information in such a way that the new information is integrated with existing knowledge. This knowledge base, which is often referred to as prior knowledge, is very important for learning, problem solving, and decision making (Ellis, Sabornie, & Marshall, 1989; Weinstein, 1987). It is necessary for the learner to select an activity that will facilitate completion of a task. Learning strategies are different from learning

styles in that they are external techniques developed by an individual through experience with learning which the learner "elects to use to accomplish a learning task" (Fellenz, 1988). Using effective learning strategies "usually results in greater learning" (McKeachie, 1988, p. 3).

Learning strategies that are effective with one student may be of no value for another student who has similar learning problems; consequently, educational programs must be individually designed (Wooten & Wooten, 1987, p. 4). In order to accomplish this, faculty training to work with the learning-disabled is needed (Schmidt, 1983).

Strategy selection becomes complicated by the idea that activities usually require more than one strategy.

✓ Learning-disabled individuals may be unaware of the need to select a strategy or may select the wrong strategy for the situation (Ellis et al., 1989, p. 497). Learning-disabled college students have difficulty in switching strategies when appropriate and in distinguishing important from unimportant information, and they lack ability in reasoning in a deductive manner (Maugrum & Strichart, 1984). ✓

However, learning-disabled students themselves are often the best inventors of alternate learning strategies.

Students need support in an atmosphere where alternatives are thinkable, strengths are recognized, and expectations Trevor?

are positive; in such an atmosphere excitement about learning is modeled, and the effort to learn is cooperative (Seitz & Scheerer, 1983, p. 24).

Learning strategies are related to the concept of learning to learn in various ways. The idea that adult learners take charge of their own learning was explored in the field of adult education by Houle (1961) and Tough (1971). Soon Apps (1978) and Smith (1982) offered this self-directing learner help in developing study skills and learning how to learn. Fellenz & Conti (1994) furthered this effort to help adults take more control over their learning in the development of SKILLS and the study of learning strategies in real-life situations.

Strategy selection is very complex. Weinstein (1990) names four general areas of learning strategies. These are (a) comprehension monitoring--knowing when you know, knowing when you don't know, (b) knowledge acquisition--building connections between what you already know and new knowledge, (c) active study skills--targeting specifically what the learner does to help acquire information, and (d) support strategies--building and maintaining suitable internal and external environments for learning.

Often learning strategies are looked at in a mechanical fashion as in increasing notetaking abilities, better time management, or acquiring information through memorization. While some educators focus on these

"survival skills," others advocate going beyond the mechanical rote process to more critical thinking skills or the application of knowledge. Learning strategies represent higher-order skills which control and regulate the task-specific or practical skills. They are general in nature and are the sort of activities needed time and time again in all sorts of different situations (Nisbet & Shucksmith, 1988, p. 26). Thus, a learning strategy can be viewed as a complete plan one formulates for accomplishing a learning goal; and a learning tactic is any individual processing technique one uses in service of the plan (Derry, 1989).

One of the earliest pioneers in the application of learning strategy training to college students was Dansereau (1978). He developed two separate types of learning strategies: (a) those used to operate on materials that college students are expected to master (primary strategies) and (b) those used by the individual to maintain the appropriate cognitive focus (support strategies). Later he expanded this to include more time for students to learn the strategy components and adopted a slow pace in instructing students in the finer aspects of the approach (Ellis et al., 1989).

Overall, it is important to note that for "high risk students, minority and low income groups, learning strategies had basically positive effects . . . the

students stayed in college longer . . . and they received better grades" (Kulik & Kulik, 1983). As learning strategies begin to aid the student in positive results and progress, the stage is set for more positive results in the next learning situation. Clearly, it seems logical that the learning strategies an individual elects to use in any learning situation have a tremendous impact on the outcome of the learning effort (Fellenz, 1988, p. 3). Thus, students who receive good strategy training during their years in school can acquire a form of knowledge especially useful in coping with the wide variety of learning situations they will encounter throughout their lives. Given the amount of time that people spend in school, in job-related training, and in acquiring knowledge associated with their interests and hobbies, the ability to find good solutions to learning problems may be the most important thinking skill of all (Derry, 1989, p. 10).

It is known that individuals differ in their learning behavior (Long, 1983). It is also known that differences in the learning strategies used by students have been recognized (Hill, 1992, p. 36). Students who get good grades differ from less able students, and their success is due to these strategies (McKeachie, 1988, p. 3). Learning strategies are external techniques developed by an individual through experience with learning which the learner elects to use to accomplish a learning task

(Fellenz, 1988). Learning strategies, therefore, hold promise as a useful educational tool in helping adult learners improve the techniques they use to master material they need to learn (Hill, 1992, p. 36).

Learning strategies are considered to be a vital part of learning research by a number of researchers (McKeachie, 1988; Mayer, 1988; Weinstein, 1988). Learning strategies may improve classroom achievement (McKeachie et al., 1989) as well as learning which takes place outside educational institutions (Fellenz, 1988; Hill, 1992, p. 38). In the area of adult education, important learning strategies for real-life learning have been defined as being composed of metamotivation, metacognition, memory, resource management, and critical thinking (Fellenz, 1988).

### Metacognition

Metacognition is defined as thinking about the process of learning. Flavell (1976) introduced the concept of manipulation and control of thinking ability in the learning process. Flavell's research was followed in the 1980s by Brown who saw metacognition as the learner assuming an active part in self-regulation of the learning process (Hill, 1992, p. 39).

As many educators are doing today, McKeachie (1988) defined metacognition as an "individual's awareness of and knowledge about cognition and control and regulation of

cognition" (p. 3). It is important for individuals to be aware of how they learn effectively, of what the nature is of the task, and of the appropriate strategy to use (Flavell, 1979). Being one's own manager of the learning process is very important. Recent research has suggested that college students' difficulties with independent learning are not due to a lack of knowledge or awareness of possible study strategies but instead are due to their inabilities to regulate the strategies by utilizing appropriate metacognitive activities (Brown, Bransford, Ferrara, & Campione, 1983; Nist, Hogrebe, & Simpson, 1986; Tierney, 1982).

All of these aspects of metacognition can be used as a basis for organizing real-life metacognitive strategies (Fellenz, 1988; Hill, 1992). Planning, monitoring, and adjusting are major categories of metacognition. Planning involves developing guidelines or an outline for the learning at hand while keeping a personal awareness of how one learns best. Monitoring involves checking the degree of effectiveness of the plan to ascertain if the learning goal is being addressed. Adjusting involves examining information to see what relationship it bears to the learning project and altering the learning process if changes are needed (Fellenz, 1988; McKeachie et al., 1989).

Flavell's research indicates that children who are active and effective learners readily use metacognitive

processes when encountering learning situations while children at risk of academic failure have a pervasive "ignorance concerning active learning . . . and effective intervention" (Brown, Armbruster, & Baker, 1986, p. 50). Yussen (1985) takes this a step further in reflecting on implications for adult learners. Because childhood is a time of acquisition of skills and adulthood is a time of application of skills and of the development of expertise, adult metacognitive strategies might well concentrate on "eliciting purposes from people, organizing purposes into hierarchies, and keeping track of diverse steps in planning over time" (p. 280). The teaching of learning strategies and metacognitive strategies has been found to be effective in education settings to facilitate attention, motivation, learning, memory and comprehension, as well as to remediate some learning disabilities (Weinstein, 1987). *grant*

### Metamotivation

Major educational philosophies argue whether a learner can be externally motivated or if it is internal. In adult education, there is not much talk of motivation; instead, the discussion is on participation. Since adults are voluntary learners, the program must have participants to make it work. Learners are assumed to be active and are entrusted with responsibility for directing their own learning (Dale & Conti, 1992, p. 57). Hence, it is assumed

that they are motivated if they participate. The term metamotivation was used to communicate people looking inward--meta--at what stimulated them 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 participating in educational programs" (Fellenz & Conti, 1994, p. 10). This concept utilized the ARCS Model (Keller, 1987) of motivation. This includes four major components: attention, reward, confidence, and enjoyment/satisfaction. Attention is the focusing of an individual's learning abilities on material to be learned. Reward describes the anticipation or recognizing the value to oneself of learning specific material. It can be very specific and goal directed, or it can relate generally to a feeling of increased competence, self-efficacy, or control over an environment. Confidence in one's ability to learn appears to be a major motivational element as Keller (1987) includes it as one of the four essential elements in his model, and McCombs (1988) says that "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" (p. 142). Enjoyment includes the fun of learning and the satisfaction with the outcome of the learning activity. Wlodkowski (1985) speaks of the learner

enjoying the activity, which in turn becomes a motivating factor.

Maintaining internal motivation is an important learning strategies construct (Fellenz & Conti, 1994). There are internal processes which provide impetus and guidance. Internal decisions are made which become a driving force behind outward action. Internal decisions causing behavior change are predicated on the interest the learner has in accomplishing a learning goal (Deci & Ryan, 1985).

McCombs (1988) provides a review of theoretical perspectives on motivation including White's theory of competence motivation, Bandura's self-efficacy theory, attribution theory, and recent inquiry into metacognition, self-control, and learning strategies. She concludes that all of these theories support the contention that "an important functional role of motivation, then, is to contribute to the maintenance of positive self-views and perception of self-efficacy and personal control that underlie the ability to change negative attitudes and orientation toward learning" (p. 142). McCombs goes on to develop an integrative model of processes underlying intrinsic motivation to learn and also presents a program for training in learning strategies related to motivation (Fellenz & Conti, 1994, p. 9).

## Memory

Although definitions and descriptions of it vary, memory can be viewed as the capacity of humans to retain information, to recall it when needed, and to recognize its familiarity when they later see it or hear it again (Wingfield & Byrnes, 1981, p. 4). Remembering is an integral part of any learning effort (Long, 1983).

To understand the effect of memory on real-life learning, it is important to review the role of memory processes, memory structures, and influencing factors. Memory processes are mental activities that store information in memory and the activities that later make use of that information. These processes involve encoding or acquisition of information, storage or retention of information, and retrieval or recall of information (Zechmeister & Nyberg, 1982). The encoding process interprets a stimulus and stores a representation of that interpretation in memory (Seamon, 1980). Retention is affected by three factors: the nature of the material, the use for the material, and the way in which it is encoded. Retrieval of material in memory is comprised of recognition and recall. Recognition is done more easily than recall, and it is possible to recognize much more information than can be recalled (Adams & others, 1982).

Memory structures are concerned with the form and nature of information storage as a product of the memory

processes. The structures have to do with the characteristics of memory storage itself: how this information is represented, how long the representation will last, and how memories are organized. Topics included under memory structures are short-term memory, long-term memory, episodic memory, semantic memory, and the manner in which stimuli are processed and organized. Memory strategies can be categorized into the three areas of organizational strategies, external memory strategies, and application of memory strategies.

Organization of information is an internal strategy, and it involves the reordering or restructuring of information (Seamon, 1980). The most effective organization of new information is when the new information fits comfortably into knowledge already held in memory.

External aids involve the learner manipulating the environment in some way to enhance recall (Hill, 1992). Aids include things such as chunking information or reducing large amount of information into organized sets (McKeachie, 1988; Miller, 1957; Wingfield & Byrnes, 1981), reviewing material (Zechmeister & Nyberg, 1982), and using such things as lists and appointment books or asking another to remind you of something (Rivera, 1984).

Mnemonics are internal memory devices related to application of memory. They involve such things as rhymes, tracing sequences of events, alphabetical searching

(Neisser, 1982), the peg system (Lorayne & Lucas, 1974), or using images to remember (Rivera, 1984).

Memory application is important because it assists the learner in creating and refining a structure for the learning task, thereby increasing the effectiveness and proficiency of the task. Practicing and reflecting about the learning task are ways to improve or expand skills and knowledge.

### Critical Thinking

Over the past decade, research has continuously addressed the need for teaching students to think and read critically at all levels of education. Educators have expressed a concern nationwide about the inefficient critical thinking skills of many students (Meyers, 1986).

Adult educators such as Horton (cited in Conti & Fellenz, 1986) and Freire (1970) have stressed the role of the social environment in thinking through issues of importance. Argyris (1982), Brookfield (1987), Meyers (1986), and Stice (1987) all proclaimed the need for greater attention to the development of critical thinking skills in adult learners.

Critical thinking is an internal process of mentally analyzing various types of available information to determine their usefulness to the learning task. This mental analysis consists of (a) identifying and challenging

assumptions, (b) challenging the importance of context, (c) imagining and exploring alternatives, and (d) reflective skepticism (Brookfield, 1987, p. 12).

Instruction in the communication skills of listening, speaking, reading, thinking, and writing and in study strategies such as notetaking, summarizing, and test preparation can be the vehicle for promoting improved critical thinking and reading (Brown et al., 1983; McKeachie et al., 1989).

Educational definitions of critical thinking usually reflect the taxonomy or classification proposed by Bloom (1956). In it Bloom describes analysis as breaking down an idea into its parts so that relations between ideas are made clear, whereas synthesis is the process of putting things together to constitute new patterns or structures. Evaluation judges the value of material or methods (Fellenz & Conti, 1994). Thus, critical thinking is a collection of discrete skills or operations each of which to some degree or other combines analysis and evaluation (Beyer, 1985). Psychological definitions of critical thinking such as Sternberg's focus on components: metacomponents, performance components, and knowledge-acquisition components. Sternberg (1979) has suggested a number of steps in problem solving that reflect strategies an individual may use. Depending on the type of problem encountered, a person follows a sequence of operations that

involves encoding, mapping, inference, application, justification, and response. Each of these steps includes the active manipulation of the terms of the problem or the response to it.

The development of higher-order thinking skills consists of challenging one's basis for assumptions about knowledge. King (1977) hypothesized that:

Epistemological changes most likely will occur as a learner accepts responsibility for investigating and accepting the relative nature of knowledge and uncertainty. With the commitment and responsibility for investigating and acceptance of the reality of one's judgment of knowledge, students may be able to choose more alternatives during situations of decision making. (Yabui, 1993, p. 9)

It is clear that attempts at defining critical thinking have resulted in rather general descriptions of a process that involves higher-order thinking skills. There are three common links among the various researchers' perspectives. First, a holistic approach is taken to describe critical thinking. Second, creativity and innovation are recognized as being closely related. Third, decision-making and problem-solving skills are included as a part of higher-order thinking processes, but critical thinking has a more general and more important goal. Improvement of individual and societal learning is the final and vital goal of critical thinking. Mezirow (1990) summarized it best when he said, "Perhaps even more central to adult learning than elaborating established meaning

schemes is the process of reflecting back on prior learning to determine whether what we have learned is justified under present circumstances" (p. 5). Critical thinking is important and necessary because sources of information may be contradictory, biased, or lacking in foundation (Hill, 1992). Thus, critical thinking or reflection is a vital strategy in the learning process.

### Resource Management

Resource management is the "identification of appropriate resources, critical use of such sources, and the use of human resources in learning" (Fellenz, 1988, p. 3). Faced with a wide variety of informational sources in today's world, it is important that learners be able to manage choices, organization, and usage of this information.

