LEARNING AND STUDY STRATEGIES, COGNITIVE INDICATORS, AND DEMOGRAPHIC FACTORS AS RELATED TO ACADEMIC ACHIEVEMENT AND RETENTION AMONG COLLEGE FRESHMEN

by

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DEDICATION

In memory of my sister and best friend, Judith Marie Wojciechowski,

12-18-63 to 01-06-90

A mother, English teacher, poet, and philosopher

"To laugh often & much; to win the respect of intelligent people and the affection of children; to earn the appreciation of honest critics and endure the betrayal of false friends; to appreciate beauty; to find the best in others; to leave the world a bit better, whether by a healthy child, or a garden patch or a redeemed social condition; to know that even one life has breathed a little easier because you have lived. This is to have succeeded."

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To my husband Frank, and sons, Kevin, Adam, Jeffrey, Aaron, and Andrew

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CHAPTER 1

STATEMENT OF THE PROBLEM

Introduction

The issues of academic success and retention are of utmost importance to administrators, researchers, and faculty in higher education (Bers, 1986; Blustein et al. 1986; Brooks-Leonard, 1991; Carney & Geis, 1981; Ganz & Ganz, 1988; Grosset, 1991; Morris & Losak, 1986; Pinkston, 1987; Weidman, 1985). The reality of enrollment declines and decreasing resources have contributed substantially to the renewed vigor of institutional interest in these areas (Blustein et al.; Grosset). Because of the nature of many colleges as enrollment or tuition-driven enterprises, Grosset states that "the importance of enrollment levels to the economic well-being of these schools cannot be ignored" (p. 159).

However, serious concern over recent trends which are greatly impacting on college enrollments deserves attention. Bers (1986) cites the declining number of traditionally-aged college students, increasing public skepticism about the market value of a college degree, and shifting attitudes that condone and sometimes strongly support students stopping out of college for personal as well as academic reasons. These influences are urging colleges to pay closer attention to retaining students currently enrolled.

While the community college contribution to higher education is substantial—more than half of all entering freshmen begin their careers in community, technical, or junior colleges (Parnell, 1984, cited in Morris & Losak, 1986) — community colleges are known to experience the lowest retention rates of all colleges and universities (Bers,

1986; Morris & Losak). National longitudinal data find that 40% of first-time-in college community college students leave after one year (Fetter, 1977; cited in Morris & Losak). Importantly, the lowest rate of consecutive term retention occurs from students' first to second term where retention rates of 50% are considered high (Bers; Brooks-Leonard, 1991). These retention rates are most critical because they tend to be the lowest and set the stage for subsequent term-to-term retention rates (Levitz, 1990; cited in Brooks-Leonard).

Of particular relevance, research has shown a strong relationship between freshmen who receive low first-semester grades and attrition (Brooks-Leonard, 1991; Hart & Keller, 1980). Because first year students who do poorly academically are among the least likely to complete their college career, institutions of higher education have a particular obligation to gain a greater understanding of this phenomena so that all students may have an opportunity to succeed.

In the pursuit of improving both the academic performance and retention rates of college students, numerous factors have been examined which have been thought to impact, correlate with, or predict retention and/or performance. In particular, student demographics, and cognitive and noncognitive indicators have been studied. More recently, attention has focused on the use of learning and study strategies and the use of these strategies to influence students' abilities to successfully meet academic challenges and strive toward desired goals and aspirations.

Problem Statement

Educators, administrators, and researchers are vitally interested in identifying

factors which contribute to, or underlie student success; specifically, the academic achievement and retention of students are at the forefront of institutional effectiveness issues (Aquino, 1989; Grosset, 1991; Morris & Losak, 1986).

Despite the vast amount of literature that exists on predicting attrition and academic success, Blustein et al. (1986) state that there are noticeable gaps. In particular, Brooks-Leonard (1991) finds that the literature on retention in two-year colleges is "strikingly inconclusive and at times contradictory" (p. 58).

In spite of these shortcomings, research has provided numerous insights and a rather global picture about the variables which are indeed critical and warrant further study. A great majority of studies have sought to determine the relationship between traditional academic variables, such as high school rank and ACT or SAT scores, and academic success (Kladivko, 1991). The literature on retention has examined factors that fall into three categories: (a) Student demographics, such as gender, race, age, and employment status; (b) Academic factors, such as high school grade point average (HGPA), placement test scores, or remediation status; and (c) Noncognitive factors, such as motivation, social integration, self-concept, and career readiness (cited in Brooks-Leonard, 1991).

Clearly, there is a noticeable overlap in the independent variables which are thought to affect both academic performance and retention. The importance of studying both variables consecutively is not entirely new to the literature (Bers, 1986; Carney & Geis, 1981; Pinkston, 1987; Webb, 1988).

While the degree of correlation differs from study to study, significant correlations have consistently been found between a variety of cognitive indices and

academic achievement (Kladivko, 1991). The independent variable of high school rank (Bers, 1986); HGPA (Kanoy, Wester, & Latta, 1989; Kladivko, 1991; Mathiasen, 1989; Ott, 1988; Weitzman, 1982); and ACT or SAT scores (Kanoy et al.; Mathiasen, 1984; Rounds & Anderson, 1985; Weitzman) have been found to be consistent predictors of academic achievement. Studies have also found that a significant indicator of retention is first-term college grade point average (CGPA) (Brooks-Leonard, 1991; Carney & Geis, 1981; Webb, 1988). Demographic factors associated with first-to-second term retention have included: part-time/full-time enrollment status, employment, day/evening status, and age (Brooks-Leonard; Webb).

The ASSET test (Assessment of Student Skills for Entry Transfer) is an achievement test developed by American College Testing (ACT) for use in two-year colleges; it is designed to measure achievement in numerical, writing, and reading skills (Sucher, 1992). It is designed for student assessment/placement for entry-level students (Hughes & Nelson, 1991). A study conducted by Craig (1991/1992) at two-year colleges within the Mid-Plains Technical Community College Area (MPTCCA) found that 54.7% of institutions reported using the ASSET test.

Because a large body of community colleges use the ASSET for entry level assessment/placement, and in some cases for selective admissions decisions, studies have been conducted to determine the relationships between the ASSET test and academic achievement and retention. Numerous researchers (Chacko & Huba, 1991; Gamble, 1994; Marcotte, 1991; McIntosh-Kochenderfer, 1988; Roberts, 1986; Sucher, 1992) have found significant relationships between the ASSET test (or its subtests) and academic achievement. Other findings suggest that the ASSET is not a strong predictor of academic

achievement (Albers, 1991; Gabe, 1989; Hughes & Nelson, 1991). In a study on community college student persistence, Webb found the ASSET to be statistically significant (1989).

In their mission to improve both academic performance and retention rates, college administrators have focused on a variety of variables, such as those described above, in the hopes of finding variables that correlate with performance, retention, or both. While standardized test scores and HGPAs have been shown to be the best predictors of college freshmen GPAs, their predictive power dramatically decreases as the student progresses though college (S.M.Cole, 1987/1988). Moreover, in attempts to predict CGPAs, the variables in question often account for a very small portion (about 9%) of the variance in CGPA (Kladivko, 1991; McIntosh-Kochenderfer, 1988). In some cases, a combination of variables have accounted for about 25-50% of the variability in GPA (S. M. Cole; Kladivko). The fact remains that the remaining 50-75% of the variability is <u>not</u> accounted for by variables normally considered in studies of academic success.

Thus, researchers have suggested the study of a new set of variables and an approach to decreasing attrition and promoting student success though expanding our understanding of the learning process (Chacko & Huba; 1991; S.M.Cole, 1987/1988). Increased attention has been directed toward how the student meaningfully processes information to increase learning. 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 (Dansereau, 1985).

The interest in learning strategies stems from the shift in orientation from the

behaviorist theories to the cognitive theories in learning. The cognitive approach to learning seeks to understand how incoming information is processed and structured (Richey, 1986; Weinstein & Mayer, 1986). Learning strategies have been defined in many, often similar ways. A widely accepted definition is that "learning strategies are behaviors that the learner engages in during learning that are intended to influence affective and cognitive processing during encoding" (Weinstein & Mayer, p.316). Importantly, instruction in learning strategies i.e. training in how to learn, can affect learner characteristics by making specific strategies and methods available to the learner. The use of particular learning strategies during learning can affect the encoding process, which in turn can affect the learning outcome and performance (Weinstein & Mayer).

Based upon the work of the Cognitive Learning Strategies Project (Weinstein, Zimmerman, & Palmer, 1988) the Learning and Study Strategies Inventory (LASSI) was developed. It is an assessment tool designed to measure students' use of learning and study strategies and methods. It is a diagnostic and prescriptive measure that focuses on both overt and covert thoughts and behavior (Weinstein, 1987). Numerous studies have used the LASSI, which is considered a non-traditional variable (Chacko, 1989; S.M.Cole, 1987/1988; Hulick & Higginson, 1989; Kladivko, 1991; McIntosh-Kochenderfer, 1988), in order to identify the attitudinal and cognitive factors that may contribute to student success in college.

Other studies have also found that non-traditional variables, such as those measured by the LASSI i.e. attitude, motivation, and knowledge and use of study skills, are related to academic performance and retention (Blustein et al. 1986; Ganz & Ganz, 1988; Kanoy et al. 1989; Schunk, 1990). Differences have also been identified between

traditional and non-traditional variables. Kladivko (1991) found that traditional predictors i.e. high school rank and ACT, are more powerful predictors of CGPA for students under age 21 while non-traditional predictors explain a greater percentage of the variance in grades for students 21 and older.

Finally, the difference between learning and study strategies and study skills is that study skills are techniques or methods for structuring the study environment without taking into account the cognitive activities that the student engages in while learning. Even though study skills research has provided some useful information about the conditions and methods students use to study, it gives little information about the actual learning approaches students employ to process, store, and retrieve information (S.M. Cole, 1987/1988). Conversely, research in learning and study strategies has provided some answers into the kinds of strategies that differentiate between successful and non-successful students. Continued research is needed to identify those factors that will contribute positively to academic performance and student retention and ultimately, meet the institution's as well as the students' needs.

Purpose of the Study

The purpose of this study was to examine the learning and study strategies used by college freshmen and to identify those strategies that differentiate successful and nonsuccessful students in terms of academic achievement and student retention. Another aspect of the study was to determine the contributions of learning and study strategies, the ASSET test, HGPA, gender, age, part-time/full-time enrollment status, day/evening status, and student curriculum on academic achievement and student retention.

Research Questions

The following questions were explored:

1. What is the relationship between LASSI individual subscale scores and the ASSET subtests of writing, reading, and numerical skills?

2. What is the relationship between LASSI subscale scores and academic achievement?

3. Is there a difference in learning and study strategies, ASSET, and academic achievement of retained and nonretained students who are under 25 and those who are 25 years or older?

4. What is the relationship between the LASSI, ASSET, high school grade point average (HGPA), gender, age, enrollment status, student curriculum; and academic achievement?

5. What is the relationship between gender, age, part-time/full-time enrollment status, day/evening status, student curriculum; and first-to-second term student retention?

Significance of the Study

Recently, the issue of student success and student failure in community colleges has come to the forefront (Aquino, 1989). It is considered an area of paramount importance. Increasing numbers of underprepared students are entering the community college. Importantly, the role of such institutions, and, in particular, the faculty working with these students, is not to weed them out; rather, it is to help them succeed (Banach, 1990). According to Fonte, (1990-1991) an image of "universal access and opportunity" is what community colleges should be promoting instead of an "open door" through which only a few stragglers venture (p. 47).

Because community colleges comprise the most heterogeneous student body in the world (Banach, 1990), educators in these settings have a particularly challenging agenda. Researchers are seeking answers to the complex questions of ways to reduce

student attrition and promote student success while at the same time meeting the reality of limited resources (Chacko, 1989; Chacko & Huba, 1991; McIntosh-Kochenderfer, 1988).

One response to the increasing numbers of academically underprepared students has been the creation of programs to remedy academic deficiencies. Most of these programs have focused on basic skills in mathematics, reading, communication, study skills, and attitudes. However, another set of competencies have been identified — that of learning and study strategies that students need to manage and monitor their own learning in a variety of contexts (Weinstein, Zimmerman, & Palmer, 1988). Results have shown that the more successful student, for example, the good reader and the higher achiever, reports a greater number and variety of strategies (Palmer & Goetz, 1988).

Instructors at the community college and open admissions colleges have found however, that students have great difficulty in managing and evaluating their own learning efforts. Students seem to be in agreement: on the SAT they rated study skills as the area in which they feel the greatest need for assistance (Segal, Chipman, & Glaser, 1985).

Improving learning effectiveness and efficiency is a vital concern for researchers, faculty, and students (Roth, 1991). College instructors and student support personnel need to understand the learning and study strategies of students in order to begin to take steps to assist them in becoming self-sufficient learners (Hulik & Higginson, 1989). A genuine interest in student success and a desire to foster productive learning are present in many faculty. The heterogeneous population of students requires that attention be paid to both classroom teaching and support systems within these institutions. The trend toward

accountability and assessment of learning will propel colleges as a whole to find ways to understand and measure student learning (Roth). Nationally, the American Association of Community and Junior Colleges has called for each institution to conduct its own assessment and to include study skills and motivation (AACJC, 1987; cited in McIntosh-Kochenderfer, 1988).

Further, the learning and study strategies used by students may help faculty to better understand student learning so that teaching and assessment methods can be developed which foster effective learning. By identifying learning approaches of their students, they can monitor and adjust their teaching techniques to match desired outcomes (Roth, 1991). Through the use of the LASSI, group profiles can be developed so that faculty can evaluate the learning and study strategies of the classroom as a whole, and tailor methods or focus instruction where needed.

Students can benefit from greater knowledge of the learning and study strategies they possess. While measures such as HGPA and placement tests may be strong predictors of academic success or retention, they do not identify the strengths or weaknesses of students with varying ability levels that may be amenable to intervention, if needed (S.M.Cole, 1987/1988).

Finally, community colleges are under state mandate to implement the process of matriculation, with the intention to place students appropriately, monitor their progress, and assist them toward student success (McIntosh-Kochenderfer, 1988). Administrators who value student learning bear the responsibility for using their budgets, time, and influence to wisely support these higher aims (Roth, 1991).

Definition of Terms

For the purposes of this study, the following operational definitions are used.

Academic Achievement:	The grade point average (GPA) obtained during the Fall semester, 1992.
ASSET	An achievement test developed by American College Testing (ACT) Program, Iowa City, Iowa, developed for use in two-year colleges to assess student's writing, reading, and numerical skills.
ASSET Educational Planning Form	The form developed by ACT to obtain student demographic information.
Community College	An institution of higher education with two-year transferable curricula primarily to a four year college or university. The following are usable synonyms: two-year college, junior college, and trade-technical college.
Cumulative College Grade Point Average	The multiplication of grade points assigned to letter grades for each course by the number of credit hours for each course. The sum of these products are then divided by the total number of credit hours.
Freshmen Students	Includes both first-time in a college (FTIAC) and first-time in Macomb (FTIM) students undergoing the assessment session.
Full-Time Student	A student taking 12 or more credit hours during the Fall, 1992 semester.
High School Grade Pont Average (HGPA)	The self-reported high school grade point average on the ASSET Educational Planning Form (AEPF).
LASSI	The Learning and Study Strategies Inventory (LASSI) is a 77 item form which measures 10 separate scales: Attitude, Motivation, Time Management, Anxiety, Concentration, Information Processing, Selecting Main Ideas, Study Aids, Self-Testing, and Test Strategies. Developed by Weinstein, Palmer, & Schulte (1987), it focuses on both overt and covert thoughts and behavior that relate to successful learning and that can be altered through educational interventions.
Part-Time Student	A student taking 11 credit hours or less during the Fall,

	1992 semester.
Non-Traditional Student	A student 25 years or older.
Student Retention	Enrollment of a student from the Fall term, 1992 to the Spring term, 1993.
Student Success	A combination of attainment of a grade point average of C or better overall in all course work, and retention from Fall term, 1992 to Spring term, 1993.
Traditional Student	A student under 25 years of age.

Limitations of the Study

This study was limited to one community college located in a suburban area. The types of students that enroll in this postsecondary institution may not be similar to students at other community colleges, limiting the generalizability of the findings to all community colleges.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The identification of variables which are related to, impact upon, and/or predict academic achievement and student retention are vital areas of concern to researchers, administrators, and faculty in higher education (Bers, 1986; Blustein et al. 1986; Brooks-Leonard, 1991; Carney & Geis, 1981; Ganz & Ganz, 1988; Grosset, 1991; Morris & Losak, 1986; Pinkston, 1987; Weidman, 1985). Therefore, the literature review that follows will be organized and synthesized in relationship to these concepts. Cognitive learning theory, constructivism, and metacognition and motivation provided the theoretical background for this study.

The theoretical background for the study is presented first followed by an examination of learning and study strategies. Research studies relating to the Learning and Study Strategies Inventory (LASSI) are reviewed and summarized. Conceptual models of student attrition and retention are presented. A thorough review and synthesis of the research on variables related to both student attrition and retention and academic achievement are presented according to the following classification: (a) academic or cognitive variables, (b) noncognitive variables, and (c) demographic factors.

The review of the literature is organized in the following way: (a)Theoretical Background, (b) Learning and Study Strategies, (c) Learning and Study Strategies Inventory (LASSI), (d) Academic Achievement, and (e) Student Attrition and Retention.

Theoretical Background

Overview. Cognitive learning theory, constructivism, and metacognition and motivation provided the theoretical framework for this study. While behaviorism dominated the first half of this century, a paradigm shift has occurred — that of cognitive learning theory and more recently, constructivism. Metacognition is grounded in constructivist theory and provides a foundation upon which students can construct new information (Narode, 1989). Further, the importance of coordinating research studies and establishing research connections among cognitive, metacognitive and motivational determinants of learning behavior has been encouraged by Weinert (1987).

Cognitive Learning Theory and Constructivism. In cognitive learning theories, learning is a function of what learners know and how they come to acquire it. The mind is the agent of learning (Jonassen, 1991b). Richey (1986) suggested that the principal concerns are in how a learner remembers and retrieves information from memory. A large school of thought has been greatly influenced by computer science. Gestalt theory and information processing theory have been influential in this area.

There has been a move from the objectivist tradition — that of Behaviorism and Cognitivism to that of Constructivism (P. Cole, 1993; Jonassen, 1991a, 1991b; Richey, 1994). Constructivism is a fairly recent term used in the educational and psychological literature; however, it can be traced back more than a quarter of a millennium (Glaserfeld, 1989). Giambattista Vico is often credited with the earliest recorded idea of constructivism in which knowledge was referred to as being "constructed." Others noted as following the constructivist tradition included

Immanuel Kant (Jonassen, 1991b), John Dewey, and Jean Piaget (Glaserfeld; D. N. Perkins, 1991). D.N. Perkins also noted that constructivism had roots in the emergence of cognitive psychology under the guidance of Jerome Bruner and Ulrick Neisser and the constructivist perspective of philosophers such as Nelson Goodman.

Constructivism claims that reality is more in the mind of the knower, that the knower constructs a reality, or at least interprets it, based upon his or her apperception. The object in objectivism is on the object of our knowing, whereas constuctivism is concerned with how we construct knowledge (Jonassen, 1991a). According to constructivists, thinking is grounded in perception of physical and social experiences, which can only be comprehended by the mind.

Jonassen (1991a) pointed out that the important epistemological assumption of constructivism is that meaning is a function of how the individual creates meaning from his or her experiences. Humans are perceivers who construct their own reality through engaging in mental activities: "Cogito, ergo sum" (I think therefore I am — Descartes). Therefore, the existence of the individual is predicated on his or her own constructions.

Central to the notion of constructivism is the notion of the organism as "active"— not just responding to stimuli, as in the behaviorist tradition, but engaging, grappling, and seeking to make sense of things. Specifically, learners do not just take in and store up information, they make tentative interpretations of experience and go on to elaborate and test those interpretations (D. N. Perkins, 1991). Jonassen (1991a, 1991b) argued that the context in which one learns is critical. It provides real-world and relevant situations for acquiring knowledge. Seels (1989) asserted that the

"constructivist paradigm states that learning occurs because personal knowledge is constructed by an active and self-regulated learner who resolves conflicts between ideas and reflects on theoretical explanations" (p.13).

Metacognition and Motivation. Metacognition has evolved from early work in cognitive-developmental psychology and is critical for successful learning (Osman & Hannafin, 1992). It is grounded theoretically in Flavell's model of cognitive monitoring (1979). Flavell defined metacognition as "knowledge and cognition about cognitive objects, that is, about anything cognitive." (Flavell, 1987). However, he stated that the concept could be broadened to include anything psychological, rather than just cognitive. The key concepts in his taxonomic classification included: (a) metacognitive knowledge, and (b) metacognitive experience.

Flavell (1979; 1987) conceived of metacognitive knowledge as subdivided into three categories: (a) person variables, (b) task variables, and (c) strategy variables. Person variables referred to the kind of acquired knowledge and beliefs that concern what human beings are like as cognitive (affective, perceptual...) organisms. With task variables, the individual learns something about how the nature of the information encountered affects and constrains how one should deal with it. Strategy variables consisted of both cognitive and metacognitive aspects. Each of the three variables always interact.

The other major classification that Flavell described is metacognitive experiences. These are conscious experiences that have cognitive and affective components. They are unique in that they have to do with some cognitive endeavor, or enterprise, most frequently, a current, on-going one. As an example, if one

suddenly has an anxious feeling that one is not understanding something and wants and needs to understand it, that feeling would be a metacognitive experience. These experiences are often pertinent to an ongoing situation, perhaps of an intellectual matter. These experiences play a crucial role in everyday cognitive lives. As one gets older, one subsequently learns how to interpret and respond to these experiences (1987, p. 24).

Brown (1987) agreed that metacognition refers loosely to one's knowledge and control of one's own cognitive system. However, she cited two problems with the term: (a) it is often difficult to distinguish between what is meta and what is cognitive, and (b) there are many different historical roots from which the area of inquiry developed. Despite these problems, a considerable amount of research has been reported on metacognition. Osman and Hannafin reviewed five aspects of metacognition that are frequently studied: (a) metamemory, (b), metacomprehension, (c) self-regulation, (d) schema training, and (e) transfer (1992).

Metamemory includes, but is not limited to, awareness of different memory systems, knowledge of which strategy to use for particular memory tasks, and knowledge of how to use given strategies (Osman & Hannafin, 1992, p. 84). Metacomprehension, or comprehension monitoring refers to conscious processes of knowing about comprehending and knowing how to comprehend (Brown, 1975, cited in Osman & Hannafin, 1987). Schema training involves the development of cognitive structures that provide a conceptual framework for comprehension (Gordon & Braun, 1985, cited in Osman & Hannafin, 1992). Transfer is considered an essential concept if learners are to acquire independence and self-sufficiency. Transfer requires the

application of a trained strategy to dissimilar learning tasks, problems, or circumstances (Clark, 1984, cited in Osman & Hannafin, 1992).

Zimmerman (1994) found that during the past two decades researchers have revealed a fascinating picture of the processes through which students are willing and able to assume responsibility for self-regulation of academic learning and performance and ultimately, self-regulation of academic achievement (p.3). Zimmerman (1986) asserted that self-regulated learning constitutes a critical new approach to the study of student academic achievement. Self-regulation theory focuses attention on how students personally activate, alter, and sustain, their learning processes in specific contexts. Students are metacognitively, motivationally, and behaviorally active participants in their own learning. Metacognitively, self-regulated learners plan, organize, self-instruct, self-monitor, and self-evaluate at various stages during the learning process. Motivationally, they perceive themselves as competent, self-efficacious, and autonomous. Behaviorally, self-regulated learners select, structure, and create environments that optimize learning (p. 307-308).

From the research conducted on metacognition it is clear that metacognitive skills are needed for individuals to regulate, control, and evaluate their own learning. These skills are involved in the knowledge and control of cognition and affect. Metacognitive skills provide the basic structure for the development of self-control of learning. For learning to be effective, learners must be actively engaged in the self-management and self-control of their own learning. Critical to the discussion of metacognition is that of motivation. McCombs (1988) stated that in order for learners to accept responsibility for their own learning, students' must be motivated as well as

possess the skills and abilities to actively engage appropriate metacognitive, cognitive, and affective (motivational) strategies. While there is no major study that thoroughly examines the exact relationship between adult motivation and learning, there is substantial evidence in youth education that motivation is consistently and positively related to educational achievement (Wlodkowski, 1985). Meece (1994) provided a research review which demonstrated that motivation in classroom settings has important implications for classroom learning, particularly in elementary and middle school students.

Several studies have explored the relationship among cognitive-motivational processes and academic performance among college freshmen (Baker & Siryk, 1984; Trawick, 1988). Baker and Siryk conducted a longitudinal study using a measure of academic motivation — the Academic Motivation Scale. They used a variety of behavioral outcomes in the study and concluded that the higher the level of academic motivation, the higher the high school rank of college students.

Trawick (1988) investigated the relationships among self-regulated learning strategies, attributional patterns, academic performance expectancies, and academic performance. Subjects consisted of 97 community college students, 70% minority. Significant positive relationships were found between self-regulated learning strategies and academic performance expectations and attributional patterns. It was concluded that students may benefit from learning ways to assess the relationship between their own efforts and academic outcomes.

Learning and Study Strategies

Overview. There are many definitions and conceptions of learning strategies.

Recently, McWhorter (1993) completed a meta-analysis of learning strategy research conducted at the postsecondary level. Based upon her research, she developed a definition of learning strategies: "An action, representative of a process i.e. selection, transformation, extension, monitoring.., that a learner initiates and maintains in response to a cognitive task" (p. 8). Weinstein and Mayer (1986) defined learning strategies as "behaviors and thoughts that a learner engages in during learning that are intended to influence the learner's encoding process" They stated that the goal of any particular learning strategy may be to affect the learner's motivational or affective state, or the way in which the learner selects, acquires, organizes, or integrates new knowledge (p. 315).

While the literature on learning strategies is vast, the following sections provide background knowledge and an overview of issues and trends in learning strategy research. A discussion of study skills is also presented because it is a term often confused with, used in place of, or in conjunction with learning strategies.

Issues in Learning Strategy Use. According to McWhorter (1993), there has been a renewed interest in how students learn and what helps students to learn. Four factors in the literature have been identified related to this renewed interest in learning: (a) an emphasis on cognitive psychology; (b) an emphasis on the active role of learners; (c) the use of integrative models of learning which describe more than one aspect of learning; and (d) a more diverse postsecondary population of learners.

Despite the increased interest in student learning, McWhorter (1993) concluded that the extant literature on learning strategies is neither straightforward nor consistent. Five key unresolved issues are evident in the literature:

1. Lack of consistent support for learning strategy use
2. Domain specific or general learning strategies
3. Importance of training in learning strategies
4. Lack of transfer
5. Lack of external validity.

In addition, questions about the use of self-report data about subjects' learning strategy use center around three issues:

1. Lack of truthful and/or accurate information
2. Lack of subjects' awareness
3. Interruption of learning (McWhorter, 1993).

Framework for Analyzing the Teaching-Learning Process. According to Weinstein (1987), there is no generally accepted scheme for classifying learning strategies, partly because they are continually evolving. However, Weinstein and Mayer (1986) developed a preliminary set of categories that reflects the current state of research and practice. The categories of learning strategies are one part of a framework for analyzing the teaching-learning process. The seven elements that make up this framework include:

- Teacher Characteristics - including the teacher's existing knowledge concerning the subject matter and how to teach that may be required for the teaching strategy selected
- Teaching Strategies - including the teacher's performance during teaching such as what is presented, when it is presented, and how it is presented
- Learner Characteristics - including the learner's existing knowledge concerning facts, procedures, and strategies, that may be required for the learning strategy selected
- Learning Strategies- including behaviors that the learner engages in during

learning that are intended to influence affective and cognitive processing during encoding

- Encoding Process - including internal cognitive processes during learning such as how the learner selects, organizes and integrates new information
- Learning Outcome - including the newly acquired knowledge that depends on both teaching and learning strategies
- Performance - including behavior on tests of retention and transfer.

