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## Community College Student Success: The Relationship of Basic Skills, Study Habits, Age, and Gender to Academic Achievement

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COMMUNITY COLLEGE STUDENT SUCCESS: THE RELATIONSHIP OF  
BASIC SKILLS, STUDY HABITS, AGE, AND GENDER TO ACADEMIC  
ACHIEVEMENT

by

Margaret Lynn Hills Wonnacott

A Dissertation  
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in partial fulfillment of the  
requirements for the  
Degree of Doctor of Education  
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and Counseling Education

Western Michigan University  
Kalamazoo, Michigan  
June 1989

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**Community college student success: The relationship of basic skills, study habits, age, and gender to academic achievement**

**Wonnacott, Margaret Lynn Hills, Ed.D.**

**Western Michigan University, 1989**

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## ACKNOWLEDGMENTS

I would like to dedicate this dissertation to my mother, Margaret McAnly Hills, whose vitality, enthusiasm and support created the energy for this project.

Many thanks and appreciation are extended to my friend and typist, Barbara Wallace; to my daughter, Shannon; to my son, Sean; to my father Louis Alexander Hills; to my boss, Dr. Philip Ward; to the Glen Oaks Board of Trustees; to my dissertation committee; to Dr. Beverly Belson; to Ms. Marcia Barnhart; to my "Monday Night Group"; to my colleagues and friends at Glen Oaks Community College; and finally, to all the loved ones who cheered me on along the way.

Margaret Lynn Hills Wonnacott



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## CHAPTER I

### INTRODUCTION

#### Problem Statement

A basic difficulty in the community college is that students attend and need to succeed yet many of these students lack the essential academic skills needed for college level work. Often they fail. How can we support them? What needs to happen?

If academic success of community college students is of concern it may be appropriate for educators to devote attention to the possible identification of student characteristics at varying levels of academic performance. What attributes correlate well with academic success? It would seem that finding possible predictors of student academic success would be helpful.

The growing body of literature on prediction of student success in the community colleges is not extensive or consistent. However, some clues to academic success exist. Community college researchers have found that reading comprehension is related to academic performance (Blustein et al., 1986). Roberts (1986) also found that females, in general, had higher GPAs and that strong math abilities correlated with higher grades. Blustein's study (1986) found that student study skills and learning

expectations were also related to grades.

The literature on student success in the community college has explored basic academic skills, gender, race, age, and study skills as predictors of student success (Blustein et al., 1986; Hankins, 1982; Kapusta, 1980; Roberts, 1986; Rogers, 1979). Other variables, explored with less frequency, include locus of control (Anderson, 1986; Griffen, 1978; Spann 1977), personality (Herridge, 1972), career decisiveness (Healy, Mourton, Anderson & Robinson, 1984), employment (Deal, Gloster, Parrott, & Ross, 1975), marital status (Yess, 1981), and financial aid (Daus, 1986). Student academic success has most often been defined as first semester grade point average.

The issue then is what variables can be expected to predict academic success in a community college. Basic skills are the primary focus in many of the community college research studies related to academic success. It is interesting to note the wide array of instruments and data collection methods that have been used to determine or measure basic skills in community colleges. The ACT or SAT composite and/or individual scores are most frequently found as predictors of success or indicators of basic skills in studies completed in four year universities and colleges. However, scores are often not available for the non-traditional community college student. Other assessments utilized to measure basic academic skills in community colleges are high school GPA, high school rank,

or high school grades in English and math. An instrument often used to determine basic skills is the Nelson Denny Reading Test (Buros, 1978). More recently entry level basic skills for community college students have been determined by ASSET, (Assessment of Successful Skills for Entry and Transfer) an ACT instrument designed specifically for community colleges in 1982.

There is a need to further develop and explore these predictors of student academic success in the community college. If educators are restricted to limited resources, declining entry level academic skills, and a demand for high academic standards it is important to identify those predictors of success. If at-risk students are identified at the point of matriculation support systems can be implemented for the purpose of preventing failure and/or attrition.

#### Purpose of Study

This study is designed to explore the relationship of the basic skills of reading, writing, math as defined by ASSET; age; gender; and study habits to academic success in a community college. Academic success will be defined as first semester grade point average. Dr. Donald G. Creamer (1988), a leading writer in the field of community college student affairs, poses the question: "What are the correlates of success on two-year college campuses? Is enough known to state conclusively why some students

succeed and some fail?... the use of behavioral science methods to investigate these problems is a must if a foundation for excellence practice is to be established" (p. 6).

It is expected that the study will find and support evidence of a relationship between basic skills, age, gender, study habits and academic performance. "There is a strong positive relation between cognitive entry behaviors of a student and his achievement in subsequent courses or learning tasks. We have estimated that cognitive entry behavior can account for up to 1/2 of the variance on relevant cognitive achievement measures over subsequent learning task" (Bloom, 1976, p. 68).

From the data collected in this study inferences will be made about which students are at risk. A profile of the high risk student will be developed. Students could then be identified who need remedial work and/or support systems to maximize academic success. Since the data will be drawn at the point of matriculation, weaknesses will be diagnosed before a pattern of poor performance becomes entrenched.

Ultimately this study should indicate approaches to orientation, assessment, advising, course placement, remediation, and support services in order to remove barriers to the goal of student academic success. "Clearly personnel such as college admission officers, high school guidance counselors, deans and teachers must, to varying degrees either make decisions or help others make decisions

that will significantly affect the course of students' lives" (Lavin, 1965, p. 166).

Data from the study should also provide students and staff with better information to utilize in the advisement of students. The Colorado Community College system, after initiating a state-wide assessment program for incoming students, found that students who follow assessment-related advice tended to succeed at a higher rate than those who did not. In fact, all community college catalogs in Colorado now have a statement alerting students to the proven benefit for following assessment-related advice and urging them to seek counseling (Richards, 1987). The open door of the 60s became the revolving door of the 70s. Now, faced with diminishing enrollments, declining basic skills, and reduced financing we must change outmoded policies and practices. This study should provide information to guide students and staff alike toward more productive decisions and activities which lead to academic success.

Finally, it is hoped that the study will highlight the necessity for an integration of counseling, advising, and instruction, a blending of student services with student learning. This information could help to determine which structures are effective in accomplishing the goals of student support. It may also have an impact on curriculum development and academic support systems such as tutoring, mentoring and learning centers. The aim is to bring a harmonious relationship between the open door policies and

ensuring student achievement.

#### Background of Problem

The academic success of college students has been a primary concern of administrators and researchers in higher education (Astin, 1985; Bloom, 1976; Lavin, 1965). The concern is currently compounded by: 1) students who enter postsecondary education with deficiencies in basic skills; 2) a decline in educational resources; 3) a broader heterogeneous student population; 4) a demand for academic excellence; and 5) a concurrent need for more education among the general populus. "Attention to the continuing decline of student academic performance as evidenced by achievement test data and inabilities to demonstrate acceptable levels of basic skills in the classroom has, ... 'fueled a furor'" (Roueche, Baker, & Roueche, 1985, p. 4). Declining Scholastic Achievement Test scores prompted the Educational Testing Service in 1977 to organize a blue ribbon panel to determine why scores were declining. This panel, in a report entitled On Further Examination and discussed in Anderson's article (1980), attributed the declining scores to reduced emphasis on reading, a diminished seriousness of purpose and attention to mastery, the influence and distraction of television viewing, and the declining role of the family. Three of the five most serious concerns of higher education as defined by panel members were: 1) the basic skill movement; 2) the

diversity of students; and 3) declining enrollments (Anderson, 1980).

The blue ribbon panel established by Educational Testing Service was not the only group to study the decline in basic skills. Commissions, agencies, foundations and task forces focused on the American schools. The report from the National Commission on Excellence in Education (1984) entitled A Nation at Risk became the most widely circulated and cited. "The educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and a people.... We recommend that schools, colleges, and universities adopt more rigorous and measurable standards, and higher expectations for academic performance and student conduct" (p. 5).

Perhaps more important to personnel in higher education was the Study Group on Conditions of Excellence in American Higher Education chaired by Dr. Kenneth P. Mortimer. The study group reported that the warning signals were obvious. A summation (Mortimer, 1986) highlighted a decline in test scores, student avoidance of the liberal arts, erosion of physical plants, and negative economic factors related to faculty salaries. The 27 recommendations resulted in a report entitled, Involvement in Learning (Study Group on the Conditions of Excellence in Higher Education, 1984). This publication cited a need for increased student involvement in learning, establishment of

clear and high academic standards as well as assessment of and feedback for students.

Specific national task forces were established for community colleges. A report of the Commission on the Future of Community Colleges entitled Building Communities states:

We recommend that reading, writing, and computational ability of all first-time community college students be carefully assessed when they enroll. Those not well prepared should be placed in an intensive developmental educational program. Community colleges must make a commitment, without apology, to help students overcome academic deficiencies and acquire the skills they need to become effective, independent learners. (Commission on the Future of Community Colleges, 1988, p. 17)

Community colleges need to react to this basic skill issue. They have borne the brunt of the great influxes of the underprepared students. These colleges are characterized as 'open-door' institutions, struggling to provide quality education for the great numbers of students who had not previously considered a college education and who frequently are underprepared for college level work (Roueche, Baker, & Roueche, 1985). Dr. Patricia Cross describes this new student as one who is educationally disadvantaged in the sense that they need help with basic skills, motivation, and guidance on how to make it in the educational system (Cross, 1968).

Some leaders in the four year university education sector also expressed concern regarding the particular problems in community colleges. Dr. Alexander Astin



expresses his concern for the unusually high drop-out rate. ".... the most consistent finding -- reported in virtually every longitudinal study of student development -- is that the student's chances of dropping out are substantially greater at a two-year college than at a four year college" (Astin, 1985, p. 146). Dr. Vincent Tinto raises special concern for the public two year college student due to lower academic ability and lower motivation. "It is also fairly clear that two-year colleges have higher dropout rates than do four-year colleges, even after student input characteristics have been taken into account" (Tinto, 1975, p. 112). "For many students the distance between high school and college is like climbing Mt. Everest" (Parnell, 1984, p. 40).

In 1984 thirteen presidents of the nation's largest community colleges met with four noted professors of higher education to discuss the most critical issues facing community colleges today. The conference was sponsored by the League for Innovation in the Community Colleges. Defined conference issues included: (1) finance, (2) access, and (3) quality. Limited monetary resources was a critical concern because financing was no longer based on number of students enrolled. Community colleges constructed in 1960s were now in need of maintenance and repair. Community colleges, unlike four year public universities, seldom qualified for capital outlay funds from the state. Access, always critical to the community

college mission, now needed a renewed emphasis because of a national priority on literacy as well as the influx of minority and older students. Quality, in academic issues they declared, was important if community colleges wanted to remain full fledged members of higher education. Developmental work such as study skills and survival skills needed to be separated from remedial work which emphasizes substantive material that should have been acquired in high school. A clear sequence of courses need to be developed based on skill development and clear standards set for competencies (Koltai & Wolf, 1984).

Dr. George Vaughan, a long-time leader in the community college movement, calls for a "Quality Revolution." Community colleges must remain comprehensive yet must develop and maintain high academic standards. As fairly new institutions the community colleges seek to fulfill the age old quest for universal higher education. Open access remains a high priority. All people deserve the opportunity to extend the limits of their ability. Remedial education was and is not only welcomed but seen as vital to the community college which tries to be all things to all people (Vaughan, 1984).

Vaughan and others (Eaton, 1984; Koltai & Wolf, 1984; Parnell, 1984) seek a new emphasis on quality of student outcomes as well as maintaining the equality of opportunity. Open admission needs to be reinforced by educational interventions such as testing, assessment,

advisement, and counseling that provides students with the best possible advice and opportunity (Eaton, 1984).

The current trend toward quality, assessment, and standards grew out of the many national commissions and task forces on education that, in turn, were developed to seek answers to declining basic skills. Substantiating this trend in community colleges is a study done by Alfred and Lowery (1984). American Association of Community and Junior Colleges convention topics from 1974-1984 were examined. The topics of the 70s focused on organizational development, collective bargaining and special programs for minorities. The topics for the 80s focused on improving basic skills, assessing student outcomes, and creating excellence in teaching and learning.

There is also a movement to hold institutions accountable for their expenditures of public funds. Astin (1985) has suggested that rather than expect institutions to produce detailed records on how funds are spent, funding agencies might more productively utilize this concern for accountability to increase students' involvement and learning. In particular, they encourage institutions to implement assessment and feedback procedures that will yield better information on the effectiveness of their talent development programs.

The emphasis on fostering student academic success and development in the community colleges includes: 1) substantiating quality of academic outcomes; 2) fostering open

access; and 3) remediating the underprepared. A societal trend for more education before the first job, more upgrading of job skills, and more retraining between jobs compounds the issue for community colleges. Dr. Patricia Cross calls this the age of the development of the human. In the First Wave or agricultural revolution, Cross reminds us, land became the capital asset. The capital asset of the Second Wave, the Industrial Revolution, was money. The capital asset of the Third Wave is knowledge and the people who know how to generate it and use it. "Ironically, the age of technology is, necessarily the age of the development of human resources" (Cross, 1985, p. 10).

Thus, it has become critical that the open access policies remain in tact for community colleges and that student success remain a priority despite declining resources, declining basic educational skills, and increasing educational needs of a more diverse student population.

Modern societies stress the development of a very large number of well-educated persons and attempt to produce this by legal and social pressures which require individuals to attend school for a minimum of 10-12 years. A society which places such great value on education and schooling that it requires the individual to attend school for long periods of time must find the means to make education attractive and meaningful to the individual learner. Modern societies no longer can content themselves with the selection of talent; they must find the means for developing talent. (Bloom, 1976, p. 17)

How to develop this talent is the unresolved issue.

The obstacles are many but the two most frequently cited by researchers are limited resources and declining basic educational skills. At the present time the gap between the well-educated and the poorly educated is actually growing although the opportunities for adult learning are increasing. "I believe that (student) personnel administrators will find themselves in a sunrise industry as colleges adopt as their mission the long-range development of creative thinking, caring human beings at any state of their lives" (Cross, 1985, p. 16).