Effective strategies for resource management begin with identification and location of the resource. The learner must judge which resources to pursue; whether they are worth the time, effort, and expense; and how willing they are to use a particular source. For instance, 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 regularly. Some prefer computer information, television, or other people.

Factors besides the learner's preference will also enter into the task of locating materials. The learner's environment, how much time is available, how difficult it is to procure the materials, and the learner's ability to tell what are good information sources will also impact upon resource management (Hill, 1992). Many adults do not perform the task of locating materials very well (Shaaden & Raiford, 1984). Oftentimes, there are so many materials available that it is difficult to choose the most relevant (Smith, 1982; Tough, 1971).

Critical use of resources is the second component addressing effective management of learning resources. Learners need to distinguish between recent and most recent information in this age of rapid change. The learner needs to recognize potential bias as well as the imagery used to sell other ideas or products. Additionally, sources used for networking or support services to individuals need to be evaluated carefully (Fellenz & Conti, 1994, p. 28).

Using other people as resources is a third strategy. Shirk (1983) and Tough (1971) have pointed out the importance of this source when considering where learners go for information. Not only will factual information be involved, but debate and discussion will also be valued for the insights that might otherwise not be provided (Fellenz, 1989).

### Study and Academic Skills Intervention

Learning disabilities can make academic achievement difficult. Simpson (1979) found that the majority of young adults with learning problems failed in college because of difficulties in reading, problems with written language, lack of organizational skills, and interpersonal communication problems. Seitz and Scheerer (1983) came to the same conclusion. Deficits in information processing interfere with students' ability to meet academic demands. Such deficits may interfere with the student's mastery of reading, writing, and math. These students may perceive information in untrustworthy, inconsistent fashion; they may have difficulty holding information in short-term memory or integrating parts with the whole (p. 1). Therefore, areas of instruction commonly proposed as critical to the successful adaptation of college students with learning disabilities are the development of study skills and test-taking skills which are part of the organizational skills referred to by Simpson (Siperstein, 1988).

Individual researchers began to identify and study specific problem areas. Learning-disabled college students have problems with applying phonics rules and generalizations, decoding unfamiliar words, understanding what was read, determining the main ideas, maintaining an

efficient rate of reading, and adapting the rate of reading to specific reading purposes (Maugrum & Strichart, 1984). Difficulties with perceptual processing have long been a primary emphasis in the learning disability field even though measurement and methodological questions abound, and learning disabled students do have problems in perceptual sequencing which show up in sequencing sounds into words, in telling time, in spelling, in writing, and in organizing and planning activities in general (DeRuiter & Wansart, 1982). The inability to understand the common meaning of root words makes the acquisition of vocabulary a time-consuming task and also affects reading comprehension (Blalock, 1981).

The lack of phonological awareness can impair one's ability to segment, analyze, and synthesize the speech stream. This is related to the ability to decode words properly, and it can affect short-term memory and hinder comprehension as well (Stanovich, 1982a, 1982b). Since learning-disabled individuals have problems in temporary storage of incoming stimuli and in employing rehearsal strategies to retain information in short-term memory, instructors must identify whether the person is having problems with knowing how to rehearse or when to rehearse (DeRuiter & Wansart, 1982). Poor readers seem to be less prone to employ even strategies that are within their capability (Torgesen, 1982).

Problems in understanding what has been read by learning-disabled students has been reported by many researchers (Blalock, 1982; Critchley, 1973; Gillespie, 1984). Learning-disabled students tend to over-rely on the general background knowledge which they bring to the reading process. Instead of facilitating comprehension, this knowledge interfered with it since the learning-disabled readers interpreted the text to conform to what they already knew about the topic. The thinking of these students is so inflexible that they may change the details of the text to conform to their prior knowledge with adverse effects on comprehension (Hughes & Brewer, 1985).

The cognitive processing problems experienced by learning-disabled persons appear in at least four general areas: comprehension, rule application, structuring information, and problem solving (DeRuiter & Wansart, 1982). The learning-disabled student must face the problem head-on and come to grips with the intricacies of the reading process (Sheridan, 1983).

Some studies have found that a characteristic of all the learning-disabled college students is that they have significant written language deficits (Cordoni, 1980). Between 80 and 90% of learning-disabled adults have problems with written language (Blalock, 1981). These fall into several problem areas: problems in using a variety of sentence structures and an appropriate range of words,

difficulty in organizing thoughts and writing compositions of sufficient length, and difficulty in expressing ideas precisely and clearly (Maugrum & Strichart, 1984).

In the area of punctuation, learning-disabled students' knowledge of rules of punctuation and capitalization is severely limited (Blalock, 1981). Learning-disabled adults use fewer punctuation marks, which are often incorrect (Critchley, 1973).

Only a few learning-disabled adults have immediately recognizable problems of oral expression that interfere with communication at a casual conversational level (Blalock, 1982). However, the level of cognitive academic linguistic proficiency is inadequate for many (Cummins, 1983). Learning-disabled students have problems in using mature syntactical patterns, using words in their appropriate context, using an appropriate range of vocabulary, and retrieving the appropriate word for a situation (Maugrum & Strichart, 1984).

Two ways that these deficiencies are being addressed are through accommodation and intervention. Examples of accommodations typically provided to learning-disabled students at community colleges include tutorial assistance, readers, notetakers, utilizing tape recorders, registration assistance, specialized counseling, and curriculum modifications (Kanter, 1986). Three common areas of intervention for the learning-disabled student are

(a) identification--schools and media make information more accessible, (b) individualized adult education--informal evaluations to identify deficits, cooperation, and commitment from the student, and (c) compensation--such as using visual aids, readers, and notetakers (Cox, 1977).

The focus of instructing learning-disabled adults should be on teaching intervention strategies which assist students in compensating for their information-processing deficits. At the same time, students can seek to develop college-level study and related skills. The intent of such classes is to demonstrate parity between the student's aptitude and achievement. A learning disabled student, having learned appropriate intervention strategies, may be able to succeed in regular college-level courses using techniques that allow for filling in missing information using other senses. For example, a student with a visual perceptual deficit may be unable to take notes from the board; however, this student might tape record lectures or utilize a notetaker who uses a standard outline format. Self-correcting strategies can be taught which help learning-disabled students catch and correct their own mistakes. Rereading, rewriting or recalculating, and recorrecting are the 3 R's for students with learning disabilities (Kanter, 1986, p. 19). This approach is more easily achieved when colleges offer specific classes for learning-disabled students or a "core classes track" for

learning-disabled students. When students are already mainstreamed into regular classes as they often are in two-year colleges, it becomes harder to bring them together to work on intervention strategies as a group. The intervention strategies approach is upheld by Seidenberg (1985) because several research studies have indicated that learning-disabled students do not spontaneously access task-specific strategies when they are needed (Brown, 1981; Seidenberg & Bernstein, 1985; Torgesen, 1977, 1982; Wang & Richards, 1985). However, when taught a task-specific strategy, many can and do use the strategy effectively. A systematic instructional methodology leading to the acquisition and generalization of task-specific learning strategies is needed, and when utilized it results in an increase in course grades and in classroom and standardized test scores (Deshler et al., 1981; Lee & Alley, 1981; Schumaker et al., 1982). In addition to this, more opportunity should be provided for student responsibility for analyzing task demands and for designing their own strategies (Seidenberg, 1985, pp. 1-16).

The literature identifies the need for individualized, specialized services for learning-disabled adult students. It also establishes a need for teaching learning strategies and expounds on the benefits of such instruction, and is summarized in the following quote:

No one exceptional method is employed and no magic solution has crystallized. What these results tend to show are that an adult, eager to improve his or her skills, will absorb and use every bit of excellent individualized teaching, learn and use every strategy given, practice well beyond what is asked and then some. Also, the adult student beginning to succeed academically tends to be willing to risk a little failure, will attempt new strategies before giving up, leading to more success, and, thus, more progress. (Smith, 1985, p. 27)

## CHAPTER 3

## METHODOLOGY

Introduction

This descriptive case study investigated the learning strategies of learning-disabled students at Montana State University College of Technology-Great Falls. Descriptive research studies involve "collecting data in order to test hypotheses and to answer questions concerning the current status of the subjects" (Gay, 1987, p. 189). Case studies are a bounded system which is "an examination of a specific phenomenon such as a program, an event, a person, a process, an institution, or a social group" (Merriam, 1988, p. 10). The group of learning disabled adult students was the social group that this case study analyzed. To measure their learning strategies and academic skills, first-time students who were either diagnosed as having learning disabilities or those who were suspected of having them were administered two standardized instruments prior to admission for the 1993 fall semester. At the end of the semester, the learning strategies instrument was once again given. Additionally, the learning strategies instrument was used to generate five clusters of learners with which

focus groups were conducted to discuss how each implemented their learning strategies.

### The Setting

Montana State University College of Technology-Great Falls is a public two-year college located in central Montana. With a surrounding population of 60,000 people, the college serves between 1,000 and 1,400 students per year. The demographics of the area suggest a particular mission for MSU College of Technology. It is approximately two hours from the nearest college with a similar mission. In Great Falls there is one private four-year institution and a small extension campus for a four-year public college in the city. MSU College of Technology is the only exclusive two-year college in the area.

The institution has been challenged over the years to provide excellent services to a broad range of individuals. MSU College of Technology is well known as a superior college for basic skill acquisition as well as for offering excellent certificate programs and associate degree programs in business, allied health professions, and trades and technology fields. The college takes pride in its high level of achievement as well as its mission of caring for students as individuals and helping them reach their full potential. This takes place in a close-knit community of students with teachers who help them excel in learning.

Perhaps that is why students choose to come to this college in spite of past failures and disappointments with post-secondary education. Students are regularly referred to MSU College of Technology from high schools, adult education centers, support agencies, and other colleges to provide services in a supportive environment with highly skilled staff. Skilled refers to the ability of most of the counseling staff to work with special needs, particularly with learning and physical disabilities. Because the facility is barrier-free, physical disabilities pose few problems. Learning disabilities which are often hidden from view are a continuing challenge to this institution. Because the college works closely with the community and is cognizant of its needs and because the community sees what the college does for its children and adults in the way of gainful employment and becoming productive citizens, it is through referral that the college generates the recruitment of many learning-disabled students. Often it is learning-disabled students who see this college as their last hope for higher education. The college's staff becomes the support system as the student walks step by step through the learning process. Skills intervention is often the first step in that process.

The Master Student course which primarily covers study skills and learning strategies is an opportunity for interactive learning in a classroom setting. It provides

students an opportunity to explore new ways of learning in a non-threatening environment. It is a part of many learning-disabled students' educational plans. Most students who complete the course have deemed the course a useful tool in their learning. The Master Student course is of concern to this study because it can help in determining whether enough is being done to assist the learning-disabled student upon entry into the college. The format for the course was designed to address group learning preferences, while the study skills lab provides for individualized instruction.

All of the students in this study were diagnosed with a learning disability or were suspected of having a learning disability. The suspected category was included (a) to acknowledge that many older non-traditional learners entering MSU College of Technology did not have access to services that might have diagnosed them with a learning disability as children and (b) to assure that anyone potentially eligible for the academic intervention services of the college be included in the study.

All students were enrolled in academic skills intervention which was provided for students who scored below the 10.0 grade level on any section of the Test of Adult Basic Education (TABE). A 16-week individualized study skills lab or 8-week Master Student class was provided for those students in need of study skills

intervention. Some students participated in both academic and study skills intervention. These classes were held daily for 50 minutes, and attendance was mandatory. Academic intervention areas included reading, arithmetic, and language which included spelling.

Based upon the history of this program, the administration and instructors working with those particular courses have judged it a successful attempt to help students stay in school to the completion of coursework. Most students complete study skills and academic intervention courses with a passing grade at the end of one semester of work.

Reading programs succeed when the skills are taught in relation to the content of other courses in which students are concurrently enrolled and when the reading program is an integrated part of a comprehensive effort including counseling, tutoring, and instruction (Maxwell, 1980, p. 299). Specific accommodations made for learning-disabled students at MSU College of Technology include: ongoing counseling services, private tutors, notetakers, oral or untimed exams, tape recorders in the classroom, and alternate assignments. The instructors in the general academic programs of this college support the overall consensus that study skills and academic skills intervention do assist the post-secondary learning-disabled student in completing current and future coursework.

### Population

Montana State University College of Technology-Great Falls is located in Great Falls, Montana. The total student population for the college for the fall of 1993 was 858 students. Of these, 647 were full-time. There were 624 females and 234 males enrolled. Caucasian was the overwhelming ethnic background, with a small percentage of American Indian (5%). The average age of a new entering student was 29 years with an age range of 19 to 52 years.

The learning-disabled population for this study consisted of 101 students. All participants were entering a post-secondary institution for the first time. There were 74 females and 27 males. Their average age was 30 with a range of 19 to 44 years of age. This constituted a greater number than the estimated 10% learning-disabled population in the United States. With only 12 American Indian students participating in the research, the question of ethnic background contributing to learning strategy usage became irrelevant. No further analysis was done with this variable.

### Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS)

The SKILLS (Self-Knowledge Inventory of Lifelong Learning Strategies) was administered to the participants both at the beginning and end of the semester. Learning

strategies are the skills and techniques that an individual chooses to use in order to accomplish a learning task. The SKILLS instrument was developed to measure important parts of the adult learning process as it takes place when adults address their real-life learning needs. The SKILLS instrument emphasizes a process rather than a componential approach. SKILLS questioning prompts adult learners to identify relationships, spot inconsistencies, question value sets, or examine the accuracy or the acceptance which is uncritically given to an assumption. In responding to the SKILLS instrument, individuals are asked to evaluate specifics of the situation or question the generalizability within a situation as specific techniques to assess the context. Statements on the SKILLS instrument that deal with the generation of alternatives encourage hypothesizing within the reality of the situation such as in brainstorming or envisioning the future. SKILLS uses questioning of simplistic answers and the predicting of consequences to measure "conditional acceptance" or reflective skepticism (Fellenz & Conti, 1994).

SKILLS contains six scenarios dealing with real-life learning situations. In the original form of the instrument which was used in this study, each scenario has 18 learning strategies potentially useful for dealing with the learning situation in the scenario. The participant chooses four of the scenarios and selects six strategies

for each of the categories of Definitely Use, Possibly Use, and Not Likely Use. Scores are assigned to each category: three points for each response under Definitely Use, two points for each response under Possibly Use, and one point for each response under Not Likely Use.

The SKILLS instrument consists of five general areas of learning strategies which include metacognitive, metamotivational, memory, critical thinking, and resource management areas. Within each of the five broad categories are several specific components (see Table 1).

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

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**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.

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### 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.

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### 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 and use the 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.

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

Validity of any instrument refers to the degree to which an instrument measures what it is actually supposed to measure (Gay, 1987). The two types of validity which are relevant to SKILLS are construct and content validity (Kerlinger, 1973).