Categories of Learning Strategies. Instruction in learning strategies can affect learner characteristics by making specific strategies available to the learner. Eight categories of learning strategies are identified by Weinstein and Mayer (1986). Each category includes methods designed to influence certain aspects of the encoding process to facilitate one or more types of learning outcome and performance. The eight categories include:

- Basic rehearsal strategies
- Complex rehearsal strategies
- Basic elaboration strategies
- Complex elaboration strategies
- Basic organizational strategies
- Complex organizational strategies
- Comprehension monitoring strategies
- Affective and motivational strategies

Basic and complex rehearsal strategies emphasize repetition in various forms. In general, they are designed to facilitate basic recall. They are especially effective when they are used as means for active rehearsal i.e. when repetition is used to hold

onto new information to help provide further occasions for more meaningful learning to take place using elaboration, organization, or comprehension monitoring strategies. Numerous studies have been conducted using rehearsal strategies, especially related to those with children (Weinstein & Mayer, 1986).

Basic and complex elaboration strategies involve adding some type of symbolic construction to what the student is trying to learn in an attempt to make it more meaningful. Basic elaboration involves paired-associate learning, serial list learning, and free recall list learning. A major cognitive goal of elaboration is construction- building of internal associations between two items (or among several items) in the material to be learned. Constructions can be either imaginal, such as using mental images to help relate and represent items in a pair (paired-associate learning) or verbal, which can be used in conjunction with an imaginal strategy i.e. to learn a foreign language vocabulary. Complex elaboration strategies include paraphrasing, summarizing, creating analogies, note-taking and question answering. The goals of these techniques include integration of presented information with prior knowledge (Weinstein & Mayer, 1986).

Basic and complex organizational strategies are used to transform information into another format that is easier to understand. The advantage in using these strategies relate to both the processing involved in accomplishing the transformation and the structure imposed. Examples include clustering, outlining, and a technique called networking. Networking trains students to identify main internal connections among ideas. Organizational strategies are useful in the case of an existing or created scheme and is used to impose organization on an otherwise unordered set of items

(Weinstein & Mayer, 1986).

Comprehension monitoring strategies are most often operationalized as metacognitive strategies. The term metacognition has been used to refer to both students' knowledge about their own cognitive processes and their ability to control these processes by organizing, monitoring, and modifying them as a function of learning outcomes (cited in Weinstein & Mayer, 1986). The main task of comprehension monitoring is accomplished by assessing one's level of understanding. A wide variety of strategies may be used but most focus on some type of self-questioning, applying a principle to a new situation, and looking for new examples of a concept.

The last category, affective and motivational strategies includes methods that students use to help create and maintain climates for learning. Research in this area has focused on the strategies learners use to focus attention, maintain concentration, manage performance anxiety, establish and maintain motivation, and manage time effectively.

Study skills vs. Learning Strategies. Nisbet and Schucksmith (1986) compared study skills vs. learning strategies. Learning strategies are the processes that underlie performance on thinking tasks. Strategies are more than simple sequences or agglomerations of skills; they go beyond the routines advocated in some study manuals. They are usually goal-oriented and purposeful but may not be carried out at a conscious or deliberate level. They may be lengthy or very rapid in execution such that it may be impossible to recapture, recall or even be aware that one has used a strategy. Strategies represent higher-order skills which control and regulate more

task-specific or more skills; they are more general in nature.

An important principle relates to the notion of "learning to learn." Learning theorists begin with the principle that "learning to learn" is a capacity to be developed concurrently with the experience of learning. The teaching of study skills often fails to build on this principle. Even though students may learn rules, they may continue to rely on previous habits acquired through their past experience with learning. While the study skills movement has continued to gain momentum in recent years, six criticisms are identified:

1. It lacks a theoretical basis, having no link with development in cognitive psychology.
2. It lacks an empirical basis, being based on self-perpetuating consensus.
3. It is often too general and out of context, so that it is not seen by learners as relevant to their needs and so is not applied.
4. It is not transferable, often being a collection of tips for coping with specific subject-based procedures.
5. It can too readily become merely a way of coping with the formal requirements of the school system, particularly passing examinations.
6. It is too late, in that habits are already formed by age sixteen or seventeen (Nisbet & Schucksmith, 1986).

Learning and Study Strategies Inventory (LASSI)

LASSI. The LASSI is an assessment tool designed to measure students' use of learning and study strategies and methods. The instrument consists of 10 scales consisting of :attitude, motivation, time management, anxiety, concentration, information processing, selecting main ideas, study aids, self-testing, and test strategies (Weinstein, 1987). Weinstein states that the LASSI is a diagnostic and prescriptive measure with a focus on both covert and overt thoughts and behavior.

Numerous studies have been conducted using the LASSI (Chacko, 1989; S.M. Cole, 1987/1988; Confer-Owens, 1992; Haynes, Comer, Hamilton-Lee, Boger & Joyner, 1987; Giles, 1994; Hulick & Higginson, 1989; Nist, Mealey, Simpson, & Kroc, 1990; Melburg, Lettus & Bonesteel, 1993; McIntosh-Kochenderfer, 1988; McKnight, 1993/1994; Normandin, 1993/1994; Olejnik & Nist, 1992; A.W.Perkins, 1991/1992; Rather, 1992/1993; Williams, 1995). Issues such as the realiablity and validity of the LASSI, student retention and attrition, and academic achievement have been addressed by these studies.

In particular, several studies have focused on the psychometric properties of the LASSI (Chacko, 1989; S.M.Cole, 1987/1988; Confer-Owens, 1992; A.W. Perkins, 1991/1992; Giles, 1994). The purpose of Chacko's study was to provide data regarding the construct validity and internal consistency of the LASSI for use with nursing students at a two-year community college. Factor analysis was performed and indicated four useful subscales instead of the ten indicated on the original version of the LASSI, including: (a) self-monitoring/use of study strategies,(b) self-efficacy, (c) concentration/preparation, and (d) motivation. Reliabilties for each of the subscales were determined by examining the internal consistencies as computed by Cronbach's alpha. The reliability estimates for subscales 1, 2, 3, and 4 were .86, .88, .91, and .80 respectively. The results of Chacko's study suggested that the variables influencing the learning process are highly interrelated and overlap. In a subsequent study, Chacko and Huba (1989) found that the four subscales were related to academic achievement. In a summary of scale descriptions of the LASSI, Gilles (1994) categorized the LASSI into the following three scales: (a) cognitive: information

processing, selecting main ideas, self-testing, study-aids, and test-taking; (b) motivation: anxiety, attitude, and motivation, and (c) time management: concentration and time-management.

S.M.Cole (1987/1988) conducted a validity study on the LASSI with college freshmen. The purpose of the study was to validate the LASSI to predict first semester college grade point average (CGPA). Concurrent validity was measured by correlating LASSI scores with CGPA. The resulting correlations were significant ($p < .05$); however, they were low, indicating that the LASSI is not highly correlated with performance as measured by CGPA. The LASSI scale of information processing was the only scale that was not significantly correlated with CGPA, a skill that may become more important as students progress through school. The reliability coefficients were obtained on all LASSI scales. Alphas ranged from .65 to .79 and indicated that the LASSI scales were reliable for the population that was investigated.

Even though the LASSI was not highly correlated with CGPA, additional information about learning strategies and the kind of skills that are necessary for the actual learning process to occur was obtained. Anxiety, concentration, test strategies, and selecting main ideas, appear to be those behaviors that are needed when approaching an academic task and when preparing to study. Information processing study aids, and self testing appear to be those skills that the student actually uses or engages in when learning (S.M.Cole, 1987/1988).

S.M.Cole also found that successful college freshmen, as measured by CGPA, are those who are able to concentrate on specific tasks, are motivated to perform, have the proper attitude for success in college, and are able to effectively deal with anxious

or tense situations. Also, the skills of being able to select salient points when learning and studying and being able to test one's self on review material effectively and to create study aids contribute to academic success (1987/1988).

In another study, A.W.Perkins (1991/1992) examined the construct and predictive validity of the LASSI. Subjects included college freshmen from a selective public institution. When subjected to factor analysis, twenty, rather than ten factors were extracted, and item loadings onto factors were inconsistent and multiple. Construct validity was nonexistent for the sample. Low predictive validity of the LASSI was found when first semester CGPA was the performance criterion. Statistical analysis revealed that the LASSI is reliable. Caution in interpreting these findings is related to the following limitations:(a) range restriction of the accessible population, (b) potential for sampling bias, and (c) possibility of sample contamination.

Gilles (1994), in an interesting report on assessing student study skills and learning strategies, sought to pre-validate three instruments, one of them being the LASSI. The five scales of attitude, motivation, anxiety, time management and test strategies were shown to be valid and reliable scales. In addition, the time management, anxiety, concentration, selecting main ideas, and possibly the motivation scales were found to be a good model for the regression effects on final course grades.

Other studies using the LASSI have found that the motivation subscale accounted for the greatest amount of variance in both CGPA (McIntosh-Kochenderfer, 1988) and in high and low achieving high school students (Haynes et

al.1987).

The LASSI has also been studied for its potential use within a variety of populations and other uses in addition to being a diagnostic and evaluation tool Melburg et al. (1993) modified and created an adult version of the LASSI termed the A-LASSI. Using the A-LASSI, these researchers generated normative information for adult learners in distance education programs. Adult norms on the A-LASSI when using the 10 subscales of the original LASSI are clearly higher than those obtained on traditional college age students attending campus-based degree programs. Using a factor analysis, it appeared that the A-LASSI can be parred down to a 64 item instrument measuring only 7 scales: The scales included: (a) self-discipline routines-time management, (b) anxiety, (c) studying techniques, (d) preparation techniques, (d) comprehension skills, (e) attitude toward college, and (f) social/peer support.

Olejnik and Nist (1992) designed a study to measure the latent variables measured by the LASSI and to investigate constructs in learning models for adults. Exploratory and confirmatory factor analysis indicated the inventory is multidimensional and concluded that the following three constructs are assessed by the 10 scales of the LASSI: effort-related activities, goal-orientation, and cognitive activities. By using structural modeling, the interrelationships among important theoretical but nonobservable constructs can be estimated and tested. The results of the study indicated that the LASSI is a complex measurement tool that has considerable potential as a research instrument in addition to being a diagnostic and evaluation tool.

Williams (1995) studied the cognitive and affective learning strategies of

participants in 12 rural high schools. Results indicated that addressing both the cognitive and affective dimension, as measured by the LASSI, provided a more comprehensive picture of self-regulated learning. In this study, motivation and cognitive self-testing and test strategies were linked to differentiating students with high and low self-regulatory efficacy.

In another study using the LASSI, Confer-Owens (1992) assessed learning strategies of college freshmen. Two methods of teaching study skills to underprepared students were compared. Results indicated that neither approach made any significant difference in the students' attitudes, motivation, or time management skills. Normandin (1993/1994) also used the LASSI with a sample of college freshmen. The experimental group was provided with detailed information of the assessment during their first semester and short-term intrusively delivered intervention while the control group received assessment results later in the semester and did not have individual sessions. Results indicated that the relationship among these factors was unrelated to students' cumulative grade point average, graduation, retention or attrition.

The LASSI was also used to assess college students' use of learning and study strategies as a means to measure cognitive and affective growth following a study strategies course. Pre and posttest measures indicated cognitive and affective growth for regularly admitted and developmental studies students. While the LASSI was significantly predictive of regularly admitted students' grade point average, no scale or combination of scales was predictive of course grades for developmental studies students. It was concluded that more data needs to be collected on at-risk populations, since the norming group used to test the reliability of the LASSI was regularly

admitted freshmen (Nist et al. 1990).

Higgison (1990) used the LASSI to determine the difference in the use of learning and study strategies between traditional and nontraditional students in a regional state university during the fall, 1989 semester. Nontraditional students were defined as age 25 and older and no previously earned college credit. The results indicated that nontraditional students differed from traditional students in their reported use of learning and study strategies when compared to the norming group and when compared from the sample used in the study. Nontraditional subjects reported having a better attitude toward learning and studying than traditional subjects, a higher degree of motivation to succeed in academic work, reported making use of time management principles more frequently, and used the strategies of selecting main ideas, acquiring new knowledge and using review or self testing procedures more frequently (1990).

Research Related to Academic Achievement

Overview. The prediction of academic success at the college level has been extensively researched. Effective measures of student success have been identified in the literature; however, results are often contradictory and inconclusive. The following review is presented in a framework that is often used to study retention in higher education (Brooks-Leonard, 1991; Pickering, Calliotte, & McAuliffe, 1992) but has also been used to study academic achievement in the community college (Wonnacott, 1989). The framework consists of three categories that are useful for analyzing and synthesizing the research on academic achievement: (a) academic or cognitive variables (b) noncognitive variables, and (c) student demographics.

Academic and Cognitive Variables. Research in the areas of reading, writing, and numerical skills and their relationship to academic achievement is vast. Wonnacott (1989) in an extensive review of the literature, summarized the findings of 37 research studies, dating from 1970-1987, on reading ability and grades in the community college. The dependent variable included both course grades and CGPA as the dependent variable. College freshmen as a whole were studied as well as special interest groups such as nurses, African Americans, and transfer students. Pearson r values were reported from .22 to -.54. Overall, a positive relationship was found between reading ability and grades in the community college; however, Wonnacott cautioned that it is difficult to conclude that reading ability causes or even predicts academic success. It does appear to be an important variable related to academic success in the community college.

Wonnacott (1989) also reviewed the literature on math ability and grades in the community college. Not surprisingly, she found that math has a relationship to academic success in science and technology courses. When combined with reading, it is related to overall CGPA. In terms of writing ability, Wonnacott found very few studies that looked at writing in isolation. Only five studies were found that used writing as the only variable. Four of the studies found a positive relationship, one did not. Roberts (1986) was the only study which used the ASSET test and found writing skills to be an unimportant variable. No conclusions could be drawn from the review on writing skills because of the small number of studies available.

Several doctoral dissertations have also studied the relationships among reading, writing, and numerical skills, using the ASSET test as the assessment tool.

McIntosh-Kochenderfer (1988) found that the ASSET test explained from 6-9% of the variance in CGPA. Chacko administered the ASSET as one of three instruments used in her study on a sample of 134 first year nursing students enrolled in a midwestern community college during the 1988-1989 academic year. As expected, reading and writing ability (which together make up the verbal component of the ASSET) accounted for 38% of the variance in CGPA. The failure to find math ability to have a direct effect on academic achievement was unexpected. Chacko suggested that further research should examine if the ASSET's elementary algebra test would assist in determining students' preparedness in a nursing program (1989).

Sucher's (1992) doctoral dissertation examined the effects of reading achievement on college success of community college freshmen. He found that reading skills, as represented by scores on the reading portion of the ASSET were related to classroom performance, regardless of the type of student's program of study. The reading test can be used as an indicator of first semester performance. Sucher also found that student success, as defined as earning a grade of A, B, or C in all courses completed in a specific semester, is higher for those students with higher reading skills. In particular, those students scoring 38 or above on the ASSET reading test have a mean grade point average and success rate higher than the group of students scoring below 38. He concluded that reading test scores as a valid predictor of short-term performance can unquestionably be used as diagnostic tool for placing students into courses.

In another doctoral dissertation studying the effects of the ASSET test on student success, Krol (1993) concluded that the reading, writing, and math skills basic

tests of the ASSET were useful predictors of classroom success in the community college. Specifically, students with high ASSET scores were more successful as measured by course grades in three introductory courses (biology, English, and political science) than students who scored on the low category of the ASSET.

Measures of past performance have consistently been related to academic achievement (Bers, 1986; Johnson, 1989; Kanoy et al. 1989; Kladivko, 1991; Mathiasen, 1984; Ott, 1988; Rounds & Anderson, 1985; Weitzman, 1982). Johnson found that the best single predictors of first year CGPA were the ACT and high school rank. HGPA has been found to be a good predictor of grade point averages. In a summary of the literature on HGPAs, it was concluded that HGPAs by itself was a better predictor of community college success than scores on the ACT or SAT (Krol, 1993; Wonnacott, 1989).

Noncognitive Variables. Previous research has raised questions about the validity and utility of using only traditional cognitive predictors to study student academic achievement. Researchers are exploring new variables, in addition to the traditional cognitive variables, which may be related to students success in college (Abbott, 1994; Chacko, 1989; Kanoy et al. 1989; Kladivko, 1991;McIntosh-Kochenderfer, 1988; Pickering et al. 1992; Sargent, 1994/1995; Wonnacott, 1989).

Abbott's recent research (1994) concluded that the noncognitive variables of motivation, test anxiety, academic attitude, and study habits had a higher predictability of student success than the use of past academic performance, that of HGPA, although HGPA was shown to be a valid indicator as well. The combination of using HGPA and noncognitive indicators gives the community college an even

higher rate of predictability. Conversely, Sargent concluded that noncognitive dimensions, as measured by the Noncognitive Questionnaire (NCQ) which assessed eight noncognitive variables, was not a significant predictor for either traditional or non-traditional students. He did conclude, however, that prior academic achievement was significant for both traditional and non-traditional students (1994/1995). A potential limitation in terms of the findings relates to the small sample of non-traditional age students.

Motivation has been found to be a strong influencing factor on academic achievement, however, its particular influence is not known (Chacko, 1989). In Chacko's path analysis model, it was suggested that motivation had a significant direct effect on three separate variables (a) self-monitoring/use of study strategies, (b)concentration/preparation for class, and(c) feelings of self-efficacy. McIntosh-Kochenderfer (1988) also found a positive relationship between motivation and coursework for community college students. When CGPA was regressed on the LASSI scales, the LASSI explained 16% of the variance in CGPA; the motivation scale alone explained about 13% of this variance.

In another study, Hart and Keller (1980) asked first semester freshmen to indicate the reasons that contributed to their poor academic performance. Results indicated that freshmen contributed their low grades on lack of motivation, improper study habits, and inattention to school work. Pickering et al. (1992) also used a Freshmen Survey to measure noncognitive predictors of academic difficulty or academic success after the freshmen year. Results indicated that the use of noncognitive indicators alone was better than the use of either cognitive or

demographic predictors alone in predicting academic difficulty or success. This study also confirmed the use of noncognitive predictors in identifying students needing additional assistance.

Demographic Factors. Evidence exists that the age of a student has a direct effect on his/her academic success (Kladivko, 1991). Wonnacott, in her comprehensive review of the literature from 1972-1986 concluded that older students perform better than do younger community college students(1989). Fredrick investigated differences between adult students, 25 years and older compared to their younger counterparts, after leaving a two-year university. The groups differed in that the adult students had higher grade point averages at both the two-year college and the subsequent four year college (1985). Georgakakos's study on community college students also found that older students tended to have greater success and achieved higher grade point averages in both political science and history (1990).

Ganz and Ganz (1988) explored the factors which affect grades at a large New England community college, typical of enrollment at American community colleges. Questionnaires and short tests were completed by 203 students, divided into the following age ranges: 17 to 20, 21 to 25, 26 to 30, and 31 and older. Results concluded that age was useful in predicting grade performance, with the younger students averaging almost ten percent lower in grades than the older students.

In another study examining the factors which influence grade point averages at the community college, Johnson and Walberg (1989) also found that age has a powerful positive influence on grade point average. An interesting analysis was conducted in calculating grade point averages over four year intervals, starting at age

19, controlling for other variables. It was determined that the largest change in CGPA occurred in the 23 to 27 year old interval and the next largest in the 27 to 31 year old interval. The third largest was in the 19 to 23 year old category, approximately that of the traditional college age student. Age and CGPA increased up to a certain point; in this study until age 31, at which point there were no longer additional increases in CGPA as age increased. With this group of students, the influence of CGPA after age 40 was almost nonexistent.

Research on the effects of gender has indicated that gender affects the correlations between the traditional predictor variables of standardized test scores and measures of past performance, such as that of the CGPA. Research on the effects of gender and the non-traditional variables and CGPA is less conclusive (Kladivko, 1991). Wonnacott's (1989) review of the literature on gender revealed that females earned higher GPA's than did males, but may not be an effective predictor in some programs, such as math, computer programming, and chemistry. Johnson (1987) also concluded that on the average, women had higher CGPA's than men. McCornack and McLeod conceded that hundreds of studies have found that women consistently get better grades at the high school level and also at the college freshmen level. They caution regarding the gender bias of systematically underpredicting for women, usually as a result from gender-related course effects (1988).

Finally, several studies have found that evening students fared better academically than daytime students (Georgakakos, 1990; Johnson, 1987). Georgakakos concluded this even after controlling for age and instructor effects. Johnson's study found that part-time students had higher CGPA's than full-time

students (1987) while other studies show that full-time status was significantly related to CGPA (Brooks-Leonard, 1991; Webb, 1988).

Attrition and Retention

Overview. Retaining students is a concern at all educational levels. While retaining students at the elementary and secondary levels is a matter of state and/or local mandates, at postsecondary levels student retention has no guarantees and is an issue that concerns both faculty and administration (Feldman, 1993). While the literature on attrition and retention in higher education is vast (Bers, 1986), the literature relating to retention in two-year colleges is often inconclusive and at times contradictory (Brooks-Leonard, 1991). Despite this finding, high attrition rates in two-year colleges have been well documented with reports of 50% attrition rates between the first and second year of enrollment (cited in Gates & Creamer, 1984). Lenning, Beal, and Sauer (1980) stated that retention and attrition are related to enrollment such that retention occurs when one continues to enroll or returns to the college after an absence, and attrition occurs when one does not enroll for a term but has not graduated or completed a degree (cited in Bers, 1986).

Numerous individuals have shed light not only on the conceptual models of attrition and persistence (or retention) in higher education but on the variables thought to impact or predict which individuals are likely to leave the academic institution vs. those that continue to enroll, or persist (Bedford & Durkee, 1989; Bers, 1986; Brooks-Leonard, 1991; Dunphy, Miller, Woodruff, & Nelson, 1987; Feldman, 1993; Fuller, 1983; Gates & Creamer, 1984; Grosset, 1991; House, 1992; Naylor & Sandford, 1982; Pickering et al. 1992; Pugh, 1991; Seidman, 1991; & Webb, 1988). It

is vital that administrators, faculty and others involved in student retention efforts in two-year colleges, have at a minimum, background knowledge and insight into those factors that may play a role in retaining students.

Conceptual Models The literature and research on models of student retention/attrition are relatively complex. They have been formulated and tested; however, their focus has been primarily at the baccalaureate level and in residential institutions (Bers, 1986; Webb, 1988). Retention research is often criticized from two-year college practitioners who argue that researchers do not understand certain special characteristics of their student clientele (Gates & Creamer, 1984). Most of the studies that have focused on two-year colleges, such as that described by Pascarella and his colleagues (1986), have tested the applicability of Tinto's model of student retention/attrition for two-year institutions. As Tinto (1987) and others pointed out, differences in the nature of two-year and four-year colleges and their students suggested that Tinto's original model may be unsuitable for two-year institutions.

The literature described several models of student attrition/retention (Bers, 1986, Brooks-Leonard, 1991; Feldman, 1993; Grosset, 1991; Webb, 1988). The following discussion will review several retention models, including Tinto's original retention model and model's evolving from his work. Webb (1988), in particular, provided a systematic overview of the following models: Spady's, Tinto's, Tinto's Revised Model, Pascarella's, and Bean's.

Spady's Model. Spady (1970) developed the first widely accepted theoretical model of college student retention. Spady asserted that students enter college with a complex pattern of dispositions, interests, expectations, goals, and values that are

shaped by family background and high school experiences. These factors influence the student's ability to adjust to the pressures found in the college environment. Integration into the college depends on meeting the demands of both its social and academic systems. It is the degree of institutional commitment in conjunction with grade performance that directly determines the student's decision to drop out (see Figure 1) (cited in Webb, 1988).

Tinto's Model. Tinto's (1975) model is the most widely recognized and tested model of student retention/attrition (Bean, 1986; Pascarella et al. 1986; cited in Webb, 1988). His model is longitudinal in nature and emphasizes integration and commitment. Tinto stated that integration into the institution is dependent on two factors (a) academic integration, and (b)social integration. The interaction between the student's commitment to the goal of college completion and his/her commitment to the institution determined whether or not the student decided to drop out. Tinto's model is comprehensive and allows for the interaction among numerous variables (see Figure 2). Many studies have shown that in two-and four-year commuter institutions, academic integration had greater indirect effects on dropout than did social integration (cited in Webb, 1988).

Tinto's Revised Model. Tinto modified his model in 1987 to reflect the results of recent research and to incorporate the work of Van Gennup (1960) on the rites of passage in tribal societies. Van Gennup saw life as being "comprised of a series of passages leading individuals from birth to death and from membership in one group status to another" (cited in Webb, 1988). In applying Tinto's work to college dropouts, Tinto viewed college students moving from one set of groups, most

typically the family and high school associations, to another, that of the college. Tinto's revised model of student dropout included student' interactions at matriculation, external environment variables, and student intentions during college (see Figure 3). The main goal of this model is to "explain how interactions among different individuals within the academic and social systems of the institution lead individuals of different characteristics to withdraw from that institution prior to degree completion" (Tinto, 1987, p. 113; cited in Webb, 1988). While this new model recognized the importance of external variables on the process of student attrition, the main emphasis was still on social integration.

Pascarella's Model. This model was developed on the basis of research conducted at a four-year residential institution. The utility of this model is questionable in two-year institutions; however, it deserves mention since it is widely found in the literature on student retention. Pascarella's main emphasis was on the importance of informal contact with faculty. His model is based upon the work of Spady (1970) and Tinto (1975) and is longitudinal and causal in design. According to this model, background characteristics interact with institutional factors which then have a causal effect on informal contact between student and faculty, with other college experiences, and with other educational outcomes. Educational outcomes, in turn, directly influence dropout decisions (see Figure 4) (cited in Webb, 1988).

Bean's Model. Bean developed two models of student attrition/retention. The first is considered a "metamodel' of dropout (see Figure 5). His model suggested that the process of dropout depends indirectly on the background characteristics of students which directly affect academic integration, social integration, and

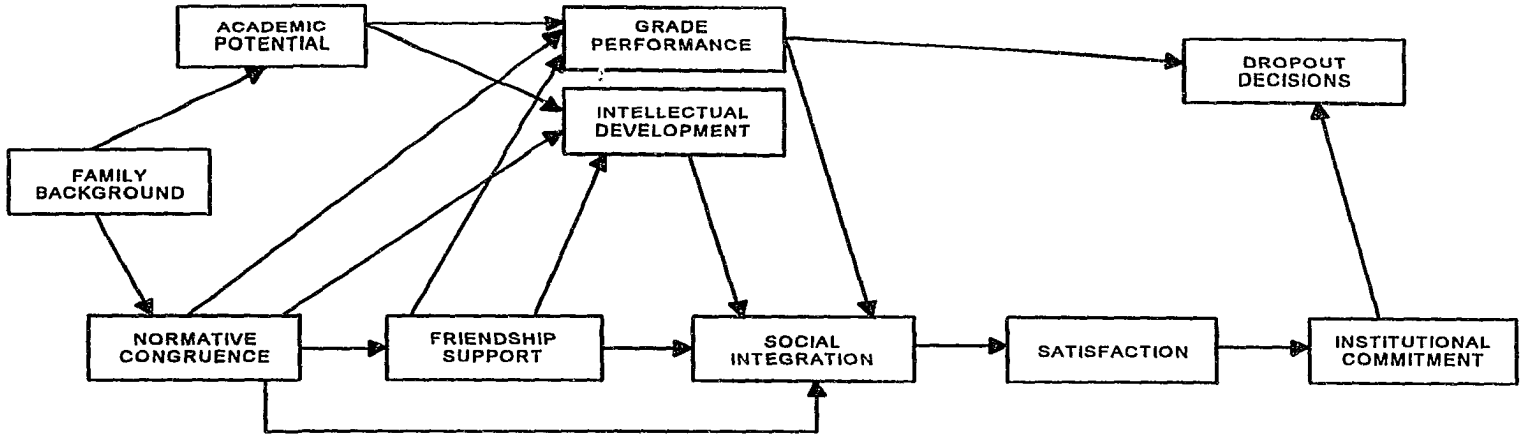
environmental pull. Institutional fit and institutional commitment are seen as directly affecting continued enrollment and indirectly affecting intent to leave, which in turn, have a direct effect on continued enrollment. The major differences between Bean's metamodel and the models of dropout based on Spady's model and Tinto's original model is that a smaller role is attributed to social integration and a larger role to environmental variables in Bean's model.