#### Conceptual Framework

Many students enter college and succeed, seeming to thrive and excel with enthusiasm, devotion, and achievement. Others, however, fail or drop out having become frustrated with insurmountable obstacles and the receipt of low or failing grades. Educators and parents ask why does a particular task seem easy for one student and difficult for the next. Are there basic skills that build a foundation for success? Is it an attitude, an expectation, or a level of motivation? Is it a question of being male or female? Teachers often ask if they have failed in teaching basic skills or instilling proper attitudes.

The questions often stop after elementary school but the issue of successful learning performance continues through college. A unique situation exists in the

community college because into the open door of a community college come students who never anticipated they would be involved in postsecondary education. The matriculants come with diverse skills, attitudes, values, and expectations. Some have a background of negative educational experiences which impacted the decision not to enter college immediately after high school graduation. These individuals now risk the challenges of the community college as they are faced with transitions, lay-offs, or new technologies. Many come with only elementary or lower high school abilities in reading, writing, math and science.

A search for causes as to why some students are successful is a search for understanding. Theories about learning and achievement in higher education are many (Astin, 1985; Bloom, 1976; Lavin, 1965; Royer, 1987; Tinto, 1975; Weiner, 1979). Attributional theory, motivational theory, and environmental theories linking students to the environment such as Astin's Involvement Theory (1985) and Tinto's Integration Theory (1975) are only a few.

In a review of the literature Lavin claims that "the research shows that the best predictions are obtained from multiple correlations in which a battery of intellectual variables are used to predict the overall grade point average" (1965, p. 57). The cognitive entry behaviors constitute a necessary link between the learners and the accomplishment of the learning task. They cannot be

ignored or omitted if the student is to adequately learn the task (Bloom, 1976). Early research focused primarily on intellectual and ability factors as predictors. Then there was a shift to non-cognitive or personality, family or socio-economic factors. More recently research supports the added importance of the interaction aspects of the student and the environment (Astin, 1985; Frerichs & Eldersveld, 1981; Haburton, 1977; Hankins, 1982; Jones, 1979; Lewis, 1979; Loucks, 1985; Meyers, 1979; Richards, 1987; Scharr, 1967).

Attribution theory states that causes for success and failure relate mainly to ability and effort.

It is evident that ability, effort, and task difficulty are among the main perceived causes of achievement performance. Others include habits and attitudes, mood, maturity, and health. Ability and effort appear to be the most salient and general of the causes. That is, outcomes frequently depend upon what we can do and how hard we try to do it. (Weiner, 1979, p. 4)

According to Dr. Patricia Cross (1968) the basic survival skills for learning are: 1) cognitive, 2) attitudinal, and 3) value oriented.

Three interdependent variables, identified by Bloom (1976), which are central to the theory of learning are: 1) the extent to which the student has already learned the basic skills necessary for the task; 2) the extent of motivation to engage the task; and 3) the extent to which the instruction is appropriate. "Higher levels of performance tend to be associated with better study habits,

more positive attitudes toward school . . . data suggest a positive association between achievement motivation and school performance" (Lavin 1965, p. 109).

Research to support the importance of student/to environment fit was developed out of the need to understand drop out activity at the college level. Tinto (1975) explained the process of the interaction between student and institution that leads to dropping out. It had its roots in Durkheim's Theory of Suicide which stated that one was more likely to commit suicide when not sufficiently integrated into society often due to divergent values to that society. Tinto found that if there is a lack of either social or academic integration students will drop out.

Tinto's (1975) theory of integration is very similar to Bloom's basic construct that "most students become very similar with regard to learning ability, rate of learning, and motivation for further learning when provided with favorable learning conditions" (Bloom, 1976, p. x.).

Research on the student-teacher relationship suggest two generalizations. First, the more the students' attitudes and values coincide with those of the teacher, the higher the students' academic performance will be. Second, characteristics of teacher behavior may effect the performance level of the student. (Lavin, 1965, p. 150)

Also closely aligned with Tinto's integration theory is the expansive work done by Astin (1985) to develop his theory of student involvement. Ideas which formed the



foundation for this theory of involvement came from John Carroll who proposed a model of school learning in which time spent and perseverance were important antecedents of scholastic achievements (Laffey, 1982). Astin (1985) defines involvement as the amount of physical and psychological energy that the student devotes to the academic experience such as energy spent studying, time spent on campus participating in student organizations and interacting with faculty and other students. Astin went further to claim that the amount of learning is directly proportionate to quality and quantity of student involvement.

### Research Objectives

#### Introduction

A review of the literature supports the premise that "....particular tests of achievement and/or aptitude given prior to a learning task or set of learning tasks enable one to predict to some extent the level or rate of achievement of students by the end of the task, course, or set of learning tasks" (Bloom, 1976, p. 32).

Many researchers believe the reading comprehension may be the most powerful predictor of learning (Bloom, 1976; Einbecker, 1974; Royer, 1987). "We believe it is likely that reading comprehension is the common denominator in most school learning...." (Bloom, 1976, p. 50). "The

possibility that (reading) comprehension and learning are the same process or at least highly related processes led to the hypothesis that comprehension performance could be used to predict learning performance. A general test of comprehension could serve as a general predictor of learning performance" (Royer, 1987, p. 20).

Agreement about the predictive value of reading is joined with agreement that past performance is the best predictor of present or future performance. "The single best predictor of performance on the college level is the high school academic record" (Lavin, 1965, p. 57). There is support in the research literature to indicate that high school GPA is the best predictor of college GPA (Doyle, 1985; Kern, 1955; Preas, 1970).

Many have sought to claim that math also has some predictive value (Preas, 1970; Roberts, 1986; & Yess, 1979). "Basic quantitative skills are likely to be expected and are necessary prerequisites not only in math and science courses but to some extent in most school learning tasks" (Bloom, 1976, p. 51). The research is questionable on the power of arithmetic alone to predict performance.

Other prediction variables studied include vocabulary (Hankins, 1982), ACT and SAT composite scores (Doyle, 1985; Ice, 1971; Mann, 1976; Morrison, 1980; Preas, 1970; Root, 1971), locus of control (Anderson, 1986; Avramides, 1987; Griffen, 1978; Spann, 1977), motivation (often measured

by study attitudes) (Blustein et. al., 1986; Griffen, 1978), personality (Herridge, 1972), career decisiveness (Healy et. al., 1984), age, race (Jones, 1979; Randolph, 1979; Roberts, 1986), gender (Reyes, 1979; Roberts, 1986; Rogers, 1979), financial aid (Daus, 1986; Morrison, 1980), marital status (Yess, 1981), and employment (Deal et al., 1975). The only conclusive agreement is that the best predictions are obtained from the use of a composite of intellectual variables. The non-cognitive variables including study attitudes and personality have not been shown to be clearly predictive.

The predictive value of these variables has not been clearly established for community college students. Much research has been done K-12 and at the four year residential college or university. What has not been fully explored is the predictive value of these variables as they relate to the community college population. The predictive value of the ASSET for overall academic success is also unclear.

In order to address these issues this study will ask the following research questions as they relate to the matriculating students at Glen Oaks Community College, Centreville, Michigan, Fall 1988.

#### Research Questions

1. What is the relationship between reading comprehension ability and academic success?

2. What is the relationship between language usage ability and academic success?

3. What is the relationship between math ability and academic success?

4. What is the relationship between effort and academic success?

5. What is the relationship between age and academic success?

6. What is the relationship between gender and academic success?

7. What is the most powerful predictor of academic success?

8. What is the combined effect of these variables on academic success?

### Hypotheses

The literature suggests that the following hypotheses can be made regarding the research questions:

1. There is a direct relationship between reading comprehension and academic success at Glen Oaks Community College.

2. There is a direct relationship between language usage ability and academic success at Glen Oaks Community College.

3. There is a direct relationship between math ability and academic success at Glen Oaks Community College.

4. There is a direct relationship between study skill ability and academic success at Glen Oaks Community College.

5. There is a direct relationship between age and academic success at Glen Oaks Community College.

6. There is a difference between males and females and academic success at Glen Oaks Community College.

7. Reading ability is the most powerful predictor of academic success at Glen Oaks Community College.

8. Reading, writing, math and study skill ability as well as sex and age can be used to predict achievement levels at Glen Oaks Community College.

#### Definition of Terms

##### Basic Skills - Reading, Language Usage and Math

Basic skills will be measured with The ASSET instrument developed by The American College Testing (ACT), Iowa City, Iowa. The ACT ASSET (Assessment of Skills for Successful Entry and Transfer) Program was designed in 1982 for the Los Angeles Community College District in response to critical retention issues occurring in higher education in California. The ASSET instrument can be and is intended to be scored immediately, interpreted, and used as part of a success seminar approach at the time of college entry.

Basic academic skills as defined by ASSET are reading comprehension, language usage, and math. The Reading

Skills component has 40 items to be administered in 20 minutes, the Language Usages has 64 items to be administered in 11 minutes, and finally the Numerical Skills has 32 items to be completed in 18 minutes.

### Effort

Effort or motivation is often determined in the literature by an assessment of study habits and attitudes (Blustein et. al., 1986; Dutrow & Houston, 1981; Griffen, 1978; Johns, 1970; Kapusta, 1980; Stockey, 1986; Thompson, 1976). Effort will be measured by the ACT ASSET Study Skills Inventory. It consists of 60 items (to be completed in 15 minutes) formulated to assist students in describing the frequency of the implementation of study skills behavior.

### Demographic Variables

The demographic variables of age and gender will be determined by the Educational Planning Form Questionnaire (American College Testing Program, 1986) and by records in the Registration Office at Glen Oaks Community College.

### Academic Success

Academic success or achievement will be determined by the first semester grade point average. Data will be used from student records in the Registration Office at Glen Oaks Community College showing course grades at the end of

the Fall Semester, 1988.

### Limitations

The study limitations will be categorized into six types. First, the study is limited by the definition of the dependent variable, academic success. "In studies of academic achievement the traditional criterion of performance has been the students' grades. Other criteria are occasionally used either in addition to or in place of the traditional approach" (Lavin, 1965, p. 14). This study uses first semester grade point average. Other criteria of value which could be used are: graduation, accumulated GPA, persistence, intellectual curiosity, acceptance into a job or four year school, and long-range career success. These criteria were not used for three reasons: 1) limitations of time; 2) limitations this would place in comparing this study to others; 3) variables of persistence and curiosity are not central to the definition of student academic success. High academic performance per se may not always be meaningful. "Of course, grades are not unimportant. They are unquestionably an index of competence in school work" (Lavin, 1965, p. 16). Grade performance is also the single strongest predictor of academic dismissal (Tinto, 1975).

Second, the study is limited to six of the variables found to affect academic performance. It will examine only reading, writing, math, effort, gender, and sex. The study

will not examine the variables closely associated with the assessment of involvement such as attendance, completion of assignment, teacher ratings of involvement, students' feelings of involvement, student/faculty contacts, or student participation in college activities. Nor will the study focus on variables associated with non-cognitive student characteristics (other than age, effort, and gender) such as personality, locus of control, degree of impulsivity, career decisiveness or socio-economic status. Past behavior in terms of high school grade point average or high school rank will also not be examined. These variables were not included in this study due to limitations of time. Also, some of the variables such as career decisiveness and economic status have clearly been shown to not be related to performance.

The third limitation is that the criterion variable, first semester GPA, is dependent upon the reliability and validity of the grading practices of the Glen Oaks Community College faculty. Some students in the study are only taking one course thereby creating a very real possibility that these issues will be threatened.

The fourth limitation is that the study is to be conducted at only a single institution, Glen Oaks Community College. This is further complicated by the small population sample of 374 students. The college was chosen because: 1) it is a typical small, rural community college with a diverse student population, 2) all incoming students



could be assessed on basic academic skills and study habits, and 3) data was accessible.

The fifth limitation is that the study is looking at relationships rather than causal links to academic performance.

It is always difficult to establish causal interpretations because it is not possible to control extraneous factors with the precision often attainable in the laboratory setting. Many relationships are not of the simple, mechanistic, cause-and-effect variety. Some variables may have a mutual effect upon one another. We may have an interdependent or feedback relationship. (Lavin, 1965, p. 40)

Finally, there is a new unexplored field of variables relating to the skill of learning which may affect performance. These skills would include but would not be limited to: use of library, time-management, use of learning resources outside the classroom, note taking and test taking abilities. These are not fully explored yet in the research but may, however, influence learning outcomes.

#### Plan of Presentation

This research project conducted at Glen Oaks Community College during the Fall of 1988 will be presented beginning with a review of literature predicting academic success in the community college. This will be followed by a description of the research design. The population and sample will be described as well as the hypotheses which will be tested. The assessment of basic skills will be explained as well as the statistical methods applied.

Analysis of results will be presented in terms of each hypotheses posed in the problem statement. Conclusions about the population will be drawn according to the findings. Practical suggestions implied by the results will be discussed as well as ideas for further research.

## CHAPTER II

### A REVIEW OF THE LITERATURE

#### Introduction

A search for causes as to why some students are academically successful is a search for understanding. Theories about learning and achievement help to explain and predict this behavior. Therefore, this review of research on the variables relating to academic success of community college students will be organized, analyzed, and synthesized according to the concepts that explain performance. Attributional theory, motivational theory, and environmental/fit theories serve as an umbrella for this understanding.

First, attributional theory explains that achievement is predicted by past performance, skills, and attributes of the learner (Bloom, 1976; Lavin, 1965). "The best predictions are obtained from multiple correlations in which a battery of intellectual variables are used to predict overall grade point average" (Lavin, 1965, p. 57). Early research focused primarily on intellectual and ability factors as predictors. More recently there has been a shift to non-cognitive variables such as personality and socio-economic issues.

Secondly, motivational theory suggests that effort can predict achievement. Astin's (1985) research done in

higher education provided the foundation for his theory of student involvement. Earlier, John Carroll had proposed that time spent and perservance were important antecedents of scholastic achievement (Laffey, 1982). Astin (1985) defines involvement as the amount of physical and psychological energy that the student devotes to the academic experience such as energy spent studying, time spent on campus participating in student organizations and interacting with faculty and other students. He went further to claim that the amount of learning is directly proportionate to the quality and quantity of student involvement. Research in the community college setting is somewhat limited in this area. Only three variables relating to effort (study skills, attendance, and need for academic achievement) have been explored.