Construct validity is the degree to which the instrument assesses a particular aspect of human behavior (Borg & Gall, 1983). It is also the extent to which the instrument measures a hypothetical construct or nonobservable trait which explains behavior (Gay, 1987). Construct validity for SKILLS was established through a literature review documenting the source of the concepts in SKILLS and by obtaining an assessment from a group of adult education and educational psychology professors including Robert Sternberg and Wilbert McKeachie. Those reviewing SKILLS indicated that the instrument effectively addressed the five theoretical constructs of metacognition, metamotivation, memory, critical thinking, and resource management (Conti & Fellenz, 1991, p. 70).

Content validity is the degree to which an instrument measures an intended content area. Content validity requires both item validity and sampling validity (Gay, 1987). Content validity of SKILLS was field tested in a variety of settings including adult basic education programs, undergraduate and graduate university courses, museums, health-care providers, continuing education

programs, and elderhostel programs, as well as judged by a panel of experts assessing each item for its measure of the intended area. In the field test, a sample set of 253 participant responses confirmed the assessment of the group of adult educators that the items in SKILLS adequately represented the five conceptual areas of the instrument (Conti & Fellenz, 1991, p. 70). The jury of experts also confirmed the content validity of SKILLS.

Reliability of an instrument is the degree to which a test consistently measures what it is supposed to measure. Reliability for SKILLS was addressed by calculating a coefficient based on two equivalent forms administered to the same group. This 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, and a correlation of .83 was calculated. The Spearman-Brown formula for reliability was also applied, and a correlation of .83 was computed. After statistical analysis was done, it was determined that all correlations were in the acceptable range (Conti & Fellenz, 1991; Hill, 1992, p. 65). Therefore, SKILLS was judged as "a reliable instrument for assessing adult learning strategies in real-life situations" (Conti & Fellenz, 1991).

Test of Adult Basic Education (TABE)

The Test of Adult Basic Education (TABE), Level D-2, was administered at the time of the initial intake interview to assess each student's academic skill levels. Because previous studies have shown that learning-disabled individuals generally scored below average on academic achievement tests (Biggs, 1990; Schumaker, Alley, Warner, & Deshler, 1980), students scoring at or below the 10th grade level on any of the six parts of the exam were included in this study as learning-disabled students.

The content of the tests at each level is based on analysis of instructional materials available at various grade levels in adult education classes. The content of the items is carefully planned to be appropriate for adults even at the lowest levels of the test (Harris, 1990, p. 18). TABE content areas include:

**Reading Vocabulary**--measures same-meaning and opposite-meaning words, words in context, multi-meaning words, and word affixes.

**Reading Comprehension**-- measures skills in understanding passage details, character analysis, main ideas, generalizations, written forms, and author techniques, as well as inferential and critical comprehension skills.

**Language Mechanics**--measures capitalization and punctuation skills, proofreading skills, using various parts of speech, forming and organizing sentences and paragraphs, identifying and developing topic sentences, and writing for clarity.

**Spelling**--measures application of rules for consonants, vowels, and various structural forms.

**Arithmetic Reasoning**--attention is given to practical problem-solving skills that do not require written computation.

**Arithmetic Fundamentals**--deals with computation skills and measures the operations of addition, subtraction, multiplication, and division, as well as fractions, decimals and percentages.

On the TABE basic academic skills test, individuals scoring below the 10.0 grade level are considered low and in need of skills intervention. It has been determined that all programs at MSU College of Technology require no less than 10th grade level to be competitive. This is also borne out through the Testing Center, College of Great Falls; Largent Adult Education Center in Great Falls; Opportunities, Inc.'s Youth Employment Corp initial academic skills evaluation; and the faculty of MSU College of Technology, who analyze textbooks, certification testing requirements, and teacher-determined evaluation/grading guidelines on a yearly basis. MSU College of Technology, therefore, uses the beginning 10th grade level score as the baseline average score. Skills intervention improves TABE scores at least one grade level over a semester for most students. If skills remain below the 10th grade level, further intervention is considered necessary prior to or during the beginning of an academic program depending on the degree of the deficiency.

In assessing content validity of the TABE, many field-tests were done over the years; one most notable field test

was done in 1990 by the Indiana Association of Area Vocational Districts. The Indiana Project developed a model diagnostic basic skills testing program with statewide application for teachers certified under the Occupational Specialist Rules. Fifteen commercially produced tests were reviewed for adoption. The TABE instrument was field-tested with a sample of first-year vocational education teachers. The sample included the students of 26 teachers at three sites. The appropriateness of the test and the utility of the information were substantiated, and the test was adopted (Harris, 1990, p. 7).

Validity of the TABE instrument was not as compelling because it was based on a correlation with the General Educational Development examination (Oxford-Carpenter & Schultz-Shiner, 1985, p. 7). However, the correlation became more significant when assessing the post-secondary sample of this study. Many students were older and non-traditional. All were learning-disabled, and many were at or just above a basic skills level of development, which would suggest that a GED correlation is appropriate and acceptable (Farr, 1986).

A published work by the Armed Forces in 1985 also substantiated the question of reliability. This study addressed the needs of the military in establishing a standardized basic skills assessment for its members. It

assessed several widely used achievement tests including the TABE. After statistical analysis it was determined that "TABE subtests have adequate reliability, in the high .70s through .90s" (Oxford-Carpenter & Schultz-Shiner, 1985, p. 7). Additionally, the measurements yielded by this instrument have been consistent and repeatable over a period of 9 years at MSU College of Technology-Great Falls. The vocational-technical school norms used at this college indicate accurate skill level determination in each of the skill areas tested, verified by the lab instructors and students themselves.

Specific individuals that fall under the learning disabled definition for this research include (a) any person diagnosed with a specific learning disability and (b) individuals falling below the 10.0 grade level on the Test of Adult Basic Education (TABE D-2) with a history of learning difficulties and considered by the counseling staff and testing center to be in need of intervention to successfully complete a program. These deficiencies could be noted in (a) reading--vocabulary, comprehension, (b) math--reasoning, computation, (c) language--English structure/grammar and spelling, (d) study skills, or (e) a combination of any of these. Several studies have broken down these deficiency groups similarly (Richards, 1977; Sims, 1979). A suspected learning disability designation is often the result of (a) testing by a rehabilitative

agency and (b) referral or psychological testing done by such agencies, as well as (c) interviews with MSU counselors who have extensive background in working with students with disabilities.

### Procedures

Permission to conduct interviews, testing, and follow-up focus group discussions was requested from the chief administrator of the college during the 1993 Spring semester so that initial interviews and testing could begin in the Summer of 1993 prior to Fall registration. Permission to conduct the research was granted at that time after assurances were provided that the survey would only include volunteer and anonymous participants (see Appendix A).

At the time of testing, a letter requesting permission to use information gathered about student participants was given to and signed by each participant (see Appendix B).

An intake questionnaire was administered at the time of initial TABE testing and SKILLS assessment of students. The purpose of this questionnaire was to gather demographic information related to age, gender, ethnic background, and educational background. Also included was information on diagnosed learning disability and suspected learning disability status. This data provided the intake

interviewer with needed information for further discussion and evaluation (see Appendix C).

A total of 125 packets were distributed. Each packet contained a cover letter explaining the purpose of the study, a permission to use information sheet, a demographic intake sheet, the Test of Adult Basic Education, and the SKILLS instrument. All were returned, but 24 individuals were not included in the study due to (a) having incomplete information and responses, (b) being identified in the review of intake materials as not being eligible as learning-disabled, or (c) not completing the post-SKILLS inventory assessment. Thus, a total of 101 learning-disabled individuals participated in the study.

Academic skills were initially assessed with the Test of Adult Basic Education (TABE) instrument. Academic skills were not post-tested with the TABE instrument; instead, successful progress was determined by a passing grade at the end of one semester.

The same learning strategies instrument, SKILLS, was given as a pre- and post-intervention instrument. Compilation of data took place during the fall semester of 1993 and was completed at the beginning of spring semester of 1994.

Focus group interviews of a cross-section of each learning cluster were done immediately following the end of the fall semester. There were a total of five focus groups.

## CHAPTER 4

## FINDINGS

Introduction

Data were collected from four sources. These were the Self-Knowledge Instrument for Lifelong Learning Survey (SKILLS), Test of Adult Basic Education (TABE), demographic survey, and focus groups. A total of 125 SKILLS packets were distributed with 101 packets being completed for use in this study. Initial data were gathered just prior to and upon entry into MSU College of Technology-Great Falls for the fall 1993 semester. Follow-up SKILLS and focus group information was gathered at the end of the same semester and at the beginning of spring semester 1994. Several statistical operations were done to analyze the data. These included frequency counts, t-tests, discriminant analysis, and cluster analysis.

Participants

For inclusion in the study, 101 students completed all four parts of the data collection process. The students included most diagnosed or suspected learning disabled students entering MSU College of Technology-Great Falls in

the fall of 1993. Female students in this college typically constitute over 70% of the total student population (MSU College of Technology Statistical Report, 1993); 74% of the students in this study were female. A total of 34 diagnosed learning disabled students participated; an additional 67 suspected learning disabled students participated. All participants were entering MSU College of Technology-Great Falls as first-time post-secondary students. All participants were high school graduates or held a General Educational Development Certificate. Ages ranged from 19 to 44 years and were distributed as follows: 19-22 years, 15; 23-28 years, 36; 29-35 years, 29; and 36-44 years, 21. The ethnic background of participants was predominantly Caucasian (84%). Minority groups in the study included Native American (12%), Asian (3%), and African American (1%).

#### Procedures

Participants completing SKILLS and the TABE were given instructions both orally and in writing by the test administrator prior to completing the instruments. The participants were asked to pick four of the six scenarios included in each SKILLS packet and to answer several prepared questions about each one to rate the strategies provided. They completed a post-SKILLS assessment after the semester had ended (see Appendix D). The TABE academic

skills assessment was completed prior to enrollment in any coursework as well.

After a statistical analysis was completed, clusters surfaced. These became the basis for five focus groups. During the focus group sessions each group was given a list of eight questions to be discussed as part of their focus group's interaction (see Appendix E).

Several research questions were addressed. (1) What is the learning strategies profile of a learning-disabled student? (2) In the post-secondary setting, does skills intervention produce a significant change in the learning-disabled student's learning strategies? (3) Do males and females and do diagnosed and suspected learning-disabled students have different patterns of learning strategies? (4) Do distinct clusters of learning-disabled students exist? (5) If distinct clusters exist, do these clusters exhibit specific learning strategies?

#### TABE Scores

The Test of Adult Basic Education (TABE) was used as an initial assessment of academic skill levels. The test provided raw scores on the three primary skill areas of reading, arithmetic, and English. The instrument provided for a range of achievement from Grades 2.6 to 12.9. The TABE norm tables distributed all raw scores in a matrix for each major test. MSU College of Technology-Great Falls

utilized the norms established for beginning vocational-technical post-secondary entrants.

Because it had been determined that learning-disabled individuals generally scored below average on academic achievement tests (Biggs, 1990; Schumaker, Alley, Warner, & Deshler, 1980), only learning-disabled students scoring at or below the 10th grade level on any of the six parts of the exam were included in this study. Because learning disabilities often show up in just one or two skill areas, but generally not in all skill areas, it was appropriate to evaluate skills individually (Seitz & Scheerer, 1983). Because there were few individuals taking multiple academic skills classes and individual skill areas were being analyzed, assessment of a "combination academic skills" participant would not be significant. Therefore, no further analysis of this participant was done.

The TABE is divided into Reading Vocabulary, Reading Comprehension, Arithmetic Reasoning, Arithmetic Computation, Language Mechanics, and Spelling. Study skills intervention was recommended when (a) deficiencies existed in two or more skill areas, (b) a student had a diagnosed learning disability, or (c) through an intake interview and accompanying discussion the student indicated a need for study skills intervention. Thus, the TABE served as one measure to identify students needing training in study skills. It was used to identify 60 of the 101

students in the study. Students who were identified as in need of study skills intervention received one of the two forms of assistance. In this study, 59% of all participants received study skills intervention; 12% attended an individualized study skills lab; and 47% received group interaction through classroom instruction in the Master Student class.

A wide range of scores existed for each tested area (see Table 2). Very low scores were reported in each of the areas for 25-36% of the participants. Those low scores were indicative of borderline illiterate levels for the non-learning-disabled student population; however, low scoring students also had high scores in other areas.

The mean scores for each tested area gave an accurate picture of key problem areas for the overall group of learning-disabled students. These included Arithmetic Reasoning (9.5), Arithmetic Fundamentals (8.9), and Language Mechanics (9.7). These low scores indicated a need for study skills intervention for many individual students.

Table 2. Individual TABE Score Ranges.

	Range	Mean	Under 10.0
Reading Vocabulary	4.9-12.9	10.7	25%
Reading Comprehension	4.0-12.4	10.8	30%
Arithmetic Reasoning	5.2-12.6	9.5	60%
Arithmetic Fundamentals	4.6-12.9	8.9	79%
Language Mechanics	3.5-12.9	9.7	58%
Language Spelling	3.2-12.9	10.9	36%

The TABE scores were also examined for differences between the diagnosed and suspected learning-disabled students. Significant differences were found on each TABE scale with the diagnosed learning-disabled students consistently scoring lower than the suspected learning-disabled students (see Table 3).

Table 3. Means and  $t$ -tests for Learning-Disabled Groups on TABE.

TABE Scale	Diagnosed	Suspected	$t$ value	$p$
Reading Vocabulary	9.69	11.21	5.96	.001
Reading Comprehension	9.50	11.42	6.59	.001
Arith. Reasoning	8.39	10.11	6.28	.001
Arith. Fund.--Compute	7.73	9.44	5.44	.001
Language Mechanics	8.35	10.45	5.98	.001
Language Spelling	9.83	10.98	3.42	.001

#### SKILLS Instrument

The SKILLS instrument was developed by faculty and doctoral fellows at the Center for Adult Learning Research at Montana State University, Bozeman. The SKILLS instrument was a response to recognizing the importance of real-life learning and of the impact that learning strategies had on adult learning activities. The original SKILLS instrument consisted of 18 items. Of these, 15 were used in this study. Two similar versions of SKILLS were developed. All participants took a pre-test and post-test on the identical form of the SKILLS instrument to determine

if a significant change had occurred after learning skills intervention was provided to them over the period of one semester. These data established a profile of the students in the study (see Tables 4 and 5).

Two types of scores were calculated for SKILLS. First, scores were computed for each of the five strategy areas included in the instrument. The SKILLS strategy scores for the areas of Metacognition, Metamotivation, Memory, Critical Thinking, and Resource Management are listed in Table 4. The five means of the strategy areas were similar. All of the means fell within the range of 23.14 (Memory) to 24.48 (Metamotivation). Composite scores for each of the strategy areas were analyzed and no strong correlations existed within the groups.

Second, scores were computed for each of the 15 learning strategies within the instrument (see Table 4). Individual learning strategy scores did not differ greatly in raw score, except for Metamotivation--Attention. With the exception of the two areas of Metamotivation--Confidence and of Critical Thinking--Conditional Acceptance, which decreased slightly, all mean scores were increased. The highest means in each of the areas were Metacognition--Planning, Metamotivation--Attention to material to be learned, Memory--Use of External Aids, Critical Thinking--Testing Assumptions, and Resource Management--Identification of Resources. The Metacognitive strategies of Monitoring

Table 4. Means and  $t$ -tests for SKILLS Conceptual Areas.