The development of Bean's second model (1986), the Conceptual Model of Nontraditional Student Attrition (see Figure 6) was based on his recognition that for non-traditional students who make up a large portion of students at two and four-year commuter institutions, social integration probably plays a reduced role in dropout decision. However, in both of Bean's models, the external environment exerts a direct influence on attrition (cited in Webb, 1988).

Summary of Conceptual Models. Each of the models described above provides insight into the multitude of factors thought to influence student attrition/retention. However, Webb (1988) stated that while these models may be useful in explaining the longitudinal process of student attrition, they may not be adequate in describing potential dropouts early in their academic careers, especially for those at two-year institutions. The development of successful retention programs must address factors, in addition to those outlined in the model, which may be more applicable to two-year college students. Figures 1 to 6 present each of the previously discussed theoretical models.

Figure 1

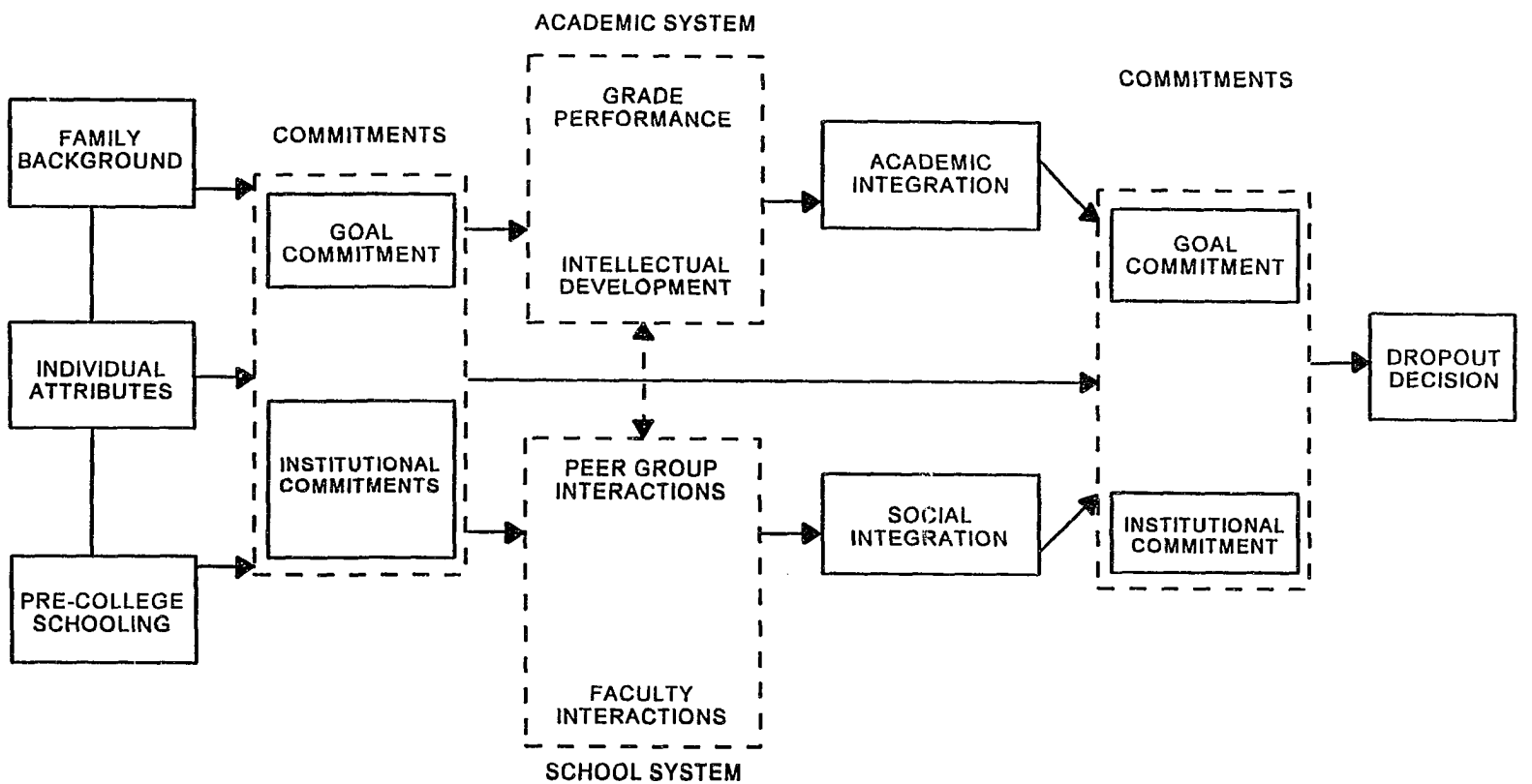
Spady's Theoretical Model of College Dropout



Note: Webb, 1988

Figure 2

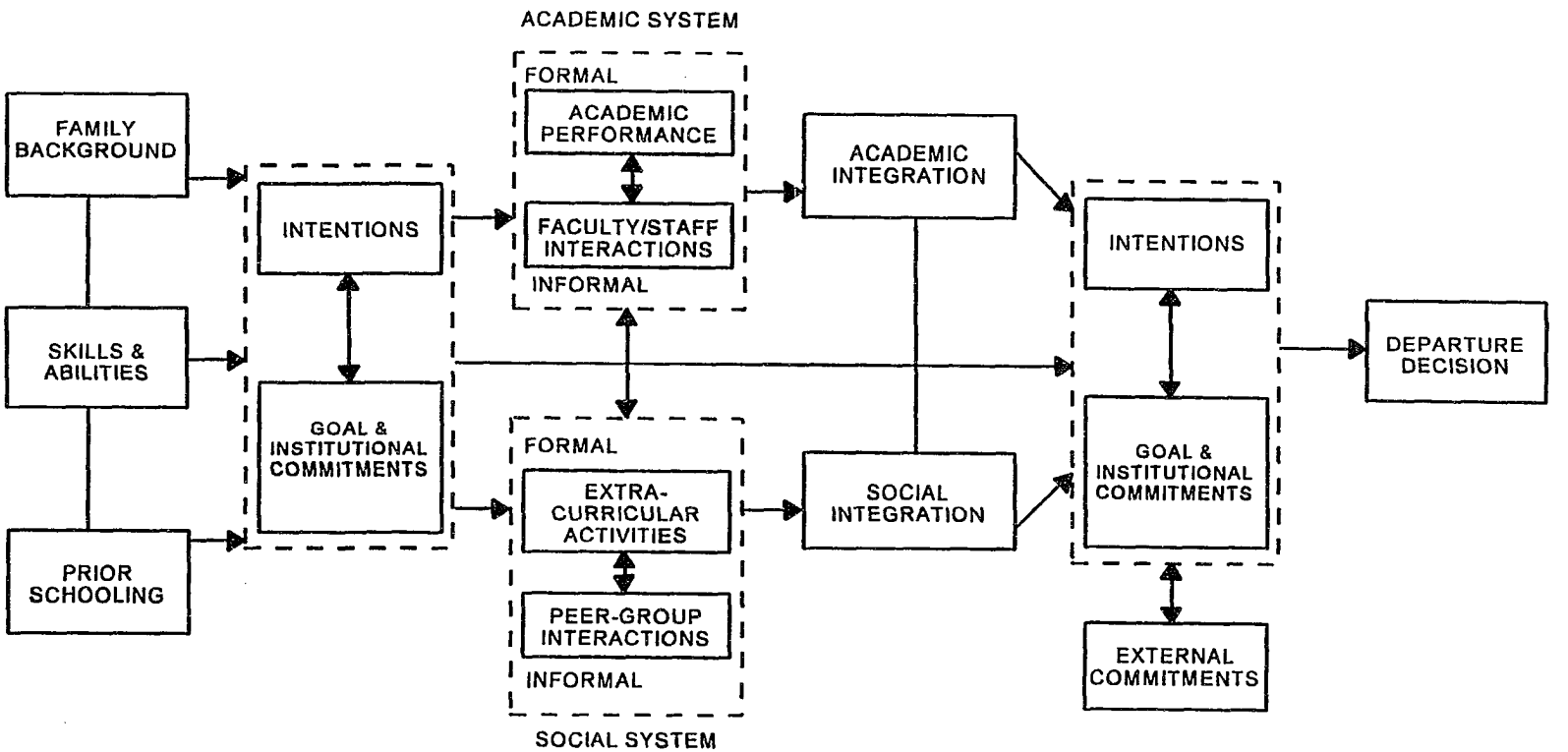
Tinto's Theoretical Model of College Retention/Attrition



Note: Webb, 1988

Figure 3

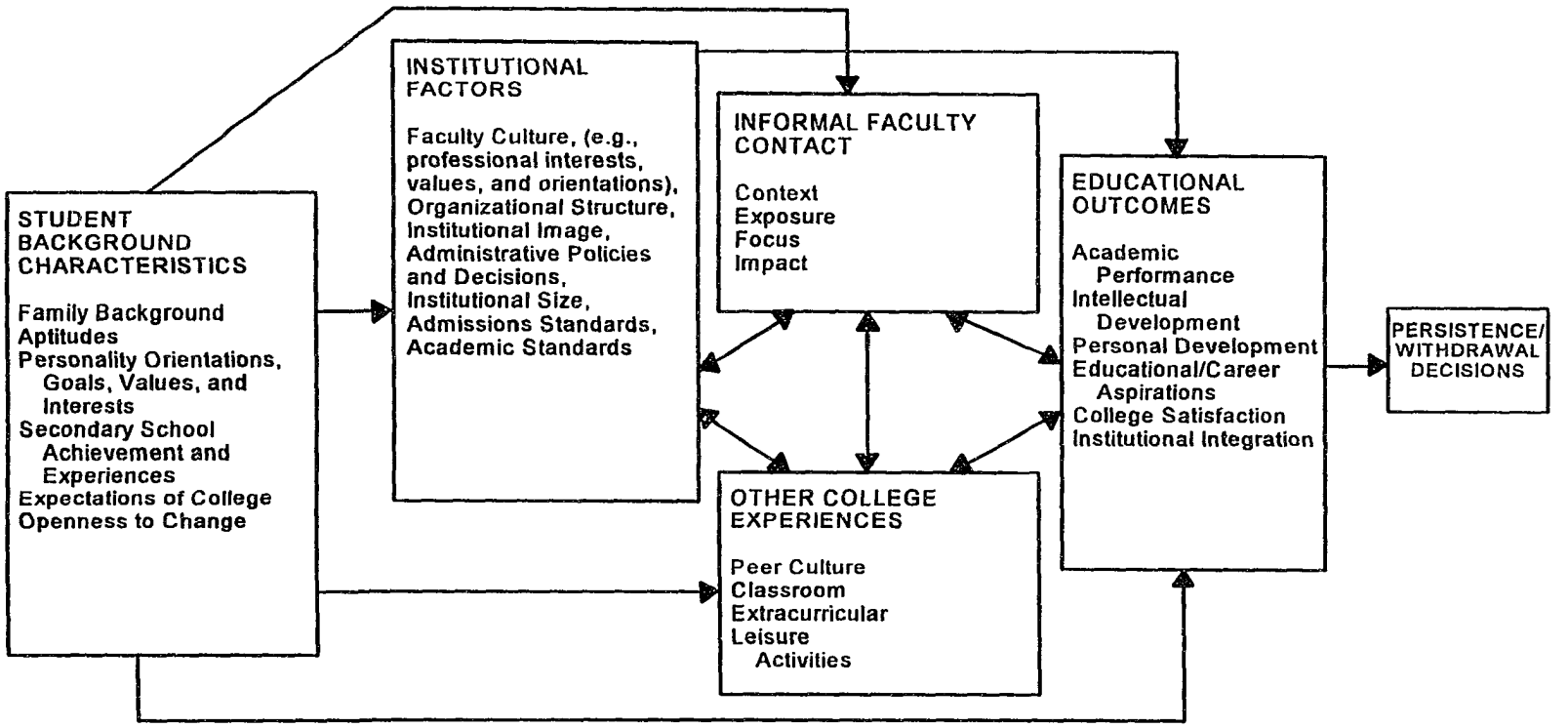
Tinto's Revised Theoretical Model of College Retention/Attrtion



Note: Webb, 1988

Figure 4

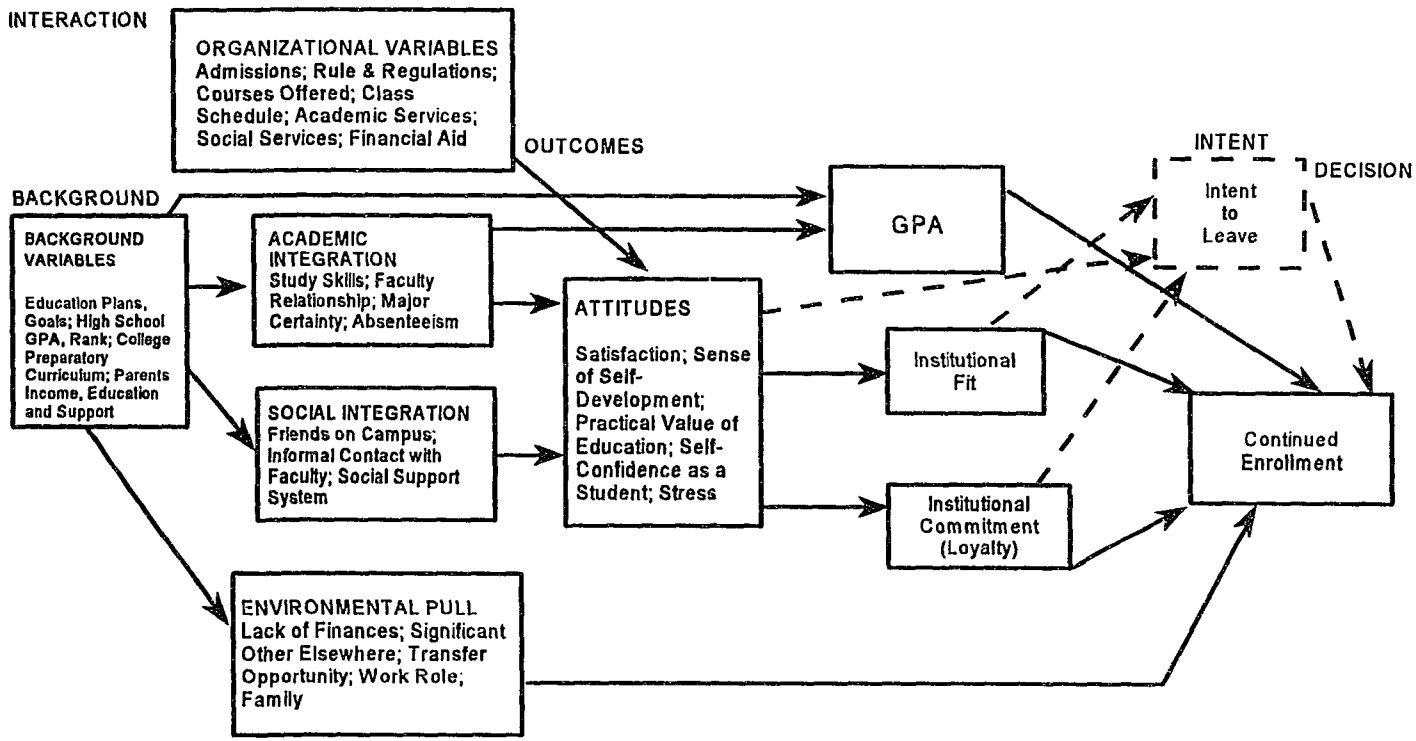
Pascarella's Theoretical Model of College Student Retention/Attrition



Note: Webb, 1988

Figure 5

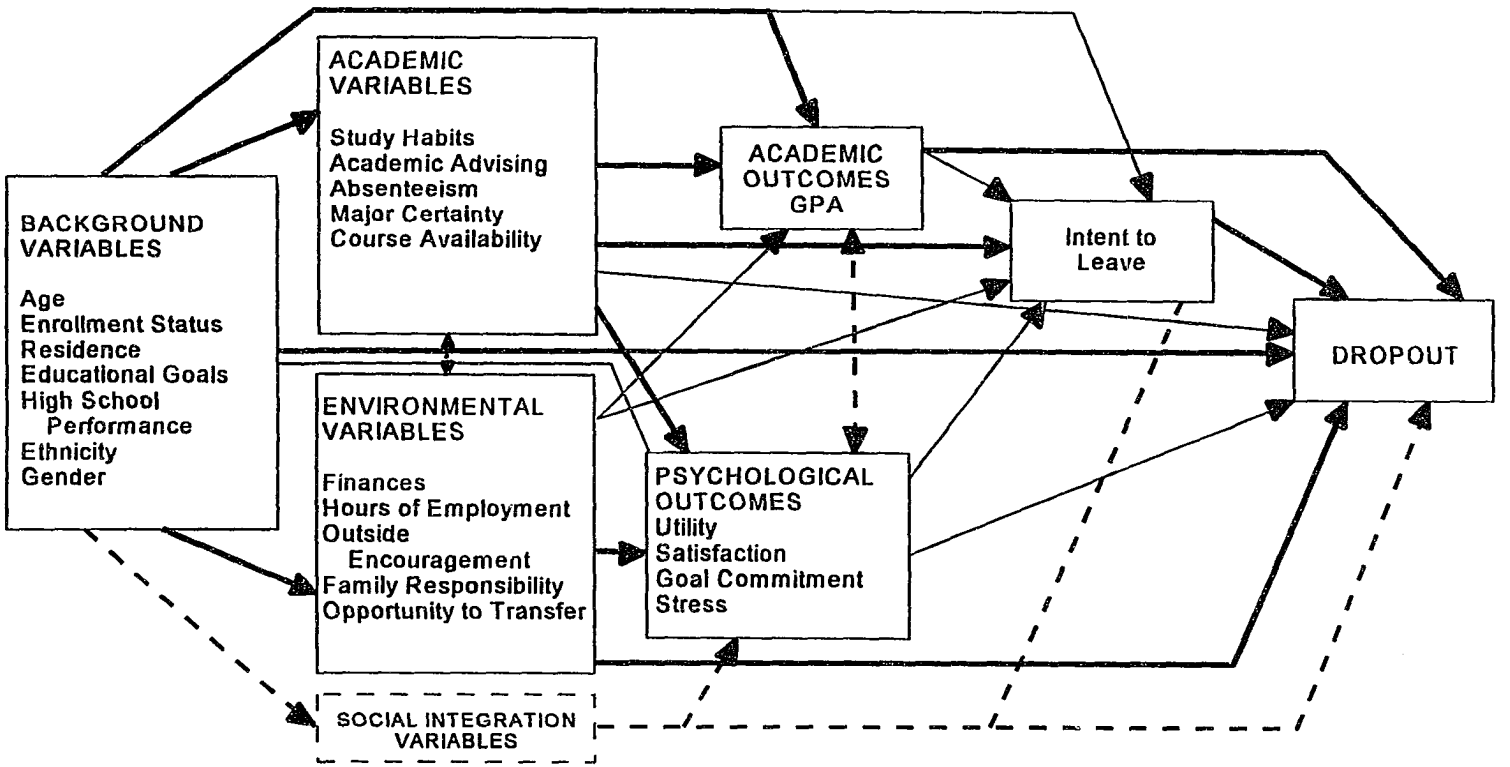
Bean's Metamodel of College Student Retention/Attrition



Note: Webb, 1988

Figure 6

Bean's Conceptual Model of Nontraditional Student Attrition



Note: Webb, 1988

Research Related to Student Attrition and Retention

Numerous studies have been conducted in order to identify factors that may impact on, influence, or perhaps more importantly, predict which students are at risk for dropping out of college. Researchers have also studied variables which contribute to student retention.

A framework that is often used to study retention in higher education falls into three basic categories: (a) academic or cognitive factors, (b) noncognitive factors, and (c) student demographics (Brooks-Leonard, 1991; Pickering, et al.1992).

Academic and Cognitive Variables. Variables such as high school grades, college entrance exam scores, placement scores, and remediation status have been widely studied. In a review of pertinent research in this area, Pickering et al. (1992) cited several studies related to retention in this area. For example, Richardson and Attinasi (1982) found that persistence is best predicted by high school rank and standardized test scores (cited in Pickering et al.).

Weidman's (1985) research results found that CGPA was one of four variables that accounted for 25% of the variance in persistence. Brooks-Leonard (1991) findings suggested that only first term CGPA was significantly related to retention ($p<.01$). Feldman (1993) also found that the single strongest predictor of retention was HGPA. Each one point increase in HGPA was associated with a decrease in dropout rate by a factor of .46. This suggested that a student with a 3.00 HGPA would be about one-half as likely to drop out as a student whose HGPA was 2.00.

Noncognitive Variables. These variables also played an important role in

retention research. As far back as 1967, Roueche proposed that student attitudes are a main factor in college persistence (cited in Pickering et al.1992). Studies conducted by Astin (1984) and Dwinell and Higbee (1989) have confirmed Roueche's view (cited in Pickering et al.). Pickering et al. also found that the combination of cognitive, demographic, and noncognitive predictors worked best for predicting attrition/retention. Interestingly, they found that the use of noncognitive predictors alone was better than the use of either cognitive or demographic predictors alone.

Demographic factors. These factors have been widely studied yet results are somewhat conflicting. Feldman (1993) found that gender was related to persistence when tested by itself but it did not hold up when other factors were considered. Brooks-Leonard (1991) found that gender was not related to retention; however, Webb (1988) found conflicting results in that being male had a negative effect in one model in which he had tested but had no effect on another freshmen year retention model. The results of Voorhees' (1987) and Feldman's (1993) research suggested that females had better retention rates than males. Therefore, gender may play a role in persistence but may not be as important as other considerations. In terms of ethnicity, Feldman found that white students generally had higher retention rates than minority students; Brooks-Leonard did not find ethnicity related to persistence in their study.

Age was also considered a predictor of retention both alone and in competition with other predictors in studies by Brooks-Leonard (1991) and Feldman (1993). While Brooks-Leonard found that older students were more likely to drop out, Feldman's research showed that students aged 20-24 were 1.77 times more likely to drop out than students aged 19 or younger. The age groups 25 and older in Feldman's

study were less likely than the youngest students to drop out. Part-time student status was related to retention in both Brooks-Leonard and Feldman's research. Brooks-Leonard found retention to be much lower in part-time students. Feldman also supports this finding — part-time students were 2.23 times more likely to drop out than full-time students. Bers (1986) results showed that students who were enrolled full-time were most likely to persist.

Summary

The theoretical background for this study is grounded in cognitive learning theory, constructivism, and metacognition and motivation. Learning and study strategy use has been comprehensively reviewed and is an integral component of these theoretical theories and constructs. Current thought on learning and motivation have led to the recognition that for effective learning to take place, the learner must engage in self-management or self-control of his or her own learning. To take on this responsibility means that learners must be competent in their abilities to actively use a variety of learning strategies.

A review of the academic and cognitive variables, noncognitive variables, and demographic factors as related to academic achievement and student retention have been presented. Research supported the increased power of using noncognitive variables in combination with cognitive variables and demographic factors in studies of academic achievement and student retention. Continued research is needed to identify the particular needs and differences of the nontraditional vs. the traditional student in terms of learning and study strategies, academic achievement and student retention. Student retention and attrition models aimed at the nontraditional student

provide promising research focusing on the unique needs of nontraditional students. According to Pinkston (1987) adults students have needs unlike their younger counterparts. The unique and often times overlapping characteristics of both groups of students needs further refinement and development though continued research in this area.

The variables which relate to academic achievement and student retention are complex and varied. Current efforts and continued research must be directed towards identifying those variables which will promote student success, through continued study of the learning process. Chapter Two has provided a comprehensive review of the literature. Chapter Three provides the methodology for this study.

CHAPTER 3

METHODOLOGY

Introduction

The following chapter discusses and explains the methods and procedures which were used to conduct this study. It includes the population and sample, research design, data collection instruments, data collection procedures, the variables studied, and methods proposed for data analysis.

Population and Sample

The target population for this study included freshmen students at two-year commuter colleges. The accessible population of freshmen consisted of both first-time in a college (FTIAC) students and First Time In Macomb (FTIM) students enrolled at Macomb Community College (MCC) at both the Warren and ClintonTownship campuses for the Fall term, 1992. Only those students taking the LASSI, in addition to the ASSET test, during the assessment sessions during August, 1992, were included in the sample. The August, 1992 assessment session was chosen since it was the only time the LASSI was administered at MCC. Random sampling techniques were necessarily precluded.

MCC is a large multi-campus institution located in the metropolitan Detroit area in the suburbs to the northeast of downtown Detroit, MI. MCC has an enrollment of over 30, 000 students, and enrolls approximately 7, 000 new students each fall, and nearly 4,000 students each spring (Sucher, 1992). In the Fall of 1992, the total enrollment was 28,465. According to the Director of Testing and Assessment, for the Fall term, 1992, 4,883 FTIAC's enrolled along with an additional 1,182 FTIM's, for a total of 6,065

students (D.Stevens, personal communication, June, 1995). Based on a population of approximately 6,000 students, a sample size of 361 students is suggested by Krejcie and Morgan (1960).

FTIACs are those students who come to MCC having had no college credits. This is their first experience with any college course. All FTIACs are required to undergo the assessment process, during which time the ASSET test is administered. FTIACs are required to take the ASSET test and go through the assessment session before enrolling in any Math, English, or Reading class. Students are strongly encouraged to take the ASSET, even if not enrolling in a Math, English, or Reading class their first term. If they choose not to complete the assessment session their first term at MCC, they may take up to a maximum of 16 credit hours of personal interest courses before it becomes mandatory that the ASSET is taken. Those students attending MCC on a scholarship are exempt from taking the ASSET.

FTIMs are those students who are attending MCC for the first time. They have anywhere from one or more college credits from another college or university. They are required to take the ASSET and complete the assessment session since they may have taken personal interest courses, but may have not been enrolled in an English, Math, or Reading course. In some cases, they may only be required to take one or two of the subtests of the ASSET, instead of all three, if their coursework reflects satisfactory coursework in a particular area i.e. English, Math, or Reading. Students who have an associate or higher degree are also exempt from going through the assessment session and taking the ASSET, although some students elect to go through the process to assist them in course placement and to provide them with general information on their strengths and

weaknesses.

Research Design

The research design used in this study consisted of a nonexperimental correlational design involving regression. This design was appropriate as the independent variables were not manipulated and no experimental treatment was used. The purpose of this study was to explore relationships between the variables through the use of multivariate analyses. With this type of exploratory investigation, significant relationships among variables may be identified. Exploratory research focuses on the phenomenon of interest, as well as pursuing the question: What factor or factors influence, affect, or relate to this phenomenon? (Polit & Hungler, 1983).