Finally, the institutional/student fit theory can help in the understanding of achievement. If appropriate systems which fit the needs of students are available in the educational setting performance can be enhanced. "Most students become very similiar with regard to learning ability, rate of learning, and motivation for further learning when provided with favorable learning conditions" (Bloom, 1976, p. x). "Characteristics of teacher behavior may effect the performance level of the student" (Lavin, 1965, p. 150).

All three concepts contribute to understanding learning performance in the community college and all three

interact to influence outcomes. It is intended that through an exploration and synthesis of the research in these areas profiles of the at-risk student can be drawn and strategies for intervention and support can be identified.

### Variables Related To Attributes

#### Cognitive Variables

##### Reading

Introduction. More studies relate reading to academic achievement than any other variable. The studies are in general agreement that reading comprehension, more than any other variable, is related to academic achievement and closely connected with learning. "The theoretical foundations for the idea that comprehension and learning involve many of the same processes have only recently been developed" (Royer et al., 1987, p. 19). Research now supports the notion that general knowledge, reasoning, memory, and speed of concept activation are related to both reading comprehension and learning. "Theory and research in the two areas have recently grown so similar that it is not certain where one ends and the other begins.... a general test of comprehension could serve as a general predictor of learning performance" (Royer et al., 1987, p. 20).

Studies on reading comprehension and learning in the

Table 1

Research Studies on the Relationship Between Reading Ability  
and Academic Performance in the Community College

Author	Date	Assessment	Dependent Variable	Relationship	Other Variables Studied	Miscellaneous
Bello & others	1977	CGP reading	Nursing Program completion & State Boards	Yes	Age sentence high school algebra college science	Increase selectivity of admission  Require C in college science  Establish pre-admission remedial reading & math  Provide remedial support during program
Berlatan	1977	Reading Level Assessment	Grades in social science	Yes	None	Reading level of textbooks is important consideration
Biermann	1985	Reading ability assessment	Nursing State Boards	Yes	46% of variance on Boards due to college GPA reading & negative rational decision making	Negative predictor was rational decision making better to be dependent decision maker
Biermann & Sarinsky	1987	Reading Comprehension	Grade in Biology	Yes	Math High school courses taken	

Table 1--Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Blustein & others	1986	Reading Comprehension	GPA	Yes (r = .49)	Study Skills Expectations	Not predictive: career decisiveness & internal motivation
Campanile	1971	SAT CGP	GPA	Yes	Values of students	Not predictive: subject matter, interest, occupational interest, & occupational information measures
Doyle	1985	ACT Composite	GPA(only 17-22 yr. olds)	Yes	High school GPA	
Dutrow & Houston	1981	Iowa Silent Reading Test	GPA	No	CGP, some personality characteristics, femininity	Not predictive: study skills
Eberly	1969	GATBY	Freshmen GPA	Sometimes		Yes for transfer No for vocational
Efurd	1980	Nelson-Denny	GPA freshmen nursing students	Yes		

Table 1--Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Einbecker	1974	Reading score on Florida 12th grade test	GPA freshmen	Yes $r = .48$		23% of variation in GPA due to variance in reading
Emmeluth	1979	Nelson-Denny	Grades in biology	Yes ( $r = .41$ )	Age high school GPA high school rank	
Gordon	1984	Reading Placement Test	GPA of high risk students	Yes	Major, female, ACT, having had a reading course	
Hankins	1982	Nelson-Denny	GPA freshmen	Yes (especially vocabulary)	Age, race, sex, completion of reading course	Nelson-Denny accounted for 9.6% of variance in GPA, 14.8% when age, race, and sex were added
Henard & Stenning	1976	Nelson-Denny	GPA freshmen	Yes		
Hurov	1987	Nelson-Denny	Grades in chemistry	Yes, especially vocabulary, $r = .30$		Reading scores lower than 20th percentile were strongly correlated with unsuccessful grades



Table 1--Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Ice	1971	ACT	GPA	Yes, especially ACT social science and composite	High school GPA Older Females	
Janzen & Johnston	1970	Cooperative English Test of Reading	GPA freshmen	Yes $r = .34$		
Johns	1970	Davis Reading Test	GPA 1st quarter predominately black community college	Yes		Study habits also measured-questionable validity  Greater male predictability
Kapusta	1980	Verbal Comprehension	GPA	Yes	Study habits & attitudes	Personality was not
Kessler	1987	College Board Assessment & Placement Test	GPA	Modest relationship $r = .22$		Fair number of students reading below 25th percentile were above 2.0 in transfer courses  Placement scores are not a reliable predictor of classroom success

Table 1--Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Latterhos	1980	Reading Test	GPA	Yes	High school rank, reading & sex accounted for 17% of GPA	No difference if used computerized guidance-SIGI
Loucks	1985	Nelson-Denny	Grades in English 101	Modest		Some students do well despite low scores or do poorly despite high scores  Testing process can be catalyst for success - feedback can motivate
Mann	1976	ACT	Grades in chemistry	Yes $r = .39$	IQ scores High school chemistry	Gender-almost no value in predicting
Morrison	1980	ACT	GPA-1st semester	Yes	High school rank, # of credit hours enrolled, financial aid	Not predictive: age, sex, race, marital status, major, residency

Table 1--Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Nielsen	1987	ASSET	GPA for voc-tech students	High to modest depending on curriculum		Persistors had higher ASSET scores, 28% of GPA for DP students accounted for by ASSET reading, writing & math scores
Parrott	1982	Reading Placement Tests	Grades in social science	Yes $r = .44$		
Preas	1970	SAT	GPA	Yes	High school GPA	
Randolph	1979	Reading Test	GPA	Yes	Younger students did better	Did not predict: income, sex, race
Reyes	1979	Davis Reading Test	GPA	No	Female, older, transfer	Did not predict: race, marital status, day/night, math
Richards	1985	Reading Test	Grades in human anatomy & physiology	Yes ( $r = .41$ )	Cognitive development, & cognitive style	

Table 1--Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Richards & Casey	1975	SAT	GPA freshmen	Yes		Creativity - weak correlation, academic motivation-poor correlation
Roberts	1986	ASSET Reading	GPA	Yes	ASSET math sex (females-higher)	Did not predict: ASSET - language, race
Rogers	1979	Comprehension Guidance Placement Tests (Reading)	GPA 1st semester	Yes $r = .35$	CGP sentences motivation, math, sex (females) career did better	
Root	1971	ACT	GPA of graduates	Yes $r = .38$	High school rank $r = .34$ Age $r = .33$ FT $r = .28$	Did not predict: parents level of education, sex, major, transfer, marital status
Simone	1986	CAP-Standardized Achievement Tests in Reading	Course grades in business math	Yes	CAP-math higher socio-economical status	Supports assessment on admission & developing a success profile to determine who will need support

Table 1--Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Spahr	1987	Nelson-Denny	Grades in nursing courses	Yes $r = .25-.54$	Write fundamentals of anatomy & physiology math	Establish comprehensive pre-admission assessment programs  Review high school transcripts closely  Implement remedial education for basic competencies
Taylor	1981	Reading Comprehension Test	Course grade in English Composition	Yes	Attendance- 36% of variance in grades	72%-85% of grades due to attendance, reading, age, sex, high school GPA, college credits, grade level of teacher talk & cognitive preference

community college show relationships not only between scores on reading tests and course grades but between reading comprehension and GPA (both first semester and graduating GPA). Some studies focus on special populations such as high risk students. Most research has revealed a positive relationship between the predictor variable, reading ability, and the criterion variable, GPA, or grades.

Reading ability and grades in courses. Several studies have been done to identify factors which relate to the success or failure of students in the highly rigorous and demanding nursing programs in the community colleges. An early study done from 1969 through 1974 on 358 nursing students found that reading scores from the Comparative Placement and Guidance Program (CGP) were valid factors predictive of program completion and passage of the State Board Test Pool Examination which leads to licensure as a registered nurse (Bello et al., 1977). Later, in 1980, Efurd conducted a study on 81 freshmen nursing students at Westark Community College which also found a positive relationship between reading ability and grades. With few exceptions, (using frequency distributions) he found students with higher reading levels on the Nelson-Denny Reading Test (NDRT) achieving higher grades. Correlational studies done on 47 nursing students at Morton College in Illinois found similar results (Spahr, 1987). Finally, in a study looking at both cognitive and non-cognitive

variables associated with two year nursing program success, Biermann (1985) also related reading ability to success on nursing State Boards. Forty-six percent of the variance on State Boards was due to college grade point average, negative rational decision making and reading.

While the above studies were being conducted in nursing programs similiar ones were done to predict the success or failure in chemistry courses in community colleges. In order to reduce the 35-40% dropout/failure rate in chemistry classes at the Perkinston Campus of Mississippi Gulf Coast Junior College a study was done to discover predictors which would provide early identification of students in need of special or additional help. Mann (1976) found that ACT (American College Testing Program) scores had the highest predictive value ( $r = .39$ ). More specific to reading skills was a study done at Saint Louis Community College at Florissant Valley which evaluated the relationship between performance on the Nelson-Denny Reading Test (NDRT) and final chemistry grades in Fundamentals of Chemistry. Study findings, based on test scores and grades of 118 chemistry students, indicated that there was a moderate relationship ( $r = .30$ ) between NDRT scores and course success, with a stronger relationship for vocabulary skills than comprehension skills (Hurov, 1987).

Predictors of success in other science courses such as biology as well as human anatomy and physiology were also

studied. Emmeluth (1979) found that scores on the Nelson-Denny Reading Test showed positive correlations ( $r = .41$ ) with final grades in introductory biology. This was supported by Biermann and Sarinsky in 1987 as they found that reading ability was related to grades in a biology course. Richards (1985) likewise found that 131 students in a human anatomy and physiology course had a positive correlation between their reading ability and their course grade. The correlation between reading and grades was  $.41$  with a  $p < .001$ .

The ability to link course grades to reading scores was also found in classes as diverse as social science, business math, and English composition. The strongest relationships were found in social science. Bertalan (1977) looked at a comparison of the readability of community college social science textbooks with the reading levels of 375 students and the effect on academic achievement. It was found that students who possess reading grade placement levels higher than readability grade placement levels of texts receive higher grades than do students who possess reading grade placement levels below level of the text. Parrott (1982) also studied the entry-level reading skills of students and their grade outcomes in social science courses for which they were enrolled. The study focused on the placement test scores and course grades of 409 students enrolled in spring 1982. Study findings included: 1) in five of seven courses, the mean reading score decreased as



the course grade decreased; 2) however the mean reading score for the 10 students who received an "F" was higher than the overall mean score for the entire sample. Further exceptions to the general conclusions will be explored at the conclusion of the review on reading. Positive correlations have also been found to exist between reading achievement scores and course grades in business math (Simone, 1986) and English composition (Taylor, 1981). Taylor reported that 72-85% of the variance in English Composition grades was due to attendance, reading, age, sex, high school GPA, college credits, grade level of teacher talk and cognitive preference.

Reading ability for special populations. Positive relationships have been found between reading ability and academic success with a variety of special populations within the community college setting. Reading placement scores were found to be related to academic achievement of high risk community college students (Gordon, 1984). In another study, 150 students at a predominantly black urban community college were given the Davis Reading Test at orientation. Results indicated a relationship between the reading scores and first quarter GPA (Johns, 1970). Positive correlations were found between ACT and first year GPA with 17-22 year olds (Doyle, 1985); ASSET and GPA for vocational-technical students (Nielsen, 1987); and the GATB and freshmen GPA for transfer students (Eberly, 1969). Nielsen (1987) reported that 28% of the GPA for data

processing students was determined by reading, writing, and math scores reported from ASSET.

Reading ability and GPA. Many studies have been done to demonstrate a positive relationship between reading ability and grade point average in the community colleges. A variety of measures have been used to measure reading ability including the Nelson-Denny Reading Test, the ACT Social Science Test, the SAT Verbal Test, the ASSET instrument, and the College Guidance and Placement Test. Most of these research studies increased the power of the predictiveness by combining reading scores with other cognitive and non-cognitive variables. This review will focus only on the reading relationships to GPA. The Nelson-Denny Reading Test was used in two community college studies predicting academic performance in terms of GPA. Both found direct positive relationships. In the fall of 1974, the Nelson-Denny was administered to 403 entering freshmen at Amarillo College. One hundred seventeen were selected as study subjects. Reading achievement was found to be a measure of grade point average (Henard & Stenning, 1976). Hankins (1982) also used the Nelson-Denny in trying to predict first year academic achievement of community college students. The NDRT scores accounted for 9.6% of variance in GPA. When age, race, and sex were added the variance increased to 14.8%. Hankins concluded 1) although positive correlations were found they lacked predictive usefulness, 2) vocabulary, not reading

comprehension was the best single predictor, and (3) students who completed a reading course earned higher GPAs.

The Nelson-Denny reveals pertinent and precise information on reading. However, many more studies have used the ACT and SAT composites and subscores to evaluate cognitive abilities in general and reading abilities specifically. Three studies looked at comparing the predictive power of ACT and SAT composites in contrast to a variety of non-cognitive variables. All three concluded that the aptitude and achievement measures of ACT and SAT predicted GPA best (Campanile, 1971; Morrison, 1980; Root, 1971). Root reported that  $r = .38$  between ACT and GPA. Similar results were found when subscores reflecting reading ability (SAT verbal and ACT social science) were used. Ice (1971) reported that the single best predictor of GPA for 707 full time adults at Macomb Community College was the ACT social science score. Preas (1970) likewise found the SAT verbal was useful as a predictor of college GPA. A study using graduating GPA was done by Yess (1979). A variety of independent variables were compiled for 483 students: age, gender, marital status, career objectives, SAT verbal and SAT math, high school math and high school English. Overall, predictors which consistently accounted for variance in GPA were high school English average, SAT verbal and SAT math.