Strategy	Pre-test Mean	Post-test Mean	$t$ value	$p$
Metacognition	23.71	24.00	.97	.33
Metamotivation	24.19	24.48	.78	.44
Memory	22.56	23.14	1.68	.10
Critical Thinking	24.35	24.27	.20	.84
Resource Management	24.02	24.43	1.26	.21

Table 5. Means and  $t$ -tests for SKILLS Subscales.

Strategy	Pre-test Mean	Post-test Mean	$t$ value	$p$
Metacognition				
Planning	9.16	9.40	1.26	.21
Monitoring	7.25	7.27	.06	.95
Adjusting	7.29	7.33	.19	.85
Metamotivation				
Attention	8.56	8.99	2.17	.03
Reward/Enjoyment	7.55	7.57	.21	.85
Confidence	8.10	7.92	.75	.45
Memory				
Organization	6.54	6.79	1.89	.06
External Aids	8.88	9.01	.75	.45
Memory Applications	7.17	7.34	.80	.43
Critical Thinking				
Test Assumptions	9.14	9.20	.17	.87
Generate Alternatives	7.56	7.68	.56	.58
Conditional Acceptance	7.60	7.39	1.03	.31
Resource Management				
Identification	8.82	8.90	.45	.66
Critical Use	7.50	7.65	.98	.33
Human Resources	7.69	7.88	1.01	.32

and Adjusting and the Memory strategy of Application represented the lowest mean scores. However, the means of the two low strategies were similar to those of other strategies, and no definitive pattern could be established.

In 14 of the 15 learning strategies there was no profound change. However, the area of Attention in Metamotivation showed a significant difference. Although the actual size of the difference was small, the post-test mean was significantly higher statistically than that of the pre-test (see Table 5).

The  $t$ -test was used to compare the means of the pre-test to the means of the post-test for the 15 SKILLS learning strategy subscale scores and five learning strategy areas. "Researchers use the  $t$ -test most often to compare the means of two groups" (Huck, Cormier, & Bounds, 1974, p. 50). The group means can be in the form of either independent scores on two separate groups or paired scores resulting from the same person being measured twice (pp. 52-53). Here, the participants' scores on SKILLS were analyzed using  $t$ -tests to determine if there were significant differences in the mean scores for each of the SKILLS subscale scores before the intervention of the academic or study skills training and after the instruction (see Tables 4 and 5).

The sample for this study consisted of two groups: diagnosed learning-disabled students and suspected

learning-disabled students. Therefore, the SKILLS scores for each of the 15 learning strategy subscales was examined to determine if the groups differed in their use of learning strategies after the intervention of study skills training. Analysis of covariance was used to compare the learning-disabled groups on the post-test while adjusting for differences between the groups on the pre-test (Huck, Cormier, & Bounds, 1974, p. 134). This analysis revealed that no significant differences existed between the groups at the end of the training on 14 of the 15 subscales (see Table 6). The only subscale which showed a significant difference was Planning with the diagnosed learning-disabled students (9.86) scoring higher than the suspected learning-disabled students (9.16).

Table 6. Analysis of Covariance of SKILLS Post-test Scores Learning-Disabled Groups.

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Planning					
Between	10.665	1	10.665	4.358	.039
Within	237.415	97	2.448		
Monitoring					
Between	.600	1	.600	.283	.596
Within	205.840	97	2.122		
Adjusting					
Between	1.233	1	1.233	.445	.506
Within	268.569	97	2.769		
Attention					
Between	.036	1	.036	.016	.900
Within	222.126	97	2.290		

Table 6. Continued.

Source	SS	df	MS	F	p
Reward					
Between	2.419	1	2.419	.905	.344
Within	259.167	97	2.672		
Confidence					
Between	1.198	1	1.198	.445	.506
Within	261.299	97	2.694		
Organization					
Between	2.007	1	2.007	1.375	.244
Within	141.615	97	1.460		
Use of External Aids					
Between	.382	1	.382	.175	.677
Within	212.158	97	2.187		
Memory Applications					
Between	.728	1	.728	.288	.593
Within	245.620	97	2.532		
Testing Assumptions					
Between	.104	1	.104	.046	.831
Within	220.731	97	2.276		
Generating Alternatives					
Between	.701	1	.701	.436	.511
Within	156.058	97	1.609		
Conditional Acceptance					
Between	7.273	1	7.273	2.424	.123
Within	291.020	97	3.000		
Identification of Resources					
Between	.986	1	.986	.372	.543
Within	257.078	97	2.650		
Critical Use of Resources					
Between	1.617	1	1.617	1.065	.305
Within	147.223	97	1.518		
Use of Human Resources					
Between	1.429	1	1.429	.705	.403
Within	196.505	97	2.026		

### Discriminant Analysis

Discriminant analysis is "a statistical technique which allows the researcher to study the differences between two or more groups of objects with respect to several variables simultaneously" (Klecka, 1990, p. 7). In other words, "the emphasis is on analyzing the variables together, not one at a time. By considering the variables simultaneously, we are able to incorporate important information about their relationships" (Norusis, 1988, p. B-6). The two major purposes for using discriminant analysis are for prediction of group membership and description of multivariate analysis of variance results (Huberty & Barton, 1989).

Discriminant analysis is useful when 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). In this study, two separate discriminant analyses were used to determine if students exhibit a different pattern of learning strategies. In one analysis students were grouped by gender and the SKILLS post-test scores were used as the

discriminating variables. In the other analysis, students were grouped by diagnosed and suspected learning disabilities.

Discriminant Analysis with  
SKILLS and Gender

The pooled within-groups correlation matrix of predictor variables was examined to determine how the variables within each of the groups in the analysis were interrelated (Klecka, 1980, pp. 31-32). 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). This examination revealed no strong correlation existed within the groups on the discriminating variables. Only two of the possible 105 correlations, Use of Human Resources (.44) and Planning (.32), were above .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 identify which variables added most to the discrimination between male and female strategy selection. The Wilks's lambda was the selection criteria. The Wilks's lambda "is a statistic which takes into consideration both the differences between groups and the cohesiveness or homogeneity within groups" (Klecka, 1980, p. 54). Since Wilks's lambda is an inverse

statistic, the variable with the smallest Wilks's lambda is selected first in stepwise analysis. In this study 10 learning strategy variables were included in the discriminant function. The analysis stopped at Step 10 because the  $F$  levels indicated that discrimination would have been insignificant beyond this step. The following discriminating variables with corresponding Wilks's lambda values were selected: Critical Use of Resources (.93), Adjusting (.89), Planning (.86), Attention (.83), Testing Assumptions (.80), Monitoring (.78), Memory Application (.76), Organization of Memory Strategies (.75), Reward (.74), and Generating Alternatives (.73). None of the other variables met the criteria for inclusion in the stepwise analysis.

Standardized discriminant coefficients were used to determine which variables were contributing most to the discrimination between male and female participants. By examining the standardized coefficients, the relative importance of each variable to the overall discriminant function could be determined (Klecka, 1980, p. 29). In this study, the coefficients obtained were .76 for Critical Use of Resources, .46 for Planning, .46 for Monitoring, .37 for Application, -.26 for Rewards, -.27 for Generating Alternatives, -.27 for Organization, -.33 for Adjusting, -.39 for Testing Assumptions, and -.45 for Attention. Thus, while most of the learning strategies were fairly

equal, Critical Use of Resources contributed almost twice as much as other variables in determining scores on the function.

Another indicator of effectiveness of the discriminant function is the actual discriminant scores in the group (Norusis, 1988, p. B-13). Separation between the groups is defined by the eigenvalue. 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). However, in this analysis there were only two groups and therefore was only one function. Here the eigenvalue was .38, which is a low value for classification into male and female groups.

The structure matrix was analyzed to determine how closely the variables and the function were related and to name the discriminant function. The structured matrix contained the correlation between each individual variable in the analysis and the overall discriminant function (Klecka, 1980, p. 31). In this interpreting process, variables with coefficients of .30 and above are generally considered. The two variables for gender with correlations above this criterion level were Critical Use of Resources

(.44) and Planning (.32). A negative correlation of  $-.30$  on Adjusting was notable.

Based on the strength of the variables Critical Use of Resources and Planning, the discriminant function was named Structured Learning. This title stresses Planning which assists in analyzing the best way to proceed with a specific learning task and Critical Use of Resources which implements several methods in using appropriate rather than available resources while recognizing their limitations. It is an organized and direct approach to problem-solving. The negative correlation of  $-.30$  on Adjusting also indicates the lack of use of this process-related strategy on the part of the males in the study. In this study, adjusting is a strength for females and enables them to direct and improve learning processes through a constantly changing and pragmatic approach to learning. It is a flexibility in the learning process that the males do not exhibit.

There were 27 males and 74 females in this study. Following intervention, the males scored higher than females in Critical Use of Resources and Planning while the females scored higher on Adjusting (see Table 7).

The percentage of cases correctly classified showed how accurate the discriminant function was in grouping the sample. This discriminant function was 73.3% accurate in classifying cases. It correctly placed 20 (74.1%) of the

Table 7. Structured Learning.

	Male	Female
Use	8.33	7.29
Planning	9.93	9.08
Adjusting	6.70	7.46

males and 54 (73%) of the females in the group. Since a 50% accuracy in placement could be expected with random assignment, this is a 23.3% improvement over chance in predicting group placement. Based on a canonical correlation of .52, that number squared indicated that the groups explained 27% of the variation in the discriminant function. Moreover, the following discriminant function of Structured Learning indicated that males and females could be distinguished on the basis of SKILLS scores.

$$\begin{aligned}
 D = &+.44 \text{ (Use of Resources)} +.26 \text{ (Monitoring)} \\
 &+.24 \text{ (Planning)} +.20 \text{ (Memory Application)} \\
 &-.13 \text{ (Reward)} -.16 \text{ (Organization)} \\
 &+.16 \text{ (Generating Alternatives)} -.18 \text{ (Adjusting)} \\
 &-.20 \text{ (Testing Assumptions)} -.23 \text{ (Attention)} -.39
 \end{aligned}$$

The group centroid "is an imaginary point which has coordinates that are the group's mean for each variable" (Klecka, 1980, p. 16). Since discriminant analysis is a multivariate statistic, individual mean scores are not useful in describing the interaction among variables.

However, the centroid represents this interaction (Yabui,

1992, p. 81). The group centroid was 1.01 for the males and was  $-.37$  for the females.

Discriminant Analysis with SKILLS  
and Diagnosed and Suspected  
Learning-Disabled Students

The second discriminant analysis involved diagnosed and suspected learning-disabled students. An examination of the pooled within-groups correlation matrix revealed that the predictor variables were not highly correlated. Of the possible 105 correlations, all were below  $.4$ . 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 variables added most to the discrimination between diagnosed and suspected learning-disabled students in strategy selection. Five variables were included in the discriminant function. The following discriminating variables with corresponding Wilks's lambda values were selected: Planning ( $.94$ ), Conditional Acceptance ( $.88$ ), Generating Alternatives ( $.86$ ), Memory--Use of External Aids ( $.85$ ), and Reward ( $.84$ ). None of the other variables met the criteria for inclusion in the stepwise analysis.

Standardized discriminant coefficients were used to determine the overall importance of each variable to the discriminant function. The coefficients obtained for the

diagnosed and suspected learning-disabled groups were .66 for Conditional Acceptance, .56 for Generating Alternatives, .33 for Reward, -.41 for Memory--Use of External Aids, and -.97 for Planning. Thus, these variables contributed the most to the function for discriminating between diagnosed and suspected learning-disabled groups.

The eigenvalue defined the separation between the groups and the actual discriminant scores they generated. Here the eigenvalue was .20, which was a low value for classification into diagnosed and suspected learning-disabled groups.

The structure matrix was examined to determine how the variables were interrelated and to name the function (Klecka, 1980, pp. 31-32). Two learning strategies had a correlation above .30. They were Planning (-.58) and Conditional Acceptance (.47). The diagnosed learning-disabled group made greater use of the Metacognition strategy of Planning while the suspected learning-disabled group utilized the Critical Thinking strategy of Conditional Acceptance (see Table 8).

Table 8. Rigid Planning.

	Diagnosed	Suspected
Planning	9.97	8.97
Acceptance	6.74	7.61

Based on the strength of the variables Planning and Conditional Acceptance, the discriminant function was named Rigid Planning.

Individuals with diagnosed learning disabilities scored higher in the Planning area, which may indicate prior instruction regarding the need for additional preparation and knowledge about study techniques because of the known disability. The diagnosed learning-disabled group is focused on forming a plan for learning but does not deviate from it. This group knows where to find resources to help plan the learning activity and takes time to plan both how to get the materials and how best to approach the problem. This group also is afraid to call a project complete unless all details are locked into place. Individuals with suspected learning disabilities scored higher in the area of Conditional Acceptance. Although they do not place a heavy emphasis on planning the learning activity, the suspected learning-disabled group can conditionally accept things and move on. They are able to question answers and evaluate results as well as increase their ability to predict consequences.

The percentage of cases correctly classified showed how accurate the discriminant function was in grouping the sample. The discriminant function was 68.7% accurate in classifying cases. It correctly placed 23 (67.6%) of the diagnosed and 46 (68.7%) of the suspected learning-disabled

students in the group. This is a 18.7% improvement over chance in predicting group placement. The discriminant function for Rigid Planning was:

$$D = +.35 \text{ (Testing Alternatives)} +.33 \text{ (Conditional Acceptance)} +.17 \text{ (Reward)} -.22 \text{ (Use of External Aids)} -.52 \text{ (Planning)} +.51$$

The group centroid for the diagnosed learning-disabled student was  $-.62$  and  $.31$  for suspected learning-disabled students. Based on a canonical correlation of  $.40$ , that number squared indicated that the groups explained 16% of the variation in the discriminant function.

Thus, learning strategies patterns can be associated with both gender and diagnosed and suspected status of a learning disability. For both, a recognizable discriminant function could be produced which was accurate in classification and which explained a substantial amount of variance.

#### Cluster Analysis of SKILLS and Demographic Variables

Cluster analysis was used to determine if distinctive learner groups could be formed based on SKILLS scores, TABE scores, study skills placement, and demographic variables. Cluster analysis is a statistical technique that lets a researcher study relatively homogeneous groups called "clusters" that share common characteristics. Cluster analysis is the generic name for a wide variety of multivariate statistical procedures that can be used to

create a classification (Aldenderfer & Blashfield, 1990, p. 7). It 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, 1989). "Clustering methods are used to discover structure in data that is not apparent by visual inspection. . . . The key to using cluster analysis is knowing when these groups are real and not merely imposed on the data by the method" (Aldenderfer & Blashfield, 1984, p. 76).