Overview: Data Collection Instruments and Procedures

Information available from the Fall 1992 semester, Spring 1993 semester, and the LASSI administered in August 1992 provided data for this study. The data consisted of information on freshmen learning and study strategies, cognitive indicators, and demographic factors. The various sources of data included (a) Learning and Study Strategies Inventory (LASSI) (Appendix A), (b) ASSET test, (c) ASSET Educational Planning Form (AEPF) (Appendix B), (d) Student Records for Fall term 1992, and (e) student registration information from the Spring term, 1993. Approval for inclusion of the LASSI in this research study was provided by H & H Publishing (Appendix C). Authorization for the use of the various sources of data was granted by MCC (Appendix D). In addition, an exemption for research on human subjects was granted by the Human Investigation Committee at Wayne State University (Appendix E).

Data Collection Instruments

The Learning and Study Strategies Inventory (LASSI). The LASSI was developed at the University of Texas at Austin, by Weinstein, Palmer, and Schulte (1987). The LASSI is an assessment tool designed to measure students' use of learning and study strategies and methods. It is a diagnostic and prescriptive measure, that focuses on both overt and covert thoughts and behavior that relate to successful learning and that can be altered through educational interventions. As of May 1, 1995, the LASSI was being used at 1,324 institutions in the United States.

The LASSI consists of a 77 item form which measures 10 separate scales. The data provided by the LASSI includes percentile score equivalents. It is a self-scoring instrument but can also be scored by computer readable-sheets. A computerized version of the form, the Electronic LASSI, is also available. The LASSI is easily administered in 30 minutes.

The LASSI was field-tested over a period of nine years. Norms were developed by using a sample of 850 incoming freshmen from a large southern university. In general, the LASSI:

I. Gives meaning and useful information to students about their study patterns in one 30-minute session;

II. Can improve student retention by providing a basis for remediation;

III. Promotes student responsibility for their performance (Weinstein, 1987).

The LASSI can be used as:

1. A diagnostic measure to help identify areas in which students could benefit most from educational interventions.

2. A basis for improving all students' learning and study strategies.
3. A basis for planning individual prescriptions for both remediation and enrichment.
4. A pre-post achievement measure for students participating in programs or courses focusing on learning strategies and study skills.
5. An evaluation tool to assess the degree of success of intervention courses or programs.
6. A counseling tool for college orientation programs, developmental education programs, learning assistance programs, and learning centers (Weinstein, 1987).

Nine years of research, development, and testing of the LASSI led to the creation of a statistically valid and reliable tool for the diagnosis of study skills. Evidence for reliability is strong with the coefficient alpha and test-retest correlations calculated for each of the 10 scales to be from .68 to .86 and .72 to .85 respectively (Mealey, 1988). Validity of the LASSI has been examined in numerous ways by several researchers (S.M.Cole, 1987/1987; Chacko, 1989; Weinstein, 1987). Several different approaches used to test validity included:

I. Scale scores were compared to other tests or subscales measuring similar factors.

II. Several of the scales have been validated against performance measures.

III. The LASSI has been subjected to repeated tests of user validity.

Scales of the LASSI. The LASSI uses a Likert-type scale to measure 10 separate scales, consisting of 77 questions. Table 1 presents each of the 10 scales with two indices

of reliability, and lists the items corresponding to each subscale.

Table 1

Scales of the LASSI

SCALE	DESCRIPTION	COEFFICIENT ALPHA	TEST-RETEST	ITEMS
1	Attitude: Measures general attitudes, interests, and motivation for succeeding in college	.72	.75	5, 14, 18,29, 38, 45, 51, 69
2	Motivation: Students' diligence, discipline, willingness to work hard	.81	.84	10, 13, 16, 28, 33, 41, 49, 56
3	Time Management: Students' use of time management principles for academic tasks	,86	.85	3, 22, 36, 42, 48, 58, 66, 74
4	Anxiety: Degree to which students worry about school and their performance	.81	.83	1, 9, 25, 31, 35, 54, 57, 63
5	Concentration: Students' ability to concentrate and direct their attention to school and school-related tasks	.84	.85	6, 11, 39, 43, 46, 55, 61, 68
6	Information Processing: Students' use of imaginal and verbal elaboration, comprehension monitoring, and reasoning	.83	.72	12, 15, 23, 32, 40, 47, 67, 76
7	Selecting Main Ideas: Students' ability to pick out important information for further study	.74	.78	2, 8, 60, 72, 77
8	Study Aids: Students' ability to use support techniques or materials to help them learn and remember new information	.68	.75	7, 19, 24, 44, 50, 53, 62, 73
9	Self-testing: Students' ability to review and prepare for classes and tests. Mostly deals with comprehension monitoring	.75	.78	4, 17, 21, 26, 30, 37, 65, 70
10	Test Strategies: Students' approach to preparing for and taking examinations	.83	.81	20, 27, 34, 52, 59, 64, 71, 75

Source: Weinstein, 1987

ASSET Test. The ASSET test of basic skills is an assessment tool currently used by many community colleges across the nation. It is primarily a placement tool, used to assist students in the selection of classes (Sucher, 1992). The ASSET test of basic skills, developed by American College Testing (ACT), Iowa City, Iowa (1989), is used to measure achievement in Numerical, Writing, and Reading Skills. ACT developed the

ASSET test for educational advising, course placement, and retention planning. It has been specifically designed for students entering two-year academic institutions.

The original version of the ASSET was developed in 1982 in response to a set of student retention and transfer objectives identified by the Los Angeles Community College District. Form B, introduced in 1989, is the current test being used by MCC. Predictive validity and internal consistency have been demonstrated by ACT (1990) (cited in Sucher, 1992). An internal consistency estimate allows reliability to be determined from only one set of test data. With the exception of the split-half method, the estimates are really indices of the homogeneity of the items in the test, or the degree to which the responses correlate with the total test score. If there is a high degree of internal consistency, then it is reasonable to assume that had another set of similar questions been asked, the results would have been comparable (Mehrens & Lehmann, 1991).

For the ASSET, measures used for internal consistency included both the Kuder-Richardson formula (KR-20) and the Standard Error of Measurement. While cutoff scores on the Asset Form A for use in course placement were locally validated by studies conducted by Marcotte (1987, 1988), Form B of the Asset is relatively new and local validity has not been established at this time (Sucher, 1992).

Data Collection Procedures

The literature suggested that the majority of community colleges across the nation are now assessing the basic skills of their incoming students. While most have implemented mandatory course placement based on the results of assessment, others have voluntary placement. MCC requires all students to take the ASSET test prior to enrolling

in a Math, English, or Reading class. Even though a student may choose not to register for one of these courses the first semester enrolled, the majority of students choose to complete the mandatory assessment program prior to their first class (D. Stevens, personal communication, June, 1995).

Students had the option of taking the ASSET test at either the Warren or Clinton Township campus. The assessment process for the Fall term generally begins on February 1st of that same year. While there are various days during which students take this assessment during the year, the majority are taken during the months of June, July, and August, prior to their first semester of courses at MCC. The assessment sessions were conducted five days per week during these three months. Upon recommendation by the researcher, during the August, 1992 assessment program, the LASSI was administered to approximately 500 students, with approximately half administered at the Warren campus and the other half at the Clinton Township campus. Administration of the LASSI took approximately two weeks as the number of students per session at both campuses varied. Approval and support for administration of the LASSI was granted by the Vice President for Academic Affairs and Provost, and several Deans within the college.

Arrangements were made with the Testing and Assessment Office for administration of the LASSI. Students were sent a letter prior to the assessment session stating that the assessment sessions would be scheduled in three and one-half hour blocks. The technicians conducting the sessions were notified in advance of the LASSI administration and were provided with instructions to be given to all students (Appendix F). During each assessment session, 30 minutes was set aside for the administration of the LASSI. The first 30 minutes of the session was given to complete the LASSI, followed

by a three hour block of time to take the ASSET test.

Except for the LASSI, all other information including the ASSET test scores, the ASSET Educational Planning Form (AEPF), student records from the Fall term, 1992 and student registration information from the Spring, 1993 semester was placed into an automated student tracking and record system currently in place at MCC.

Variables in the Study

Several variables were included in this study. These variables were used interchangeably as dependent and independent variables to address the research questions posed for this study. Tables 2 provides sources for all independent and dependent variables included in this study.

Table 2

Variables in the Study

Variable	Source
Learning and Study Strategies	LASSI subscales: Attitude, Motivation, Time Management, Anxiety, Concentration, Information Processing, Selecting Main Ideas, Study Aids, Self-Testing, Test Strategies
ASSET Scores	Writing, Reading, and Numerical Skills
Demographic Variables	ASSET Educational Planning Form (AEPF), High School grade point average (HGPA), gender, age, day/evening/both, work status, and educational plans
Student Success Academic Achievement College Retention	Student records of enrollment, courses, credit hours attempted, and course grades, and part-time/full-time status

Data Analysis

The data collected from the various sources were entered into a data file for analysis using the Statistical Package for the Social Sciences - Windows, version 7.0. Descriptive and inferential statistical procedures were used to analyze the data. The descriptive procedures, including frequency distributions and measures of central tendency and dispersion, provided a description of the freshmen students attending MCC in the Fall, 1992 semester. Inferential statistical procedures that were used included stepwise multiple regression analyses, correlations, factorial analysis of variance, and chi-square analysis to address each of the research questions. All decisions on the significance of the findings were made using an alpha level of .05. Table 3 presents the statistical analysis for each of the research questions posed for this study.

Table 3

Statistical Analysis

Research Question	Variables	Statistical Analysis
1. What is the relationship between LASSI individual subscale scores and the ASSET subtests of writing, reading, and numerical skills?	LASSI Subscales ASSET Subtests	Pearson product moment correlations were used to determine the strength and direction of the relationship between learning and study strategies and ASSET testing.
2. What is the relationship between LASSI subscale scores and academic achievement?	LASSI Subscales High School Grade Point Average College Grade Point Average	Pearson product moment correlations were used to determine the strength and direction of the relationship between learning and study strategies and academic achievement in high school and college.
3. Is there a difference in learning and study strategies, ASSET, and academic achievement of retained and nonretained students who are under 25 and those who are 25 years or older?	Dependent Variables LASSI Subscales ASSET Subtests College Grade Point Average Independent Variables Retention Status Age of Student	Factorial analysis of variance procedures were used to determine if the dependent variables differ relative to the main effects or interaction effects of learning and study strategies, ASSET subtests, and college GPA.
4. What is the relationship between the LASSI, ASSET, high school grade point average (HGPA), gender, age, enrollment status, student curriculum; and academic achievement ?	Dependent Variable College Grade Point Average Independent Variable LASSI Subscales ASSET Subtests High school GPA Gender Age Part/full-time enrollment status Curriculum area	Stepwise multiple regression analyses were used to determine which of the independent variables can be used to predict and explain college GPA.
5. What is the relationship between gender, age, part-time/full-time enrollment status, day/evening status, student curriculum; and first-to-second term student retention?	Dependent Variable Retention Status Independent Variable Gender Age Part/Full-time status Curriculum Area	Crosstabulations and chi square analysis were used to determine the association between each of the independent variables with the retention status of the student.

CHAPTER 4

RESULTS OF DATA ANALYSIS

This chapter presents the results of the statistical analysis that was used to describe and answer the research questions posed for this study. The data that were used in these analyses were obtained from student records at Macomb Community College (MCC), as well as from having students complete the Learning and Study Strategies Inventory (LASSI).

A total of 492 students participated in the study. These entering students completed the LASSI during the assessment session. The researcher used information from students' individual records including: scores on the ASSET Test of Basic Skills; curriculum areas; enrollment status for Spring term, 1993; course enrollment, credit hours, and grades for courses completed during the Fall, 1992 semester. In addition, entering students completed the ASSET Educational Planning Form (AEPF), a short demographic questionnaire, with this information also used in the study.

The data presentation is divided into two sections. The demographic description of the participants is presented first, with the research questions answered separately.

Demographic Characteristics of the Sample

Student Characteristics

The students provided their birth dates on the survey. For the purpose of this study, these birthdates were divided into two groups, those who were under 25 years of age and those who were 25 years of age and older. Table 4 presents the results of this analysis.

Table 4

Age of Student

Age of Student	Number	Percent
Under 25 years of age	278	60.3
25 years of age and older	183	39.7
Total	461	100.0

Missing 31

The majority of the students (n=278, 60.3%) provided birth dates that indicated they were under 25 years of age when the original data were collected, with the remaining 183 (39.7%) of the students 25 years of age and older. Thirty-one of the students did not provide their age on the survey.

The students indicated their gender on the survey. Their responses to this question were summarized for presentation in Table 5.

Table 5

Sex of Student

Sex of Student	Number	Percent
Male	225	48.5
Female	239	51.5
Total	461	100.0

Missing 28

Of the 461 students who provided their sex on the survey, the majority (n=239, 51.5%) indicated they were female. The remaining 225 (48.5%) reported their sex as male. Twenty-eight students did not provide a response to this question.

The students were asked to report their ethnicity on the demographic survey.

Their responses to this question are presented in Table 6.

Table 6

Ethnicity of Student

Ethnicity of Student	Number	Percent
Black/African American	24	5.4
American Indian/Alaskan	8	7.2
White/Caucasian	373	84.2
Mexican American	11	2.5
Asian/Pacific Islander	6	1.4
Puerto Rican/Cuban/Other Hispanic	1	0.2
Filipino	3	0.7
Other	7	1.6
Preferred not to respond	10	2.3
Total	443	100.0

Missing 49

The majority of the students (n=373, 84.2%) reported their ethnicity as White/Caucasian, with Black/African American (n=24, 5.4%) the next largest ethnic group in the study. There were 11 (2.5%) students who were Mexican American, and 8 (1.8%) American Indians/Alaskan students who were included in the sample. The remainder of the students reported they were Asian/Pacific Islanders (n=6, 1.4%), Puerto Ricans/Cubans/Other Hispanics (n=1, 0.2%), or Filipino (n=3, 0.7%). Seven (1.6%) students reported "other" as their ethnicity, and 10 (2.3%) participants indicated they would rather not respond to this question. Forty-nine of the students did not provide their ethnicity on the survey.

The students were asked to provide their educational backgrounds prior to

attending MCC. Their responses to this question were summarized for presentation in Table 7.

Table 7

Educational Background of Student

Educational Background of Student	Number	Percent
Have not attended any college	259	63.6
Some credits/courses	114	28.0
Certificate or Diploma	23	5.7
Associate's Degree	2	0.5
Bachelor's Degree	3	0.7
Other	6	1.5
Total	407	100.0

Missing 85

The majority of students (n=259, 63.6%) had not attended any postsecondary institution prior to the Fall, 1992 semester. There were 114 (28.0%) students who were new to MCC, but had some credits and courses at another postsecondary institution. Twenty-three (5.7%) students had previously earned either a certificate or diploma at some other institution, with 2 (0.5%) reporting they had earned an associate degree. Three (0.7%) students had completed requirements for a bachelor's degree, with 6 (1.5%) indicating "other" as their previous educational background. Eighty-five students did not provide a response to this question.

The students self-reported their high school grade point averages. Their responses were coded into seven categories. Table 8 presents the results of this analysis.

Table 8

Self-Reported High School Grade Point Average (HGPA)

Self-Reported High School Grade Point Average	Number	Percent
A- to A (3.5 to 4.0)	15	3.8
B to A- (3.0 to 3.4)	70	17.8
B- to B (2.5 to 2.9)	114	28.9
C to B- (2.0 to 2.4)	126	32.1
C- to C (1.5 to 1.9)	61	15.5
D to C- (1.0 to 1.4)	7	1.8
D- to D (0.5 to 0.9)	1	0.3
Total	394	100.0

Missing 98

The grade distribution followed a normal curve, with the largest number of students (n=126, 32.1%) reporting their HSGPA was between a "C and B-." The next largest group (n=114, 289.9%) indicated their HSGPA was between a "B- and B," while 70 (17.8%) reported HSGPA between "B and A-." Sixty-one (15.5%) students indicated their HSGPAs were between "C- and C." Fifteen (3.8%) students self-reported that their HSGPAs were between "A- to A," while 7 (1.4%) indicated HSGPAs between "D and C-." One (0.3%) student reported his/her HSGPA was between "D- and D." Ninety-eight students did not provide a response to this question.

The students' attendance patterns were obtained on the AEPF and from student records. Attendance patterns included full/part-time status and time they were most likely to attend classes. Table 9 presents the results of these analyses.

Table 9

Attendance Patterns of Students

Attendance Patterns	Number	Percent
Student Status		
Full-time	91	23.3
Part-time	300	76.7
(Missing 101)		
Time Classes Attended		
Day	174	40.7
Evening	161	37.6
Both	93	21.7
(Missing 65)		

Based on the information in student records, the majority of the students (n=300, 76.7%) were attending classes on a part-time basis. Ninety-one (23.3%) were attending on a full-time basis. Data on 101 students were not available as these students had been admitted, completed ASSET testing, but either did not enroll or dropped their classes.

The largest group of students (n=174, 40.7%) reported they were attending classes during the day, with 161 (37.6%) indicating they were attending in the evening. Ninety-three (21.7%) students were attending both day and evening classes. Sixty-four students did not provide a response to this item.

The students were asked to report the number of hours they were employed on a weekly basis. Their responses to this question were summarized for presentation in Table 10.

Table 10

Hours Employed Per Week

Hours Employed Per Week	Number	Percent
None	45	9.9
1 to 10 hours	23	5.1
11 to 15 hours	13	2.8
16 to 20 hours	64	14.1
21 to 30 hours	82	18.1
More than 30 hours	227	50.0
Total	454	100.0

Missing 38

Forty-five (9.9%) students were not employed, while 23 (5.1%) reported they were employed for 1 to 10 hours per week. Thirteen (2.8%) students were employed between 11 and 15 hours per week, while 64 (14.1%) indicated they were employed between 16 and 20 hours per week. Eighty-two (18.1%) students were employed for 21 to 30 hours per week, with 227 (50.0%) reporting they were employed for more than 30 hours per week. Thirty-eight of the students did not respond to this question.

The educational plans of the students were obtained on the AEPF. Their responses are provided in Table 11.

Table 11

Educational Plans

Educational Plans	Number	Percent
Classes only; no certificate or degree	29	6.3
One to two-year certificate or diploma program	40	8.7
Two-year college degree	116	25.2
Four-year college degree	199	43.1
Graduate or professional study beyond four-year degree	77	16.7
Total	454	100.0

Missing 31

Twenty-nine (6.3%) students were planning on taking classes only and were not working toward a certificate or degree, with 40 (8.7%) participants reporting they were planning on completing a one to two-year certificate or diploma program. Two-year college degrees were in the educational plans of 116 (25.2%) students, while 199 (43.1%) participants were planning on completing a four-year degree. Seventy-seven (16.7%) students indicated their plans included graduate or professional study beyond a four-year degree. Thirty-one students did not respond to this item on the AEPF.

The students were asked if they were considering transfer to another school when they completed their programs at MCC. Their responses are presented in Table 12.

Table 12

Transfer Status

Transfer Status	Number	Percent
Two year college	13	3.1
Four year college or university	163	39.0
Other type of institution	5	1.2
Not planning to transfer	89	21.3
Undecided about transfer	148	35.4
Total	18	100.0

Missing 74

The largest group of students (n=163, 39.0%) were planning to transfer to a four year college or university, with 13 (3.1%) planning to attend a two-year college. Since Walsh College is a two year, upper division college to which many students transfer after completion of their first two years at MCC, there may have been some confusion regarding their responses on this category. Five (1.2%) students were planing to transfer to another type of institution, while 89 (21.3%) were not planning to transfer and 148 (35.4%) were undecided about their transfer plans. Seventy-four students did not provide a response to this question.

The students were asked to select the most important reason for attending MCC during the semester when the study was conducted. Their responses to this question were summarized for presentation in Table 13.

Table 13

Most Important Reason for Attending MCC

Most Important Reason for Attending MCC	Number	Percent
Learn skills to get a new job	136	29.7
Learn skills to advance in job	84	18.4
Transfer to four-year college	121	26.5
Satisfy general education requirements	50	10.9
Improve basic skills in English, reading, or math	16	3.5
Take courses for personal interest	25	5.5
Other	25	5.5
Total	457	100.0

Missing 35

The largest group of students (n=136, 29.7%) reported they were attending MCC to learn skills to get a new job, while 84 (18.4%) were learning skills to advance in their current job. Transfer to a four-year college was indicated by 121 (26.5%) of the students, with 50 (10.9%) reporting they wanted to satisfy general education requirements. Sixteen (3.5%) indicated the most important reason for attending MCC was to improve basic skills in English, reading, or math and 25 (5.5%) were taking courses for personal interest. Twenty-five (5.5%) students had "other" reasons for taking courses at MCC. Thirty-five students did not respond to this question.

Retention of students was determined by comparing enrollment patterns of the students from the first to the second semester. Students who re-enrolled were considered retained, while students who did not re-enroll, regardless of the reason, were not retained. Table 14 presents the results of this analysis.

Table 14

Retention of Students

Retention of Students	Number	Percent
Retained	259	62.1
Not Retained	158	37.9
Total	417	100.0

Missing 75

The majority of the students (n=259, 62.1%) were retained from the Fall to the Spring semester. The remainder (n=158, 37.9%) reported they were not retained. Of the 75 students with missing information, some had completed the AEPF and ASSET testing, but did not enroll in the Fall semester, although they may have enrolled in the Spring semester.

The college grade point averages were determined by weighing the students' grades for each class by the number of credit hours to obtain honor points for each class. The grades were coded with a "4" for an "A," "3" for a "B," "2" for a "C," "1" for a "D," and a "0" for an "E." Course grades of "W," "N," or "I" were coded as missing as these grades are not included in the computation for grade point averages. The honor points were summed and then divided by the number of credit hours completed for the semester to get a grade point average. Table 15 presents the results of the analysis on grade point average.

Table 15

College Grade Point Average

College Grade Point Average	Number	Percent
A- to A (3.50 to 4.00)	103	33.2
B to A- (3.00 to 3.49)	63	20.3
B- to B (2.50 to 2.99)	22	7.1
C to B- (2.00 to 2.49)	51	16.5
C- to C (1.50 to 1.99)	1 9	6.1
D to C- (1.00 to 1.49)	23	7.4
D- to D (0.01 to 0.99)	29	9.4
Total	394	100.0

Missing 182

The largest group of students (n=103, 33.2%) had achieved grade point averages (GPA) between 3.50 and 4.00, with 63 (20.3%) having GPAs between 3.00 and 3.49. GPAs between 2.50 and 2.99 were achieved by 22 (7.1%) of the students, with 51 (16.5%) having GPAs between 2.00 and 2.49. Nineteen (6.1%) students had GPAs between 1.50 and 1.99, while 23 (7.4%) students' GPAs were between 1.00 and 1.49. Twenty-nine (9.4%) of the students had GPAs between .01 and .99. Grade point averages were not available on 182 of the students who completed ASSET testing.

The students' curriculum codes were obtained from their records. These codes indicated the program they intended to complete during their time at MCC. The codes were collapsed into nine major curriculum types. Table 16 presents the results of this analysis.

Table 16

Curricular Program Areas

Curricular Program Areas	Number	Percent
Undecided	119	30.8
Arts & Sciences	39	10.1
Transfer	62	16.1
Public Service	20	5.2
Health	33	8.5
Business	56	14.5
Design	25	6.5
Mechanical	22	5.7
Applied Technology	10	2.6
Total	386	100.0

Missing 106

The largest group of students (n=119, 30.8%) were undecided about their curriculum programs. Thirty-nine (10.1%) were enrolled in programs considered arts and sciences, with 62 (16.1%) in transfer programs. There were 20 (5.2%) students who were in public service programs and 33 (8.5%) enrolled in health areas. Fifty-six (14.5%) students were in business curricular areas. Twenty-five (6.5%) students were in design and 22 (6.5%) were in mechanical programs. Applied technology programs had enrolled 10 (2.6%) of the students in the study. Data was missing on curriculum programs for 106 of the students.

Description of Dependent Variables

Data on the dependent variables that were collected for this study included scores on the Writing, Reading, and Numeric Skills ASSET subtests; subscales on the LASSI;

and college grade point averages. Descriptive statistics were obtained for each of these variables to provide a baseline for comparisons. The results of these analyses are presented in Table 17.

Table 17

Dependent Variables

Variable	Mean	SD	Median	Range	
				Minimum	Maximum
ASSET Scores					
Writing Skills	40.06	6.73	40	25	54
Reading Skills	40.95	6.32	41	24	53
Numeric Skills	39.67	6.44	39	25	54
LASSI					
Attitude	32.02	4.75	32	14	40
Motivation	30.16	5.41	30	14	40
Time Management	25.34	6.23	25	10	40
Anxiety	25.42	5.91	26	8	40
Concentration	26.52	6.16	27	10	40
Information Processing	26.93	4.90	27	13	39
Selecting Main Ideas	17.83	3.52	18	7	25
Study Aids	24.10	4.57	24	9	39
Self-Testing	27.17	5.18	27	12	40
Test Strategies	28.78	5.43	29	11	40
College Grade Point Average	2.69	1.12	3	.14	4.00

ASSET Scores.

The scores on three of the subtests of the ASSET test were summarized using descriptive statistics. This test determines course placement in English, mathematics, and reading courses at MCC.

Writing Skills. The mean score on the Writing Skills test was 40.06 (sd=6.73) with a median score of 40. The scores ranged from a minimum of 25 to a maximum of 54. Scores between 23 and 35 indicate the need for remedial coursework, while students

scoring between 36 and 45 would be advised to enroll in Communication I. Scores between 46 and 54 would provide support for the student to enroll in Composition I.

Reading Skills. The mean score on the Reading Skills test was 40.95 (sd=6.32). The median score on this test was 41, with scores ranging from 24 to 53. Students who scored between 23 and 37 would need to complete a preparatory reading and study skills class. Scores between 38 and 43 would indicate a need for the student to enroll in General Reading and Study Skills, while students with scores between 44 and 53 would be encouraged to complete a speed reading course.

Numeric Skills. The mean score on the Numeric Skills test was 39.67 (sd=6.44). The median score on this test was 39, with scores ranging from 25 to 54. Students scoring between 23 and 35 would be advised to enroll in Modern Fundamental Math, while scores between 36 and 42 provides a decision zone with the student able to enroll in Modern Fundamental Math or Beginning Algebra. Scores between 43 and 55 would allow a student to enroll in Beginning Algebra.

Learning and Study Strategies Inventory (LASSI).

The LASSI measured learning and study strategies used by incoming students at MCC. Both student thought processes and behaviors were assessed by this test. Since these subscales reflect different types of constructs, development of a total score was not appropriate. Higher scores reflected more positive thought process and behaviors.

Attitude. The attitude subscale measures general attitudes, interests, and motivation for succeeding in college. The mean score for this subscale was 32.02 (sd=4.75) with a median score of 32. The range of scores on this subscale was from a minimum of 14 to a maximum of 40. A total of eight items were included on this

subscale which was rated with a 5 point scale. Possible scores could range from 8 to 40. Higher scores on this subscale reflected more positive attitudes toward school.

Motivation. The subscale, motivation, measures the students' diligence, discipline, and willingness to work hard. The mean score on this subscale was 30.16 (sd=5.41). The median score on this subscale was 30 with scores ranging from 14 to 40. There were 8 items included on this subscale with possible scores ranging from 8 to 40. Higher scores on this subscale reflected greater motivation for students.