Of particular importance to ASSET research is a study designed to show the relationship of ASSET test scores

(reading, math, and language usage), sex, and race to success in a variety of programs at Milwaukee Area Technical College (Roberts, 1986). Using a multiple regression analysis it was found that reading, math and sex were related to GPA (grade point average) while race and language usage scores were not. Similiar, but not identical, results were found using the Comparative Guidance and Placement (CGP) Test which yields raw scores in reading, sentences, math, and academic motivation. All of the variables from the CGP test were found to be significant at the 5% level (Rogers, 1979).

Five other studies specifically linked reading ability with GPA in the community college. Randolph (1979) analyzed the factors that affect academic achievement of students in an urban open door community college. Results indicated that students who read well do relatively better and that income, sex, and race were not predictive. Blustein et al. (1986) and Kapusta (1980), looking at a variety of variables, also reported that reading comprehension was related to GPA. Blustein reported an  $r$  of .49 between reading and GPA. Einbecker's (1974) investigation was designed to specifically determine the relationship between reading ability and academic performance of junior college freshmen and to what degree a measure of reading ability could predict academic performance. Three hundred thirteen Pensacola Junior College freshmen were subjects. Using Reading Index Scores on the Florida Twelfth Grade

Test it was concluded that 23% of the variation in GPA could be accounted for by variance in the Reading Index Score. The fifth and final study found that for 266 full time Mercer Community College students the predictors of GPA were high school rank, reading test scores, and sex. These three variables accounted for 16.8% of the variance (Latterhos, 1980).

Low relationships between reading ability and GPA.

Most studies on reading and community college achievement give caution to the claims of predictability of reading scores. Five studies were especially cautious in this area. Four of the studies used instruments not used in other research.

The first study was conducted at Dabney S. Lancaster Community College to examine the relationships between reading achievement, academic major, selected personality variables, and grade point average. Scores on the Iowa Silent Reading Test were not found to be related to GPA (Dutrow & Houston, 1981). However, only 172 students were in the sample. Also, the statistic used was not Pearson product correlation but the t-test for differences between groups. On first glance the groups did look different. All three scores taken in reading (reading level, vocabulary and comprehension) were lower in the group that earned a GPA below 2.0 than the group that earned between a 2.0 and a 3.0 and the group that earned above a 3.0. Also the averaged reading scores for the below 2.0 group fell

below the mean reading score for the entire sample. Scores on the College Guidance and Placement Test did provide a valid way to predict GPA in this study.

The second study done at San Jose City College found that 300 student scores on the Davis Reading Test were not related to GPA (Reyes, 1979). However, reading scores were not treated to Pearson product moment analysis. Also, reading was not isolated for an analysis but was incorporated into a regression analysis which included age, math and number of years to graduate.

Janzen and Johnston (1970) reported from Mount Royal College in Canada that the scores from the Cooperative English Test which measures reading had extremely low predictive value. However, several things need to be considered: 1) the sample of 189 was fairly small; 2) the English Test did predict English grades and English grades predicted 47% of GPA; and 3) when nine Van Hagenen Scales of Reading were combined for males and females it was found that reading accounted for 12% of the GPA variance.

A fourth study questioning the relationship between reading and achievement performance was entitled: "Can reading placement scores predict classroom performance?" This study, conducted by the Rancho Santiago Community College District used the College Board Assessment and Placement Test. It was concluded that there was only a modest positive relationship between placement scores and grades ( $r = .22$ ) and that a fair number of students who had

reading scores below the 25th percentile were successful (grade of "C" or better) in transfer-level courses. These findings suggested that placement scores were not a reliable predictor of classroom success for many courses and challenged the predictive validity of such measures. The results showed that only 46% to 79% of the students could be correctly classified on the basis of reading placement scores alone. Based on study findings it was concluded that the use of cut-off scores was inappropriate since many students who could have been predicted to fail actually earned a grade of "C" or better (Kessler, 1987).

The fifth study recognized an important relationship between reading and achievement yet concluded that the predictive validity of the tests (in this case, Nelson-Denny) is low. Many students at Shoreline Community College in Seattle, Washington were doing well in class despite low reading scores and many were doing poorly despite high initial scores. Interviews conducted with staff and students led to the following conclusions: 1) a significant number of students who failed the course in English Composition did so for reasons other than ability; and 2) students who do well in class despite low scores often do so because of the attitude and involvement of the instructor (Loucks, 1985).

Summary on reading. There appears to be overall support, underscored by 37 research studies that there is a positive relationship between reading ability and grades in

the community college setting (when Pearson r values were reported they ranged from .22-.54). Studies used both course grades and college GPA as the dependent variable and were conducted on special populations such as nurses, African American, and transfer students as well as the college freshmen class as a whole. A few studies questioned the relationship. Many questioned the predictive validity of reading scores. Attribution theory, motivational theory, Astin's involvement theory, and Tinto's integration theory all indicate that the causes for academic achievement are multiple and varied. It would be difficult to conclude that reading ability causes or even predicts academic success. However, it appears to be a very important variable related to student academic success in a community college setting.

### Writing

Very few studies have been done on the relationship between writing ability and academic achievement in the community colleges. None appear to look at this variable in isolation. It has been tied to reading, math, science achievement, and sex. However, five studies were found using writing ability as one of the variables. Four of the studies found a positive relationship. One did not. One using ASSET as an instrument found writing skills as an unimportant variable (Roberts, 1986). Even though conclusions about writing skills cannot be drawn due to the



**Table 2**  
**Research Studies on the Relationship Between Writing Ability**  
**and Academic Performance in the Community College**

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Bello	1977	CGP sentence scores	GPA nursing program	Yes	CGP reading, high school algebra college science	358 - Nursing students
Parrott	1982	Writing Placement Scores	Grades in social science	Yes r = .42	Reading	409
Roberts	1986	ASSET	GPA	No	Reading, math, sex	919 - Milwaukee
Rogers	1979	CGP sentence	1st semester GPA	most important variable r = .37	Academic motivation Reading math female	Mount Wachusett Community College - Massachusetts
Spahr	1987		Grades in nursing courses	Yes	Read, fundamentals of anatomy & physiology	

small number of studies each project will be reviewed here briefly.

Both Bello (1977) and Spahr (1987) studied the relationship of writing ability to success in the Nursing Program. Both studies drew similiar conclusions:

(1) writing or sentence scores were related to success in the program and (2) a variety of other variables were also important--both named reading and achievement in college science classes.

Parrott (1982) likewise studied the correlation between writing and achievement. However, the dependent variable was social science grades instead of nursing program success. This study was conducted at the College of the Sequoias, focusing on 490 students enrolled in a social science course. Results indicated relationships between students' grade outcomes and their ability to read ( $r = .44$ ) and write ( $r = .42$ ).

In a study done at Mount Wachusett Community College in Massachusetts (Rogers, 1979), all freshmen took the Comparative Guidance and Placement (CGP) test which yields raw scores in reading, sentences, math, and academic motivation. All of these variables were found to be valuable in predicting first semester GPA. It is interesting though, that sentence scores were elevated to the highest importance of all the variables predicting GPA ( $r = .37$ ). It was followed by, reading ( $r = .35$ ), motivation ( $r = .30$ ) and math ( $r = .30$ ).

The only study that found writing unrelated to academic success and set it aside was one done by Roberts (1986) using ASSET at Milwaukee Area Technical College. ASSET yields raw scores in language usage, reading, comprehension, and math. Using multiple regression analyses on over 900 student scores on ASSET, Roberts concluded that: 1) reading and numerical scores were good predictors of success for developmental studies students, while language test scores were less useful; and 2) among associate degree students language test scores appeared to have little relationship to grade point average.

Differences in the research may be due to the variety of instruments used. ASSET, recently developed by ACT for community colleges, has not been available long enough for a depth of research to be available on the instrument. The scant number of studies done on writing prevents any firm conclusions to be drawn.

### Math

Math as an independent variable predicting academic success has been studied in a handful of cases on community college campuses within the last 10 years. Only one study found math skills to be unimportant to academic success. The studies will be reviewed in three groups depending on the criterion variable. These groups are: 1) those that used grades in math courses as the dependent variable; 2) those that used grades in science courses and/or programs

as the dependent variable; and 3) those that used overall GPA as the dependent variable.

Two studies used math grades as the dependent variable. A correlation was found in both, as would be expected. Using the CAP (Comprehensive Achievement Program), a standardized achievement test in reading and math, Simone (1986) found that scores were related to course grades in college business math. A study involving 513 developmental math students at eight Illinois community colleges was conducted to determine the correlation between success or failure in developmental math courses and nine independent variables, one of which was numerical skills. Stepwise multiple discriminant analysis was used to determine those variables which discriminate between passing and failing students. Study results identified five of the variables could account for 9% of the variance in grades. Math ability was the most important with an F of 26.23 (Frerichs & Eldersveld, 1981).

looked at math as a possible predictor of success in science courses and science programs in the community college. Some combined math with reading. All but one identified math as an important basic skill related to academic success. High risk students in college chemistry are often identified by low mathematics SAT scores at the university level according to researchers, Sanchez and Betkouski (1986). They wanted to find additional factors to predict success and studied eight.

**Table 3**  
**Research Studies on the Relationship Between Math Ability**  
**and Academic Performance in the Community College**

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Biermann & Sarinsky	1987		Grades in biology	Yes	Reading & type of high school diploma	
Frerichs & Eldersveld	1981	Form H of Career Planning Program assessing numerical skills	Grades in math	Yes F = 26.23	Older, traditionally taught course, more positive attitudes	513 Developmental math students at 8 Illinois community colleges
Greenwood	1962	High school grades ACE subtest scores	GPA freshmen	Yes 49%	Number of years of high school math	Just students in chemical electrical, and mechanical curricula at 3 community colleges in New York
Hurov	1987	DAT Numerical Reasoning Subtest	Grades in Fundamentals of Chemistry	No	Reading better predictor, especially vocabulary	118 chemistry students at Floessant Valley (MO)

Table 3-Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Preas	1970	Cooperative Math Test and SAT math	GPA	Yes	High school GPA, high school rank, SATV and English Co-operative	Rockingham Community College, NC
Roberts	1986	ASSET	GPA	Yes	Reading, math, and sex biggest predictors	Milwaukee A.T.C. Language Usage not predicting  Separate analysis for Developmental Associate Degree & Tech students
Rogers	1979	CGP	1st semester GPA	Yes r = .30	Motivation & reading better	Mount Wachusett Community College - MA - all freshmen
Sanchez & Betkouski	1986	Algebra background	Grades in chemistry	Yes	Overall GPA & chemistry background	Just chemistry students
Simone	1986	Standard Achievement Test CAP in math	Grades in college business math	Yes	Reading also	

Table 3-Continued

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Spahr	1987	In-house math placement exams	Nursing grades	Yes	More important were reading, writing & grasp of anatomy & physiology	Just nursing Morton Community College IL
Yess	1979	SAT Math	Graduating GPA	Yes	Also - high school English SATV; in nursing & secretarial marital status also	483 - one community college

The best predictors found were grade point average and prior chemistry background. In another study done on successful completion of fundamentals of chemistry, Hurov (1987) found a weak correlation between the Numerical Reasoning subtest of the Differential Aptitude Test (DAT) and grades.

Math combined with reading was found to be related to success in biology, nursing, and technical course work. In an analysis of selected cognitive abilities associated with achievement in a biology preparatory course at an urban community college, Biermann and Sarinsky (1987) concluded that 33% of the variance in biology course grades was due to math, reading and type of high school degree. The ability to read, write, understand fundamental concepts of anatomy and physiology, and to a lesser extent perform basic mathematical operations, relates to academic success in introductory nursing courses (Spahr, 1987). Math scores and years of high school math were found to be important for the prediction of academic success in chemical, electrical and mechanical curricula in three community colleges in New York state (Greenwood, 1962). High school chemistry grades, math course grades and high school GPA accounted for 49% of the variance in community college GPA for students majoring in chemistry.

Math ability was also identified as a predictor of GPA in studies done in community colleges. A multiple regression analysis of the variables from the CGP test upon



GPA done at a community college in Massachusetts concluded that all of the variables from the CGP test had predictive ability. The order of importance of the variables predicting GPA was sentences, academic motivation, reading, math, and sex (Rogers, 1979). In order to predict the academic success of community college students, Yess (1979) performed a forward stepwise multiple regression analysis on nine variables. Predictors which consistently accounted for variance in graduating GPA were high school English average, SAT Verbal and SAT Math scores. Roberts (1986) also concluded that reading and math scores predicted success in a variety of academic programs at Milwaukee Area Technical College.

In conclusion, it has been shown that math has a relationship to academic success in the science and tech courses. When combined with reading it is related to overall GPA.

#### High School Work

High school grade point average or high school rank is a very good predictor of community college success. Thirteen studies concluded that high school grade point average was as good or better than ACTs and SATs (Emmeluth, 1979; Doyle, 1985; Greenwood, 1962; Ice, 1971; Kern, 1955; Kurlander, 1972; Latterhos, 1980; Mann, 1976; Morrison, 1980; Preas, 1970; Root, 1971; Sanchez & Betkouski, 1986; Yess, 1979). Also, community college grade point average

Table 4

Research Studies on the Relationship Between High School GPA  
and Academic Performance in the Community College

Author	Date	Independent Variable	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Doyle	1985	High school GPA High school rank	Freshmen GPA Wyoming Community College	Yes	ACT	High school GPA = Best Predictor (only 17-22 year olds) ACT composite-also related
Emmeluth	1979	High school GPA & high school rank	Grades in Biology course at Fulton-Montgomery Community College (53 students)	Yes	Age, sex, NDRT, biology in high school	NDRT & high school GPA & rank were best predictors
Greenwood	1962	High school math, chemistry, English	Success in chemistry, electrical & mechanical curriculum			High school math is important.