The data for the cluster analysis included the 15 learning strategies of SKILLS, the 6 TABE scores, the study skills placement into study skills lab or Master Student class, and the demographic variables of gender and diagnosed and suspected learning-disabled students. Initially, all 101 participants were included in the analysis. However, as the data were analyzed to determine the best number of groups that would provide distinct participant clusters, 5 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 96 remaining participants. The Ward's method of forming clusters was used because it is designed to optimize the minimum variance within clusters. This method

tends to create clusters of relatively equal sizes. This method has been widely used in the social sciences (Aldenderfer & Blashfield, 1990, p. 43; Yabui, 1993, p. 95).

A common method in choosing the number of clusters is the "scree slope" method. The scree slope is named after the flattened slope that formed where an original abrupt change in slope of a hill or steep sided valley was filled in with large weathered rocks over time. If the cluster stages and coefficients were plotted on a graph with the cluster stages on the y-axis (with the last stage at the origin) and the coefficients on the x-axis (with the lowest coefficient at the origin), the position along the graph where there is a definite flattening of the graph's slope, or the scree slope, is the location of the "break" point that determines the number of clusters that are chosen for the cluster analysis (Aldenderfer & Blashfield, 1984, p. 54; Yabui, 1993, p. 96).

Using the general clustering program, this process did not identify a distinct difference between the various cluster groupings. Therefore, three-cluster, four-cluster, and five-cluster solutions were run using the quick cluster process of SPSS and the Ward technique. 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: Assisted Learners--10, Hands-On Learners--20, Sensitive Learners--23, Persistent Learners--25, and Balanced Learners--18.

After the five-cluster solution was chosen, the means for each group were calculated for SKILLS scores, TABE scores, study skills placement, and the demographic variables. A one-way analysis of variance was performed on each to determine if there were significant differences among the five groups (Yabui, 1993). Variables on which the groups differed greatly were retained in the analysis. A total of 17 variables had considerable differences among clusters: gender ( $F = 2.48$ ,  $df = 4/91$ ,  $p = .05$ ), TABE-reading vocabulary ( $F = 10.20$ ,  $df = 4/91$ ,  $p = .0001$ ), reading comprehension ( $F = 20.9$ ,  $df = 4/91$ ,  $p = .0001$ ), arithmetic reasoning ( $F = 14.5$ ,  $df = 4/91$ ,  $p = .0001$ ), arithmetic fundamentals ( $F = 19.27$ ,  $df = 4/91$ ,  $p = .0001$ ), language mechanics ( $F = 24.6$ ,  $df = 4/91$ ,  $p = .0001$ ), language spelling ( $F = 9.98$ ,  $df = 4/91$ ,  $p = .0001$ ), study skills ( $F = 4.11$ ,  $df = 4/91$ ,  $p = .0042$ ), diagnosed and suspected learning-disabled ( $F = 10.02$ ,  $df = 4/91$ ,  $p = .0001$ ), SKILLS Metacognition--Planning ( $F = 9.19$ ,  $df = 4/91$ ,  $p = .0001$ ), Metamotivation--Reward ( $F = 9.52$ ,  $df = 4/91$ ,  $p = .0001$ ), Metamotivation--Confidence ( $F = 10.67$ ,  $df = 4/91$ ,  $p = .0001$ ), Memory--Use of External Aids ( $F = 5.36$ ,  $df = 4/91$ ,  $p = .0006$ ), Memory--Application ( $F = 7.78$ ,  $df = 4/91$ ,  $p = .0001$ ), Critical Thinking--

Testing Assumptions ( $F = 7.62$ ,  $df = 4/91$ ,  $p = .0001$ ), Resource Management--Identification of Resources ( $F = 2.66$ ,  $df = 4/91$ ,  $p = .0379$ ), and Resource Management--Use of Human Resources ( $F = 3.54$ ,  $df = 4/91$ ,  $p = .0099$ ).

The means of the 5 cluster groups for each of the 17 variables were selected as characteristic indicators. Tukey post hoc tests were used to identify the groupings of the means for each variable. In order to clearly see the combination of means for each group, the means were arranged in a linear chart (see Table 9).

In order to supplement the quantitative data in describing the clusters (Yabui, 1993, p. 129), focus groups were held with each group. Each of the five groups had members with distinct academic skills levels. Some groups used similar learning strategies, some were participating in study skills training, and some had either diagnosed or suspected learning disabilities as well as combinations of these characteristics.

Focus groups are basically group interviews although not in the sense of an alternation between the researcher's questions and the participants' responses. Instead, the reliance is on interaction within the group, based on topics that are supplied by the researcher, who typically takes the role of a moderator. The fundamental data that

Table 9. Mean Scores for Clustering Variables.

Cluster:	1	2	3	4	5
<u>Significant Variables</u>					
Gender	1.70	1.50	1.74	1.88	1.83
Read. Vocab.	11.06	9.76	10.20	11.60	11.16
Read. Compre.	11.32	9.16	10.31	12.02	11.37
Arith. Reason.	10.28	8.27	8.79	10.31	10.51
Arith. Fund.	9.06	8.07	7.60	9.33	10.66
Lang. Mechanics	9.10	7.70	9.40	10.94	11.27
Lang. Spelling	10.56	9.30	10.35	11.33	11.58
Study Skills	1.10	1.30	.52	.88	1.56
Learning Disab.	1.80	1.30	1.43	1.88	1.94
Planning	9.20	9.95	10.30	7.96	9.50
Reward	9.50	6.70	7.74	6.60	8.39
Confidence	9.60	6.90	9.09	6.72	7.89
External Aids	9.50	9.20	8.21	10.04	8.72
Application	6.90	8.15	6.74	6.56	8.56
Test Assumption	6.90	9.05	9.83	9.80	9.06
Identification	7.80	8.45	9.04	9.60	8.83
Human Resources	9.20	7.70	7.22	7.96	8.06
<u>Non-Significant Variables</u>					
Monitoring	6.90	7.45	7.00	7.72	6.94
Adjusting	7.30	7.60	6.78	7.96	6.78
Attention	8.70	9.20	8.70	9.64	8.61
Organization	5.80	6.85	7.17	6.60	7.28
Alternatives	7.20	7.95	7.26	8.12	7.61
Acceptance	6.30	7.85	6.65	7.92	7.78
Critical Use	7.10	7.75	7.96	7.92	6.72

focus groups produce are transcripts of the group discussions (Morgan, 1988, pp. 10-11). Additionally,

a qualitative follow-up method can be an extremely useful component 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)

In this study, focus groups were used as a supplement to data collection rather than as a self-contained means of gathering information. The primary goal of using focus groups was to gain participants' insights. Focus groups were formed by placement within a cluster; in other words, the focus groups were segments of the larger cluster groups. Therefore, a total of five focus groups were organized by asking a group of individuals from each cluster to participate in a small group discussion. Each focus group met independently from the others. Permission to tape the focus group discussion was granted by each group so that responses could be reviewed and analyzed at another time.

Each group was given a list of eight possible discussion questions (Appendix F). Although some groups focused on certain questions more than others, all groups were able to discuss each of the eight questions. Verbal participation by each member was consistently high in all focus groups. Each session took approximately 1 hour. In these discussions, each group had distinguishable characteristics that identified learners who thought and used learning strategies in a similar manner.

Cluster 1: Assisted Learners

The Assisted Learners were a group of seven females and three males. The cluster was named Assisted Learners because of the group's need for outside help or explanation of the learning task. Comments heard from these students include: "I really like the learning labs because my teachers give me individual attention," and "books can be too complicated--please show me how. Diagrams help, but doing it is the best." Assisted learners did not feel comfortable with traditional classroom instruction. "I'm thinking about taking one of those correspondence courses after I finish building up my English skills because I feel uncomfortable in the classroom," said one student. Although reading ability was high, general English and writing skills as well as math skills were low. A student entering a pre-medical program noted, "I'd really like to be a medical technician someday, but with all that math I don't think I'll ever make it." "I speak better than I write" was a comment supporting the fact that this group shared a high reading vocabulary score with the Balanced Learners. The group scored high in Confidence and Managing Human Resources and moderately high in Memory--External Aids, Memory--Application, and Identification of Resources. Regarding Confidence, one student responded, "I sound like everyone else here. I was forced into learning situations as a kid and felt very uncomfortable. As an adult I'm

learning to satisfy myself instead of others." The critical thinking strategy of Testing Assumptions, which is characterized by evaluation of general and specific trends in the learning situation, was the lowest score for this group and was much lower when compared to the rest of the clusters.

The focus group, which consisted of five members of the cluster, confirmed the characteristics of the Assisted Learner. These individuals needed to use people and outside resources as well as family support and focused on hands-on tasks to get the most out of the learning situation. Several comments were made in the focus group regarding this point, but two were particularly explicit. "I like working on computers. I can get physically involved in a hands-on task." Also, "the best learning experiences are when I start, continue a hands-on project, and finally see the finished product several months later." Such comments emphasize the importance of hands-on instruction with these students. Many reported unpleasant classroom experiences as children which made them uncomfortable in the adult classroom. "Learning is an attitude. You really have to want to get the most out of it" was a statement made by more than one student looking for a fresh start in school. They felt that increasing their background knowledge through a study skills class or

an academic skill building class would diminish their hesitancy in participating in the classroom.

### Cluster 2: Hands-On Learners

All individuals in the Hands-On Learners group demonstrated low skills in all academic areas. There were 10 males and 10 females in the group. Although 74% of all participants in the study were female, only 50% of the Hands-On Learners were females. Thus, males were disproportionately clustered in the Hands-On Learners group, given there are only 37 males in the entire study. On SKILLS these learners were identified as strong planners who know how to identify resources to help them learn a task. One student commented, "Although I consider myself a pretty good planner, the Master Student class really helped me as a beginning student--lots of good topics to help me organize myself, do more pre-planning, and learn better." Hands-On Learners were also able to utilize memory techniques or mental pictures to help them apply their knowledge; a common sentiment from this group was "I learn best when I see it, then do it. I don't get much out of reading about it." These individuals scored low in two Metamotivation areas of Confidence and Reward. Low scores in these areas are not necessarily negative. It probably means that these students did not need more Confidence or sense of Reward in their lives. Hands-On Learners tend to

feel they are good at what they do on-the-job. They have skills they know how to use and take pride in the finished product. Two students shared this thought: "People tell me I'm good at what I do, and I know that, but I don't need to hear it from others." However, to many it may be the completion of a job to gain tangible rewards or a paycheck that drives their efforts. For instance, two related comments were made in this vein:

Working on a job is just that. I finish my work and go home. Then I get up the next day and do the same thing.

I don't consider my work to be very exciting. A job is a job. I make enough money to get by.

These individuals feel neither good nor bad about what they have done. However, a common difficulty shared by most in this group revolves around earlier school and personal experiences. One student expressed, "I had lots of personal problems dealing with drugs and family issues that interfered with my learning in high school." This could explain a certain numbness or lack of anticipation in the Hands-On Learner.

The focus group supported these findings. Eight participated in the focus group. All described themselves as having low self-esteem, having gone through many personal problems in their lives, but knowing they had strong abilities in certain areas. They felt encouraged by instructors in the past and described themselves as

motivated to learn. Comments reflected a more positive note:

My best learning experiences in the past six months have been all of them! Just coming back to school has helped balance my life.

In college everybody is encouraging me. All my instructors are helpful and they want to see me succeed.

Hands-on instruction and using the whole-body approach are this group's best methods to learn a new task.

### Cluster 3: Sensitive Learners

This cluster consisted of 23 individuals. There were 17 females and 6 males in the group. These individuals demonstrated moderate academic skills in reading, below average skills in language, and low skills in math. Academic skills were summed up by two students as "I've always been good in reading, but my math skills are awful!" and as "I'm not what you would call a good student--just an OK student." On the SKILLS instrument, Sensitive Learners demonstrated high use of planning strategies as well as some confidence and good identification of resources skills. For example, one group member reported, "I don't think I'm a very good writer, but my teachers say I'm good. They always say I find lots of good resources to draw from." Testing Assumptions, Reward, Using External Aids, and Managing Human Resources scores were slightly lower. The lowest SKILLS score was on Memory--Application, or

problem-solving and was shared with the Persistent Learners of Cluster 4. Many Sensitive Learners share in one student's remark that "sometimes I have a hard time figuring out what the teacher wants on a report."

The focus group consisted of eight of the cluster members. Although Sensitive Learners express some confidence in their abilities, six of the eight described themselves as being very sensitive and often hurt by others' comments. Common sentiments are:

In high school I felt intimidated by others and embarrassed that I would give a wrong answer in class.

I hated all the distractions and interruptions in my classes, and I felt intimidated by the teachers in high school but not here.

Sensitive Learners are aware of their academic shortcomings and feel that they will gain more confidence with time and practice. They indicated that additional basic skills intervention in reading, math, and study skills would be beneficial. "I think improving my study skills is really helping me to adjust to being a student and is helping me do better than I expected my first semester" was stated by one member. This group unanimously agreed that they are media-driven and in need of constant television, radio, or newspaper input to assist their learning and hold their attention. For instance, one student commented, "I learn things mainly through the newspaper and television news."

Another student simply said, "If you want to keep my attention, use a video in class to bring the point across."

#### Cluster 4: Persistent Learners

This large cluster of 25 was overwhelmingly female (22). Although moderately high in all academic areas, the group excelled in the reading areas.

I guess I'm sort of a combination learner. I watch, read and listen carefully, then practice it. Then I've got it! I'm especially good in reading.

Their lowest academic scores were found in math. One student summed up the group consensus with "what does math have to do with anything in my field?" The SKILLS instrument identified Using External Aids as a strong strategy for this group. Identifying Resources, Managing Human Resources, and Testing Assumptions were moderately high areas as well. As with the Hands-On Learners Persistent Learners scored low on Reward. They also had low scores in Planning and Confidence, and they shared the lowest Memory--Application score with the Sensitive Learners. One student confessed, "I really have a hard time getting all my studying done. I don't think I'll ever finish this program!" Regarding Application skills, another student said, "The teacher will get me started on a project, but sometimes I just don't know how to complete it by myself." The frustration that accompanies this

situation was shared by several group members in the statement,

I don't like it when the instructor sets up the worst possible learning situation for us on purpose. I know it's probably the best way to learn something well, but it's frustrating and hard on us.

The focus group consisted of seven cluster members. These individuals enjoyed experiencing a large quantity of different types of information at any time. Persistent Learners expressed a need to use many different ways to learn new information and said that these techniques often change with each new situation. "I speak for several of us," said one student, "when I say we usually like to work in the lab instead of in the classroom." Another student expressed similar feelings with "I just don't understand why I have to do all this book work. I understand the material better if I can practice the idea in class." This particular group was made up primarily of pre-medical technicians students. They expressed an ability to locate and use resources to enable them to complete a task. All Persistent Learners expressed concern with obstacles in their way to success whether the obstacle is another person, circumstance, or school work. However, they agreed that perseverance and outside support is the key to success. "The thing that has helped me become successful in my learning is moral support from friends and family and inspiration from others." Persistent Learners lack

confidence frequently, but they know they can accomplish their goals. One student's global thinking was expressed with "I think a support group for the older students, single parents, or students with disabilities would help them feel more comfortable and supported by the school." Several others talked about the Master Student course as a good resource and alternative for this problem. One student commented, "I really love the Master Student class this semester. I didn't really want to take it to begin with because I thought it might be useless for my studies, but I was surprised. It's the best lead-in course to college studies ever!"