Time Management. The mean score on this subscale, which measured use of time management principles for academic tasks was 25.34 (sd=6.23). The scores ranged from 10 to 40 with a median score of 25. Possible scores on this subscale with 8 items ranged from 8 to 40. Higher scores on this subscale indicated better use of time management relating to academic tasks.

Anxiety. This subscale measured the degree to which students worried about school and their performance. The mean score on this subscale was 25.42 (sd=5.91) with a median score of 26. The scores on this subscale ranged from a minimum of 8 to a maximum of 40. Eight items were included on this subscale with possible scores ranging from 8 to 40. Lower scores on this subscale indicated high levels of anxiety regarding school and academic performance.

Concentration. The students' ability to concentrate and direct their attention to school and school-related tasks was the focus of this subscale. The obtained mean score was 26.52 (sd=6.16) with a median score of 27. The scores on this subscale ranged from 10 to 40. Possible scores on this subscale, which contained 8 items, could range from a low of 8 to a high of 40. Higher scores on this subscale were indicative of better skills in

concentration and directing attention to school and school-related tasks.

Information Processing. This subscale measured the students' use of imaginal and verbal elaboration, comprehension, monitoring, and listening. The scores on this subscale ranged from a low of 10 to a high of 40 with a median score of 27. The mean score on this subscale was 26.93 (sd=4.90). Possible scores on this eight item subscale ranged from 8 to 40. Higher scores on this subscale were indicative of the better use of information processing skills.

Selecting Main Ideas. Students' ability to pick out important information for further study was measured by this subscale. The scores on this subscale ranged from 7 to 25 with a median score of 18. The mean score was 17.83 (sd=3.52). Five items were included on this subscale with possible scores ranging from 5 to 25. Higher scores on this subscale indicated better ability to select important information for further study.

Study Aids. This subscale measured the students' ability to use support techniques or materials to help them learn and remember new information. The scores on this subscale ranged from a low of 9 to a high of 39. The mean score was 24.10 (sd=4.57) with a median score of 24. Eight items were included on this subscale with possible scores ranging from 8 to 40. Higher scores on this subscale reflected greater use of study aids to improve learning and comprehension.

Self-Testing. Students' ability to review and prepare for classes and tests was measured by this subscale. The obtained mean score was 27.17 (sd=5.18) with a median score of 27. The scores on this subscale ranged from a low of 12 to a high of 40. Eight items were included on this subscale with possible scores ranging from 8 to 40. Higher scores reflected better abilities to review and prepare for classes and tests.

Test Strategies. This subscale measured the students' approach to preparing for and taking examinations. The mean score on this subscale was 28.78 (sd=5.43) with a median score of 29. The scores on this test ranged from a low of 11 to a high of 40. Possible scores on this subscale, that included 8 items, could range from a low of 8 to a high of 40. Higher scores on this subscale were indicative of better approaches for preparing and taking examinations.

College Grade Point Average (GPA).

The mean grade point average for the students was 2.69 (sd=1.12). The median GPA was 3.00 with a range from .14 to 4.00.

Research Questions

Five research questions were posed for this study. These questions were answered using inferential statistical procedures. All decisions on the significance of the findings were made using an alpha level of .05.

Research question 1: What is the relationship between LASSI individual subscale scores and the ASSET subtests of writing, reading, and numerical skills?

The subscale scores on the LASSI were correlated with the three scores from the ASSET test measuring writing, reading, and numerical skills using Pearson product moment correlations. The results of these analyses are presented in Table 18.

Table 18

Pearson Product Moment Correlations
LASSI Scores with ASSET Scores

LASSI Scores	Number	ASSET Scores		
		Writing	Reading	Numeric
Attitude	440	.15 *	.10*	.06
Motivation	448	.17*	.10*	.01
Time Management	446	-.03	-.07	-.09
Anxiety	443	.19*	.24*	.31*
Concentration	446	.07	.04	-.01
Information Processing	442	.18*	.23*	.13*
Selecting Main Ideas	451	.22*	.23*	.15*
Study Aids	445	.01	.02	.01
Self Testing	446	.04	.06	-.09
Test Strategies	446	.33*	.30*	.26*

*p≤05

Writing Skills. The correlations between the 10 subscales on the LASSI and the scores on writing skills from the ASSET test provided evidence of six significant relationships. The r value of .15 obtained for the correlation between writing scores and scores on the subscale, attitude, was statistically significant at an alpha level of .05. The positive nature of this relationship indicated that higher scores on the writing skills test were associated with more positive attitudes. The correlation of .17 between writing scores and scores on the subscale, motivation, was statistically significant at an alpha level of .05. Higher scores on the writing subtest of the ASSET were associated with higher motivation as evidenced by the positive value of the correlation. The r value of .19 measuring the relationship between writing scores and anxiety was statistically

significant at an alpha level of .05. This result indicated a positive relationship between the two variables, with higher scores on the writing subtest associated with lower levels of anxiety. When information processing and scores on the writing skills subtest of the ASSET were correlated, an r value of .18 was obtained. The positive value of this statistically significant relationship indicated higher scores on the ASSET were associated with higher scores on information processing. The r value of .22 obtained on the correlation between selecting main ideas and writing scores was statistically significant at an alpha level of .05. Higher scores on the writing skills subtest of the ASSET were associated with higher scores on selecting main ideas. The resultant r value of .33 measuring the strength of the relationship between the LASSI subscale, test strategies, and writing skills was statistically significant at an alpha level of .05. This result indicated that higher scores on writing skills were associated with higher scores on test strategies. The remaining subscales; time management, concentration, study aids, and self testing; were not significantly correlated with scores on the writing subtest of the ASSET.

Reading. Six subscales of the LASSI; attitude (r=.10), motivation (r=.10), anxiety (r=.24), information processing (r=.23), selecting main ideas (r=.23), and test strategies (r=.30); were found to be significantly correlated with scores on the reading subtest. These subscales were the same ones that were significantly correlated with writing subtest scores. The direction of the correlations were the same with higher scores on each of the subscales associated with higher scores on the reading scores. The remaining subscales were not correlated with reading scores on the ASSET.

Numeric Skills. Four subscales on the LASSI; anxiety (r=.24), information

processing (r=.13), selecting main ideas (r=.15), and test strategies (r=.26); were found to be significantly correlated with scores on numeric skills as measured on the ASSET. These positive correlations indicated that higher scores on the numeric skills subtest were associated with more positive responses on the four LASSI subscales. Attitude and motivation, which were significantly correlated with writing and reading subtest scores, were not significantly correlated with numeric skills scores. The remaining subscales-time management, concentration, study aids, and self testing; were not found to be significantly related to test scores measuring numeric skills.

Care should be taken in interpreting the r values measuring the strength of the relationships between the LASSI subscales and ASSET subtests. Due to the size of the sample, the strength of the relationship did not need to be large to achieve significance. Correlations of .10 and .15 tended to reflect weak correlations and should be considered carefully in determining if the relationships are important.

Research question 2. What is the relationship between LASSI subscale scores and academic achievement?

Academic achievement as measured by high school and first semester college grade point averages of students were correlated with the 10 subscales on the LASSI using Pearson product moment correlation. The coding for high school grade point average and college grade point averages used higher scores to reflect higher grade point averages. The results of this analysis is presented in Table 19.

Table 19

Pearson Product Moment Correlations
LASSI Scores with Academic Achievement

LASSI Scores	Academic Achievement			
	HSGPA		College GPA	
	Number	r value	Number	r value
Attitude	377	.21*	297	.19*
Motivation	381	.31*	301	.35*
Time Management	382	.19*	298	.27*
Anxiety	381	.17*	297	.01
Concentration	380	.22*	299	.23*
Information Processing	378	.14*	296	.08
Selecting Main Ideas	385	.26*	300	.10
Study Aids	381	.12*	298	.16*
Self Testing	382	.17*	301	.19*
Test Strategies	380	.25*	297	.14*

*p≤05

The self-reported high school grade point averages were found to be significantly correlated with all of the subscales of the LASSI: attitude (r=.21), motivation (r=.31), time management (r=.19), anxiety (r=.17), concentration (r=.22), information processing (r=.14), selecting main ideas (r=.26), study aids (r=.12), self testing (r=.17), and test strategies (r=.25). The positive values of these correlations reflect that higher scores on the LASSI subscales were associated with higher high school grade point averages.

The second set of correlations used to answer this research question examined the relationship between college grade point average and each of the subscales on the LASSI. Seven of the subscales; attitude (r=.19), motivation (r=.35), time management (r=.27), concentration (r=.23), study aids (r=.16), self testing (r=.19), and test strategies (r=.14);

were found to be significantly related to college grade point average at an alpha level of .05. The positive values of the correlations indicated that higher scores on these subscales were associated with higher college grade point averages. The remaining subscales — anxiety, information processing, and selecting main ideas were not significantly correlated with college grade point average.

These significant correlations indicated that students with stronger academic achievement are more motivated and have better study habits than students with weaker academic skills. The correlations should be interpreted with care due to the low r values which were significant because of the number of observations. The highest obtained r value was .35 which indicated a moderate degree of relationship with the other significant correlations ranging from .12 to .31.

Research Question 3. Is there a difference in learning and study strategies, ASSET, and academic achievement of retained and nonretained students who are under 25 and those who are 25 years or older?

The scores on the LASSI, ASSET and academic achievement were used as dependent variables in factorial analysis of variance, with the retention status and age of the students used as the independent variables. Retention status was defined as retained students who re-enrolled in the Spring, 1993 semester and nonretained students who did not re-enroll after the Fall, 1992 semester. The ages of the students were divided into two groups, those who were younger than 25 and those who were 25 and older.

Attitude. The first analysis used the scores on the attitude subscale of the LASSI as the dependent variable. The results of this analysis is presented in Table 20.

Table 20

Factorial Analysis of Variance

Attitude by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	231	31.40	4.58	1.14 (NS)
Nonretained	144	32.22	5.02	
Age				
Under 25	224	30.85	4.73	24.62*
25 and Older	151	33.47	4.37	
Interaction				
Retained/Under 25	127	31.03	4.53	.05 (NS)
Retained/25 and Over	104	33.67	4.22	
Nonretained/Under 25	97	30.61	5.01	
Nonretained/25 and Over	47	33.02	4.37	

*$p \leq .05$

The F ratio of 24.62 obtained for the main effect of age was found to be statistically significant at an alpha level of .05 with 1 and 371 degrees of freedom. This result indicated that students who were 25 and older (m=33.47, sd=4.37) had significantly higher scores on attitude than students who were under 25 years of age. The F ratio of 1.14 for the main effect of retention was not statistically significant indicating that retention status did not cause a difference in attitude of the students. The interaction effect between retention and age of the student was also not statistically significant.

Motivation. The scores on the subscale, motivation, were used as the dependent variable in the factorial analysis of variance. The results of this analysis is presented in Table 21.

Table 21

Factorial Analysis of Variance

Motivation by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	236	30.72	5.46	5.32*
Nonretained	144	28.99	5.12	
Age				
Under 25	224	28.63	5.28	39.09*
25 and Older	151	32.19	4.61	
Interaction				
Retained/Under 25	130	31.03	5.19	.06 (NS)
Retained/25 and Over	106	33.67	4.40	
Nonretained/Under 25	97	30.61	5.31	
Nonretained/25 and Over	47	33.02	4.99	

*p≤.05

The F ratio of 5.32 obtained for the main effect, retention, was statistically significant at an alpha level of .05 with 1 and 376 degrees of freedom. This result indicated that students who were retained (m=30.64, sd=5.15) had significantly higher scores on this subscale than students who were not retained (m=29.13, sd=5.43). The second main effect, age, produced an F ratio of 30.09 which was statistically significant at an alpha level of .05 with 1 and 376 degrees of freedom. This result indicated that students who were under 25 (m=28.63, sd=5.28) had significantly lower scores on motivation than students who were 25 and older (m=32.19, sd=4.61). The interaction between retention status and age of the student was not statistically significant indicating that when the students were divided into the four groups, there were no significant differences in their scores on motivation.

Time management skills. Time management skills were used as the dependent variable in a factorial analysis of variance, with the retention status and age of the student

used as the independent variables. Table 22 presents the results of this analysis.

Table 21

Factorial Analysis of Variance

Time Management Skills by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	235	26.00	6.31	3.45 (NS)
Nonretained	143	24.35	5.87	
Age				
Under 25	226	23.47	5.97	49.27*
25 and Older	152	28.21	5.38	
Interaction				
Retained/Under 25	129	23.78	6.10	.53 (NS)
Retained/25 and Over	106	28.71	5.46	
Nonretained/Under 25	97	23.06	5.80	
Nonretained/25 and Over	46	27.06	5.07	

*$p \leq .05$

The main effect, age, produced an F ratio of 49.27 which was statistically significant at an alpha level of .05 with 1 and 374 degrees of freedom. The mean of 28.21 (sd=5.38) obtained for students who were 25 and over was significantly higher than the mean of 23.47 (sd=5.97) for students who were under 25 years of age. The main effect, retention, failed to provide evidence of a statistically significant difference between students who were retained and those who did not re-enroll on time management skills. The interaction between the four groups was not statistically significant indicating that differences between older and younger students and their retention status did not differ in regards to time management skills.

Anxiety. The independent variables, retention status and age of student, were used in a factorial analysis of variance, with scores on anxiety used as the dependent variable.

The results of this analysis are presented in Table 23.

Table 23

Factorial Analysis of Variance

Anxiety by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	233	25.55	5.83	.66 (NS)
Nonretained	143	25.76	5.30	
Age				
Under 25	225	25.08	5.10	6.18*
25 and Older	151	26.44	5.79	
Interaction				
Retained/Under 25	129	25.06	5.74	.55 (NS)
Retained/25 and Over	106	26.14	5.92	
Nonretained/Under 25	96	25.10	5.10	
Nonretained/25 and Over	47	27.11	5.49	

*$p \leq .05$

The main effect, age, yielded an F ratio of 6.18 for the comparison of students who were under 25 and those who were 25 and over on anxiety. The mean score of 26.44, (sd=5.79) for the older students was significantly higher than the mean score of 25.08 (sd=5.10) obtained for the younger students. The main effect, retention status of the student, did not provide evidence that retained and nonretained students differed significantly in their levels of anxiety. The interaction effect between the four groups was not statistically significant indicating that anxiety of the students did not differ relative to their retention status and age.

Concentration. A factorial analysis of variance procedure was used to compare the scores on concentration by the retention status of the students and their ages. The results of this analysis is presented in Table 24.

Table 24

Factorial Analysis of Variance

Concentration by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	234	26.95	6.08	1.73 (NS)
Nonretained	144	25.67	5.99	
Age				
Under 25	229	24.60	5.58	54.49*
25 and Older	149	29.33	5.68	
Interaction				
Retained/Under 25	132	24.86	5.78	.09 (NS)
Retained/25 and Over	102	29.65	5.38	
Nonretained/Under 25	97	24.24	5.30	
Nonretained/25 and Over	47	28.64	6.30	

*$p \leq .05$

The age of the student, divided into two groups, those under 25 and those who were 25 and over, produced an F ratio of 54.49 for the comparison on concentration. This F ratio was statistically significant at an alpha level of .05 with 1 and 374 degrees of freedom. This result indicated that students who were 25 and over (m=29.33, sd=5.68) had significantly higher scores on concentration than students who were under 25 (m=24.60, sd=5.58). The other main effect, retention status, did not provide evidence of significant differences in scores on concentration. The interaction effect comparing the four groups on concentration was not statistically significant indicating the scores on concentration did not differ relative to the retention status and age of the student.

Information Processing. The scores on information processing were used as the dependent variables in a factorial analysis of variance, with retention status and age of the student used as the independent variable. Table 25 presents the results of this analysis.

Table 25

Factorial Analysis of Variance

Information Processing by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	232	26.99	4.81	.48 (NS)
Nonretained	141	26.87	4.47	
Age				
Under 25	227	26.30	4.39	13.64*
25 and Older	146	27.94	4.95	
Interaction				
Retained/Under 25	129	26.51	4.68	2.67 (NS)
Retained/25 and Over	103	27.58	4.92	
Nonretained/Under 25	98	26.02	3.98	
Nonretained/25 and Over	43	28.79	4.96	

*$p \leq .05$

The F ratio of 13.64 obtained for the main effect, age, was statistically significant at an alpha level of .05 with 1 and 369 degrees of freedom. This result indicated that students who were 25 and older (m=27.94, sd=4.95) had significantly higher scores on information processing than students who were under 25 (m=26.30, sd=4.39). The scores on information processing did not differ significantly relative to the retention status of the student. The interaction effect between the younger and older students and their retention status did not provide evidence of a statistically significant difference on the scores for information processing. This result indicated that scores on information processing did not differ relative to the retention status or age of the students.

Selecting Main Ideas. The scores on the subscale, selecting main ideas, were used as the dependent variable in a factorial analysis of variance. The retention status of the student and their ages were used as the independent variables in this analysis. Table 26 presents the results of this analysis.

Table 26

Factorial Analysis of Variance

Selecting Main Ideas by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	236	18.01	18.01	.79 (NS)
Nonretained	146	17.45	17.45	
Age				
Under 25	231	17.45	3.27	6.58*
25 and Older	151	18.32	3.52	
Interaction				
Retained/Under 25	132	17.80	3.42	1.71 (NS)
Retained/25 and Over	104	18.27	3.53	
Nonretained/Under 25	99	16.99	3.00	
Nonretained/25 and Over	47	18.43	3.54	

*p≤.05

The obtained F ratio of 6.58 for the comparison of scores on the subscale, selecting main ideas, by the age of the students was statistically significant at an alpha level of .05 with 1 and 378 degrees of freedom. This result provided evidence that students who were 25 and older (m=18.32, sd=3.52) had significantly higher scores on the subscale, selecting main ideas, than students who were under 25 (m=17.45, sd=3.27). The F ratio on the other main effect, retention status, was not statistically significant indicating students did not differ in their scores on selecting main ideas by their retention status. The interaction between retention status and age of the student was not statistically significant indicating that scores on selecting main ideas were not related to the retention status or age of the student.

Study Aids. The scores on the subscale of the LASSI, study aids, were used as the dependent variable in a factorial analysis of variance, with retention status and gender of the student used as independent variables. Table 27 presents the results of this analysis.

Table 27

Factorial Analysis of Variance

Study Aids by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	233	24.42	4.41	.27 (NS)
Nonretained	144	23.82	4.40	
Age				
Under 25	228	23.88	4.57	3.96*
25 and Older	149	24.66	4.12	
Interaction				
Retained/Under 25	129	24.37	4.85	3.20 (NS)
Retained/25 and Over	104	24.47	3.82	
Nonretained/Under 25	99	23.24	4.13	
Nonretained/25 and Over	45	25.09	4.75	

*$p \leq .05$

The F ratio of 3.96 for the main effect, age of the student, was found to be statistically significant at an alpha level of .05 with 1 and 373 degrees of freedom. This finding indicated that students who were 25 years and over (m=24.66, sd=4.12) had scores on study aids that were significantly higher than the scores on this subscale that were attained by students who were under 25 (m=23.88, sd=4.57). The main effect, retention status, did not differ significantly between retained and nonretained students. The interaction on study aids did not provide evidence of significant differences when the four groups were considered.

Self Testing. Age and retention status were used as independent variables in a factorial analysis to compare scores on the LASSI subscale, self-testing. The results of this analysis are presented in Table 28.

Table 28

Factorial Analysis of Variance

Self-Testing by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	233	24.42	4.41	1.30 (NS)
Nonretained	144	23.82	4.40	
Age				
Under 25	229	26.08	4.84	24.64*
25 and Older	149	28.74	5.02	
Interaction				
Retained/Under 25	130	26.52	5.09	.57 (NS)
Retained/25 and Over	102	28.80	4.78	
Nonretained/Under 25	99	25.49	4.44	
Nonretained/25 and Over	47	28.60	5.55	

*$p \leq .05$

The F ratio of 24.64 obtained for the comparison of scores on self-testing by the age of the student was statistically significant at an alpha level of .05 with 1 and 374 degrees of freedom. This result indicated that students who were 25 and over (m=28.74, sd=5.02) was significantly higher than students who were under 25 years of age (m=26.08, sd=4.84). The other main effect, retention status, was not statistically significant indicating that retained and nonretained students did not differ on their scores measuring self-testing. The interaction between retention status and age was not statistically significant indicating no significant differences between the four groups.

Test Strategies. The scores on the subscale of the LASSI, test strategies, were used as the dependent variables with the retention status and age of the student used as the independent variable. The results of this analysis are presented in Table 29.

Table 29

Factorial Analysis of Variance

Test Strategies by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	233	29.13	5.22	.85 (NS)
Nonretained	145	28.32	5.30	
Age				
Under 25	226	27.90	5.22	16.03*
25 and Older	152	30.19	5.08	
Interaction				
Retained/Under 25	129	2817	5.12	.04 (NS)
Retained/25 and Over	104	30.33	5.11	
Nonretained/Under 25	97	27.54	5.04	
Nonretained/25 and Over	48	29.92	5.50	

*p≤.05

The factorial analysis of variance produced one statistically significant result for age on the LASSI subscale, test strategies. The F ratio of 16.03 on this main effect was statistically significant at an alpha level of .05 with 1 and 374 degrees of freedom. This result indicated that students who were over 25 (m=30.19, sd=5.08) had higher scores on test strategies than students who were under 25 (m=27.90, sd=5.08). Scores on test strategies did not differ significantly relative to the retention status of the student. The interaction between retention status and age was not statistically significant indicating that scores on the LASSI subscale, test strategies did not differ significantly among the four groups.

Writing skills. The scores on the ASSET subtest, writing skills were used as the independent variable in a factorial analysis of variance with the retention status and age of the student used as the independent variable. The results of this analysis are presented in Table 30.

Table 30

Factorial Analysis of Variance

Writing Skills ASSET Scores by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	234	40.47	6.72	.99 (NS)
Nonretained	150	39.77	6.83	
Age				
Under 25	232	40.11	6.82	.01 (NS)
25 and Older	152	40.32	6.70	
Interaction				
Retained/Under 25	131	40.34	6.71	.09 (NS)
Retained/25 and Over	103	40.63	6.76	
Nonretained/Under 25	101	39.82	6.97	
Nonretained/25 and Over	49	39.67	6.59	

*$p \leq .05$

The results of the factorial analysis of variance for writing skills scores by the retention status and age of the student provided no evidence of statistically significant differences for main effects of retention and age. The interaction between retention status and age and scores on writing skills were not statistically significant indicating no differences when the four groups were examined.

Reading skills. The reading skills scores on the ASSET test were used as the dependent variable with the retention status and age of the student used as the independent variables in a factorial analysis of variance. The results of this analysis is presented in Table 31.

Table 31

Factorial Analysis of Variance

Reading Skills ASSET Scores by Retention Status and Age of Student

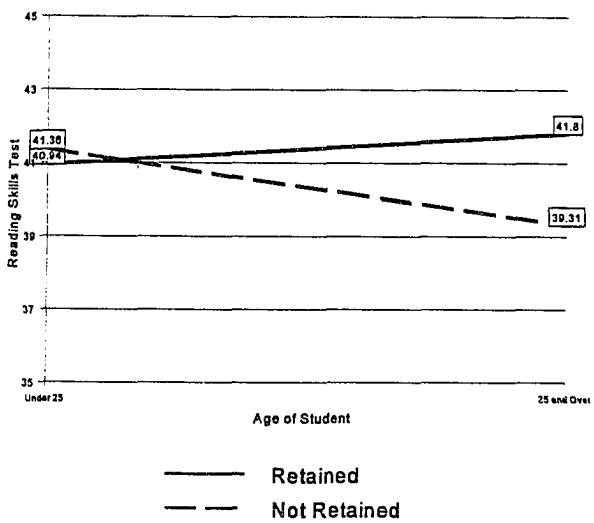
Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	235	41.31	6.28	2.27 (NS)
Nonretained	148	41.36	6.31	
Age				
Under 25	231	41.12	6.18	.77 (NS)
25 and Older	152	40.99	6.46	
Interaction				
Retained/Under 25	132	40.94	6.39	4.52*
Retained/25 and Over	103	41.80	6.13	
Nonretained/Under 25	99	41.36	5.93	
Nonretained/25 and Over	49	39.31	6.88	

*$p \leq .05$

The main effects, retention status and age, provided no evidence of statistically significant differences in reading skills scores on the ASSET test. The F ratio of 4.52 obtained on the interaction between retention status and age was statistically significant at an alpha level of .05 with 1 and 379 degrees of freedom. This result indicated a significant difference among the four groups. Retained students who were 25 and over (m=41.80, sd=6.13) had the highest scores with nonretained students 25 and over having the lowest scores (m=39.31, sd=6.88). The nonretained students who were under 25 (m=41.36, sd=5.93) and retained students under 25 (m=40.94, sd=6.39) had similar scores. Figure 7 presents the graphical representation of this interaction effect.

Figure 7

Interaction between Retention Status and Age



Numeric Skills. The scores on the numeric skills subtest of the ASSET were used as the dependent variable in a factorial analysis of variance procedure with the retention status and age of the student used as the independent variables. The results of this analysis are presented in Table 32.

Table 32

Factorial Analysis of Variance

Numeric Skills ASSET Scores by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	236	39.84	6.48	.01 (NS)
Nonretained	148	40.68	6.34	
Age				
Under 25	232	40.54	6.33	4.97*
25 and Older	152	38.86	6.40	
Interaction				
Retained/Under 25	131	40.94	6.39	.53 (NS)
Retained/25 and Over	103	41.80	6.13	
Nonretained/Under 25	101	41.36	5.93	
Nonretained/25 and Over	49	39.31	6.88	

*$p \leq .05$

The F ratio of 4.97 for the main effect, age, was found to be statistically significant at an alpha level of .05 with 1 and 380 degrees of freedom. This result indicated that students who were less than 25 (m=40.54, sd=6.40) had significantly higher scores on this subtest than students who were 25 and older (m=38.86, sd=6.33). The remaining main effect, retention status, was not statistically significant indicating that retained and nonretained students did not differ in their scores on the numeric skills. The interaction between retention status and age did not produced a statistically significant difference on numeric skills test on the ASSET. This finding indicated that retained and nonretained students who were under 25 or 25 and over did not differ in their scores on the numeric skills subtest of the ASSET.

College grade point average. The scores on the students' college grade point averages at the end of the first semester were used as the dependent variable with the retention status and age of the students used as the independent variables in a factorial

analysis of variance. The results of this analysis are presented in Table 33.

Table 33

Factorial Analysis of Variance

College Grade Point Average by Retention Status and Age of Student

Sources of Variance	Number	Mean	SD	F Ratio
Retention				
Retained	206	2.87	.99	19.56*
Nonretained	85	2.21	1.30	
Age				
Under 25	163	2.20	1.10	71.22*
25 and Older	128	3.29	.84	
Interaction				
Retained/Under 25	110	2.39	.99	.09 (NS)
Retained/25 and Over	96	3.42	.65	
Nonretained/Under 25	53	1.79	1.21	
Nonretained/25 and Over	32	2.90	1.16	

*p≤.05

The F ratio of 19.56 obtained for the main effect, retention status, was statistically significant at an alpha level of .05 with 1 and 287 degrees of freedom. This result indicated that retained students (m=2.87, sd=.99) had significantly higher grade point averages than nonretained students (m=2.21 (sd=1.30). The F ratio of 71.22 yielded for the main effect, age, was statistically significant at an alpha level of .05 with 1 and 287 degrees of freedom. This result showed that students who were under 25 (m=2.20, sd=1.10) had significantly lower college grade point averages than students who were 25 and over (m=3.29, sd=.84). The results of the analysis for the interaction between retention status and age of the student on college grade point average was not statistically significant indicating there was no difference among the four groups.