Table 4--Continued

Author	Date	Independent Variable	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Ice	1971	High school GPA	College GPA 707 full-time		Age Gender Older females do better Older students better generally	ACT Composite a bit better than high school GPA
Kern	1955	High school GPA	College GPA	Yes	English Test Reading Composition Test	Most significant - High school record & GPA - also English & Reading Test
Kurlander	1972	High school GPA	College GPA (524 community college students)		Looked at psychological variables & socio-economic (Taylor's Manifest Anxiety)	High school GPA & Regents Scholarship Test Scores  Psychological & socio-economic - not good predictors
Latterhos	1980	High school rank	College GPA 266 students		SIGI Reading Scores Sex	High school rank Reading & sex - yes SIGI - no
Mann	1976	High school chemistry	Mid-Term grades in college chemistry	Yes	ACT Sex(no) IQ	Best predictor ACT

Table 4--Continued

Author	Date	Independent Variables	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Morrison	1980		1st semester GPA		Age, sex, race, marital status, major financial aid, ACT	Best predictors are ACT & high school rank
Preas	1970	High school GPA & rank	College GPA	Yes	SATV & M English & Math Cooperative Scores	High school GPA better than rank SATV better than English Cooperative Cooperative Math better than SATM
Root	1971	High school rank	College GPA		ACT Sex Major FT/PT Age Marital status Mother/father's education	ACT best predictor High school rank second best predictor Age-older better
Sanchez & Betkouski	1986	High school chemistry	Chemistry grades		Sex, age, attitudes about science, overall GPA algebra grades	Best predictor overall college GPA & prior chemistry background

Table 4--Continued

Author	Date	Independent Variables	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Wright & Losak*	1983	Freshmen & Sophomore College Grades	Success at 4 year school (455 students)	Yes	CLAST (Achievement)	CLAST was not a better predictor than previous academic performance. Use of CLAST alone would lead to erroneous conclusions about success. Miami-Dade
Yess	1979	High school English grades	GPA of community college graduates (483 students)	Yes	Age, gender, marital status SAT Verbal & SAT Math High school math	High school English, SATM & SATV-best predictors  (Note: married females - almost as good a predictor)

\*Note this is a study of community college grades predicting 4 year success.

predicts four year grade point average better than achievement tests (Wright & Losak, 1983). Past behavior is a good predictor of future behavior.

#### Basic Intelligence

Only one study has been completed on IQ (Intelligence Quotient) and its relationship to academic success in the community college. This was reported by Mann in 1976. The purpose of this study was to provide early identification of students in need of special or additional help to succeed in chemistry classes. IQ scores were found to be useful in predicting academic success ( $r = .34$ ).

#### Level of Intellectual Development

Cognitive level of development was found to be related to achievement in both chemistry and human anatomy classes. High scores on the Test of Logical Thinking (TOLT) and the Test of Integrated Process Skills (TIPS) were predictors of college chemistry grades (Sanchez & Betkouski, 1986). Cognitive development and cognitive style were related to grades in anatomy (Richards, 1985). Cognitive development level and GPA revealed an  $r$  of .38 ( $p < .001$ ). Cognitive style and GPA revealed an  $r$  of .28 ( $p < .001$ ).

#### Critical Thinking

A recent study done at Saint Louis Community College

at Florissant Valley evaluated the effectiveness of the Watson-Glaser Critical Thinking Appraisal (WGCTA) in predicting final grades in Fundamentals of Chemistry. Results concluded that even though critical thinking was related ( $r = .25$ ), reading scores from Nelson-Denny were found to have a higher relationship with grades ( $r = .30$ ) (Hurov, 1987).

### Creativity

Results of a study in Boston on the effects of creativity (as measured by the Torrance Tests of Creative Thinking) concluded that creative ability was a very poor correlation with freshmen GPA. High school GPA and SAT scores, however, could predict 31% of the GPA (Richards & Casey, 1975).

### Listening Comprehension

The ability to listen well was not found to be related to final course grades in English Composition (Taylor, 1981). However, the independent variables of reading composition, attendance, age, high school grade point average and college grade point average accounted for 85%-92% of the variance of English comprehension grades.

### Brain Dominance

A study comparing brain dominance to test scores in English, reading, and math concluded that there is no

relationship between hemisphericity and examination scores (Riley, 1981).

### Learning Style

Studies are not in total agreement on the results of the effectiveness of cognitive mapping. However, it seems there is value in helping students become aware of their own particular preferences in receiving and processing information. Two studies confirmed that disclosure of cognitive style map information raises academic achievement (Belisle, 1987; Fourier, 1983). Fourier reported that 3-5% of achievement could be accounted for by disclosure of cognitive style map. Also, when student learning styles were matched with faculty leadership styles learning was enhanced (Ballard, 1980). However, Fisher (1980) found no difference in mean grade point averages between mapped and unmapped students.

### Non-Cognitive Variables

#### Personality

There appears to be general agreement that personality type as a variable is not related to academic achievement level. However, some personality traits were commonly found among the high achievers. They were noticeably more self-confident, autonomous, intellectually inclined, and more realistic (Herridge, 1972) as well as more self-



sufficient, relaxed, unfrustrated, conscientious, and socially precise (Ennis, 1973). Dutrow and Houston (1981) found them to be self-accepting, responsible, tolerant, independent, flexible, self-controlled and able to avoid work delay.

Scores from the California Psychological Inventory (Kapusta, 1980), Rotter's Personal Power Scale (Kurlander, 1972), and Taylor's Scale of Manifest Anxiety (Coleman, 1974) all revealed low or no relationship to community college GPA. Similar negative results were concluded from Myers-Briggs Scales (Baker, 1984; Popovics, 1981). Popovics however, did show that in one curriculum, accounting, if students scored high on judgment and thinking scales this could explain an additional 6.8% of the variance in GPA.

### Attitudes

Directly related to personality traits are attitudes. Studies confirm that positive attitudes get positive results. Successful students are more likely to have more positive attitudes not only toward their subject matter (Frerichs & Eldersveld, 1981; Norman, 1987) but toward their faculty (Jones, 1979) and themselves (Griffen, 1978; Carroll, 1986). Furthermore, successful students have realistic expectations of academic demands, insight into personal abilities and a readiness to work hard (Dispenzieri & Giniger, 1971).

### Values

Values as well as attitudes are related to student success. The Purpose in Life Test was found to be an indicator of academic achievement (Hayes, 1978).

### Locus of Control

Internally controlled students do better academically (Anderson, 1986; Avramides, 1987; Griffen, 1978; Spann, 1977). However, the relationship does not always show up (Edwards & Walters, 1981; Fitts, 1987). One study established a relationship for anglo males and females (Christner, 1977) but not for other ethnic groups. Further exploration and clarification of this variable is needed.

### Career Maturity

Career maturity may be more directly related to retention and drop-out activity than academic achievement. When examining the relationship of career maturity to academic achievement of 182 community college students relationships were found that varied from zero correlations to an  $r$  of .31 (Healy et al., 1984).

### Demographic Attributes

#### Age

Older students perform better than their younger counterparts in community colleges. Results of numerous

**Table 5**  
**Research Studies on the Relationship Between Age**  
**and Academic Performance in the Community College**

Author	Date	Assessment	Dependent Variable	Relationship	Other Predictive Variables	Miscellaneous
Anderson	1986		Typing Test	Yes - older	Internally controlled; study, female	Achievement & satisfaction of beginning typing student
Baker	1984		GPA	Yes - older		Nursing program only.
Brunk	1976		GPA	Yes - older better		Oscar Rose J. C. 6259 Looked at age group - adult students
Daus	1986		GPA	Yes - older	Better were FT, white, receiving aid, female	Mott Community College 11,000
Emmeluth	1979		Grades in Biology	Yes - older	Age & reading High school GPA & high school rank	53 students - Fulton - Montgomery CC

Table 5-Continued

Author	Date	Assessment	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Frerichs & Eldersveld	1981		Grades in Developmental Math	Yes-older	Better numerical scores taught traditionally	513 developmental math students - 8 community colleges in IL
Greer	1980		GPA	Yes - older $F = 47.43$		Clayton, GA Study looked at older students
Griffen	1978		GPA	Yes - older $r = .22$	Locus of control Study Habits	211 new community college students
Hankins	1982		GPA - first year	Yes-older	Nelson-Denny 9.6% of variance, white & female & older up to 14.8%	Correlations - significant - lacked predictive usefulness 736 - Texas
Herridge	1972		Low, middle & high achievement GPA	Yes-older	White, married, PT, evening, realistic, self confident, parents have less education	Non-intellectual variables

Table 5-Continued

Author	Date	Assessment	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Ice	1971		GPA	Yes -older	Females do better, ACT social science ACT composite	707 Full time students at Macomb
Jones	1979		Grades in computer Programming	Yes r = .22	Overall GPA, students perceptions	106 students at 8 community colleges in Virginia
Popovics	1981		1st semester grades in occupational programs	Some	Better ? Basic skills & high school record	Middlesex C. Community College, NJ - 293 students Just Voc-tech students
Randolph	1979			Yes - Younger	Read well Income, sex, & race did not predict	200 students - urban community college
Reyes	1979		GPA	Yes - older (27)	Also female, transfer	San Jose City College 300 AA grads
Sanchez & Betkouski	1986		Grades in chemistry	Yes - older	GPA, prior chemistry background, good grasp of science, good algebra grades	In past - low chemistry in college associated with low SATM

research projects show agreement on this variable (Anderson, 1986; Baker, 1984; Brunk, 1976; Daus, 1986; Emmeluth, 1979; Frerichs & Eldersveld, 1981; Greer, 1980; Griffen, 1978; Hankins, 1982; Herridge, 1972; Ice, 1971; Popovics, 1981; Reyes, 1979; Sanchez & Betkouski, 1986). However, in predicting success of computer programming majors Jones (1979) found that the demographic variables of sex, marital status, race and age did not appear to make a large difference. In the only other study differing on this issue Randolph (1979) concluded that younger students do better. In spite of these two latter research studies it does appear that older students do receive higher grades.

### Gender

Academic success research in the community colleges has resulted in overwhelming support for the notion that female students reach higher levels of academic success than do males. However, a few studies (Frerichs & Eldersveld, 1981; Jones, 1979; Sanchez & Betkouski, 1986) conducted in math, chemistry, and computer programming show no variance in grades due to sex.

Using GPA as the dependent variable most studies concluded that female students earned higher GPAs than did their male counterparts (Daus, 1986; Dutrow & Houston, 1981; Griffen, 1978; Hankins, 1982; Ice, 1971; Johnson, 1987; Klein & Snyder, 1969; Latterhos, 1980; Reyes, 1979;

Table 6

Research Studies on the Relationship Between Gender  
and Academic Performance in the Community College

Author	Date	Assessment	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Anderson	1986		Typing grades	Yes(female)	Study, locus of control, older	
Daus	1986		GPA	Yes(female)		Mott - 11,000 students
Dutrow & Houston	1981		GPA	Yes-over 3.0 (female)	CGP & some personality characteristics - not study skills	Dabney S. Lancaster Community College 172 - English courses
Frerichs & Eldersveld	1981		Grades in math	No		513 Developmental Math students at 8 Illinois community colleges
Gordon	1984		GPA	Yes(female)	ACT, reading scores	Hinds Jr. College High risk students
Griffen	1978		GPA	Yes $r = .17$	Locus of control, self-concepts of academic abilities, study habits	211 community college students
Hankins	1982		GPA	Yes(female)	NDRT - 9.6%	736 - Texas

Table 6-Continued

Author	Date	Assessment	Dependent Variables	Relationship	Other Dependent Variables	Miscellaneous
Ice	1971		GPA	Yes(female)	ACT Social Science ACT Composite High school GPA	707 Macomb
Johnson	1987		GPA	Yes(females)	Part-time, night	472
Jones	1979		Computer Programming Majors	No (neither did age, race or marital status)	GPA, student perceptions	Virginia - 18 variables 106 students
Klein & Snyder	1969		GPA	Yes(females)	Low income	Harrisburg 164
Latterhos	1980		GPA	Yes	Reading, high school rank	Mucer, Trenton, NJ 266 - not SIGI
Mann	1976		GPA - science	No	ACT	
Norman	1987					



**Table 6--Continued**

Author	Date	Assessment	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Popovics	1981				Basic Skills High school record	Middlesex Community College - 293
Randoph	1979		GPA	Not predictive	Younger & read well	200 urban
Reyes	1979		GPA	Yes(female) F = 10.2	27 transfer	300 AA - San Jose City Colleges - 11 variables
Roberts	1986		GPA	Yes(females)	Reading & Numerical	ASSET Milwaukee
Rogers	1979		GPA	Yes(female)	CGP, academic motivation, reading, math	Mt. Wachusett Community College, MA - all freshmen
Sanchez & Betkouski	1986		Chemistry course grades	No	GPA & prior chemistry	13 predictors

Roberts, 1986; Rogers, 1979). However, one study found that sex was not predictive of general academic achievement (Randolph, 1979).

Sex was found to have almost no value in predicting mid-term grades for chemistry students at Perkinston Campus of Mississippi Gulf Coast Junior College (Mann, 1976). Similiar results were found with chemistry students studied by Sanchez and Betkouski (1986).

Nine variables, including sex, were investigated in a study to determine the correlation between student success or failure in developmental math courses. Stepwise multiple discriminant analysis was used to determine those variables which discriminate between passing and failing students. Sex was not found to be a discrimating variable (Frerichs & Eldersveld, 1981). Similiarly, sex did not appear to discriminate between successful, unsuccessful and withdrawal groups of first-year computer programming majors in Virginia community colleges (Jones, 1979).

Sex appears to be related to overall GPA but may not be an effective predictor of success in some programs and courses such as math, computer programming, and chemistry.

#### Ethnic Background

Studies using ethnic background as a variable to predict academic performance are not in agreement nor do they reveal a consistent positive relationship between the two variables (Jones, 1979; Randolph, 1979; Roberts, 1986).

However, there is support for the notion that to be African American is a disadvantage academically. High achievers and successful students were most often white with a disproportionate number of African Americans in the low achieving groups (Daus, 1986; Hankins, 1982; Herridge, 1972).

#### Marital Status

Married students are more often found in the high achieving groups (Herridge, 1972; Klein & Snyder, 1969). Yess (1979, 1981) reported that even though he did not specifically design a study to look at effects of marriage on achievement it was a powerful predictor. Looking at 15 variables it was concluded that marital status had almost as much predictive validity as high school English averages and SAT scores, especially in nursing and secretarial curriculums. Married females earned higher grades than single or divorced females.