#### Cluster 5: Balanced Learners

This cluster is a female-dominated group consisting of 15 females and 3 males. Of all clusters, the Balanced Learners have the highest academic scores. Several students said, "I've always gotten good grades in school." Like the Hands-On Learners and the Sensitive Learners, this cluster scored high on Planning. These individuals have very high scores in Reward and high scores in Identification of Resources and Memory--Application through memory techniques to facilitate problem-solving. One student simply said, "Everyone says I have a good memory for details." Another said, "I like to learn about things that interest me. I'll even read extra things about a

particular topic on my own." Balanced Learners demonstrated moderately high scores in Testing Assumptions, Managing Human Resources, and Using External Aids. These individuals utilize all learning strategies somewhat consistently as no low scores were identified.

The focus group consisted of six of the cluster members. This group clearly demonstrated an ease with the traditional classroom setting. Several comments focused on the setting for the learning activity: "I like this college setting. The teachers are more willing to give a little. They take time with each of us in class." Balanced Learners expressed comfort with group learning situations and enjoy learning from and with others. They are also excellent individual learners and work and study well on their own. "It seems to be easier for me to learn with a group of other students although I can do the assignments by myself if I have to." Balanced Learners express preferences for a variety of learning situations, including typical classroom lecture, hands-on demonstration, and other visual and auditory stimulation. These individuals feel support from others, do not feel threatened by peers or teachers, are self-motivated, and take responsibility for their own learning. Several comments were made dealing with these factors.

I think having support from my peers and outside support has helped me become a successful learner.

When I want to learn something new, I believe I have to motivate myself to just do it!

Most feel that other students struggle with their studies much more than they do and "would benefit from a class like Master Student that teaches ways to study, how to handle conflict, and encourages individuals to take responsibility for their own learning."

## CHAPTER 5

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Problems experienced by learning-disabled adult students have come to the forefront in post-secondary education. Schools are mandated to provide reasonable accommodations to learning-disabled students to assist them in completing coursework and eventually graduate. The concept of learning strategies offers a new approach to identify how these adults learn upon entry into a formal learning situation such as vocational training. There is a growing body of research (Ellis et al., 1991; Harris, 1988; Pressley, 1989) to support the contention that one of the major differences between effective students and ineffective students is their understanding and use of successful learning strategies (Lombardi, 1992, p. 7). Because colleges are constantly assessing their services and attempting to improve a student's ability to learn, learning strategies provide a potentially important link to student success.

This study investigated whether learning strategies used by entering learning-disabled adult college students

changed after initial academic and study skills intervention. It was conducted using 101 diagnosed and suspected learning-disabled adults entering MSU College of Technology as new students in the fall of 1993. Of these, 34 students had a diagnosed learning-disability; 67 had a suspected learning-disability. A total of 27 males and 74 females participated. The ethnic background of learning-disabled students was overwhelmingly Caucasian. Although there were 16 non-Caucasian students in this study, their numbers were not sufficient to warrant the analysis of ethnicity as a separate variable in this study.

Data were gathered from several sources: (a) a demographic intake sheet, (b) the Test of Adult Basic Education (TABE) scores, (c) Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS), and (d) focus group responses. In the statistical analysis, 101 students were included in discriminant analyses, and 96 were used in a cluster analysis.

Multivariate analyses were used. The multivariate procedure of discriminant analysis was performed on the data in order to determine if males and females or if diagnosed and suspected learning-disabled students used different learning strategies after skills intervention. Skills intervention was defined as either (a) individualized study skills instruction in a lab setting or (b) group instruction within the Master Student course in a regular

classroom setting. Cluster analysis was employed to discover if there were clusters of participants that think and learn in a similar manner. Five cluster groups were identified in this study, and members of each group were interviewed in focus groups.

The SKILLS instrument was administered prior to and following academic skills intervention. This instrument has established validity and reliability in identifying learning strategies used by adults in solving real-life problems. Students selected 18 responses to learning strategy questions on 4 of 6 possible learning scenarios of the SKILLS instrument. The five strategy construct areas of metacognition, metamotivation, memory, critical thinking, and resource management were identified in SKILLS.

The TABE instrument was used prior to entrance into MSU College of Technology. This academic skills test assessed Reading--vocabulary and comprehension; Arithmetic--reasoning and computation; and Language--mechanics and spelling. The TABE instrument also had been established as valid and reliable. A score below a 10.0 grade equivalence on any section of the test indicated a need for academic skills intervention. All students included in the study were in need of one or more areas of academic skills intervention. Through this instrument and referral, it was determined whether a student needed study skills

intervention as well. A total of 59% of this group received study skills intervention.

### Discussion of the Findings

#### TABE Assessment Scores

TABE results alone indicated that the entire group of learning-disabled students in this study had some kind of academic skills deficiency requiring academic skills intervention and that over half were in need of study skills intervention. TABE scores indicated that the greatest difficulties occurred in Arithmetic Reasoning and Fundamentals and Language Mechanics.

#### Pre- and Post-test SKILLS Instrument Scores

Both pre- and post-test SKILLS scores were compared to assess whether academic and study skills intervention changed learning strategy approaches within a 16-week or one semester period of time. The pre-test and post-test means of the five learning strategy areas of Metacognition, Metamotivation, Memory, Critical Thinking, and Resource Management were similar. The scores fell in the range of 23.14 for Memory to 24.48 for Metamotivation. Composite scores for all of the items in each of the areas were analyzed. When scores were computed for each of the 15 learning strategy subscales, only the area of Metamotivation--Attention showed a significant difference.

Although the actual size of the difference was small, the post-SKILLS mean was significantly higher statistically than that of the pre-test.

#### Results of the Discriminant Analysis

The first discriminant analysis examined males and females and post-test SKILLS results to determine if different patterns of learning strategies were exhibited based on gender. The analysis indicated that males and females differed on Structured Learning. The discriminant function for Structured Learning was 73% accurate in placing students in their correct group.

The second discriminant analysis examined diagnosed and suspected learning-disabled students in relation to SKILLS to determine if these groups exhibited different patterns of learning strategies. The analysis indicated that the diagnosed and suspected learning-disabled students differed on the function Rigid Planning. The discriminant function for Rigid Planning was 69% accurate in placing students in their correct group.

#### Results of the Cluster Analysis

Cluster analysis procedures were used to determine if it was possible to identify distinct clusters among learning-disabled students based on SKILLS scores, TABE scores, study skills placement, and demographic variables.

This process identified five specific learner groups. Each of the groups had distinctive SKILLS and demographic variable characteristics. Focus groups were held with members of each cluster to provide additional data in naming and describing the clusters. The five clusters were the Assisted Learners, Hands-On Learners, Sensitive Learners, Persistent Learners, and Balanced Learners.

### Conclusions

The following conclusions were drawn from the findings. It should be noted that the findings and conclusions are delimited to the students of Montana State University College of Technology-Great Falls.

### TABE Scores

Learning-disabled adult students generally experience academic skills deficiencies. Although TABE scores indicate the greatest difficulties in Arithmetic and Language, low scores were identified in all six areas with no less than 25% of the participants scoring below the 10.0 grade equivalent level on some part of the TABE. In this study, low-range scores started at a 3.2 grade equivalence; this is the illiterate range by adult basic education standards. The highest of the low-range scores was 5.2 in Arithmetic Fundamentals or the computation area. Arithmetic appears to be a difficult academic skill for

most learning-disabled college students at MSU College of Technology. Scores below 10.0 are indicative of potential academic problems occurring in other academic areas and therefore need to be elevated as soon as possible with academic skills intervention.

### SKILLS and Learning Strategies

The SKILLS instrument and concept of learning strategies are practical tools for use with learning-disabled students entering MSU College of Technology-Great Falls (MSU College of Technology). Studies have shown that 2-year colleges such as MSU College of Technology may be a final opportunity for higher education for many learning-disabled adults. The setting allows for foundational skills such as academic and study skills courses to provide a firm basis for more difficult coursework. Learning strategies such as memorizing content, learning to focus on material, planning, and identifying resources are the first step for learning-disabled students to concentrate on for continued success. Many of these strategies are taught in a study skills lab or Master Student course or within the context of each course at MSU College of Technology.

"Current 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" (Weinstein, 1988, p. 25).

Additionally, researchers have noted SKILLS "may be used as an individual learning tool for personal diagnosis to get people thinking about how they learn" (Fellenz & Conti, 1994).

A study by Seybert, Denton, and Franklin (1986) provides an examination of the efficacy of learning strategies instruction at an open access community college. These authors note that community colleges provide an excellent setting for instructing students in the use of strategy training, given that one-fourth of these students fail to complete courses successfully. After completing a learning strategies course containing eight specific strategies and a generalization strategy that assisted students to transfer the learned strategies to several content areas, the students earned an average of one full grade point higher than nonparticipants in an introductory psychology class, and they showed a much higher course completion rate than nonparticipants (96.6% compared to 75.2%). Students indicated that the program helped them in psychology and other classes, as well as improved grades overall (Ellis et al., 1989, p. 499). Learning strategies instruction can become an important tool to facilitate educational improvement for students at MSU College of Technology-Great Falls.

Although the SKILLS instrument was specifically developed for real-life learning situations, it is very useful in a two-year college setting. Most students come to MSU College of Technology immediately out the world-of-work or from participating in day-to-day tasks of homemaking. They have not been involved in educational pursuits for many years. Therefore, using the SKILLS instrument may give results more indicative of current learning strategies which may be employed in the formal classroom setting. Additional research by Hill (1992) supports this idea when he says, "Although SKILLS consists of real-life situations, both successful discriminant functions in this study revealed a relationship of some of these learning strategies to academic success" (p. 147). Consequently, the SKILLS instrument can be used to help learning-disabled students understand how they approach learning tasks and which strategies are most effective for them in particular situations.

#### Academic and Study Skills Intervention

Academic and study skills intervention in the form of short-term training does not produce a significant change in the learning-disabled student's learning strategies. Despite one semester of training in academic and study skills, there was no profound change in 14 of the 15 learning strategies. Only the area of Metamotivation--

Attention showed a significant difference. Although important, the difference is not great enough to indicate an impact on learning strategies due to intervention.

Although studies have shown that short-term training can have a definite impact on post-secondary students' success in particular coursework (Idol-Maestas, 1981), this study indicates that no significant change occurred in strategies which learning-disabled students used. There are reasons why this may have occurred. First, the concept of learning strategies and academic/study skills intervention may be different. Learning strategies are ways of learning materials including different methods and techniques to arrive at the solution to a variety of problems. Access to learning strategies broadens the way problems are solved. In academic skills intervention the emphasis is on solving a particular problem at that moment. Study skills intervention solves an immediate problem but also provide the basic tools or strategies for solving various problems. The process is much narrower than learning strategies. A student may ultimately use the ideas learned in study skills training as a model to continually solve a particular problem with a particular strategy.

Second, to allow learning strategies to gain more importance in a learning-disabled adult's learning process, it may be necessary to focus specifically on the five

strategy areas to bring about change. These strategy areas are multi-faceted and go beyond a basic and short-term notetaking instruction to the more complex areas of memory, motivation, thinking, learning, and resource management.

Third, expertise in utilizing learning strategies may be harder to generate in individuals than was assumed at the onset of this research. Learning-disabled students may take a period of months or years to acquire and implement learning strategies. The goal with learning strategies is to encourage lifelong, self-directed learning. If given instruction in the use of learning strategies, learning-disabled students may, over time, increase their ability to utilize these strategies and become more effective learners.

Fourth, SKILLS is an ipsative measurement instrument. With such a scale, the total of the sums of the subscores is a constant (Saville & Willson, 1991, p. 220). While such scales correctly reflect the position that life is about choices (p. 221) and while they can measure change in relative performance on scales, they are not effective in measuring growth. By examining the differences between the pre-test and the post-test scores, the design of this study focused on growth. Consequently, the use of an ipsative measure was inappropriate for this purpose, and the analysis was insensitive to this concern for examining development of the students in the use of various learning

strategies. While growth may have occurred at a constant rate in all learning strategy areas, the statistical analysis did not reveal any change in the relative use of the various strategies. Future studies using SKILLS should be careful to distinguish if the emphasis is upon growth or upon change.

### Discriminant Analysis Results

Gender influences learning strategy selection. The Structured Learning function of the first discriminant analysis indicates that male and female learning-disabled students differ in the areas of Planning, Critical Use of Resources, and Adjusting. Males are planners who make good use of resources for the learning task. They have an organized and direct approach to problem-solving and tend to be structured. Females utilize Adjusting which enables them to improve their learning through a changing and flexible approach to learning.

The discriminant function suggests that if males take an organized and direct approach in their learning and if females take a constantly changing and pragmatic approach to learning, then perhaps males could also be seen as having a more career-oriented, focused mission approach to learning than females. Females may be taking a mother's or homemaker's type approach. This requires constant adjustment, flexibility, and creative use of available

resources to avoid problematic situations. In spite of society's shift to women working outside the home for economic reasons, the stereotypical attitude of "father as provider, mother as nurturer" may be carrying over to learning strategies. If so, this attitude may be more ingrained than current trends suggest.

Diagnosed and suspected learning-disabled students use different patterns of learning strategies. The Rigid Planning function of the second discriminant analysis indicates that diagnosed learning-disabled students are good planners but are inflexible in knowing when and how to complete their learning activity. On the other hand, suspected learning-disabled students are reflective non-conformists who are good at predicting the consequences of a given learning situation.

#### Cluster Analysis Results

Distinct learner groups exist within the learning-disabled students at MSU College of Technology. One group consists of Assisted Learners. They need a great deal of assistance with the learning task. Although they appear confident, this group is very uncomfortable with traditional classroom instruction. Scores are moderate for several learning strategies, but the critical thinking skill of Testing Assumptions is weak. These students find it hard to evaluate the specifics and generalize within a

situation. They may not be able to detect inconsistencies in their work, which would be particularly detrimental in high-tech or precision instrumenting fields or positions requiring detailed accuracy. These individuals may become frustrated by the technical knowledge that is required of them in addition to the hands-on learning they like to do.

The Hands-On Learners demonstrate low academic skills and need more assistance to help them complete coursework. However, members of this group are strong planners and able to find the resources and assistance they need. Males constitute a greater number in this group than in other groups. This group prefers hands-on activity to book work because they lack confidence, do not feel they will be competitive, and feel that academic failures in the past will affect their present and future attempts in academic coursework. A possible reason for these students not performing well in school is that they need to see learning as a pleasant experience and to realize that they will gain something from it. That will assist in their enjoyment and satisfaction with a completed task.