Research Question 4. What is the relationship between the LASSI, ASSET, high school grade point average (HGPA), gender, age, enrollment status, student curriculum; and academic achievement?

The subscales on the LASSI, subtests on the ASSET, high school grade point average, gender of the student, age of the student, enrollment status, and curricular area of study were used as dependent variables in a stepwise multiple linear regression analysis. Enrollment status consisted of whether the student attended full or part time, and when s/he attended, day, evening, or both. Categorical variables — gender, age, and enrollment status were dummy coded to allow for their use in the stepwise multiple regression analysis. The results of this analysis are presented in Table 34.

Table 34

Stepwise Multiple Linear Regression

College Grade Point Average

Independent Variable	Constant	b Weights	Beta Weights	Partial Correlation	t-Value
Age	3.30	-1.13	-.48	.212	-7.59*
High school grade point average		.16	.15	.056	2.37*
Reading Skills		.04	.21	.030	3.50*
Anxiety		-.03	-.16	.023	-2.45
Motivation		.07	.34	.031	3.92*
Attitude		.05	-.22	.022	-2.48*

R Value	.61
R^2	.37
F ratio	18.00*
Degrees of Freedom	6/181

*p≤.05

Six independent variables; age, high school grade point average, reading skills,

anxiety, motivation and attitude; were used in the stepwise multiple regression analysis to predict college grade point average. These six variables explained a total of 37.4% of the variation in college grade point average. The F ratio of 18.00 was statistically significant at an alpha level of .05 with 6 and 181 degrees of freedom.

The first variable that entered the equation was age of the student. Age explained 21.2% of the variation in college grade point average. The t-value of -7.59 obtained for this independent variable was statistically significant indicating the amount of variation in the dependent variable that was explained by age was a significant predictor of college grade point average. The negative value of the relationship indicated that students who were 25 and over (coded as a "1") had higher grade point averages than students who were under 25 (coded as a "2").

High school grade point average entered the equation explaining an additional 5.6% of the variation in college grade point average. The t-value of 2.37 obtained for this independent variable was statistically significant at an alpha level of .05 indicating high school grade point average was a significant predictor of college grade point average. The positive value of the relationship indicated that higher high school grade point averages (A to A- coded as a "7" and D to D- coded as a "1") was associated with higher college grade point averages (ranging from A=4.0 to D=1.0).

The scores on the reading skills subtest of the ASSET was the next variable to enter the equation. This variable explained 3% of the variation in college grade point average. The associated t-value of 3.50 was statistically significant at an alpha level of .05, indicating the amount of variation in college grade point was associated with scores on the reading skills subtest. The positive value of this analysis indicated higher scores on

the reading skills subtest of the ASSET were associated with higher college grade point averages.

Anxiety, a subscale of the LASSI, explained an additional 2.3% of the variation in college grade point average. The t-value of -2.45 was statistically significant at an alpha level of .05 indicating that anxiety was a significant predictor of college grade point average. The negative value of the relationship provided evidence that lower scores on anxiety were associated with higher college grade point averages. Lower scores on anxiety are reflective of higher levels of anxiousness for the college student.

Another subscale of the LASSI, motivation, entered the regression equation next. This independent variable explained a total of 3.1% of the variation in college grade point average. The t-value of 3.92, associated with motivation, was statistically significant at an alpha level of .05. This finding demonstrated that motivation explained a significant amount of variation in college grade point averages. The positive value of the relationship between motivation and college grade point average indicated that higher levels of motivation were associated with higher college grade point averages.

The LASSI subscale, attitude, was the last independent variable to enter the equation. This independent variable explained an additional 2.2% of the variation in college grade point average. The t-value of -2.48 obtained for attitude was statistically significant at an alpha level of .05. This finding indicated that the amount of variation in college grade point average that was explained by attitude was statistically significant. The negative value of the relationship provided evidence that lower scores on attitude were associated with higher college grade point averages. Lower scores on attitude reflect a poorer attitude and interest toward college.

When the beta weights were examined, age (β=-.48) was the strongest predictor of college grade point averages, with high school grade point average (β=.15) the weakest predictor. Motivation (β=.34) was a stronger predictor of college grade point average than attitude (β=-.22), reading skills scores (β=.21), and anxiety (β=-.16). The remaining independent variables did not enter the equation indicating they were not statistically significant predictors of college grade point average.

Research question 5. What is the relationship between gender, age, part-time/full-time enrollment status, day/evening status, student curriculum; and first-to-second term student retention?

To test the association between gender, age, part-time/full-time enrollment, day/evening status, student curriculum with the first-to-second term student retention, chi square tests for independence were used. Where the variables were dichotomous; gender, age, part-time/full-time enrollment status; Fisher's exact probability test results were used.

Gender. Gender of the student was crosstabulated by their retention status to determine the association between the two variables. Table 35 presents the results of this analysis.

Table 35

Crosstabulation
Gender by Retention Status

Gender	Retention Status				Total	
	Retained		Not Retained			
	Number	Percent	Number	Percent	Number	Percent
Male	118	48.6	79	51.6	197	49.7
Female	125	51.4	74	48.4	199	50.3
Total	243	61.4	153	38.6	396	100.0
Fisher's Exact Probability Test						.61 (NS)

Of the 197 (49.7%) males in the study, 118 (48.6%) were retained from the first to the second semester, with 79 (51.6%) not retained. One hundred twenty five (51.4%) of the females were retained compared to 74 (48.4%) who were not retained. The results of the Fisher's Exact Probability Test was .61 indicating the association between gender and the retention status of the student was not statistically significant. This finding indicated that the retention status of females and males did not differ.

Age. The age of the students divided into two groups, those who were under 25 and those who were 25 and over, was crosstabulated by retention status. The results of this analysis are presented in Table 36.

Table 36

Crosstabulation
Age by Retention Status

Age	Retention Status				Total	
	Retained		Not Retained			
	Number	Percent	Number	Percent	Number	Percent
Under 25	106	44.0	49	32.2	155	39.4
25 and Over	135	56.0	103	67.8	238	60.6
Total	241	61.3	152	38.7	396	100.0
Fisher's Exact Probability Test						.03*

*p≤.05

Of the 155 (39.4%) students who were under 25, 106 (44.0%) were retained and 49 (32.2%) were not retained. There were 135 (56.0%) students 25 and over who were retained compared to 103 (67.8%) who were not retained. The Fisher's exact probability produced a p value of .03 which was statistically significant at an alpha level of .05 indicating an association between the students' age and their retention status.

Day/Evening Attendance. Day/evening attendance patterns were divided into three groups:(a) students who attended class during the day only, (b) those who attended class in the evening only, and (c)students who attended class both day and evening. Their responses to this item were crosstabulated with their retention status. The results of this analysis are presented in Table 37.

Table 37

Crosstabulation
Day/Evening Attendance Pattens by Retention Status

Day/Evening Attendance Patterns	Retention Status				Total	
	Retained		Not Retained			
	Number	Percent	Number	Percent	Number	Percent
Day only	95	43.8	53	36.8	148	41.0
Evening only	75	34.6	60	41.7	135	37.4
Both	47	21.7	31	21.5	78	21.6
Total	217	60.1	144	39.9	361	100.0
Chi Square Value						2.20 (NS)
Degrees of freedom						2

Of the 148 (41.0%) students who indicated they attended day classes only, 95 (43.8%) were retained from the first to the second semester, with 53 (36.8%) not retained. There were 75 (34.6%) students who attended evening classes only who were retained compared to 60 (41.7%) evening students who were not retained from the first to the second semester. Of the 78 (21.6%) students who attended both day and evening classes, 47 (21.5%) were in the retained group compared to 31 (21.5%) who were in the nonretained group. The chi square value of 2.20 obtained on this comparison of day/evening attendance patterns by retention status was not statistically significant at an alpha level of .05 with 2 degrees of freedom. This result indicated that the retention status of students was not associated with their day/evening attendance patterns.

Full-time/Part-time Enrollment Status. The students' enrollment status was divided into two groups, full-time and part-time. Students who were taking at least 12 credit hours were considered full-time, with students enrolled for less than 12 credit hours

considered part-time. Their enrollment status was crosstabulated by their retention status for presentation in Table 38.

Table 38

Crosstabulation
Enrollment Status by Retention Status

Enrollment Status	Retention Status				Total	
	Retained		Not Retained			
	Number	Percent	Number	Percent	Number	Percent
Full-time	70	29.4	21	13.7	91	23.3
Part-time	168	70.6	132	86.3	300	76.7
Total	243	61.4	153	38.6	396	100.0
Fisher's Exact Probability Test						>.01*

*p≤.05

Seventy (29.4%) of the full-time students at MCC were retained from the first to the second semester compared to 21 (13.7%) who were not retained. Of the 300 (76.7%) part-time students in the study, 168 (70.6%) were retained and 132 (86.3%) were not retained. The p value of >.01 obtained on the Fisher's exact probability test was statistically significant at an alpha level of .05 indicating there was an association between enrollment status and retention status.

Curriculum Areas. The majors of the students were divided into nine curriculum areas: undecided, arts and sciences, transfer, public service, health, business, design, mechanical, and applied technology. The curriculum areas were crosstabulated with the retention status of the student to determine the association between programs of choice and retention of students from the first to the second semester. Table 39 presents the results of this analysis.

Table 39

Crosstabulation
Curriculum Areas by Retention Status

Curriculum Areas	Retention Status				Total	
	Retained		Not Retained			
	Number	Percent	Number	Percent	Number	Percent
Undecided	72	30.5	47	31.3	119	30.8
Arts and Sciences	27	11.4	12	8.0	39	10.1
Transfer	28	11.9	34	22.7	62	16.1
Public Service	11	4.7	9	6.0	20	5.2
Health	22	9.3	11	7.3	33	8.5
Business	39	16.5	17	11.3	56	14.5
Design	17	7.2	8	5.3	25	6.5
Mechanical	13	5.5	9	6.0	22	5.7
Applied Technology	7	3.0	3	2.0	10	2.6
Total	236	61.1	150	38.9	386	100.0
Chi Square Value						11.07 (NS)
Degrees of freedom						8

The largest group of students (n=119, 30.8%) indicated they were undecided about their curriculum area, with 72 (30.5%) of these students in the retained group and 47 (31.3%) in the nonretained group. Of the 39 (10.1%) students who were in the arts and sciences curriculum area, 27 (11.4%) were retained, with 12 (8.0%) not retained from the first to the second semester. Twenty-eight (45.2%) of the students in transfer programs were retained, while 34 (22.7%) of students in this curriculum area were not retained. Twenty (5.2%) students, 11 (4.7%) who were retained and 9 (6.0%) who were not retained, were in public service curriculum areas. Of the 33 (8.5%) students who were enrolled in health curriculum programs, 22 (9.3%) were retained from the first to the

second semester, while 11 (7.3%) were not retained. Thirty-nine (16.5%) students in the business program were retained, compared to 17 (11.3%) who were not retained. A total of 25 (5.7%) students identified their curriculum area as design. Of this number, 17 (7.2%) were retained, while 8 (5.3%) were not retained from the first to the second semester. Twenty-two (5.7%) students, including 13 (5.5%) in the retained group and 9 (6.0%) in the nonretained group, were in the curriculum area dealing with mechanics. Ten (2.6%) of the students in the study were enrolled in courses in the applied technology curriculum, with 7 (3.0%) in the retained group and 3 (2.0%) in the nonretained group.

A chi square analysis was used to determine if the association between curriculum area and retention status was statistically significant. The resultant chi square value of 11.07 was not statistically significant at an alpha level of .05 with 8 degrees of freedom. This result indicated that students' curriculum choices were not associated with their retention status.

Summary

Chapter 4 has presented the results of the data analysis that was used to describe the sample and answer the research questions. A summary, discussion, conclusions and recommendations based on these findings are provided in Chapter 5.

CHAPTER 5

SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to examine learning and study strategies used by college freshmen so that identification of strategies that differentiate successful and nonsuccessful students in terms of academic achievement and student retention could be determined. Another aspect of the research was to determine contributions of learning and study strategies, the ASSET test, high school grade point average (HGPA), gender, age, part-time/full-time enrollment status, day/evening status, and curriculum on academic achievement and student retention.

The issue of student success is a critical area of concern in two-year commuter colleges because of the increasing numbers of underprepared students entering these institutions. Research aimed at improving learning effectiveness and efficiency, and increasing retention, has included the identification of not only traditional cognitive indicators but also a new set of nontraditional variables that correlate with, or predict academic performance and retention.

Attention and interest in studying nontraditional variables, specifically, learning and study strategies, reflect the current state of learning theory. Particularly, there has been a paradigm shift from the behavioral to the cognitive learning theories and more recently, to that of constructivism (P.Cole, 1993; Jonassen, 1991a, 1991b; Richey, 1994). In cognitive learning theories, learning is a function of what learners know and how they come to acquire it (Jonassen, 1991b). The principal concerns are in how a learner remembers and retrieves information from memory (Richey, 1986). In constructivism,

reality is constructed by the knower based upon mental activity. Thinking is grounded in perceptions of physical and social experiences, which can only be comprehended by the mind. The important epistemological assumption is that meaning is a function of how the individual creates meaning from his or her experience (Jonassen 1991a, 1991b).

Summary of Methodology

The population for this study consisted of FTIACs and FTIMs, who completed the LASSI in addition to the ASSET test during the assessment sessions during August, 1992 at both the Warren and Clinton Township campuses of Macomb Community College (MCC). The August, 1992 assessment session was chosen as it was the only time in which the LASSI was administered.

This research examined academic and cognitive variables, noncognitive variables, and demographic factors as related to academic achievement and student retention. The research design used in this study consisted of a nonexperimental, correlational design involving multivariate analysis to answer the research questions.

The LASSI was administered to measure students' learning and study strategies. This inventory measured students' self-perceptions in 10 areas: attitude, motivation, time management, anxiety, concentration, information-processing, selecting main ideas, use of study aids, self-testing, and test strategies.

Student scores on a traditional cognitive indicator, the ASSET test, were obtained for Writing Skills, Reading Skills, and Numerical Skills. The Asset Educational Planning Form (AEPF) provided demographic data for this study. Students' first semester college grade point averages (CGPAs) were obtained along with their stated curriculum code by way of student records. Information on student retention was retrieved from the same set

of records through a determination of whether the student registered for the following term, Spring, 1993.

Summary of Findings

Description of the sample. The majority of the students were less than 25 years of age, with males and females represented equally in the sample. Students were primarily White/Caucasian. Most students were FTIAC, with the next largest group indicating completion of some credits/courses taken either at MCC or at other postsecondary institutions. High school grade point averages (HGPAs) followed a normal distribution, with the largest groups of students reporting grades from a B- to C and B to B- respectively.

The students generally attended classes part-time, with a similar number indicating they were enrolled in day or evening classes. The majority of students were employed, with most of them working more than 30 hours per week. The greatest number of students were planning on obtaining a four-year college degree after completing their programs at MCC. When asked what was the most important reason for attending MCC, the largest group indicated they needed to learn skills to get a new job, with transfer to a four-year college reported by the next largest group.

The majority of students participating in the study were retained from the Fall, 1992 to Spring, 1993 semester. Their college grade point averages (CGPAs), computed by weighting course grades by the number of credit hours for the course, indicated that the largest number of students had CGPAs ranging from 3.50 to 4.00. The largest group of students were undecided about the curriculum area they were pursuing.

Research Questions. The first research question explored the relationship between

individual LASSI subscale scores and the ASSET subscale scores of writing, reading, and numeric skills. There was a direct, positive relationship between the LASSI subscales of anxiety, information processing, selecting main ideas, and test strategies, and scores on the ASSETsubtests of writing, reading, and numeric skills. Students with lower levels of anxiety used greater information processing skills, were more skillful in selecting main ideas, and used test strategies had higher scores on ASSET subtests. Higher levels of motivation and a more favorable attitude toward school were associated with higher scores on writing and reading subtests, but were not related to numeric skill scores.

The second research question investigated the relationship between LASSI subscale scores and academic achievement. Each of the 10 LASSI subscales was significantly related to students' self-reported HGPAs. Higher student scores on the 10 LASSI subscales were related to higher HGPAs. A positive attitude toward school, higher levels of motivation, ability to concentrate, and effective use of time management, study aids, self-testing, and tests strategies were positively correlated with students having higher CGPAs. Anxiety, information processing, and selecting main ideas were not related to CGPA.

The third research question examined differences in learning and study strategies, ASSET, and academic achievement of retained and nonretained students under 25 years and 25 years and older. There was a positive difference between students age 25 and older and scores on each of the 10 subscales of the LASSI. The older group scored higher on each of these subscales than those under 25 years of age. Students who were retained were more highly motivated than students who were not retained; however, none of the other LASSI subscales differed relative to retention status. When students were divided

into four groups: retained/under 25; retained/25 and older; nonretained/under 25; and nonretained/25 and older, no differences in any of the LASSI subscale scores were found on the interactions.

Age and retention status did not differ on writing skills on the ASSET. Reading skills differences were found on the interaction between age and retention status, with retained students who were 25 and over having the highest scores and nonretained students 25 and older having the lowest scores. Students under 25 years of age had higher scores on the numeric skills subtest of the ASSET than students 25 years of age and over. The interaction between retention status and age on the numeric skills subtest did not differ.

Overall, retained students performed better in college classes than nonretained students. Students 25 and older were also more successfully academically. There were no differences in CGPA when the four groups consisting of a combination of retention status and age were compared.

The fourth research question explored the relationship between the LASSI, ASSET, HGPA, gender, age, enrollment status, student curriculum, and academic achievement. The six variables including: age, HGPA, reading skills, anxiety, motivation, and attitude contributed to predicting CGPA. The strongest predictor of CGPA was age, followed by motivation. Again, students that were 25 and over outperformed those under 25 years of age in terms of their CGPA. The weakest predictor of academic achievement was HGPA.

The fifth question investigated the relationship between gender, age, part-time/full-time enrollment status, day/evening status, student curriculum, and student

retention using chi-square analysis. No association was found between gender, day/evening attendance, or curriculum area and student retention. Students' age and enrollment status was related to retention. Those students who were carrying 12 credits or more, and were considered full-time students, enrolled in the Spring, 1993 semester at a greater rate than part-time students. Traditional students, age 25 or older had higher rates of retention than those under 25 years of age.

Discussion

Explanation of Findings

The most prominent finding of this study was that nontraditional students age 25 and older were more successful than their younger counterparts under 25 years of age. Nontraditional students performed better in course work as evidenced by their cumulative CGPA and had higher rates of retention than did traditional students. An unexpected result was the great amount of predictive power that age had on CGPA. Age explained 21.2 % of the variance in CGPA and was the strongest predictor overall.

A critical variable in this study was learning and study strategies. The researcher was interested in knowing as much as possible about the strategies used by college freshmen. What strategies were used, and do they make a difference; if so, how and to what extent? Because the ASSET test is a commonly used tool in the community college for placement and identifying at-risk students, it was important to assess whether or not including other information, in addition to the ASSET, could assist college personnel and faculty in identifying factors related to success in writing, reading, or numeric skills. Question one addressed this area of inquiry.

Six subscales on the LASSI were identified as related to higher scores on each of the three substests of the ASSET: lower anxiety, greater information processing, selecting main ideas, and test strategy use. Students possessing higher levels of motivation and a more favorable attitude toward school also fared better on the writing and reading subtests; however, these two factors did not come into play in relationship to numeric skills.

In using Giles (1994) classification scheme for the LASSI, the scales of information processing, selecting main ideas, and test strategies made up the "cognitive" category. These cognitive indices should be related to other cognitive indicators: each of the subtests of the ASSET. The "motivation" component in Giles classification consisted of the subscales: motivation, attitude, and anxiety. If students had cognitive strategies available to them, but were not motivated, their learning could be hampered. As a result, lower test scores may be the result. While the motivation and attitude subscales were not directly related to a student scoring high on the numeric skills subtest, lower anxiety levels were associated with higher numeric scores. This research supports the importance of lower levels of anxiety, particularly for success on the numeric skills subtest of the ASSET test.

The areas of time management, concentration, study aids and self testing were not associated with the three subtests of the ASSET. The strategies of concentration and time-management fell under Giles' (1994) categorization of "time-management." The utility of these strategies were perhaps more important to overall classroom learning and completion of tasks, projects, and studying in general because they involve such things as directing attention to school and school-related tasks, such as study activities, and

creating and using schedules. These strategies did not seem as critical to the type of cognitive learning being assessed by the writing, reading, and numeric skills of the ASSET. While study aids and self testing were cognitive strategies, they also did not seem as integral to achieving high scores on a one-time assessment test versus their use in more prolonged studying, test taking, or similar endeavors.

The majority of learning and study strategy subscales were associated with higher scores on the reading and writing subtests of the ASSET with four of the subscales being related to higher numeric skills. This is an important finding; however, other explanations for these results should be considered. Due to the relatively large size of the sample, the strength of the relationships did not need to be large to achieve significance. Correlations ranged from .10 to .33. Those of .10 and .15 tend to reflect weak associations and should therefore be interpreted in light of these findings.

Question two explored the relationship between LASSI subscale scores and academic achievement. The LASSI subscales were important in identifying significant relationships between each of the 10 subscales and past performance, that of HGPAs. As a student progresses through high school, cognitive, motivational, and time-management skills are essential to success. The greater the ability to effectively use these strategies, the greater the success, and subsequently, the higher the HGPA.

A majority of learning and study strategies were found to be related to academic achievement at the college level but not all were significancy related; specifically, anxiety, information processing, and selecting main ideas. A possible reason for these three strategies not being associated with CGPA may be that other strategies become more important or students' become more proficient in certain strategies with time and

experience. While information processing skills and selecting main ideas are needed for success in college, use of other strategies, such as greater levels of motivation, a more favorable attitude, or using effective test strategies, may compensate for students who are who less likely to use information processing and selecting main ideas at a higher level. While anxiety was not associated with higher CGPAs, it may be that students' were still able to perform well academically because of the effective use of other strategies

The researcher cautions that interpretations of these relationships should be carefully considered. The significant r values ranged from -.12 to -.31 for HGPA and .14 to .35 for CGPA. The highest obtained r value was .31 for motivation and HGPA and .34 for motivation and CGPA.

The third question examined differences in learning and study strategies, ASSET, and academic achievement of retained and nonretained students who were under 25 and 25 and older. Nontraditional students 25 and older, scored significantly higher on each of the 10 subscales of the LASSI scales than did students under 25 years old. This finding meant that these students had an overall general positive attitude toward school, higher levels of motivation, lower levels of anxiety, and a greater ability to focus attention on school-related activities such as studying and listening. In addition, nontraditional students were able to use information processing skills such as elaboration and organization strategies better than their traditional counterparts. Their skills at selecting main ideas means that they are able to select important information to concentrate on for further study in both the classroom setting and in autonomous learning situations. The use of study aids, self-testing, and test strategies are also areas where they perceive themselves as effective.

In terms of the cognitive learning strategies, it may be that the more time and experience a student has in these areas, the more proficient one becomes. Students who are older may also carry additional responsibilities of work, and/or family. In order to carry out the many demands on their time and multitude of roles they undertake, they need to be efficient time managers, who are motivated to complete their goals. Despite the complexity in many of their lives, they tend to maintain a positive attitude toward school and perhaps, because of having learned to deal more effectively with diverse situations, ultimately have lower levels of anxiety about academic tasks. .

Another finding related to the LASSI scale related to retention and motivation. Those students who were retained had higher levels of motivation as measured by scores on the LASSI subscale of motivation. Students who accepted more responsibility for studying and performance, including behaviors such as preparing for class, completing assignments on time, and being diligent in studying, were more likely to reenroll for a second term.

Reading skills were important as they related to retention. Reading skills differences were found with retained students who were 25 and older having higher scores than those 25 years of age and older who were not retained. Students under 25 were more successful than nontraditional students on the numerical skills subtest of the ASSET. Traditional students may have more recent experience with math courses than nontraditional students who may have not had recent opportunities to practice or sharpen their skills Also, students who were retained performed better in college classes. It may be that academic success is a motivating force for freshmen students to continue to enroll. Nontraditional students were more successful as evidenced by their CGPA. A variety of

factors, in varying combinations and degree may contribute to this finding.

The fourth research question analyzed which independent variables could be used to predict CGPA. The variables which contributed toward predicting college grade point average consisted of age, motivation, anxiety, attitude, reading skills and high school grade point average. Age explained 21.1% of the variance in grade point average. Again, students 25 and older performed academically greater than those under 25. A possible explanation for this finding is that the adult learner comes to the learning environment with a unique set of experiences and backgrounds. These factors combined , though complex, influence students academic experience in higher education. Motivation is also a key variable in achieving academic success. If there is lack of motivation, the effective use of learning strategies becomes less important or perhaps even irrelevant. Attributing what happens to oneself as a result of one's own efforts rather than to outside forces such as luck, or uncontrollable forces, results in more effective studying and school performance (Weinstein, 1987). In this study, those were more highly motivated were more successful.

High anxiety and a poorer attitude toward school and school related tasks also explained college grade point average. This is inconsistent with Weinstein's (1987) assertions that students performance improves when they are less tense, anxious or fearful about studying or performing in academic situations. Weinstein also found that when the relationship between students' life goals and attitudes about themselves and their world are clear and relevant, diligence in their study and in autonomous situations results. Caution should be used in interpreting the results related to anxiety and attitude. Anxiety contributed only 2.3% and attitude 2.2% to the variance in CGPA.

Reading skills also explained CGPA. Students with higher reading skills subsequently earned higher CGPAs. Without the ability to read at a level appropriate for higher education, students find it difficult to succeed at academic tasks. Those students who were better readers performed better academically. Reading ability is essential for student success at the community college. In this study, nontraditional students who were skilled in reading had the greatest chance for success.

High school grade point average explained college grade point average but was the weakest of the six predictors. A measure of past performance, such as the HGPA, has consistently shown to be an important indicator of future success. The HGPA represents what the student has accomplished in the past; however, it does not necessarily reflect cognitive, motivational, or time management strategies the student may have acquired or improved upon since high school. Especially for the nontraditional student, many experiences and intervening factors may have played a role in their lives since high school. This is turn affects their approach to learning and studying in higher education.

Overall, only three of the subscales of the LASSI, and one subscale from the ASSET entered the prediction equation. It is possible that if age had not been as highly predictive as it was, additional variables may have explained CGPA. Together, the six variables explained 37.4% of the variance in CGPA. Part-time/full-time enrollment status, which was related to retention, did not predict CGPA. Day/evening status, gender, and curriculum area were not entered into the regression equation. While an almost equal number attended day or evening, some attended both times. The curriculum was entered by students when they applied for admission. This code may change every semester if the student changes their major. Since the majority of students were FTIAC's, this code is

highly subject to change. Perhaps equally important, students stating different curriculum codes may be taking the same courses since there are general education requirements for many of the programs.

Another finding in terms of retention was that full-time students were retained at a greater rate than part-time students. There may be a variety of reasons for this finding. The sample consisted of 300 part-time students and 91 full-time students, with 50% working 30 hours or more. Full-time students were carrying 12 or more credit hours. Their full-time commitment was to school and therefore they may have taken on fewer outside activities or had fewer work or family related responsibilities than part-time students. Additionally, they may have had greater financial resources which enabled them to attend school on a full-time basis.

Integration of Findings.