#### Day/Night

Night students do better academically than do day students (Herridge, 1972; Johnson, 1987). This may have occurred in the studies because night students in an open-door community college are generally older than the full-time traditional day students. Age has been found to be directly related to academic achievement.

### Transfer/Occupational

It is not clear if transfer or occupational status is related to academic achievement. Studies produce conflicting results. At Mount Wachusett Community College in Massachusetts, Rogers (1979) concluded that career students, whether male or female, earned higher GPAs than did those enrolled in transfer curricula. At the same time a study of graduates from San Jose City College (Reyes, 1979) found that the student who is most likely to succeed was found to be a transfer liberal arts major.

### GED or High School Diploma

Community colleges with their open door policies receive many students who have not graduated from high school but who have passed an equivalency exam called GED (Government Education Diploma). These students do as well as the high school diploma students. No differences in GPA have been found between the two groups (Clark, 1987). Both GED and high school diploma students perceive the importance of obtaining the Associate Degree as a passport to the world of employment and college.

### Amount of Education by Parents

Contrary to what may be expected, high achievers in the community college are apt to have parents with less education or who put less emphasis on education (Herridge,

1972). Many at the community college are first generation college students, proud to be achieving this status, and under some family pressure to be successful.

#### Socio-economic Factors

Socio-economic factors do not reveal discriminating variables in a search for predictors of community college success. Income and socio-economic variables were not particularly effective in predicting success (Kurlander, 1972; Randolph, 1979). Two studies concluded directly opposite results. Klein and Snyder (1969) reported that students of low income were in greater numbers in the achiever groups and Simone (1986) reported that students with higher socio-economic status received higher grades in course work and higher math achievement test scores than those in a lower socio-economic group.

#### Stress

Amount of stress is not an effective predictor of GPA but is effective in predicting completion of course load (Henard & Stenning, 1976). Three hundred twenty six students at Amarillo Community College were assessed on life change (amount and rate of change as a stress producing factor) in order to evaluate the effect of stress on success. Although it is not an influence on grades it does impact incomplete grades and withdrawal activity. Retention and stress are related.

### Part-time or Full-time

Research is marked by contradiction on the issue of part-time/full-time status and its relationship to GPA. Two studies report that part-time students do better (Herridge, 1972; Johnson, 1987) yet a large scale study done on 11,000 students at Mott Community College concluded that full-time students are more successful (Daus, 1986).

### Employment

Super achievers appeared in a study done to analyze the current grade point averages of employed full-time students at Wilkes Community College. Deal (1975) reported that full-time occupational students working over 40 hours per week made higher GPAs than students taking the same load and working 27-39 hours. However, students in the transfer program and working 14-26 hours per week had higher GPAs than those working 40 or more hours per week. The variables of program choice (occupational or transfer) interact with the variable defined as hours of employment.

### Variables Related to Motivation

#### Study Skills

Encouraged by motivational theory, studies have been done to test the hypothesis that effort or time on task is directly related to academic success. This variable has most frequently been measured by The Survey of Study Habits

**Table 7**  
**Research Studies on the Relationship Between Study Skills**  
**and Academic Performance in the Community College**

Author	Date	Assessment	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Anderson	1986		Typing test	Yes-when put with age (older) internally controlled & female		
Blustein et al.	1986	SSHA	GPA	Yes r = .50	Reading Composition Expectations	50 students 1 community college
Dutrow & Houston	1981	SSHA	GPA	No		
Evans	1985	Intervention-Study skill course	1st quarter GPA	No		
Federico	1972	Study skill program - Intervention	GPA	No		
Goldman & Warren	1973	Assessment of Study habits		Yes		
Griffen	1978	SSAA	GPA	Yes		

Table 7--Continued

Author	Date	Assessment	Dependent Variables	Relationship	Other Predictive Variables	Miscellaneous
Johns	1970	SSHA	1st quarter GPA	Questionable		
Kapusta	1980	SSHA	GPA	Yes		
Richards & Casey	1975	Test of Effective Academic Motivation (TEAM)	GPA	No	Also used creativity	Poor and unstable Population-educationally marginal Boston University CBS
Rogers	1979	CGP-one component is academic motivation	1st semester GPA	Yes $r = .30$	Reading, math, sex, type of math test	Career students did better
Stockey	1986	SSHA		No		Milwaukee Area Technical College
Thompson	1976	Entwistle Student Attitudes Inventory Motivational Study, Exam, Distract, SAI	GPA	Yes	Beyond ACT	996 at 6 K. Community Colleges - overachievers had higher scores



and Attitudes Test. Other instruments such as the College Guidance and Placement Sub-test on Academic Motivation and the Entwistle Scale have also been used. The studies conflict in their findings. The relationship between study habits and attitudes and academic success is inconsistent.

Several studies conclude that study skills and attitude are important variables relating to student success. A study done at the Community College of Allegheny County with part-time students reported that study habits and attitudes were correlated with levels of academic performance and further were effective predictors (Kapusta, 1980). The same results were found by Griffen using the identical instrument (the Survey of Study Habits and Attitudes, SSHA) with 211 community college students (1978). Further support was gathered using SSHA by Blustein et al. (1986). Blustein reported an  $r$  of .50 between study habits and GPA. All three of these studies supported the relationship between study skills and attitudes and academic performance using the SSHA.

A variety of other instruments assessing academic motivation have been implemented in studies. The results were similiar. Successful students are more diligent in their study habits. Diligence means spending more time studying than most other students. Successful students are more likely to actively transform scholastic information (Goldman & Warren, 1973). An interesting study was done using the Entwistle Student Attitude Inventory. This

survey of 47 items developed in England identifies: 1) motivation; 2) study methods; and 3) examination techniques. Nine hundred ninety-six students at six Kentucky Community Colleges were included in the study. Entwistle and the ACT scores were used. Overachievers had higher Entwistle scores than underachievers. Thompson (1976) concluded that attitudes about study techniques can be identified at different levels of achievement. Rogers (1979) found that academic motivation as measured by the College Placement and Guidance (CPG) test was one of four variables that predicted student grade point average after one semester's work. Finally, in a study of variables related to success in typing Anderson (1986) concluded that a successful student was an internally controlled older female who studied more than her classmates.

However, not all studies have uncovered a relationship between study skills and attitudes and academic performance. The SSHA failed to separate successful from unsuccessful students at Milwaukee Area Technical College (Stockey, 1986). The SSHA was found to have questionable validity in a black urban community college in a study done by Johns (1970). Even though the CGP test scores and GPA were related Dutrow and Houston (1981) reported that study skills sub-test scores were not related.

Two studies evaluating the effectiveness of a study skills program on academic achievement have failed to show positive results. A study skills program implemented for a

large number of high risk students was not effective in showing differences in GPA (Federico, 1972). Personality measures from the Test of Effective Academic Motivation (TEAM) also failed to relate to student success. The TEAM factors were poor and unstable predictors of college GPA with marginal students in Boston (Richards & Casey, 1975). In another investigation of the motivational, study skills, and self-regulatory skills model for improving academic competence in community college students, 390 students at Thomas Nelson Community College were divided into three groups. One had a six week course in study skills, one had an eight week course in study skills and self-regulatory skills and motivational instruction, and the final group was a control group in career development. Results indicated no difference in academic performance among students receiving different treatments (Evans, 1985).

It is difficult to know exactly why studies done on the study habits and attitudes in community colleges are divided on this issue. It appears that further analysis of the problem and research is needed in this area.

### Attendance

Clearly, attendance is an important variable predicting student success. Supported by time-on-task theory, research results conclude that end-of-course grades would be higher if regular attendance in class were maintained (Nelson, 1975). Attendance may be responsible

for up to 1/3 of the variance in grades (Taylor, 1981). Important implications are inherent in this research for orientation directors and faculty.

#### Need for Academic Achievement

Research done to evaluate the need for academic achievement as a predictor of academic success determined that there is no relationship between first year GPA and need for academic achievement as measured by the Test of Imagination (Fedell, 1971) for community college students. One would expect that a higher need for academic achievement would increase motivation, effort and time-on-task, all contributing to better grades. Obviously, this is not true of community college students. The key here may be that non-traditional adult students may be more focused on learning or job skills than academic achievement, per se.

#### Variables Related to the Environment

##### Teaching

Studies done in community colleges confirm and support the importance of the impact of teaching styles and faculty attitudes on achievement. When students perceive that teachers have positive attitudes toward students and when teachers are perceived as fair, students do better (Jones, 1979). Furthermore, students who do well in class despite

low achievement tests often do so because of the attitude and involvement of the instructor. Weak students are especially vulnerable to the style and attitudes of faculty. Developmental work is much more effective if the instructional method is traditional in that the instructor, not the student, sets the pace for learning (Frerichs & Eldersveld, 1981).

### Counseling Interventions

Low achieving students also benefit from involvement and support from counseling staff. Weekly support letters from student personnel administrators made a difference in academic achievement for these students as did weekly individual 40 minute counseling sessions (Scharz, 1967).

### Assessment and Feedback

Recent studies have focused on the benefits of the process of assessment and feedback given to community college students and the impact of this on student success. Interviews with students at Shoreline Community College in Seattle, Washington revealed that test results can serve as catalysts for student success and that the testing process can be an impetus for high academic achievement (Loucks, 1985).

A large study done on the effectiveness of a student assessment program in all of the Colorado community colleges concluded that students who follow assessment-

related advice tend to succeed at higher rates than those who do not. Findings were: 1) students who follow advice in English placement are four times as likely to succeed as those who do not; and 2) students who follow advice in reading and math placement are two times as likely to succeed. All community college catalogs in Colorado now have a statement alerting students to the proven benefits for following assessment-related advice and urging them to seek counseling. Most community colleges in Colorado now have formal policies requiring all new students to be assessed and to follow up with advisement (Richards, 1987).

### Tutors

Structured learning and academic support outside the classroom is a means of increasing student success. Students who meet with tutors on a weekly basis and who establish and sign agreements for academic tasks achieve higher grades (Lewis, 1979; Meyers, 1979).

### Financial Aid

Students with higher grades are likely to be receiving financial aid. Two studies confirm this finding. One is a large study done on 11,000 students at Mott Community College (Daus, 1986). Another study at Lincoln Land had similar results (Morrison, 1980).

### Parent Orientation

The effect of a parent orientation program on achievement level and drop-out rate was studied at Cuyahoga Community College. Parents in experimental groups were given information on programs and taken on tours. The theory was that parents who were made aware of programs and services would behave in subtle ways to encourage their freshmen students to achieve and continue. However, no differences were found. A one-time parent orientation program does not affect achievement or attrition rate of community college freshmen (Rubins, 1972).

### Courses

Courses in reading, study skills, motivation, self-concept, human potential, career development and survival skills have all been evaluated in terms of their effectiveness in improving academic achievement. The results are mixed and not encouraging in terms of improving achievement. However, many reported positive results in terms of involvement and student satisfaction (Magnavita, 1981; Varelas, 1973). Reading courses were most effective in improving grades (Haburton, 1977; Hankins, 1982) but not all studies agree (Magnavita, 1981; Scheller, 1967) on its validity. A college survival course developed and taught for developmental students did produce a difference in GPA at Washington State Community College. Ninety-one percent

of the participants rated the course as valuable in terms of their college survival (Jackson, 1983). However, courses in self-enhancement (Parrish, 1981), human potential (Varelas, 1973), and career development (Latterhos, 1980) did not impact grades.

### Conclusion

In conclusion, the literature review (see Tables 8 and 9) suggests that profiles can be developed for the at-risk student. The research also implies the qualities of an institution committed to student success. At the same time that the research gives direction and understanding it also offers inclusive evidence. This supports opportunities for further exploration.

Many students enter a community college with a potential to fail. A student with any one of the following attributes would be in a high risk population: low reading scores, poor high school record or poor attendance. These three characteristics stand out as important predictors of academic success in the community college setting and would consequently be adequate indicators of the high risk or disadvantaged students. Interventions and special support for these students is a must if they are to succeed.

Some students appear to be more vulnerable than others. African American students and younger students are more often at risk. Men are more vulnerable than women. These general population groups are ones to monitor for



Table 8

Research Review of Independent Variables as They are Related to  
Community College Academic Success (Course Grades or GPA)

<u>Related to Success</u>			
Variables	Yes	No	Comments
Reading	X		Accounted for up to 25% of GPA, however, some students do well despite low scores (Blustein, Root, Roberts, Kapusta).
Writing	X		Limited research; explained up to 17% of grades.
Math	X		Found to be very important for chemistry, nursing and technical courses; explained up to 50% of grade.
High School Work	X		Definitely yes, past behavior is good predictor of future behavior.
I.Q.	X		Accounted for 11% of chemistry - only one study (Mann).
Cognitive Development	X		Accounted for 14% of grades in anatomy, used the Test of Logical Thinking (only 2 studies Sanchez & Richards).
Critical Thinking	X		Only one study, used the Watson-Glaser Critical Thinking Appraisal; 6% of chemistry grades related (Hurov).
Creativity		X	Used Torrance Tests of Creative Thinking (Richards & Casey), only one study.

Table 8--Continued

Variables	<u>Relate to Success</u>		Comments
	Yes	No	
Listening		X	Only one study (Taylor) dependent variable was English Composition grade.
Brain Dominance		X	Only one study (Riley).
Learning Styles	X		Disclosure of cognitive map information could improve grades 3-5% (Fourier, Belisle, Ballard)
Personality Type		X	Used California Psychological Inventory, Rotter's Personal Power, Taylor's Manifest Anxiety, and Myers-Briggs.
Personality Traits	X		Traits that helped: self-confident, autonomous, intellectually inclined.
Attitudes	X		Positive attitudes toward subject matter, toward faculty and toward self are helpful.
Values	X		Used Purpose in Life Test, only one study (Hayes).
Locus of Control	X		Internally controlled students do better - 4 studies.
Age	X		Older students do better (14 studies).
Gender	X		Female students do better generally but not in chemistry, math or data processing.