Sensitive Learners have only moderate to below average academic skills and are therefore not highly motivated to pursue a post-secondary education. However, Sensitive Learners are aware of their shortcomings. By recognizing their need to develop confidence strategies as well as utilizing their ability to identify resources, they could

participate successfully in a college program. Given their learning disability, it will be important for these individuals to advocate for themselves with counselors and faculty regarding special programs and services at MSU College of Technology. The ability to apply material they have learned to another situation may be difficult for these students thereby necessitating a step-by-step approach with individualized lab instruction and specifically with academic or study skills intervention. Sensitive Learners prefer to have information given to them. The need for constant media input may make the classroom seem boring. Moderate scores in the Reward learning strategy may help them place value on and enjoy the learning task itself.

Predominately female, the large cluster of Persistent Learners excel in the reading and language areas. They increase their chance of success in school with good academic skills because most faculty require (a) average or above average reading and language skills to participate in classroom discussion, (b) notetaking, and (c) understanding the text book which is written at a college-level of reading comprehension. Depending on the college degree program, the math deficiency they experience may or may not pose a problem. With support services, lower-level math courses would be achievable. These Persistent Learners also utilize memory strategies, identify and utilize

supportive resources, and recognize and evaluate assumptions in relation to the learning situation.

However, Persistent Learners struggle with confidence and have difficulty applying their knowledge to other tasks.

Primarily female, Balanced Learners demonstrate the highest academic potential of all five clusters. They are good planners and know how to proceed with a task after preliminary preparation. These learners also recognize the value of putting the best effort possible into a learning task. These academically strong students have an ability to use critical thinking and problem-solving skills readily. Balanced Learners are the students most at ease in the traditional classroom. They feel supported by counselors and faculty. They take advantage of things that will assist their learning such as the Master Student course or individualized instruction in labs if needed. Their academic skills and use of higher-level learning strategies indicate a positive, directed approach to learning with no signs of potential difficulty in completing a college program. In fact, Balanced Learners tend to exceed average expectations and go the extra distance in reaching goals. They are truly self-sufficient and motivated to learn.

As a result of distinct learner groups being formed in this study and focus groups stressing the need for instructor or outside assistance with their studies, it is

necessary for learning-disabled students to advocate for themselves with counselors and faculty regarding special programs and services available to them at MSU College of Technology-Great Falls. Although the Americans with Disabilities Act has become a law, many colleges do not provide adequate services to students with disabilities except under the strict letter of the law in terms of documentation and a student request. It will continue to be a problem area for colleges because services cost money, and most colleges stretch their resources to the limit with day-to-day operations. It will therefore be necessary for students to request specific services needed to assist them with their coursework.

There are twice as many suspected learning-disabled students as there are diagnosed learning-disabled students at MSU College of Technology. Unless a student has been diagnosed, services are not technically available. Thus, advocating for oneself is very important. Because the average age for first-time entry at MSU College of Technology is 30-years old, it is not surprising that some students have not had services to be initially diagnosed as learning-disabled. As well, learning-disabled students are very good at accommodating their own disability. Consequently, many may have slipped through each grade level in elementary and secondary school without acquiring sufficient knowledge for that grade level but allowed by

school administration to move on. Additionally, whether as a child or as an adult, it is very expensive to be assessed for a learning disability. This may have prevented many from inquiring about or receiving early services. Finally, it is particularly important for the suspected learning-disabled student to gain access to the proper agency or health professional to obtain a formal diagnosis.

Learning-disabled students require specific accommodations in particular learning situations. The cluster analysis has shown that all learning-disabled students are not the same. They perceive the learning process and situation differently and express different needs. Not all coursework is the same either. Teacher presentation, completion requirements, and study demands differ from one course to another. That may necessitate particular accommodations for learning-disabled students in one course that may not be needed in another.

#### Recommendations

1. It is recommended that a trained MSU College of Technology counselor be appointed who will develop the affective, academic, and advisement dimensions needed for working with learning-disabled students from the time their admissions applications are received. Following this, several steps would be taken with each student:

(a) personal interview; (b) pre-testing which assesses

current academic levels and which contains a career component and a self-analysis component with emphasis upon student motivation and an ability to meet already established standards; (c) prescription for particular tutorial and regular coursework; (d) scheduled counseling conferences; (e) advocacy training; (f) provision for accommodations such as books on tape, notetakers, readers, untimed testing, oral exams, and tutors; and (g) provision for ongoing advisement regarding course selection and career goals.

2. In 1981 the National Joint Committee on Learning Disabilities issued a position paper stressing the need for in-service programs for service providers. Faculty development and training must be ongoing (Schmidt, 1983). No program can succeed unless teaching faculty understand the nature and goals of the program and understand that the institution is not burdening them with students who are incapable of succeeding in a program of study. "The paucity of skilled and knowledgeable leadership personnel for post-secondary learning disability programs is a critical limitation to the development of this area of special education" (Shaw et al., 1986, p. 1). For instance, faculty must realize that men and women utilize different learning strategies.

Faculty of students with disabilities at MSU College of Technology should receive appropriate materials and

technical assistance to facilitate their learning and implementation of program services. The following should be provided to the faculty: (a) The MSU College of Technology ACCESS Handbook for Faculty, (b) the publication from The President's Committee on Employment of the Handicapped entitled "The College Student With a Disability: A Faculty Handbook," and (c) access to the library of disability resources located in the Student Services Department of the college.

3. Because this study has shown that SKILLS and the learning strategy concept can be a useful instrument in the post-secondary setting, it is recommended that a Learning Strategies course be developed and implemented prior to semester registration with first-time students at MSU College of Technology. This course should be at least a 5-day 15-hour training course. Ideally, a 40-hour 8-week credited course would be implemented to address the needs of the learning-disabled adult student.

4. It is recommended that SKILLS be utilized as an instrument for assessment of incoming students at MSU College of Technology-Great Falls. Both successful discriminant analyses revealed a relationship of some of the SKILLS learning strategies to academic success through the Balanced Learner cluster. This counseling tool could be used to alert students to possible problems and prepare them for seeking assistance through a learning strategies

course and other supportive services. Findings suggest that learning strategies usage may change as students' experience with post-secondary education increases (Hill, 1992, p. 149). This provides a rationale for providing orientation programs which provide information on learning strategies.

5. Specific accommodations should be provided for learning-disabled students' individual needs. Suggestions include:

- (a) Provide weekly tutoring services at designated times.
- (b) Arrange with students for a peer buddy system in each class to provide support.
- (c) Provide self-advocacy training for learning-disabled adults so that they can more independently manage their affairs.
- (d) Encourage participation in group interaction, study skills, interpersonal communication, and career planning by recommending classes such as Master Student, Interpersonal Communications, and a newly implemented Learning Strategies course to all learning-disabled students. "Instruction in the communication skills of listening, speaking, reading, thinking, and writing and in the study strategies of notetaking, summarizing, and test preparation can be the vehicle for promoting

improved critical thinking and reading" (Biggs, 1990, p. 128).

6. It is recommended that MSU College of Technology have a referral system in place to recommend to students needing assessment for a learning disability diagnosis. With services unavailable for those not diagnosed, it is appropriate to refer students to the proper community resources as a first step.

7. Further research should be conducted on the impact of skills intervention on learning-disabled adults' learning strategies utilizing a different instrument to access a student's academic skills. The age of the TABE instrument may preclude its usefulness in a follow-up investigation.

8. Further research should be conducted to determine if academic and study skills intervention could affect the learning-disabled adult's learning strategies over time. It is suggested that the research be done over a one-year or two-year period to better assess the long-term impact of intervention skills and that it be conducted after a more comprehensive course in which specifically addressed learning strategies components are provided to the learning-disabled students.

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APPENDICES

APPENDIX A  
PERMISSION TO CONDUCT RESEARCH

Patricia A. Hays  
2814 5th Avenue N.  
Great Falls, Montana  
July 25, 1993

Mr. Will Weaver, Director  
Great Falls Vocational-Technical Center  
2100 16th Avenue South  
Great Falls, Montana

Dear Mr. Weaver,

I am requesting permission to conduct an educational survey, selected interviews and general background information questionnaire at the Great Falls Vo-Tech Center as part of my Montana State University doctoral dissertation in Adult and Higher Education.

I would like to survey a population of no more than 120 new entering students, prior to, during, and following the fall semester, 1993. These individuals will be asked to volunteer as participants in one learning strategies instrument, called the Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS), developed by Dr. Bob Fellenz and Dr. Gary Conti of MSU. Although I oversee the Career and Testing Center operations and currently administer the Learning Styles Inventory by Piney Mountain Press, I would like to additionally administer the SKILLS instrument, which I believe would enhance the LSI and give additional information about the student. No cost is involved in the administration of any test. My goal is to further explain and anticipate strategies learning disabled students use, thereby expanding my ability to assist students in my position as retention counselor.

Interviews with a selected number of individuals from particular groups will follow after the semester is completed. This will establish verification of testing results, as well as personal insights about differences in the learning disabled student's learning. Interviews will be scheduled around regular work hours.

The background information survey is used primarily for clustering groups of students. The participants' names will not be used in this study. They will be identified by number. Questions include information about gender, level of education, age, type of courses, program of study, disability status, assessment of whether study/skills remediation is recommended, and finally, whether student was enrolled in such remediation. In this study, I will focus on learning disabled students requiring remediation and learning strategy outcomes.

No major commercial publications are expected to result from this study. Normal dissertation publication by the University of Michigan Microfilm Service is anticipated. If professional articles are written, the name Great Falls Vocational-Technical Center will not be used without written permission by the institution. The term "a population of first-time entering students in a Rocky Mountain state vocational/technical center" will be used.

My primary goal involves finding ways to further assist learning disabled students complete their programs and reach their full potential. I believe administration and evaluation of the SKILLS inventory, in combination with the regularly given Test of Adult Basic Education (TABE), in order to discover particular learning strategies, will not only assist the student, but will also give input to instructors in how they might facilitate the adult learning process.

I agree to share all my research information with Mr. Will Weaver, Director of the the Great Falls Vocational-Technical Center, and any department(s) of the institution that would benefit from my findings.

Thank you for considering my request to conduct this research.

Sincerely,

*Patricia A. Hays*

Patricia A. Hays  
Counselor  
Great Falls Vo-Tech Center

cc: Pat Kercher, Academic Officer

*Patricia,*

*I'm happy to grant you the permission you requested to conduct this survey. If I can be of any help in the future please ask. Good luck and I look forward to receiving the results and your providing this information back to the departments. I believe your findings should be very beneficial.*

*Will*

APPENDIX B  
STUDENT PARTICIPANT LETTER

August 9, 1993

Subject: Educational Questionnaires

To: Participants

Thank you for participating in this educational survey. The information from the Background Information Survey, Test of Adult Basic Education (TABE), and Self-Knowledge Inventory of Lifelong Learning Strategies (SKILLS) will be used in a doctoral dissertation research project that I am conducting to satisfy the requirements for the Doctor of Education in Adult and Higher Education degree from Montana State University.

The TABE test and Background Information Survey are already used in the regular admissions process of the Great Falls Vocational-Technical Center. It will continue to serve the same purpose and will additionally give information regarding skill level groups used in this research. Additional information from the SKILLS instrument will be held in the strictest confidence. No names will be used in the research project, nor will names be published as a result of this project. What findings and recommendations come out of the study will be shared with the Great Falls Vo-Tech Center.

Hopefully, following a retake of the SKILLS instrument at the end of the semester, better student learning strategies and techniques will be identified that will directly benefit you. The SKILLS instrument will analyze your present use of various learning strategies. The TABE will determine your entering academic skill levels. The Background Information Survey will be used to determine if gender, age, learning disability, education level, and/or academic skills level affect people's use and type of learning strategies.

Again, thank you for participating in the research project.

Sincerely,

Patricia Hays  
Career Assistance Center  
Great Falls Vo-Tech Center

Patricia Hays has my permission to use my test/survey results in her doctoral research.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

APPENDIX C  
INTAKE SHEET



OFFICE USE ONLY	
Date:	_____
Program:	_____
Expected Enrollment Date:	_____
Montana Resident:	Yes ___ No ___
	Malmstrom AFB

Last Name	First Name	Middle Initial	Maiden
Address	City	State	Zip
____/____/____ Birthdate	Check One Sex: ___ M ___ F	Telephone: Work (____) ____-____ Home (____) ____-____	
____-____-____ Social Security #	Married ____ Yes ___ No ___	Ethnicity ___ White/Nonhispanic ___ Hispanic ___ Asian/Pacific Islander ___ American Indian/Alaska Native Tribal Affiliation: _____ ___ Black/Nonhispanic ___ Other	
Residency Information ___ Montana Resident ___ Malmstrom AFB ___ Resident Alien ___ Non-Resident Alien ___ Non-Resident			

Educational History (darken highest grade completed)	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Tech Prep:
GED: ___ Yes ___ No Date: _____	College or Vo-Tech											Other:					
High School Graduate Yes ___ No ___	Name of School: _____ Address: _____											Name: _____ Address: _____					
Name: _____ Address: _____ Year of Graduation: _____	Degree Awarded: _____ Date: _____											Degree Awarded: _____ Date: _____					

Disability Please Check:	Please Check:	Agency Information:	What is your primary goal?
___ None ___ Learning Disability ___ Visual Disability ___ Seizure Disorder ___ Speech Impairment ___ Head Injury ___ Hearing Disability ___ Orthopedic Disability ___ Medical Disability ___ Psychological Disorder	___ Single Parent ___ Women in Transition (Displaced Homemaker) ___ Displaced Farmer ___ Economically Disadvantaged ___ Ex-Offender (incarcerated)	Have you been referred by an Agency? ___ Yes ___ No  ___ Voc-Rehab ___ BIA ___ Social Security ___ VA ___ JTPA ___ Project Challenge ___ Other	___ Improvement of existing "Job skills" ___ Personal Interest ___ Job preparation ___ Earn AAS Degree or Certificate ___ Other

Nearest Relative (other than spouse)	Name: _____ Address: _____ Phone: _____	Permission to release test scores: _____ Signature Date: _____
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APPENDIX D  
SKILLS INSTRUMENT AND ANSWER SHEET

## Real-Life Learning Situations

### PUTTING A BIKE TOGETHER

You buy a bicycle from a discount store at a very reasonable price, but when you get it home and unpack it, you discover that it is not assembled. Directions are included. Nobody is willing to put it together for a price you can afford, and the store will not take it back. You decide to try to put the bike together yourself. **How likely are you to use the following strategies to learn how to put the bike together?**

### DENTAL CARE

The dentist has told you that your gums are receding and that you are in danger of losing your teeth if you do not do a better job of taking care of your gums. You are not really happy about the program of care that the dentist suggested, but you realize that you need to do more to care for your gums. **How likely are you to use the following learning strategies in learning what you need to know in order to care for your gums?**

### RECRUITING LEADERS

Your best friend has been asked to help recruit leaders for a group that is going to investigate the recreation and park services in your community. You have volunteered to help study what good leaders are like and to recruit good leaders. **How likely are you to use the following strategies in learning how to recruit leaders?**

### LETTER TO THE EDITOR

A lot of people have been concerned about an issue affecting your neighborhood. Two of your neighbors want you to help them put together a letter to the editor of your local newspaper that would state your side of the case. You agree to help plan the letter, but you realize that you first must know more about this issue and about the attitude of others toward it. **How likely are you to use the following learning strategies in learning about the issue and in preparing an effective letter to the editor?**

### NATIONAL PARK

You have decided to visit a national park such as Yellowstone or Grand Canyon for a summer vacation. Because of the size of the park, the crowds of people, and the park's numerous attractions, you know that you will have to learn some things about the park before you go. **How likely are you to use the following strategies to learn what you need to know in order to prepare for your trip?**

### CARE FOR A RELATIVE

A close relative who has no one to rely on except you becomes seriously ill and can no longer be taken care of at home. You need to find out about the care facilities available, but you also realize you must try to calm the fears of your relative. **How likely are you to use the following strategies in learning how to find a good place for your relative to live and in learning how to help that person adjust to a new living style?**

### PUTTING A BIKE TOGETHER

You buy a bicycle from a discount store at a very reasonable price, but when you get it home and unpack it, you discover that it is not assembled. Directions are included. Nobody is willing to put it together for a price you can afford, and the store will not take it back. You decide to try to put the bike together yourself. **How likely are you to use the following strategies to learn how to put the bike together?**

**Directions:** Select the 6 strategies from the following list of 18 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 6 other strategies that you might possibly use and place the number of these strategies in the *Possibly Use* box of the answer sheet. Select 6 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.