The findings of this study have been examined relative to previous research related to academic achievement and student retention among college freshmen. There is clearly an overlap in the factors which are thought to affect both academic performance and student retention (Bers, 1986; Carney & Geis, 1981, Pickering et al. 1992; Pinkston, 1987; Webb, 1988). Academic achievement has been studied relative to a variety of academic or cognitive factors thought to affect performance. The researcher found results similar to other researchers that examined the relationship between reading and CGPA or explained the contribution of reading skills to academic performance. The reading skills subtest, as measured by the ASSET test explained 3% of the variance in CGPA of college freshmen at MCC. The writing and numerical skills subtest did not contribute to explaining CGPA.

Previous research studies have found from 1 to 38% of the variance of CGPA, explained by the subtests of the ASSET. Wonnacott (1989) found that reading, although statistically significant, contributed only 1% to the variance of CGPA. Writing and numeric skills did not add to the prediction of CGPA. In McIntosh-Kochenderfer's (1988) study, the ASSET collectively, accounted for 6-9% of the variance in CGPA. Chacko (1989) conducted a path analysis and found that reading and writing skills accounted for 38% of the variance in CGPA. Other studies using the ASSET have found that the reading subtest (Sucher, 1992) and the reading, writing, and math, collectively are useful indicators of first semester performance at the community college (Krol, 1993).

The interest and importance of including noncognitive variables and demographic factors, in addition to traditional cognitive indicators is well supported in the literature (Abbott, 1994; Chacko, 1989; Kanoy et al. 1989; McIntosh-Kochenderfer, 1988; Pickering et al. 1992, Sargent, 1994/1995; Wonnacott, 1989). The use of traditional cognitive or academic variables, noncognitive variables and demographic factors used in this study predicted 37.4% of CGPA. The combined variance was higher than that found by McIntosh-Kochenderfer (24%) or Wonnacott (10%). Chacko, using path analysis explained 46% of variance in CGPA by the reading and writing subtests of the ASSET and by measures of self-efficacy.

In McIntosh-Kochenderfer's study (1988) the variance explained by the LASSI and ASSET was 24%. The LASSI added an additional 16% of prediction to the ASSET, with the motivation scale accounting for 13%. In this study, the LASSI added an additional 7.6% of explained variance to CGPA; motivation accounted for 3.1% of the total variance. In contrast to McIntosh-Kochenderfer's study, the combination of LASSI

and ASSET accounted for only 10.6% of the variance in CGPA.

While age has been used to add to the prediction equation in various studies (Ganz & Ganz, 1988; Johnson & Walberg, 1989; Wonnacott, 1989) this study was unique in comparing nontraditional students, those 25 and older, and traditional students, under 25 years of age. The inclusion of this variable added a substantial amount in explaining CGPAs of college freshmen. Age alone accounted for 21.2% of the total 37.4% of variance.

Only one other study specifically addressed traditional and nontradtional students in terms of academic achievement and persistence. In Sargent's study (1994/1995) traditional students were defined as first time college students, 18 to 21, taking nine semester credits or more. Nontraditional students were defined as first time in college students, 25 or more, taking nine semester credits or more. He concluded that while prior academic achievement was significant for both groups of students, no difference in academic achievement between the groups were found. He cited a potential limitation as related to the small sample size of the nontraditional age students.

The finding that there was a positive difference between students age 25 and older and scores on each of the 10 scales of the LASSI was not found in other studies of the LASSI. Numerous studies have been conducted using the LASSI and a variety of other variables (Chacko, 1989; S.M.Cole, 1987; Confer-Owens, 1992; Haynes et al. 1987; Giles, 1994; Hulick & Higginson, 1989; Nist et al. 1990; Melburg et al. 1993; McIntosh-Kochenderfer, 1988; McKnight, 1993/1994; Normandin, 1993/1994; Olejnik & Nist, 1992; A.W.Perkins, 1991/1992; Rather, 1992/1993; Williams, 1995) but only one study could be found which examined learning and study strategy differences between the

traditional students, defined as under 25 and nontraditional students, 25 and older (Higgison, 1990). Higgison found significant differences on eight of the ten LASSI subscales except the anxiety and study aids subscale. Caution should be used in interpreting the results due to the small sample size used.

The findings on factors predicting student retention are varied and complex. The researcher found that the only subscale on the LASSI that was related to retention was motivation. As far back as 1967, Roueche found that students attitudes are a main factor in persistence (cited in Pickering et al. 1992). This was not supported in this study. The researcher found that retained students performed better in college academically than nonretained students. The findings in this study related to academic achievement supported other studies. Weidman (1985) found that college grade point average was one of four variables that accounted for 25% of the variance in persistence. Brooks-Leonard (1991) also found that first semester CGPA was significantly related to retention.

The findings that age is related to retention is supported in this study. Students 25 and older had higher rates of retention than traditional students under 25. Age was considered a predictor of retention both alone and in combination with other predictors in studies conducted by Brooks-Leonard (1991) and Feldman (1993). Brooks-Leonard found that older students were more likely to drop out yet Feldman's research showed that students aged 20-24 were1.77 times more likely to drop out than students aged 19 and younger. However, consistent with this study, the 25 and older age group in Feldman's study were less likely than the youngest students to drop out.

Another demographic variable that was significantly related to retention in this study was enrollment status. Full-time students were retained at a greater rate than part-

time students in this study. This finding is consistent with research on full-time enrollment status being related to persistence (Bers, 1986, Brooks-Leonard, 1991; Feldman, 1993).

Conclusions

Results from this study support previous research which suggest that many variables, in varying combinations and in varying degrees, effect academic achievement and student retention at the community college. Findings of this study provided information on college freshmen which have been confirmed by previous studies and in some instances, might be contradictory to previous research. This research provided additional answers about variables which were related to student success and could assist in explaining student success in terms that have not been explored in previous research.

The results of this study provided support for the importance of identifying and studying both nontraditional and traditional students. Students age 25 and older were more successful in terms of both higher academic achievement and greater rates of retention than traditional students who were under 25 years of age. In addition, nontraditional students scored higher on all 10 subscales of the LASSI. Higher scores on the LASSI reflected thought processes and behaviors which contribute significantly to success in post-secondary education settings. While HGPA was found to be significantly related to each of the 10 subscales of the LASSI, it reflected a measure of past performance which was static and therefore was not amenable to change.

The finding that 37.4% of the variance in CGPA was accounted for by a combination of cognitive and noncognitive variables and demographic factors suggested

that traditional methods of assessing student success might not fully capture the complexities inherent in this construct. Age alone accounted for 21.2% of the variance in CGPA. The magnitude of this variable added a dimension to the equation which was not found in previous studies. The LASSI subscales of attitude, motivation, and anxiety, added an additional 7.6% to the prediction of grade point average for a total of 28.8% attributed to nontraditional factors. High school grade point average and the ASSET subtest of reading skills added 8.6% to the variance in grade point average. The selected variables used in this study, collectively, were powerful predictors in explaining CGPA.

The significance of motivation for college freshmen related not only to its explanatory power in predicting CGPA but also its association with higher scores on the reading and writing subtests of the ASSET and to student retention. Assessing student motivation at the outset of a students' entrance into the post-secondary academic environment is essential as it relates to and predicts student success of college freshmen.

Overall, learning and study strategies were related to and predicted academic achievement in community college freshmen. The majority of the scales were also related to performance on the ASSET test. The motivation component was significantly associated with retention. Future research related to learning and study strategies, academic achievement and student retention should be conducted using the categories of nontraditional and traditional students described in this study.

Implications for Educational Evaluation and Research..

Traditional measures of evaluating student learning have included such measures as the SAT, ACT, high school rank or HGPA. Assessment of student ability in terms of

placement decisions or for identifying high risk students at the community college have primarily been conducted via the ASSET test. The ASSET tool is a useful mechanism for such purposes. However, the addition of other nontraditional methods such as the LASSI, has demonstrated that additional information can be obtained on student learning and its relationship, and to some extent, its predictability to grade point average. The LASSI provides a way to assess student learning and subsequently use that information as a diagnostic measure to determine which students could benefit from educational interventions and as a basis for planning individual prescriptions for both remediation and enrichment. It may also be used as a counseling tool for college orientation programs, developmental education programs, and learning centers (Weinstein, 1987).

Evaluation of student learning is critical if student success is truly a goal in post-secondary institutions. Valid and reliable assessment instruments and tests are one mechanism to assure that what is being measured reflects the constructs in question. The LASSI and ASSET together provide an effective formula to measure not only student ability in the areas of writing, reading, and numeric skills, but in learning and study strategies as well. The combination of tools which can effectively add to the explanatory power of predicting student success, is a first step toward meeting individual student goals as well as the goals of institutions. No longer can complacency about student learning and ultimately student success be the rule. The time is now to begin to implement what we do know will lead to positive academic experiences at the community college. The impact of such efforts will hopefully lead to improved academic achievement and student retention.

Implications for Instructional Technology

According to Seels and Richey (1994), "Instructional Technology is the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (p. 1). While instructional technology is a field that has been primarily concerned with application, its procedures and principles are theory based. The essential role that cognitive learning theory and, more recently, constructivism occupies in relationship to student learning can not be underestimated. Constructivists are concerned with the context in which an individual learns. The context provides real world and relevant situations for acquiring knowledge. According to Jonassen (1991a) meaning is a function of how the individual creates meaning from his or her experience. Metacognition is grounded in constructivist theory and provides a foundation upon which students can construct new meaning (Narode, 1989). Metacognitive skills are needed for individuals to regulate, control, and evaluate their own learning. These skills are involved in the knowledge and control of cognition and affect.

Each of these concepts is integral to understanding student learning. This study measured learning and study strategies and found that they were related to reading and writing skills and predicted CGPA. Perhaps equally important were the differences in nontraditional and traditional students in relationship to their self-reported use of learning and study strategies on the LASSI. Cognitive learning seeks to understand what learners know and how they come to acquire it. Constructivists would be interested in how the individual creates meaning from his or her experience.

The idea of creating meaning from experience has particular relevance for adult learners. Adult learners come to the learning situation with a unique set of experiences

and backgrounds. The context in which their learning occurs is critical. According to D.N. Perkins (1991), learners do not just take up and store information, they make tentative interpretations of experiences and go on to elaborate those interpretations. Human are perceivers who construct their own reality through engaging in mental activities: "Cogito, ergo sum" (I think therefore I am—Descartes). Therefore, the existence of the individual is predicated on his or her own constructions (Jonnassen, 1991b).

Cognitive learning theory and constructivist principles are important when considering the way in which individuals learn and how they learn best. Learning is a dynamic process that does not occur in isolation, but interacts with the real-world environment so that learning is constructed within a particular context. The role of metacognition and motivation also affect learner achievement and in this study, as well as many others, motivation was found to be related to student retention.

The application of instructional technology principles, specifically, theory based research and practice applications relative to the development and evaluation of learning situations, and careful assessment of learner characteristics, is appropriate in a postsecondary institution. These methods can assist in promoting student success at the community college level.

Limitations

1. Since this study used a correlational design causality cannot be assumed. Care must be taken not to interpret findings related to academic achievement and student retention as causal in nature.

2. Generalizations about the total population of college students must be carefully considered. Statements should reflect characteristics of a large suburban community college, with a predominantly Caucasian population.

3. Operational definitions of traditional and nontraditional students were defined specifically for the purposes of this study. Research studies defining these variables in other ways may lead to different findings.

4. This study used self-report which relied on indicators of observable behavior in the absence of data to demonstrate that the data actually corresponded with direct observation.

5. This study was limited to the grading practices of instructors at Macomb Community College. Their methods and procedures of instruction, testing, and grading may not reflect or be applicable to grading practices at other colleges.

Recommendations for Further Research

Based upon the results of this study and in light of the literature reviewed, the following recommendations are presented:

1. Replicate this study using other geographical locations with different population characteristics.

2. Examine the effects of variables; such as types of courses, number of hours studied per week, measures of intelligence, etc.; that were not considered in this study on college grade point average.

3. Identify additional cognitive, noncognitive, and demographic factors that should be considered when studying academic achievement and student retention.

4. Explore the effects of age on college grade point average using more precise measurements than under 25 and 25 and over.

5. Develop a model that includes the nontraditional student in studying student attrition.

6. Use a longitudinal study to predict retention of students for more than two consecutive semesters in a community college.

Appendix A

Learning and Study Strategies Inventory

LASSI

Learning And Study Strategies Inventory

1987, H&H Publishing Company, Inc.
1231 Kapp Drive
Clearwater, Florida 34625-2116

by
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Directions

The Learning and Study Strategies Inventory (LASSI) is designed to gather information about learning and study practices and attitudes. On the two forms at right, which you pull out to begin the LASSI, you will find 77 statements related to learning and studying. You are to read each statement and then mark a response according to the following key:

- Not at all typical of me
- Not very typical of me
- Somewhat typical of me
- Fairly typical of me
- Very much typical of me

To help you decide which responses to mark, we would like to explain what is meant by each term.

By **Not at all typical of me**, we do not necessarily mean that the statement would never describe you, but that it would be true of you only in rare instances. Mark an **a** for this response.

By **Not very typical of me**, we mean that the statement generally would not be true of you. Mark a **b** for this response.

By **Somewhat typical of me**, we mean that the statement would be true of you about half the time. Mark a **c** for this response.

By **Fairly typical of me**, we mean that the statement would generally be true of you. Mark a **d** for this response.

By **Very much typical of me**, we do not necessarily mean that the statement would always describe you, but that it would be true of you almost all the time. Mark an **e** for this response.

Please completely darken the appropriate letter. For example, darken the **d** if you feel that the statement is fairly typical of you.

a b c ■ e

Try to rate yourself according to *how well the statement describes you*, not in terms of how you think you should be or what others do. There are no right or wrong answers to these statements. Please work as quickly as you can without being careless and *please complete all the items.*

Both of the forms at right, along with the Directions booklet are two-part, carbonless forms. Take care *not* to stack any of the forms on top of the other when writing since it would damage the forms below.

After reading the directions, tear out *both* two-part forms at right and set this booklet aside. The forms contain the statements you will respond to. This booklet contains information which will be used after you complete the LASSI.

Scoring Directions

After responding to statements 1-77, you may begin the scoring process. Peel off pages 2 and 3 of the inventory. These are the pages you marked with your answers. When the pages are removed, you will then see pages 4 and 5 of the inventory. These pages contain copies of the responses you made to the LASSI statements. Notice that each item is accompanied by a number you darkened and a three-letter code, such as ANX. You will use the code for each item as well as your answer to that item in calculating and plotting your scores.

To calculate your scores for the LASSI, you will need to add the numbers that have been darkened for each of the 10 different scales. Write the darkened number for each scale item in the appropriate space below.

For example, look at the first scale, labeled ATT below. The first item number for the ATT scale is item #5. Go to page 4 and find item #5. Copy the darkened number, in this example the number 3 (e.g. 1 2 ▓ 4 5), into the space above item (5) on this page. Now find the next item for that scale, item #14. Write the darkened number from page 4 in the space provided.

Do this for all items for the ATT scale. Then carefully add the numbers and write the total at the far right in the space provided. You will use these numbers again so please double check your work carefully.

Now finish copying the darkened numbers for each item for all the scales below. Don't forget to add the numbers for each scale.

ATT	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	ATT
Item#	(5)	(14)	(18)	(29)	(38)	(45)	(51)	(69)		
MOT	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	MOT
Item#	(10)	(13)	(16)	(28)	(33)	(41)	(49)	(56)		
TMT	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	TMT
Item#	(3)	(22)	(36)	(42)	(48)	(58)	(66)	(74)		
ANX	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	ANX
Item#	(1)	(9)	(25)	(31)	(35)	(54)	(57)	(63)		
CON	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	CON
Item#	(6)	(11)	(39)	(43)	(46)	(55)	(61)	(68)		
INP	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	INP
Item#	(12)	(15)	(23)	(32)	(40)	(47)	(67)	(76)		
SMI	___ +	___ +	___ +	___ +	___				= ___	SMI
Item#	(2)	(8)	(60)	(72)	(77)					
STA	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	STA
Item#	(7)	(19)	(24)	(44)	(50)	(53)	(62)	(73)		
SFT	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	SFT
Item#	(4)	(17)	(21)	(26)	(30)	(37)	(65)	(70)		
TST	___ +	___ +	___ +	___ +	___ +	___ +	___ +	___	= ___	TST
Item#	(20)	(27)	(34)	(52)	(59)	(64)	(71)	(75)		

Very much typical of me
Fairly typical of me
Somewhat typical of me
Not very typical of me
Not at all typical of me

1. I worry that I will flunk out of school. a b c d e
2. I am able to distinguish between more important and less important information during a lecture. a b c d e
3. I find it hard to stick to a study schedule. a b c d e
4. After a class, I review my notes to help me understand the information. a b c d e
5. I don't care if I finish school as long as I find a husband/wife. a b c d e
6. I find that during lectures I think of other things and don't really listen to what is being said. a b c d e
7. I use special study helps, such as italics and headings, that are in my textbook. a b c d e
8. I try to identify the main points when I listen to lectures. a b c d e
9. I get discouraged because of low grades. a b c d e
10. I am up-to-date in my class assignments. a b c d e
11. Problems outside of school – being in love, financial difficulties, conflict with parents, etc. – cause me to neglect my school work. a b c d e
12. I try to think through a topic and decide what I am supposed to learn from it rather than just read it over when studying. a b c d e
13. Even when study materials are dull and uninteresting, I manage to keep working until I finish. a b c d e
14. I feel confused and undecided as to what my educational goals should be. a b c d e
15. I learn new words or ideas by visualizing a situation in which they occur. a b c d e
16. I come to class unprepared. a b c d e
17. When preparing for an exam, I create questions that I think might be included. a b c d e
18. I would rather not be in school. a b c d e
19. My underlining is helpful when I review text material. a b c d e

Very much typical of me
Fairly typical of me
Somewhat typical of me
Not very typical of me
Not at all typical of me

20. I do poorly on tests because I find it hard to plan my work within a short period of time. a b c d e
21. I try to identify potential test questions when reviewing my class material. a b c d e
22. I only study when there is the pressure of a test. a b c d e
23. I translate what I am studying into my own words. a b c d e
24. I compare class notes with other students to make sure my notes are complete. a b c d e
25. I am very tense when I study. a b c d e
26. I review my notes before the next class. a b c d e
27. I am unable to summarize what I have just heard in a lecture or read in a textbook. a b c d e
28. I work hard to get a good grade, even when I don't like a course. a b c d e
29. I often feel like I have little control over what happens to me in school. a b c d e
30. I stop periodically while reading and mentally go over or review what was said. a b c d e
31. Even when I am well prepared for a test, I feel very anxious. a b c d e
32. When I am studying a topic I try to make everything fit together logically. a b c d e
33. I talk myself into believing some excuse for not doing a study assignment. a b c d e
34. When I study, I have trouble figuring out just what to do to learn the material. a b c d e
35. When I begin an examination, I feel pretty confident that I will do well. a b c d e
36. When it comes to studying, procrastination is a problem for me. a b c d e
37. I check to see if I understand what the instructor is saying during the lecture. a b c d e
38. I do not care about getting a general education, I just want to get a good job. a b c d e

1. ANX 5 4 3 2 1

2. SMI 1 2 3 4 5

3. TMT 5 4 3 2 1

4. SFT 1 2 3 4 5

5. ATT 5 4 3 2 1

6. CON 5 4 3 2 1

7. STA 1 2 3 4 5

8. SMI 1 2 3 4 5

9. ANX 5 4 3 2 1

10. MOT 1 2 3 4 5

11. CON 5 4 3 2 1

12. INP 1 2 3 4 5

13. MOT 1 2 3 4 5

14. ATT 5 4 3 2 1

15. INP 1 2 3 4 5

16. MOT 5 4 3 2 1

17. SFT 1 2 3 4 5

18. ATT 5 4 3 2 1

19. STA 1 2 3 4 5

20. TST 5 4 3 2 1

21. SFT 1 2 3 4 5

22. TMT 5 4 3 2 1

23. INP 1 2 3 4 5

24. STA 1 2 3 4 5

25. ANX 5 4 3 2 1

26. SFT 1 2 3 4 5

27. TST 5 4 3 2 1

28. MOT 1 2 3 4 5

29. ATT 5 4 3 2 1

30. SFT 1 2 3 4 5

31. ANX 5 4 3 2 1

32. INP 1 2 3 4 5

33. MOT 5 4 3 2 1

34. TST 5 4 3 2 1

35. ANX 1 2 3 4 5

36. TMT 5 4 3 2 1

37. SFT 1 2 3 4 5

38. ATT 5 4 3 2 1

Very much typical of me
Fairly typical of me
Somewhat typical of me
Not very typical of me
Not at all typical of me

39. I am unable to concentrate well because of restlessness or moodiness. a b c d e
40. I try to find relationships between what I am learning and what I already know. a b c d e
41. I set high standards for myself in school. a b c d e
42. I end up "cramming" for almost every test. a b c d e
43. I find it hard to pay attention during lectures. a b c d e
44. I key in on the first and/or last sentences of most paragraphs when reading my text. a b c d e
45. I only study the subjects I like. a b c d e
46. I am distracted from my studies very easily. a b c d e
47. I try to relate what I am studying to my own experiences. a b c d e
48. I make good use of daytime study hours between classes. a b c d e
49. When work is difficult I either give up or study only the easy parts. a b c d e
50. I make drawings or sketches to help me understand what I am studying. a b c d e
51. I dislike most of the work in my classes. a b c d e
52. I have trouble understanding just what a test question is asking. a b c d e
53. I make simple charts, diagrams, or tables to summarize material in my courses. a b c d e
54. Worrying about doing poorly interferes with my concentration on tests. a b c d e
55. I don't understand some course material because I don't listen carefully. a b c d e
56. I read textbooks assigned for my classes. a b c d e
57. I feel very panicky when I take an important test. a b c d e
58. When I decide to study, I set aside a specific length of time and stick to it. a b c d e
59. When I take a test, I realize I have studied the wrong material. a b c d e

Very much typical of me
Fairly typical of me
Somewhat typical of me
Not very typical of me
Not at all typical of me

60. It is hard for me to decide what is important to underline in a text. a b c d e
61. I concentrate fully when studying. a b c d e
62. I use the chapter headings as a guide to identify important points in my reading. a b c d e
63. I get so nervous and confused when taking an examination that I fail to answer questions to the best of my ability. a b c d e
64. I memorize grammatical rules, technical terms, formulas, etc., without understanding them. a b c d e
65. I test myself to be sure I know the material I have been studying. a b c d e
66. I put off studying more than I should. a b c d e
67. I try to see how what I am studying would apply to my everyday living. a b c d e
68. My mind wanders a lot when I study. a b c d e
69. In my opinion, what is taught in my courses is not worth learning. a b c d e
70. I go over homework assignments when reviewing class materials. a b c d e
71. I have difficulty adapting my studying to different types of courses. a b c d e
72. Often when studying I seem to get lost in details and "can't see the forest for the trees." a b c d e
73. When they are available, I attend group review sessions. a b c d e
74. I tend to spend so much time with friends that my coursework suffers. a b c d e
75. In taking tests, writing themes, etc. I find I have misunderstood what is wanted and lose points because of it. a b c d e
76. I try to interrelate themes in what I am studying. a b c d e
77. I have difficulty identifying the important points in my reading. a b c d e

39. CON 5 4 3 2 1

40. INP 1 2 3 4 5

41. MOT 1 2 3 4 5

42. TMT 5 4 3 2 1

43. CON 5 4 3 2 1

44. STA 1 2 3 4 5

45. ATT 5 4 3 2 1

46. CON 5 4 3 2 1

47. INP 1 2 3 4 5

48. TMT 1 2 3 4 5

49. MOT 5 4 3 2 1

50. STA 1 2 3 4 5

51. ATT 5 4 3 2 1

52. TST 5 4 3 2 1

53. STA 1 2 3 4 5

54. ANX 5 4 3 2 1

55. CON 5 4 3 2 1

56. MOT 1 2 3 4 5

57. ANX 5 4 3 2 1

58. TMT 1 2 3 4 5

59. TST 5 4 3 2 1

60. SMI 5 4 3 2 1

61. CON 1 2 3 4 5

62. STA 1 2 3 4 5

63. ANX 5 4 3 2 1

64. TST 5 4 3 2 1

65. SFT 1 2 3 4 5

66. TMT 5 4 3 2 1

67. INP 1 2 3 4 5

68. CON 5 4 3 2 1

69. ATT 5 4 3 2 1

70. SFT 1 2 3 4 5

71. TST 5 4 3 2 1

72. SMI 5 4 3 2 1

73. STA 1 2 3 4 5

74. TMT 5 4 3 2 1

75. TST 5 4 3 2 1

76. INP 1 2 3 4 5

77. SMI 5 4 3 2 1

Plot Your Scores - *Student's Copy*

Name: _____
Date: _____
I.D.# _____

The chart below is used to interpret the scores you calculated on page 2 of this booklet. Each column of the table below is labeled using the three-letter codes. Copy your scores from page 2 into the space provided for each scale. Find your score on the scale directly above each scale code and place an X over this number. Do this for each scale.

For example, if your ATT score was 29, find the number 29 on the set of numbers just above the ATT scale name and place an X over the 29, as shown in the example below.

40	31
35	30
30	~~29~~
25	--

If you cannot find your exact score, place an X over the next lowest number. When you have finished all 10 scale scores, connect the X's to see your learning and study strategies profile.

The columns on the far left and far right of the chart show percentiles. You can use these percentiles to look at your scores in relation to other college students answering the same items.

Each of the three-letter codes indicates a category of learning and study strategies or methods. The meanings of the codes are:

- ATT • attitude and interest
- MOT • motivation, diligence, self-discipline, and willingness to work hard
- TMT • use of time management principles for academic tasks
- ANX • anxiety and worry about school performance
- CON • concentration and attention to academic tasks
- INP • information processing, acquiring knowledge, and reasoning
- SMI • selecting main ideas and recognizing important information
- STA • use of support techniques and materials
- SFT • self testing, reviewing, and preparing for classes
- TST • test strategies and preparing for tests.

99	39	39	39	39	38	39	25	38	39	39	99
95	38	38	33	36	34	36	23	33	33	37	95
90	37	37	32	34	32	34	22	31	32	35	90
85	36	36	30	33	31	32	21	30	30	34	85
80	35	35	29	32	30	31	--	29	29	33	80
75	--	--	28	31	29	30	20	28	--	--	75
70	34	34	27	30	--	29	--	27	28	32	70
65	--	33	26	29	28	--	19	26	27	--	65
60	33	32	25	28	27	28	--	--	--	31	60
55	--	--	24	27	26	27	--	25	26	--	55
50	32	31	23	26	25	--	18	--	25	30	50
45	--	30	22	25	24	26	--	24	--	29	45
40	31	--	21	24	23	25	17	23	24	--	40
35	30	29	20	23	22	24	--	--	23	28	35
30	29	28	19	22	21	23	16	22	22	27	30
25	--	27	18	21	20	22	--	21	21	26	25
20	28	26	17	20	19	21	15	20	20	25	20
15	27	25	15	19	18	20	14	19	19	24	15
10	25	23	14	17	16	19	13	18	18	22	10
05	23	20	12	15	13	17	11	16	16	19	05
01	19	17	09	12	10	14	08	13	12	14	01
	ATT	MOT	TMT	ANX	CON	INP	SMI	STA	SFT	TST	

LASSI

Learning And Study Strategies Inventory

1231 Kapp Drive
Clearwater, Florida 34625-2116

Separate this sheet from the Directions booklet before writing prescriptions.

Prescriptions:

User's Manual

A LASSI User's Manual is available to those administering the inventory. This User's Manual includes a history of the instrument's development, a complete description of the ten scales included in the LASSI, a section on administration and scoring, results of pilot and field testing, and the process used in scale construction. In addition, it contains information to help create individual prescriptions for enhancing students' skills.