Table 8--Continued

Variables	Related to Success		Comments
	Yes	No	
Ethnic Origin	X		African Americans more often found in low achieving groups.
Marital Status	X		Married students more often found in high achieving groups.
Evening/Day	X		Evening students do better academically.
Transfer/ Occupational	?	?	One study found transfer students do better, one study found occupational students do better.
GED/Regular Diploma		X	Clark found no difference.
Amount of Education of Parents	X		High achievers in community colleges are apt to have parents with less education.
Socio-Economic Status		X	Studies conflict on this issue.
Stress		X	Stress is related to drop out activity, not grades.
Part time/full time		X	2 studies have conflicting results.
Employment		X	Tech students seemed to do better with full time jobs than did transfer students.

<u>Related to Success</u>			
Variables	Yes	No	Comments
Study Skills	X		Up to 25% of GPA accounted for by study skills.
Attendance	X		Up to 33% of GPA accounted for by attendance.
Need for Academic Achievement		X	Only one study (Fedell) used Test of Imagination.
Teaching Style	X		Weak students are especially vulnerable to attitude and involvement of instructor.
Counseling Intervention	X		Weekly letters from counseling staff or weekly counseling helped GPA.
Assessment and Feedback	X		Test results can be catalysts for success (Loucks, Richards).
Tutors	X		Structured academic tasks outside of classroom helps.
Financial Aid	X		Students receiving aid do better, 2 studies (Daus & Morrison).
Parent Orientation		X	"Parent Orientation" sessions did not increase student GPA.
Human Potential Course		X	Increased satisfaction but not GPA.
Reading Course	X		Reading courses helped GPAs
Survival Course	X		Students increased GPA and reported course as valuable for college survival.

Table 9

Review of Research Using Multiple Variables to Predict  
Academic Success in the Community College

Variables	Comments	Author
Attendance, reading, age, sex, high school GPA	Predicted 46% of variance on State Nursing Board Examination	Bello et al. 1977
Math ability, reading ability, and type of high school curriculum	Predicted 33% of variance in biology course grade	Biermann & Sarinsky 1987
Study skills and reading comprehension	Predicted 56% of variance in GPA	Blustein et al. 1986
High school chemistry grades, math grades and high school GPA	Predicted 49% of variance in GPA for students majoring in chemistry	Greenwood, 1962
Nelson Denny Reading tests, age, sex and race	Predicted 15% of variance in first year GPA	Hankins, 1982
High school rank, reading, gender	Predicted 17% of variance in GPA	Latterhos, 1980
ASSET reading, ASSET writing, and ASSET math.	Predicted 28% of variance in GPA for data processing	Nielson, 1987
Age, math scores and English scores	Predicted 8% of variance in GPA	Reyes, 1979
High school GPA and SAT scores	Predicted 31% of variance in GPA	Richards & Casey, 1975

Table 9--Continued

Variables	Comments	Author
ASSET reading, ASSET numerical & gender	Explained 9-11% of variance in GPA	Roberts, 1986
CGP (sentence, reading, math & motivation)	Explained 19.6% of variance in GPA	Rogers, 1979
Attendance, reading ability, age, sex, high school GPA, college credits, grade level of teacher talk and cognitive preference	Predicted 72-85% of variance in English Composition grades	Taylor, 1981

possible intervention strategies.

The typical student who is struggling and in need of intervention and support is young, has poor reading skills, has a poor high school record, is more often African American, attending day classes, may have a poor attitude and is more likely to find reasons for poor attendance.

Students who have very high reading scores probably need to be challenged beyond the normal classroom experience. These students are possibly ones who would benefit from honors programs, challenges in student activity programming or who could be recruited and trained for tutoring and/or leadership functions.

Institutions committed to student success have faculty who are involved with students and who care about students as individuals. They are also fair in their judgment and appraisals of students. Curriculum support in remediation of basic skills is available, especially in reading. Furthermore, these institutions provide assessment and feedback procedures beginning at the point of entry. Tutors and counseling are provided for support. Attendance is taken seriously and students are monitored closely on attendance, academic progress, and attitude. The research is clear and conclusive on these issues.

The research is clear on the above issues, profiles, and strategies. However, further exploration of variables related to student success is needed, especially in the following: importance of writing skills and the influence

of effort as determined by study skills and attitudes. These two areas are not yet clear or resolved and seem to have logical potential to be important predictors of student success.

The entire field of the community college and student success is fertile for further research and development. The ASSET evaluation now used nation wide is an excellent tool for research. The effects of tracking and monitoring students are also unrelated. The community college system is not noted for its research. The studies are few and sometimes inconclusive or vague. Much begs for explanation.



## CHAPTER III

### DESIGN AND METHODOLOGY

#### Population

The population of interest in this study included students enrolled in college credit classes at Glen Oaks Community College, Centreville, Michigan, a small rural public community college. Glen Oaks, established in 1967, provides post-secondary education and job training programs to the people of St. Joseph County and the surrounding area. Its original mission was to provide baccalaureate transfer courses, vocational/technical courses, life-long educational opportunities, and guidance and counseling. A recently completed long range plan entitled Project 2000 approved by the Glen Oaks Board of Trustees called for: 1) a new commitment to assure student access and student academic success; 2) a rededication to the original comprehensive mission; and 3) expansion of the mission to include customized training for industry and area-wide economic development.

Glen Oaks' student headcount population fall semester, 1988 was 1273. The typical student was enrolled in 8 credit hours, was 30 years old and employed. Twenty-eight percent were interested in transfer programs. Nineteen percent were interested in personal enrichment, 21% were enrolled to gain skills for a new job, and 32% were

preparing to advance in a job. Forty-one percent of the population was male, 59% female. Sixty-seven percent were enrolled part-time. Two percent of the students are Afro-American, 1% are Asian, American Indian, or Hispanic. The remaining 97% are white. Eighty-six percent are residents of St. Joseph County, 13% come from northern Indiana and other border counties, 1% come from other states or other parts of Michigan (see Table 10).

#### Sample

The intent of this research was to study variables related to academic success of college students enrolled in credit courses in an open-door community college environment. Therefore, not all types of students were included in the sample. Students enrolled in non-credit courses were excluded as well as students who opted not to receive grades (audit standing). High school pupils attending as guest students were also excluded. Nursing students were excluded because they are screened and selected into the nursing program based on their academic abilities and therefore are not part of the open-door policy at the college. Students transferring substantial and successful college work from other colleges (and therefore not new to college) were excluded. All other matriculating students were included in the research.

The sample, therefore, included students new to the college experience who were over 18 years of age taking

Table 10  
 Profile of Glen Oaks Community College  
 Student Population Compared to Sample

Population	% of sample withdrew	% of sample never enrolled	% of sample partial data	sample with complete data	
Total Students	1273	32(9%)	24(7%)	19(5%)	355
Average credit hours in which enrolled	8	NA	NA	12	9
Average Age	30	28	29	28	27
Employed	82%	73%	84%	58%	80%
Enrolled part-time	67%	41%	N/A	14%	46%
Enrolled full-time	33%	59%	N/A	86%	54%
Enrolled to transfer	28%	23%	25%	28%	34%
Enrolled to gain skills for new job	21%	48%	42%	39%	29%
Enrolled to gain skills to advance in job	32%	9%	8%	28%	27%
Enrolled for personal interest	19%	19%	24%	5%	10%
Male	41%	31%	42%	42%	32%
Female	59%	69%	58%	58%	68%
White	97%	100%	79%	100%	96%
% Afro-American	2%	0%	21%	0%	2%
% Asian, Indian or Hispanic	1%	0%	0%	0%	2%
% Residents	86%	78%	75%	68%	73%
% From service area	13%	19%	8%	26%	23%
% From other parts of Michigan and other states	1%	3%	17%	6%	4%

courses for credit. Full time students were included as well as part time students. Table 8 presents data showing the differences between the sample population and the total Glen Oaks College population. (New students entering in January each year are relatively small in number. Only 13 new full-time students enrolled in January of 1989. Therefore, the new student population profile in winter semester is essentially the same as in the fall semester.)

The original sample included 430 new students planning on entering Glen Oaks in the fall semester of 1988. All of these students were given the instruments used to measure the independent variables. However, 24 of these students did not matriculate. This group of students is profiled in Table 8. Their profile is very similiar to the student population profile in terms of age, employment, and gender. However, they were more often Afro-American, residing outside of the service area, and more interested in gaining skills for a new job.

During the semester 32 students in the sample withdrew. This student group is profiled in Table 8. These students tended to be slightly younger than the typical student and more often non-working females, enrolled full-time in order to develop skills for a new job. They were more often white and traveling a greater distance to go to school.

The resulting sample included 374 students. Data from these students were used in this research. These students

are profiled in Table 3. They are the new full and part time students taking college work for credit. They are similiar to the student population but differ slightly in the following ways: new students at Glen Oaks are slightly younger (average age is 27 instead of 30), more often full-time (54% instead of 33%), more often interested in transfer and less likely to go to school for personal interest, more likely to be female (68% instead of 59%) and more likely to be from the service area (23% instead of 13%).

Of the 374 students in this research project, 19 had partial data. For the most part this was an administration error. New students admitted with JTPA funding were measured on the independent variables off-campus and neglected to complete the study skill component. The profile of these students can be viewed in Table 8. These students are less likely to be employed, more likely to be full-time and more likely to be enrolled to gain skills for a new job. The data for these students were incomplete on only one of the independent variables. The correlations for each variable were analyzed separately. Therefore, these data could be incorporated. However, the analysis of the simultaneous effect of all variables used the sample of 355 students for which the data was complete.

#### Procedure for Implementation

All new college students (excluding nurses) wishing to

enroll in credit courses at Glen Oaks fall semester, 1988 participated in the study. Each student, prior to course registration completed the ASSET (Assessment of Skills for Successful Entry and Transfer, Appendix A and B) evaluation and Educational Planning Form (Appendix D).

Letters were sent to students explaining the intent and the importance of the ASSET evaluation in terms of their academic success and retention. These letters also instructed students on the process of registration for the ASSET evaluation such as times, dates, and number to call. If students did not respond follow-up letters were mailed. Student ASSET evaluation status was monitored finally at the point of registration for courses. If ASSET scores were not available registration was delayed until the evaluation was completed.

All students evaluated completed an Educational Planning Form (see Appendix D) which included a signed release of information to counselors and professional staff. Data collected for this study does not reflect names or confidential information protected by the Family Rights and Privacy Act. The Human Subjects Institutional Review Board of Western Michigan University approved the study on May 23, 1988 as exempt (Appendix E). The President of Glen Oaks, Dr. Philip Ward expressed his approval for the study to be conducted (Appendix F). ASSET evaluations have been a regular part of the Glen Oaks orientation process since 1983. The study was not only

approved as appropriate but was viewed as a vehicle to further implement and enhance the college mission to assure student access and student success.

## Measurement

### Introduction

The instrument, ASSET, was developed by the American College Testing Program in response to a set of student retention and transfer objectives identified by the Los Angeles Community College District in 1982. It is a skills assessment program designed for use with incoming students in a community college setting. Short assessment instruments in reading, language usage, math, and study skills were used from the ASSET tool. It was designed to help students and counselors identify strengths and weaknesses of students and relate them to career goals as well as to provide information for early guidance in a variety of areas that affect academic persistence (American College Testing Program, 1983).

ASSET validity and reliability has been well established and is documented in the ASSET Technical Manual (1986) published by the American College Testing Program. Content validity, the extent to which ASSET measures appropriate subject matter, has been established by using advisory council members from leaders in the community college sector to develop test items. Concurrent validity

has been established by relating ASSET scores to similiar tests commonly used in the field. Correlations are as follows: Nelson Denny,  $r = .62$  and  $.61$ ; ACT,  $r = .59-.73$ ; SAT,  $r = .52-.67$ ; and CGP,  $r = .76$ . Reliability or consistency of scores has been determined by the Kuder-Richardson formula. They are  $.87$  for Language Usage,  $.9$  for Reading Skills and  $.88$  for Numerical Skills.

The use of ASSET was chosen for a variety of reasons. First, it was designed specifically for the community college population by a company respected for its expertise in educational testing and evaluation. ASSET has been used now for five years in community colleges nationwide. Alabama adopted the ASSET Program on a statewide basis in 1983. Presently 22 of Michigan's 29 community colleges use the ASSET evaluation program. The directions for administration are complete and precise. Secondly, it is easily administered in a group setting, can be immediately scored by the student (Appendix C), and recorded on the Educational Planning Form (Appendix D). It is not only easily administered but the battery of components chosen can be completed and scored in less than 1 1/2 hours. Third, theory and research indicate that the ASSET components of reading, writing, math, and study skills are related to academic success. Finally, ASSET was economically feasible. Cost per student was \$2.50.



### ASSET, Language Usage Skills

The Language Usage Skills Section of ASSET evaluated writing skills. The unit consisted of 16 sentences each having four underlined parts. Some underlined parts were correct as they were; others were incorrect. Incorrect parts involved common errors in the use of the English language. Students were asked to determine if each underlined part was correct or incorrect and to mark an answer sheet. This unit had an 11 minute time frame. A perfect score was 64.

### ASSET, Reading Skills

The Reading Skills Section of ASSET had five passages, each followed by 8 questions. Students were asked to read each passage and then choose the best answer to each question looking back at the passages as often as they wished. There was a 20 minute limit on this section. A perfect score was 40.

### ASSET, Numerical Skills

The math section of ASSET had 32 questions, each followed by 5 possible answers. There was an 18 minute time limit to this section. A perfect score was 32.

### ASSET, Study Skills

The study skill inventory was designed to describe

study methods and habits. Sixty items were provided and students were asked to respond to each item with how often the behavior applies to them. Choices were: A. Not often; B. Sometimes; C. Frequently or usually; or D. Almost always. The highest possible study skill score was 240. This component was not timed but was usually completed in 10-15 minutes.