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| <ol style="list-style-type: none"> <li>1. Reflecting on whether you learn best by trial and error, by following directions, or by having someone tell you how to do it</li> <li>2. Resolving to learn how to put the bike together rather than worrying whether you can learn to do so</li> <li>3. Looking at a bike that is already put together so you can have a model to examine as you work</li> <li>4. Marking those steps or suggestions in the instructions that seem important yet easy to forget</li> <li>5. Previewing the directions to see if you will need to follow them exactly as written</li> <li>6. Reminding yourself of the money you are saving by putting the bike together</li> <li>7. Phoning someone at the company that made the bike if you get stuck</li> <li>8. Looking at all the parts of the bike to form a general idea of how they will fit together</li> <li>9. Keeping the overall task in mind to prevent getting lost in details</li> </ol> | <ol style="list-style-type: none"> <li>10. Reassuring yourself occasionally that you can put the bike together</li> <li>11. Remembering the tools you will need to get by making up a word or phrase based on their first letters</li> <li>12. Talking with a friend who has better mechanical skills than you for encouragement in putting the bike together</li> <li>13. Sorting out the parts that fit together so you will not leave out any part</li> <li>14. Imagining various ways the bike could be put together</li> <li>15. Thinking about the fun you will have when the bike is put together</li> <li>16. Recalling similar experiences putting things together to remember what methods worked best for you</li> <li>17. Taking a break if frustration interferes with figuring out how to put the bike together</li> <li>18. Putting parts of the bike together to see if they work even if you are not sure you are doing it right</li> </ol> |
|--|--|

## DENTAL CARE

The dentist has told you that your gums are receding and that you are in danger of losing your teeth if you do not do a better job of taking care of your gums. You are not really happy about the program of care that the dentist suggested, but you realize that you need to do more to care for your gums. **How likely are you to use the following learning strategies in learning what you need to know in order to care for your gums?**

**Directions:** Select the 6 strategies from the following list of 18 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 6 other strategies that you might possibly use and place the number of these strategies in the *Possibly Use* box of the answer sheet. Select 6 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.

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| <ol style="list-style-type: none"> <li>1. Dividing the learning project into learning about general dental care and learning about your particular type of gum disease</li> <li>2. Taking time to learn enough about teeth and dental health to help you make decisions</li> <li>3. Using the Yellow Pages of the phone book to identify those offering dental services</li> <li>4. Repeating to yourself often a list of good dental care practices so you will be able to remember them</li> <li>5. Questioning the appropriateness of suggested dental practices</li> <li>6. Imagining problems you could have with your teeth to help motivate you to learn</li> <li>7. Checking to see if some profit-making agency has prepared the resource material you are using</li> <li>8. Checking to see how the cost of dental care is influencing your decision making on gum care</li> <li>9. Checking to see if what you are learning is actually helping you with your dental problem</li> </ol> | <ol style="list-style-type: none"> <li>10. Reassuring yourself that you can learn how to take better care of your gums</li> <li>11. Connecting ideas on gum care with the people who gave you the information so you will remember the ideas</li> <li>12. Seeking support from others who have had the same problem</li> <li>13. Putting dental floss next to your toothbrush as a reminder of the benefits of flossing your teeth</li> <li>14. Finding alternative dental practices and learning about them</li> <li>15. Reminding yourself how good it will feel to know you can take care of your dental problems</li> <li>16. Thinking over other things you know about dental care to see if you can remember useful ideas</li> <li>17. Revising your learning plans if you are not finding an acceptable way of caring for your gums</li> <li>18. Selecting one dental-care practice that you will try for a few weeks to see if it leads to any improvement</li> </ol> |
|--|---|

### RECRUITING LEADERS

Your best friend has been asked to help recruit leaders for a group that is going to investigate the recreation and park services in your community. You have volunteered to help study what good leaders are like and to recruit good leaders. **How likely are you to use the following strategies in learning how to recruit leaders?**

**Directions:** Select the 6 strategies from the following list of 18 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 6 other strategies that you might possibly use and place the number of these strategies in the *Possibly Use* box of the answer sheet. Select 6 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.

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| <ol style="list-style-type: none"> <li>1. Asking yourself what specifically needs to be done in your community before identifying the most appropriate leaders</li> <li>2. Reminding yourself to focus on learning about leadership rather than worrying about being able to talk people into volunteering</li> <li>3. Calling the Chamber of Commerce in your town to see if they have a community leadership group or program from which you could get ideas</li> <li>4. Skimming through the information you have to highlight the key points you want to remember when recruiting leaders</li> <li>5. Reviewing your decisions to see if friendship for certain people has influenced the suggestions you have made</li> <li>6. Thinking about how your efforts will help your community have good recreation facilities</li> <li>7. Examining closely the qualifications of those suggested as leaders by interviewing several people who have worked with them</li> <li>8. Thinking about community leaders you have known to see if the advice you are getting from others is appropriate</li> </ol> | <ol style="list-style-type: none"> <li>9. Reflecting back to see if you are sticking with your learning plan</li> <li>10. Feeling confident you will be able to convince those you identify as good leaders to volunteer their services</li> <li>11. Making up a word or phrase to remind yourself of the things you want to ask potential leaders</li> <li>12. Talking with community leaders to test out your opinions on the qualities of a good leader</li> <li>13. Using a notebook or note cards to keep track of ideas that you want to remember</li> <li>14. Thinking of many different ways of recruiting good leaders</li> <li>15. Imagining how satisfying it will be to know you affected the recreational policies of your community</li> <li>16. Recalling similar experiences you have had in selecting leaders so you can remember what worked best</li> <li>17. Asking yourself if there are any traits of good leaders about which you are still confused</li> <li>18. Thinking through what could be done if those who are selected turn out to be poor leaders</li> </ol> |
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## LETTER TO THE EDITOR

A lot of people have been concerned about an issue affecting your neighborhood. Two of your neighbors want you to help them put together a letter to the editor of your local newspaper that would state your side of the case. You agree to help plan the letter, but you realize that you first must know more about this issue and about the attitude of others toward it. **How likely are you to use the following learning strategies in learning about the issue and in preparing an effective letter to the editor?**

**Directions:** Select the 6 strategies from the following list of 18 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 6 other strategies that you might possibly use and place the number of these strategies in the *Possibly Use* box of the answer sheet. Select 6 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.

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| <ol style="list-style-type: none"> <li>1. Deciding what methods work best for you in analyzing issues</li> <li>2. Focussing on learning about the issues rather than worrying if you can write an effective letter</li> <li>3. Reading previous letters to the editor to clarify your position</li> <li>4. Skimming through the information you have to highlight the key points that you want to remember for upcoming discussions</li> <li>5. Checking the arguments of those opposing your position to pick out inconsistencies in your ideas</li> <li>6. Thinking of how the letter could improve the cooperative spirit within your neighborhood</li> <li>7. Checking with someone outside the neighborhood who knows a lot about such issues</li> <li>8. Reviewing previous letters to the editor to analyze the points that made them effective</li> <li>9. Reflecting back to see if you are sticking with your plan of learning</li> </ol> | <ol style="list-style-type: none"> <li>10. Confirming your belief that a statement of your position in a letter to the editor will bring about positive change on the issue</li> <li>11. Forming a mental outline of the points you hear in discussions that you want to remember until you get a chance to write them down</li> <li>12. Taking time to test your ideas out on people whose opinions differ from yours</li> <li>13. Keeping a list of the points you want to get more information about before you write the letter</li> <li>14. Thinking about numerous possible solutions that could be used to address this issue</li> <li>15. Thinking of the satisfaction you and your neighbors will feel in seeing your ideas printed in the paper</li> <li>16. Recalling similar experiences people have had in writing letters to the editor</li> <li>17. Getting some feedback on your ideas before you sent the letter to the newspaper</li> <li>18. Thinking about what will happen if the letter is published by the editor</li> </ol> |
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## NATIONAL PARK

You have decided to visit a national park such as Yellowstone or Grand Canyon for a summer vacation. Because of the size of the park, the crowds of people, and the park's numerous attractions, you know that you will have to learn some things about the park before you go. **How likely are you to use the following strategies to learn what you need to know in order to prepare for your trip?**

**Directions:** Select the 6 strategies from the following list of 18 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 6 other strategies that you might possibly use and place the number of these strategies in the *Possibly Use* box of the answer sheet. Select 6 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.

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| <ol style="list-style-type: none"> <li>1. Taking a few minutes to think about how you best locate the materials you will need to plan this trip</li> <li>2. Setting aside a specific amount of time to collect and review resource materials about the park</li> <li>3. Gathering some resources such as books, maps, and names of people who have been there</li> <li>4. Repeating to yourself several times the names of places in the park that others mention to you as being particularly interesting so you will become familiar with these names</li> <li>5. Thinking about where you want to stay in order to check if there are accommodations available</li> <li>6. Thinking about how nice it will be to tell stories about your trip when you return home</li> <li>7. Analyzing carefully the materials about the park that you have collected by talking to others who have been there</li> <li>8. Thinking through the kinds of things that could interfere with your enjoyment of the trip</li> <li>9. Checking periodically to see if there are other things you would like to learn about the park</li> </ol> | <ol style="list-style-type: none"> <li>10. Reminding yourself of other trips you have planned successfully</li> <li>11. Forming a mental image of what would be nice to have in the car as you travel</li> <li>12. Identifying some people who have been to the park to see if you can learn anything from their experience</li> <li>13. Starting a list of all the important questions you have about the trip so you will remember to deal with them</li> <li>14. Thinking about various things to do each day of your trip in case crowds or conditions make you change plans</li> <li>15. Thinking of the fun you are going to have learning new things about the park</li> <li>16. Recalling similar experiences you have had in the out-of-doors to decide what extra supplies you will take along</li> <li>17. Evaluating how well you have done in learning about the park</li> <li>18. Drawing up a tentative schedule of events for your trip while realizing that changes may need to be made once you get there</li> </ol> |
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## CARE FOR A RELATIVE

A close relative who has no one to rely on except you becomes seriously ill and can no longer be taken care of at home. You need to find out about the care facilities available, but you also realize you must try to calm the fears of your relative. **How likely are you to use the following strategies in learning how to find a good place for your relative to live and in learning how to help that person adjust to a new living style?**

**Directions:** Select the 6 strategies from the following list of 18 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 6 other strategies that you might possibly use and place the number of these strategies in the *Possibly Use* box of the answer sheet. Select 6 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.

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| <ol style="list-style-type: none"> <li>1. Recalling the kinds of things your relative enjoys so that you can be sure to look for those things at the various facilities</li> <li>2. Organizing your time for finding resources, learning about alternatives, and analyzing the information</li> <li>3. Calling the county courthouse to find out if there are any local agencies that provide help in locating services that help people adjust to living in a health-care facility</li> <li>4. Repeating every once in a while the points you want to remember about each place</li> <li>5. Finding out whether your idea of a good care facility matches that of the relative</li> <li>6. Deciding that it is worth the time it will take to visit all the facilities</li> <li>7. Asking yourself if the information you received from each of the care facilities is honest or if it is slanted just to draw customers</li> <li>8. Thinking through the activities that your relative enjoys to make sure the facility can provide those activities</li> <li>9. Thinking about how your concern for your relative might influence your learning</li> </ol> | <ol style="list-style-type: none"> <li>10. Feeling confident that you can find the best facility for your relative</li> <li>11. Attaching the points you want to remember to a mental image of each care facility</li> <li>12. Checking out your ideas of what a good health care facility is with people who have knowledge about these places</li> <li>13. Using a list of important things to check at each care facility to gather complete information</li> <li>14. Listing the various alternatives including the advantages of each facility</li> <li>15. Reminding yourself of how satisfied you will feel because you helped your relative find good care</li> <li>16. Recalling similar situations regarding care for the seriously ill that you have heard about from friends, professional contacts, the paper, or TV</li> <li>17. Revising your plan for learning if you cannot find ways to calm your relative's fears</li> <li>18. Selecting the most appropriate facility for your relative realizing you may later need to change your decision</li> </ol> |
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Name: \_\_\_\_\_

**Directions and Answer Sheet for SKILLS**

**First:** Read the six scenes dealing with real-life learning situations. Select **four** that make sense to you as situations that apply to you. Check these four on the following list:

- Putting Bike Together     Letter to Editor  
 Dental Care     National Park  
 Recruiting Leaders     Care of a Relative

**Second:** After you have selected four scenes, turn to the pages for these scenes that describe various learning strategies that you might use in these situations. For each scene, select the 6 learning strategies that you would **Definitely Use**, 6 that you might **Possibly Use**, and 6 that you would **Not Likely Use**. Enter the number for each of these 6 items in the proper box below.

**Scene 1:** \_\_\_\_\_

Definitely Use	Possibly Use	Not Likely Use
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**Scene 2:** \_\_\_\_\_

Definitely Use	Possibly Use	Not Likely Use
-----	-----	-----

**Scene 3:** \_\_\_\_\_

Definitely Use	Possibly Use	Not Likely Use
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**Scene 4:** \_\_\_\_\_

Definitely Use	Possibly Use	Not Likely Use
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APPENDIX E  
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 is the best way for you to learn these things?
3. What gave you the most trouble with learning something new? "Barriers" to learning in general?
4. Describe one of the best learning experiences you've had in the past 6 months.
5. Describe one of the worst learning experiences you've had in the past 6 months.
6. What did teachers do to help/hinder your progress?
7. Name 3 things that have helped you become successful in your learning experiences.
8. Would a particular type of class be helpful to a student just entering post-secondary education?

Thanks for your help with this research project!

Patricia Hays

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