Ordering Information

Volume discounts are available. Complete information on ordering the LASSI is available from:

H&H Publishing Company, Inc.
1231 Kapp Drive
Clearwater, FL 34625-2116
Phone
(813) 442-7760
(813) 447-0835

Appendix B

ASSET Educational Planning Form

ACT ASSET Educational Planning Form and Answer Folder *(Scantron)*

1 NAME (Use a Soft No. 2 Lead Pencil)

Last Name | First Name | MI

2 IDENTIFICATION
Student/Social Security Number

3 DATE OF BIRTH
Month: Jan., Feb., March, April, May, June, July, Aug., Sept., Oct., Nov., Dec.
Day | Year

4 IS ENGLISH YOUR FIRST LANGUAGE?
Yes
No

5 SEX
Male
Female

6 ARE YOU A VETERAN?
Yes
Active Duty
No

7 ETHNIC BACKGROUND
Black/Afro-American
Amer.-Indian/Alaskan Native
White/Caucasian
Mexican-American/Chicano
Asian/Pacific Islander
Puerto Rican/Cuban/Other Hispanic
Filipino
Other
Prefer Not to Respond

8 TYPE OF HIGH SCHOOL CERTIFICATE
Year | Code (see list)
High School Diploma
GED
Proficiency Exam
Certificate of Completion
Foreign Secondary
Not a H.S. Graduate
Still in High School

9 CREDITS EARNED AFTER HIGH SCHOOL
Quarter | Semester

10 HIGHEST DEGREE/CERTIFICATE AFTER HIGH SCHOOL
Code (see list)
Have Not Attended
Some Credits/Courses
Certificate or Diploma
Associate Degree
Bachelor's Degree
Master's Degree or Beyond
Other

11 OVERALL HIGH SCHOOL GRADE AVERAGE
A- to A (3.5-4.0)
B to A- (3.0-3.4)
B- to B (2.5-2.9)
C to B- (2.0-2.4)
C- to C (1.5-1.9)
D to C- (1.0-1.4)
D- to D (0.5-0.9)

12 COURSES COMPLETED AND GRADES EARNED

Subjects	High School: Years Studied	High School: Last Grade Received	After High School: Years Studied	After High School: Last Grade Received
English	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F
Business Math	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F
Algebra	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F
Calculus	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F
Science	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F
Foreign Lang.	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F
Computer Skills	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F
Vocational Skills	0 1 2 3 4	A B C D F	0 1 2 3 4	A B C D F

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13 ENROLLMENT PLAN		Credits Planned		14 CAREER GOAL Code (see list)			How Sure of Choice?	15 INTEREST REGION (from ACT CPP, VIESA or DISCOVER)		16 EDUCATIONAL PROGRAM OR MAJOR Code (see list)						How Sure of Choice?	17 WEEKLY EMPLOYMENT HOURS PLANNED WHILE ENROLLED
Term	Year																
○ Fall	○ 1989	0	0	0	0	0	○ Very Sure	0	0	0	0	0	0	0	0	○ Very Sure	○ None
○ Winter	○ 1990	1	1	1	1	1		1	1	1	1	1	1	1	1		○ 1-10
○ Spring	○ 1991	2	2	2	2	2			2	2	2	2	2	2	2		○ 11-15
○ Summer I	○ 1992		3	3	3	3	○ Fairly Sure		3	3	3	3	3	3	3	○ Fairly Sure	○ 16-20
○ Summer II	○ 1993		4		4	4			4	4	4	4	4	4	4		○ 21-30
	○ 1994		5		5	5			5	5	5	5	5	5	5		○ 31 or More
Time	○ 1995		6		6	6	○ Not Sure		6	6	6	6	6	6	6	○ Not Sure	
○ Day	○ 1996		7		7	7			7	7	7	7	7	7	7		
○ Evening	○ 1997		8		8	8			8	8	8	8	8	8	8		
○ Day and Evening	○ 1998		9		9	9		9	9	9	9	9	9	9	9		

18 AMOUNT OF EDUCATION PLANNED	19 CONSIDERING TRANSFER TO ANOTHER SCHOOL LATER?	Code (see list)				20 MOST IMPORTANT REASON FOR ATTENDING THIS TERM	21 PLAN TO EARN CERTIFICATE OR TWO-YEAR DEGREE AT THIS INSTITUTION?
○ Classes only (no certificate or degree)	○ 2-year college	0	0	0	0	○ Learn skills to get a new job	○ Yes, two-year degree
○ One to two-year certificate or diploma program	○ 4-year college or university	1	1	1	1	○ Learn skills to advance in job	
○ Two-year college degree	○ Other type of institution	2	2	2	2	○ Transfer to four-year college	○ Yes, certificate or diploma
○ Four-year college degree	○ Not planning to transfer	3	3	3	3	○ Satisfy general education requirements	
○ Graduate or professional study beyond four-year degree	○ Undecided about transfer	4	4	4	4	○ Improve basic skills in English, reading, or math	○ Undecided
		5	5	5	5	○ Take courses for personal interest	○ No
		6	6	6	6	○ Other	
		7	7	7	7		
		8	8	8	8		
		9	9	9	9		

22 WOULD LIKE HELP WITH	YES	MAYBE	NO
1. Financial aid	○	○	○
2. Finding work	○	○	○
3. Learning English	○	○	○
4. Reading skills	○	○	○
5. Study skills	○	○	○
6. Writing skills	○	○	○
7. Math skills	○	○	○
8. Choosing career/major	○	○	○
9. Personal concerns	○	○	○
10. Learning disability	○	○	○
11. Physical disability	○	○	○
12. Health problem	○	○	○
13. Commuter information	○	○	○
14. Work experience credit	○	○	○
15. Day care information	○	○	○
16. ______	○	○	○

23 GRADES EXPECTED FIRST TERM

- ○ A- to A (3.5-4.0)
- ○ B to A- (3.0-3.4)
- ○ B- to B (2.5-2.9)
- ○ C to B- (2.0-2.4)
- ○ C- to C (1.5-1.9)
- ○ D to C- (1.0-1.4)
- ○ D- to D (0.5-0.9)

24 RELEASE OF INFORMATION

I hereby authorize release of this information (including assessment results) to other educational institutions, so they may contact me about their educational programs and related opportunities.

Other Postsecondary Institutions	My High School
○ Yes	○ Yes
○ No	○ No

______________________________ ______________
Student's Signature Date

TEST FORM ○ Form B ○ Form C1 ○ Form C2 ○ Form D ○ Form E

PART A: Writing Skills

1 ○A ○B ○C ○D	10 ○A ○B ○C ○D	19 ○A ○B ○C ○D	28 ○A ○B ○C ○D
2 ○A ○B ○C ○D	11 ○A ○B ○C ○D	20 ○A ○B ○C ○D	29 ○A ○B ○C ○D
3 ○A ○B ○C ○D	12 ○A ○B ○C ○D	21 ○A ○B ○C ○D	30 ○A ○B ○C ○D
4 ○A ○B ○C ○D	13 ○A ○B ○C ○D	22 ○A ○B ○C ○D	31 ○A ○B ○C ○D
5 ○A ○B ○C ○D	14 ○A ○B ○C ○D	23 ○A ○B ○C ○D	32 ○A ○B ○C ○D
6 ○A ○B ○C ○D	15 ○A ○B ○C ○D	24 ○A ○B ○C ○D	33 ○A ○B ○C ○D
7 ○A ○B ○C ○D	16 ○A ○B ○C ○D	25 ○A ○B ○C ○D	34 ○A ○B ○C ○D
8 ○A ○B ○C ○D	17 ○A ○B ○C ○D	26 ○A ○B ○C ○D	35 ○A ○B ○C ○D
9 ○A ○B ○C ○D	18 ○A ○B ○C ○D	27 ○A ○B ○C ○D	36 ○A ○B ○C ○D

PART B: Reading Skills

1 ○A ○B ○C ○D	7 ○A ○B ○C ○D	13 ○A ○B ○C ○D	19 ○A ○B ○C ○D
2 ○A ○B ○C ○D	8 ○A ○B ○C ○D	14 ○A ○B ○C ○D	20 ○A ○B ○C ○D
3 ○A ○B ○C ○D	9 ○A ○B ○C ○D	15 ○A ○B ○C ○D	21 ○A ○B ○C ○D
4 ○A ○B ○C ○D	10 ○A ○B ○C ○D	16 ○A ○B ○C ○D	22 ○A ○B ○C ○D
5 ○A ○B ○C ○D	11 ○A ○B ○C ○D	17 ○A ○B ○C ○D	23 ○A ○B ○C ○D
6 ○A ○B ○C ○D	12 ○A ○B ○C ○D	18 ○A ○B ○C ○D	24 ○A ○B ○C ○D

PART C: Numerical Skills

1 ○A ○B ○C ○D ○E	9 ○A ○B ○C ○D ○E	17 ○A ○B ○C ○D ○E	25 ○A ○B ○C ○D ○E
2 ○A ○B ○C ○D ○E	10 ○A ○B ○C ○D ○E	18 ○A ○B ○C ○D ○E	26 ○A ○B ○C ○D ○E
3 ○A ○B ○C ○D ○E	11 ○A ○B ○C ○D ○E	19 ○A ○B ○C ○D ○E	27 ○A ○B ○C ○D ○E
4 ○A ○B ○C ○D ○E	12 ○A ○B ○C ○D ○E	20 ○A ○B ○C ○D ○E	28 ○A ○B ○C ○D ○E
5 ○A ○B ○C ○D ○E	13 ○A ○B ○C ○D ○E	21 ○A ○B ○C ○D ○E	29 ○A ○B ○C ○D ○E
6 ○A ○B ○C ○D ○E	14 ○A ○B ○C ○D ○E	22 ○A ○B ○C ○D ○E	30 ○A ○B ○C ○D ○E
7 ○A ○B ○C ○D ○E	15 ○A ○B ○C ○D ○E	23 ○A ○B ○C ○D ○E	31 ○A ○B ○C ○D ○E
8 ○A ○B ○C ○D ○E	16 ○A ○B ○C ○D ○E	24 ○A ○B ○C ○D ○E	32 ○A ○B ○C ○D ○E

FEED THIS DIRECTION

FEED THIS DIRECTION

PART D: Study Skills

1	A	B	C	D	23	A	B	C	D	45	A	B	C	D	67	A	B	C	D
2	A	B	C	D	24	A	B	C	D	46	A	B	C	D	68	A	B	C	D
3	A	B	C	D	25	A	B	C	D	47	A	B	C	D	69	A	B	C	D
4	A	B	C	D	26	A	B	C	D	48	A	B	C	D	70	A	B	C	D
5	A	B	C	D	27	A	B	C	D	49	A	B	C	D	71	A	B	C	D
6	A	B	C	D	28	A	B	C	D	50	A	B	C	D	72	A	B	C	D
7	A	B	C	D	29	A	B	C	D	51	A	B	C	D	73	A	B	C	D
8	A	B	C	D	30	A	B	C	D	52	A	B	C	D	74	A	B	C	D
9	A	B	C	D	31	A	B	C	D	53	A	B	C	D	75	A	B	C	D
10	A	B	C	D	32	A	B	C	D	54	A	B	C	D	76	A	B	C	D
11	A	B	C	D	33	A	B	C	D	55	A	B	C	D	77	A	B	C	D
12	A	B	C	D	34	A	B	C	D	56	A	B	C	D	78	A	B	C	D
13	A	B	C	D	35	A	B	C	D	57	A	B	C	D	79	A	B	C	D
14	A	B	C	D	36	A	B	C	D	58	A	B	C	D	80	A	B	C	D
15	A	B	C	D	37	A	B	C	D	59	A	B	C	D	81	A	B	C	D
16	A	B	C	D	38	A	B	C	D	60	A	B	C	D	82	A	B	C	D
17	A	B	C	D	39	A	B	C	D	61	A	B	C	D	83	A	B	C	D
18	A	B	C	D	40	A	B	C	D	62	A	B	C	D	84	A	B	C	D
19	A	B	C	D	41	A	B	C	D	63	A	B	C	D	85	A	B	C	D
20	A	B	C	D	42	A	B	C	D	64	A	B	C	D					
21	A	B	C	D	43	A	B	C	D	65	A	B	C	D					
22	A	B	C	D	44	A	B	C	D	66	A	B	C	D					

PART E: Elementary Algebra

1	A	B	C	D	E	8	A	B	C	D	E	15	A	B	C	D	E	22	A	B	C	D	E
2	A	B	C	D	E	9	A	B	C	D	E	16	A	B	C	D	E	23	A	B	C	D	E
3	A	B	C	D	E	10	A	B	C	D	E	17	A	B	C	D	E	24	A	B	C	D	E
4	A	B	C	D	E	11	A	B	C	D	E	18	A	B	C	D	E	25	A	B	C	D	E
5	A	B	C	D	E	12	A	B	C	D	E	19	A	B	C	D	E						
6	A	B	C	D	E	13	A	B	C	D	E	20	A	B	C	D	E						
7	A	B	C	D	E	14	A	B	C	D	E	21	A	B	C	D	E						

PART F: Intermediate Algebra

1	A	B	C	D	E	8	A	B	C	D	E	15	A	B	C	D	E	22	A	B	C	D	E
2	A	B	C	D	E	9	A	B	C	D	E	16	A	B	C	D	E	23	A	B	C	D	E
3	A	B	C	D	E	10	A	B	C	D	E	17	A	B	C	D	E	24	A	B	C	D	E
4	A	B	C	D	E	11	A	B	C	D	E	18	A	B	C	D	E	25	A	B	C	D	E
5	A	B	C	D	E	12	A	B	C	D	E	19	A	B	C	D	E						
6	A	B	C	D	E	13	A	B	C	D	E	20	A	B	C	D	E						
7	A	B	C	D	E	14	A	B	C	D	E	21	A	B	C	D	E						

PART G: College Algebra

1	A	B	C	D	E	8	A	B	C	D	E	15	A	B	C	D	E	22	A	B	C	D	E
2	A	B	C	D	E	9	A	B	C	D	E	16	A	B	C	D	E	23	A	B	C	D	E
3	A	B	C	D	E	10	A	B	C	D	E	17	A	B	C	D	E	24	A	B	C	D	E
4	A	B	C	D	E	11	A	B	C	D	E	18	A	B	C	D	E	25	A	B	C	D	E
5	A	B	C	D	E	12	A	B	C	D	E	19	A	B	C	D	E						
6	A	B	C	D	E	13	A	B	C	D	E	20	A	B	C	D	E						
7	A	B	C	D	E	14	A	B	C	D	E	21	A	B	C	D	E						

PART H: Geometry

1	A	B	C	D	E	8	A	B	C	D	E	15	A	B	C	D	E	22	A	B	C	D	E
2	A	B	C	D	E	9	A	B	C	D	E	16	A	B	C	D	E	23	A	B	C	D	E
3	A	B	C	D	E	10	A	B	C	D	E	17	A	B	C	D	E	24	A	B	C	D	E
4	A	B	C	D	E	11	A	B	C	D	E	18	A	B	C	D	E	25	A	B	C	D	E
5	A	B	C	D	E	12	A	B	C	D	E	19	A	B	C	D	E						
6	A	B	C	D	E	13	A	B	C	D	E	20	A	B	C	D	E						
7	A	B	C	D	E	14	A	B	C	D	E	21	A	B	C	D	E						

PART I: Local Items

1	A	B	C	D	E																
2	A	B	C	D	E																
3	A	B	C	D	E																
4	A	B	C	D	E																
5	A	B	C	D	E																
6	A	B	C	D	E																
7	A	B	C	D	E																
8	A	B	C	D	E																
9	A	B	C	D	E																
10	A	B	C	D	E																
11	A	B	C	D	E																
	F	G	H	I	J																
12	A	B	C	D	E																
	F	G	H	I	J																

13		14		ADVISOR			ADDITIONAL SCORES									
							I		II		V					
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9

FEED THIS DIRECTION

25 STREET ADDRESS
House No. St., & Apt. No.; "PO Box" & No., "RR" & No.

28 STATE CODE (see list below)

27 ZIP CODE

STATE CODE LIST

Ala.	01	Ohio	36
Alaska	02	Okla.	37
Ariz.	03	Oreg.	38
Ark.	04	Pa.	39
Calif.	05	R.I.	40
Colo.	06	S.C.	41
Conn.	07	S. Dak.	42
Del.	08	Tenn.	43
D.C.	09	Tex.	44
Fla.	10	Utah	45
Ga.	11	Vt.	46
Hawaii	12	Va.	47
Idaho	13	Wash.	48
Ill.	14	W. Va.	49
Ind.	15	Wis.	50
Iowa	16	Wyo.	51
Kans.	17		
Ky.	18	Canada	53
La.	19		
Maine	20	All	
Md.	21	Other	55
Mass.	22		
Mich.	23		
Minn.	24		
Miss.	25		
Mo.	26		
Mont.	27		
Nebr.	28		
Nev.	29		
N.H.	30		
N.J.	31		
N. Mex.	32		
N.Y.	33		
N.C.	34		
N. Dak.	35		

28 CITY
(Do Not Enter State in This Area)

29 TELEPHONE

Appendix C

Approval Letter for LASSI

H&H PUBLISHING
OWNED AND OPERATED BY EDUCATORS

January 24, 1996

Mary Jane Heaney
39931 Memory Lane
Harrison Township, MI 48045

Dear Ms. Heaney:

H & H Publishing Company grants permission for you to include the ***LASSI, Learning and Study Strategies Inventory***, in the appendix of your dissertation titled "Learning and Study Strategies, Cognitive Indicators, and Demographic Factors as Related to Academic Achievement and Student Retention Among College Freshmen," at Wayne State University, Detroit, Michigan.

We will welcome any results you have to share on the completion of your study.

Sincerely,

Robert D. Hackworth

1231 Kapp Drive
Clearwater, FL 34625
(813) 442-7760

Appendix D

Authorization Letters From MCC

MEMORANDUM

Date: May 15, 1995

To: Dr. Jim Blanzy
Provost

From: Mary Jane Heaney
Doctoral Candidate
Wayne State University, College of Education

RE: Dissertation Research

As we previously discussed, I am planning on conducting my doctoral research in the area of learning and study strategies, cognitive indicators, and demographic factors as they relate to academic achievement and student retention of freshmen students at two-year commuter colleges. The data that I am requesting access to in order to conduct this study includes information on students from both the South and Center campuses at Macomb Community College (MCC). The following information is needed to conduct the proposed research:

(1) Student Records from the Fall Term, 1992, of all students who completed the Learning and Study Strategies Instrument (LASSI) and the ASSET test during the August, 1992 assessment sessions at MCC.

(2) Student Records from the Winter Term, 1993, of all students who completed the LASSI and the ASSET test during the August, 1992 assessment sessions at MCC.

(3) Results from the ASSET test administered in the August, 1992 assessment session, from all students who also completed the LASSI during that time.

(4) The ASSET Educational Planning Form completed during the August 1992 assessment session from all students who completed the ASSET test and the LASSI during that time.

(5) The Learning and Study Strategies Instrument (LASSI) administered to students during the August, 1992 assessment sessions.

All student information will remain confidential. Specifically, individual students will in no way be identified. In advance, I thank you for your cooperation and time in this matter.

If this request is acceptable, please permit the authorization of the above information to be used for research purposes. Your signature will provide verification of the authorization. Thank you again.

I , Dr. Jim Blanzy, authorize Mary Jane Heaney, doctoral candidate at Wayne State University to have access to the student information as described above, in numbers 1-5. It is understood that all information will remain confidential.

Date: 5/17/95 Signature Jim Blanzy

MEMORANDUM

Date: May 11, 1995

To: Dr. Jim Varty
Dean of Academic and Student Development Services

From: Mary Jane Heaney
Doctoral Candidate
Wayne State University, College of Education

RE: Dissertation Research

As we previously discussed, I am planning on conducting my doctoral research in the area of learning and study strategies, cognitive indicators, and demographic factors as they relate to academic achievement and student retention of freshmen students at two-year commuter colleges. The data that I am requesting access to in order to conduct this study includes information on students from both the South and Center campuses at Macomb Community College (MCC). The following information is needed to conduct the proposed research:

(1) Student Records from the Fall Term, 1992, of all students who completed the Learning and Study Strategies Instrument (LASSI) and the ASSET test during the August, 1992 assessment sessions at MCC.

(2) Student Records from the Winter Term, 1993, of all students who completed the LASSI and the ASSET test during the August, 1992 assessment sessions at MCC.

(3) Results from the ASSET test administered in the August, 1992 assessment session, from all students who also completed the LASSI during that time.

(4) The ASSET Educational Planning Form completed during the August 1992 assessment session from all students who completed the ASSET test and the LASSI during that time.

(5) The Learning and Study Strategies Instrument (LASSI) administered to students during the August, 1992 assessment sessions.

All student information will remain confidential. Specifically, individual students will in no way be identified. In advance, I thank you for you cooperation and time in this matter.

If this request is acceptable, please permit the authorization of the above information to be used for research purposes. Your signature will provide verification of the authorization. Thank you again.

I , Dr. Jim Varty, authorize Mary Jane Heaney, doctoral candidate at Wayne State University to have access to the student information as described above, in numbers 1-5. It is understood that all information will remain confidential.

Date: 5/11/95 Signature

MEMORANDUM

Date: May 11, 1995

To: Mr. Sal Evangelista
Director of Enrollment Services

From: Mary Jane Heaney
Doctoral Candidate
Wayne State University, College of Education

RE: Dissertation Research

As we previously discussed, I am planning on conducting my doctoral research in the area of learning and study strategies, cognitive indicators, and demographic factors as they relate to academic achievement and student retention of freshmen students at two-year commuter colleges. The data that I am requesting access to in order to conduct this study includes the following:

(1) Student Records from the Fall Term, 1992, of all students who completed the Learning and Study Strategies Instrument (LASSI) and the ASSET test during the August, 1992 assessment sessions at Macomb Community College (South and Center campuses).

(2) Student Records from the Winter Term, 1993, of all students who completed the LASSI and the ASSET test during the August, 1992 assessment sessions at Macomb Community College (South and Center campuses).

All student records will remain confidential. Specifically, individual students will in no way be identified. All records will be returned to your office after completion of the dissertation. In advance, I thank you for you cooperation and time in this matter.

If this request is acceptable, please permit the authorization of the student records as described in #1 and #2 above. Your signature will provide verification of the authorization. Thank you again.

I , Sal Evangelista, authorize Mary Jane Heaney, doctoral candidate at Wayne State University to have access to the student records as described above. It is understood that the records will remain confidential and will be returned to Enrollment Services after the research is completed.

Date: 5/12/95 Signature: Sal Evangelista

Appendix E

Exemption Status

Wayne State University

Human Investigation Committee
Room 2238 Gordon H. Scott Hall
540 E. Canfield Avenue
Detroit, MI 48201
Phone: (313) 577-1628
FAX: (313) 577-1941

Multiple Assurance# M1261
IRB# 03

MEMORANDUM

TO: Mary Jane Heaney, Education (EER/IT)
c/o Dr. R. Richey
395 Education

FROM: Peter A. Lichtenberg, Ph.D. Peter A. Lichtenberg, Ph.D
Chairman, Behavioral Investigation Committee

SUBJECT: Exemption Status of Protocol #H 05-31-95(B03)-X;
"Learning and Study Strategies, Cognitive Indicators, and Demographic Factors as Related to Academic Success and Retention among College Freshman"

DATE: May 25, 1995

The research proposal named above has been reviewed and found to qualify for exemption according to paragraph 4 of the Rules and Regulations of the Department of Health and Human Services, CFR Part 46.101(b).

Since I have not evaluated this proposal for scientific merit except to weigh the risk to the human subjects in relation to potential benefits, this approval does not replace or serve in place of any departmental or other approvals which may be required.

This protocol will be subject to annual review by the BIC.

Appendix F

LASSI Administration Instructions

ADMINISTRATION OF THE LASSI

TECHNICIANS: **Please use the following format for all students taking the LASSI. It should take approximately 15-20 minutes for students to complete the inventory. However, it is not timed and if students need additional time, they are being given the opportunity to complete it during the 30 minutes being allotted. It is very important that the directions are carried out in the same manner for all students. This will ensure that the results obtained are valid.**

You may now begin to present the following information to the students:

Directions for the LASSI

The learning and study strategies inventory you are about to complete is designed to gather information about your learning and study practices. Macomb Community College (MCC) is using this inventory on a trial basis to evaluate how helpful it is for students to know about their learning strengths and weaknesses. The information you provide will be extremely important in helping MCC to decide whether or not to use this inventory in the future. **Please be as honest as you can. There are no right or wrong answers. This is not a test and the information you provide will not effect your enrollment in any way.** Let's begin by doing the following:

(1) Turn to page 3 where it says at the top "Plot Your Scores-Student's Copy." Please print your name, date and student ID# in the upper right hand corner.

(2) Turn to the first page of the LASSI booklet. Under the **DIRECTIONS**, read the descriptions for the five responses. Also, under the descriptions please note the correct way of marking your responses by completely darkening the appropriate letter. **Please ignore any other directions in your booklet.** If you need to refer back to this while filling out the inventory, please feel free to do so. Before preceding, we will wait until everyone has read this information. (**TECHNICICANS:** *Check with the students after 1 minute, and again after 1 and 1/2 minutes-- ask them if they are ready to continue).

(3) Now turn to pages 2 and 3 of the inventory. Pages 2 and 3 make up the 77 item inventory which you will be filling out. Please use the #2 pencil provided. Place your booklet like this: (TECHNICIAN DEMONSTRATES).

(4) **Please work as quickly as you can without being careless and please complete all items.**

(6) When you have completed the 77 items, please go back to page 3. Above your name, could you please state any reactions or feelings you have about this inventory.

(5) You should not need any further instructions. DO NOT pull your pages apart.

6) Please return your entire booklet, intact, when you are finished. You will be given until (TIME) to complete the inventory. You may now begin.

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ABSTRACT

LEARNING AND STUDY STRATEGIES, COGNITIVE INDICATORS, AND DEMOGRAPHIC FACTORS AS RELATED TO ACADEMIC ACHIEVEMENT AND RETENTION AMONG COLLEGE FRESHMEN

by

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May, 1996

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The purpose of the research was to examine the learning and study strategies used by college freshmen to determine if those strategies were related to academic achievement and student retention. Another purpose was to determine the contributions of learning and study strategies, the ASSET test, high school grade point average, gender, age, part-time/full-time enrollment status, time of attendance (day or evening or both), and student curriculum on academic achievement and student retention. Cognitive learning theory, constructivism, metacognition, and motivation, provided the theoretical background for this study.

During the August, 1992 assessment session, first time in a college (FTIAC) students and first time in Macomb (FTIM) students completed the ASSET test and the Learning and Study Strategies Inventory (LASSI). Data from the ASSET, ASSET Educational Planning Form (AEPF), LASSI, and student records from the Fall term, 1992 and Spring term, 1993 provided all needed information. Inferential statistical procedures

included multiple regression analyses, correlations, factorial analysis of variance, and chi-square analysis to address each the five research questions of the study.

Analysis of the data revealed that learning and study strategies were related to and predicted academic achievement in community college freshmen. The most prominent finding of this study was that nontraditional students age 25 and older were more successful than traditional students under 25 years of age. Age explained 21.1% of the variance in college grade point average.

The finding that 37.4% of the variance in college grade point average was accounted for by a combination of cognitive and noncognitive variables and demographic factors suggested that traditional methods of assessing student success might not fully capture the complexities inherent in this construct. Results from this study support previous research which suggested that many variables, in varying combinations and in varying degrees, affect academic achievement and student retention at the community college level. This research provided additional answers about variables which were related to student success and could assist in explaining student success in terms that have not been explored in previous research. Implications for educational evaluation and research and instructional technology are provided. Recommendations for further research are also presented.

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