Students used a self-scoring answer folder (Appendix C) which enabled each student to compute and record the four evaluation scores upon completion of the battery. This was done in small groups at orientation sessions. Students recorded the four scores on their Education Planning Form (Appendix D) in the appropriate places. At this point in time students were given information relative to the meaning or interpretation of the scores. They were provided with a chart that gave suggestions for appropriate developmental or remedial course work if scores fell below levels generally recommended for college courses. Glen Oaks did not have mandatory advising nor mandatory course placement during the time of the study.

All of the evaluations were conducted by the Dean of Student Services or trained professional staff. The Dean was trained by the American College Testing Program staff and has been administering ASSET evaluations at the college for five years and has trained Glen Oaks staff in ASSET administration. The evaluations were part of a three hour Orientation Success Seminar conducted during August and

September 1988.

The dependent variable academic success has been measured by first semester grade point average. This was chosen for a variety of reasons. First, this is the most frequently used measure and allows for comparative evaluations with other studies. Second, it is the measure by which institutions of higher education most often use to measure academic success. Third, in a community college students often do not attend consecutive terms due to transfer to other colleges or job and family issues. The drop out/stop out or transfer rate is high. Therefore, the criterion variable becomes less available as semesters are accumulated. The first semester grade point average for entering 1988 fall Glen Oaks students was reported from the Office of the Registrar in December, 1988.

#### Data Analysis

It is the intent of this research to investigate the relationship between a dependent or criterion variable, first semester grade point average, and a set of independent or predictor variables -- reading, writing, math, study skills, age, and gender. The following hypotheses have been formulated:

1. The relationship as determined by the Pearson product moment correlation coefficient (Issac & Michael, 1981) between ASSET reading scores and first semester GPA will be greater than zero.

2. The relationship as determined by the Pearson product moment correlation coefficient (Issac & Michael, 1981) between ASSET writing scores and first semester GPA will be greater than zero.

3. The relationship as determined by the Pearson product moment correlation coefficient (Issac & Michael, 1981) between ASSET math scores and first semester GPA will be greater than zero.

4. The relationship as determined by the Pearson product moment correlation coefficient (Issac & Michael, 1981) between ASSET study skill scores and first semester GPA will be greater than zero.

5. The relationship as determined by the Pearson product moment correlation coefficient (Issac & Michael, 1981) between age and first semester GPA will be greater than zero.

6. The difference as determined by the t-test for difference between two sample means (Isacc & Michael, 1981) between male and female groups and first semester GPA will be greater than zero.

7. Independent variables of reading ability, writing ability, math ability, study skills, age and gender can predict first semester GPA as determined by multiple regression analysis (Isaac & Michael, 1981).

The analysis must answer the question: Is there a relationship between each independent variable and the depend variable, GPA? Each independent variable must be

looked at separately to determine if the values of each independent variable go along with the values of the dependent variable. The indices of relation must be calculated between the sets of ordered pairs. Product-moment correlations will be calculated testing hypotheses #1-#5. This is the most stable technique according to Isaac and Michael (1981) for developing correlations between continuous variables.

Coefficients of determination can then be calculated from  $r$ .

When the latter is squared and multiplied by 100, it indicates the percentage of variance held in common by two variables,  $X$  and  $Y$ , assuming linear regression. It answers the question, How much of the variance in  $Y$  is accounted for, associated with, or determined by the variance in  $X$ ? (Issac & Michael, 1981, p. 194)

For testing the difference between males and females and first semester GPA the mean achievement level for females will be calculated as well as the mean achievement level for males. Then a  $t$ -test for determining the difference between independent means will be used.

To answer the question, Can a set of independent variables predict a dependent variable (hypothesis #7) a multiple regression equation will be calculated. "Multiple regression analysis is a method for studying the effects and the magnitudes of the effects of more than one independent variable on one dependent variable using principles of correlation and regression" (Kerlinger, 1973,

p. 603). Multiple regression analysis allows the use of all the variables simultaneously to predict the criterion variable. This is also called the coefficient of determination. It will mean that a certain percentage of GPA is accounted for, or determined by the six independent variables in combination. Gender is a noncontinuous variable but will work in multiple regression calculations because it is a dicotomy. "The problem of the relative contribution of independent variables to a dependent variable or variables is one of the most complex and difficult of regression analysis" (Kerlinger, 1973, p. 621). Calculations will change depending on the sample, the addition or subtraction of independent variables, the order of entry into the equation, and the degree to which the variables are intercorrelated.

The stepwise regression method will be used to address the issues presented in hypothesis #7. "The computer first selects the independent variable,  $X_a$  that has the highest correlation with the dependent variable  $Y$ , and calculates a regression statistic. It then selects the variable  $X_b$  that after the first variable, will contribute most to the variance of  $Y$ . It then stops to evaluate what it has done. That is, it examines the contribution the first variable would have made had it been entered second. If this contribution turns out not to be statistically significant the variable is dropped" (Kerlinger, 1973, p. 654). The interpretation of this equation is, therefore, problematic.

Important variables may not appear because they are not statistically significant in the procedure. Caution will be important in the full discussion of this analysis.

The statistical analysis will include the following: Pearson product moment correlations, coefficients of determination, t-test for independent means (for gender), and the stepwise multiple regression equation, and the probability of each parameter differing from zero.

## CHAPTER IV

### RESULTS

#### Introduction

This research was designed to explore the relationship between six variables and the first semester grade point average for each of the students included in this investigation. The Pearson product moment correlation coefficient was used to determine the relationship between age, study skills, reading, writing, math and grade point average. The t-test for finding differences in independent sample means was used to determine the differences between men and women on grade point average. The step-wise multiple regression analysis from the SPSS-X software package was used to determine the simultaneous effect of all the variables on grade point average.

#### Hypothesis 1-Reading and GPA

The findings indicate that hypothesis 1, the relationship as determined by the Pearson product moment correlation coefficient between ASSET reading scores and first semester grade point average will be greater than zero, can be accepted (see Table 11). The sample for this correlation included 374 students. The Pearson  $r$  was .113 with a .015 probability of differing from zero. This would allow for acceptance of this hypothesis at the .05 level of



Table 11

Results of Pearson Product Moment Correlation Coefficient  
Analysis of Reading, Writing, Math, Study Skills and Age and  
Grade Point Average

Variable	N	Pearson r	R <sup>2</sup>	Probability of Differing from zero
Reading	370	.113	.013	.015*
Writing	370	.071	.005	.087
Math	370	.052	.003	.161
Study Skill	358	.159	.025	.001*
Age	374	.240	.049	.000*

\*p < .05

confidence. The R squared or coefficient of determination, which is an indication of the strength of the linear relationship between reading and grade point average, revealed the amount of variance accounted for by the variables. The percent of variance accounted for was  $(.113)^2$  or .013. Even though this finding indicates that a direct positive relationship exists between reading and grade point average (as the literature supports), the findings of an R squared of 1% do not reveal a substantial relationship between reading and grade point average for this sample under the conditions of this investigation.

#### Hypothesis 2-Writing and GPA

The findings here indicate that the Pearson product moment correlation coefficient between ASSET writing scores and first semester grade point average is not large enough to support the hypothesis that there is a relationship (see Table 11). The sample for this correlation included 370 students. The Pearson r was .071 with a .087 probability of differing from zero. This does not allow acceptance of the hypothesis at the .05 level of confidence. The coefficient of determination of .005 is very slight (.5%).

#### Hypothesis 3-Math and GPA

The findings for math indicate that the Pearson product moment correlation coefficient between ASSET math scores and first semester grade point average is not large

enough to support the hypothesis that there is a relationship (see Table 11). The sample for this correlation included 374 students. The Pearson  $r$  was .052 with a .161 probability of differing from zero. This probability does not allow for acceptance of this hypothesis at the .05 level of confidence. The coefficient of determination of .003 is very slight (.3%).

#### Hypothesis 4-Study Skills and GPA

The findings for study skills indicate that the relationship as determined by the Pearson product moment correlation coefficient between ASSET study skill scores and first semester grade point average is greater than zero. Therefore, the hypothesis that there is a relationship can be accepted. The sample for this correlation included 358 students. The Pearson  $r$  was .159 (see Table 11). A .001 probability of differing from zero allows for acceptance of this hypothesis at a very high level of confidence. The coefficient of determination (.159)<sup>2</sup> is .025 or 3%. Even though this finding indicates with confidence that there is a direct positive relationship between study skill scores on ASSET and first semester grade point average, the findings of an  $R$  squared of 3% does not reveal a substantial relationship between study skills and grade point average for this sample under the conditions of this investigation.

#### Hypothesis 5-Age and GPA

The findings here indicate that hypothesis number 5 can be accepted. This hypothesis stated that the relationship as determined by the Pearson product moment correlation coefficient between age and first semester grade point average will be greater than zero. The sample for this correlation included 374 students. The Pearson  $r$  was .240 (see Table 11). A .000 probability of differing from zero allows for acceptance of this hypothesis with utmost confidence. The coefficient of determination<sup>2</sup> (.240) is .049 or 5%. Even though this finding indicates with confidence that there is a direct positive relationship between age and first semester grade point average, the findings of an  $R$  squared of 5% does not reveal a substantial relationship between age and first semester grade point average for this sample under the conditions of this investigation.

#### Hypothesis 6-Gender and GPA

The findings indicate that hypothesis 6 can be accepted. This hypothesis stated the means of male and female groups on first semester grade point average will be different from zero as determined by the  $t$ -test for differences on sample means. Females had a larger mean grade point average, 2.98, as opposed to the male group which had a mean grade point average of 2.56 (see Table

Table 12  
Summary of Data Analysis for Gender and GPA

Variable	N	Mean	Standard Deviation	t value	Probability
Males	158	2.5615	1.108	-3.80	.000*
Females	217	2.9757	.943		

\*p <.05

12). A .000 probability of differing from zero and a t value of -3.80 supports the hypothesis that females make higher grades than males.

#### Hypothesis 7-Simultaneous Contribution of Variables to GPA

The step-wise multiple regression analysis from the SPSS-X software package was used to test hypothesis number 7. This hypothesis stated that the variables of reading, writing, math, study skills, age and gender can predict first semester grade point average. The analysis of the data is represented in Table 11 and 12. The variables of age, sex and study skills provided the best variables for prediction. Together they provide and explain 10% of the variance in first semester grade point average. This does not exclude the possibility that reading, writing and math are related to grade point average. The step-wise multiple regression analysis did not include these variables because they did not add to the prediction equation after age, sex and study skills were used in the analysis.

Findings were consistent with the similiar research conducted in community college settings in that a positive and statistically significant relationship was found for reading, study skills, age and gender and GPA. However, findings were inconsistent in two ways: 1) relationships were not supported for math and writing; and 2) relationships established for reading, study skills, age and gender were low.

Table 13

Summary of Step-Wise Multiple Regression Analysis  
with GPA as the Dependent Variable

Variable	Simple r or t*	Beta	Standard Error of B	t Ratio	Probability
Age	.11	.023	.005	4.386	.000
Sex*	3.80*	.238	.109	2.167	.03
Study Skill	.16	.004	.002	2.153	.03
Constant		1.153	.343	3.354	.000

(GPA = .023 x age + .238 x sex + .0043 x study skills + 1.153)

Table 14  
 Summary of Step-Wise Multiple Regression Analysis with GPA as the Dependent Variable

Variable	Multiple R	R Squared	Adjusted R sq	F	Probability	R sq Ch	F Ch.	Sig Ch
Age	.2555	.0653	.0626	24.66	.000	.065	24.66	.000
Sex	.2929	.0858	.0806	16.52	.000	.020	7.89	.005
Study Skills	.3126	.0977	.0900	12.67	.000	.0119	4.63	.032



Because of the inconsistencies in results, it was decided to review the data and to apply all statistical applications to only full-time students. It was observed that many part-time students were enrolled in only one course for high tech credit or for such courses as real estate or statistical process control. The results of these statistical applications are summarized in Tables 15 and 16.

The results for full-time students indicate that relationships as determined by the Pearson product moment correlation coefficient between ASSET reading scores and GPA, between ASSET language usage scores and GPA, between ASSET math scores and GPA, and finally between ASSET study skill scores and GPA are not large enough to support hypotheses 1-4. The findings support a positive and statistically significant relationship between age and GPA for full-time students. However, with an R-squared of .02, this is not substantial. When the gender data was analyzed for full-time students using the t-test for finding differences between sample means, the results did not support hypothesis number 6 which indicated a relationship does exist between gender and GPA.

#### Summary

All the variables studied (age, sex, reading, writing, math and study skill) appear directly related to grade point average. However, only four (age, sex, reading and

Table 15

Results of Pearson Product Moment Correlation Coefficient Analysis with Grade Point Average as the Dependent Variable (full-time students only)

Variable	N	Pearson r	$R^2$	Probability
Reading	178	.11	.01	.08
Writing	178	.11	.01	.08
Math	178	.02	.0004	.40
Study Skill	177	.05	.0025	.25
Age	178	.16	.02	.02*

\*  $p < .05$

Table 16

Summary of Data Analysis for Gender  
and Grade Point Average (full-time students)

Variable	N	Mean	Standard Deviation	Standard Error	t Value	Probability
Males	73	2.89	1.08	.13	-1.85	.07
Females	105	3.18	.96	.09		

study skills) were statistically significant at the .05 level of confidence when the analysis was applied to all students. None of the variables were, however, substantially related to grade point average.

The step-wise multiple regression analysis indicated that age, sex and reading ability could be used to predict 10% of first term grade point average. After these three variables entered the regression equation, the other variables, including study skills did not add to the predictive power of the variables used in this study.

## CHAPTER V

### CONCLUSIONS

#### Summary of Problem Statement

Community college students often enter college without being well prepared in academic basic skills. They are also more often older. Are these attributes handicaps in their ability to be successful? Are these attributes related to academic performance? Will these variables be useful in predicting student success?

This investigation was designed to explore these issues as they related to community college students at Glen Oaks Community College. More specifically, the study was developed to determine the relationship between the six independent variables of age, sex, reading ability, writing ability, math ability, and study skills and academic performance. The problem may be formulated as a search for a relationship between dependent variable  $y$  and independent variables  $x_1, x_2, x_3, x_4, x_5,$  and  $x_6$ . The variable  $y$  for this investigation was the students' first semester grade point average and the independent variables were the students' age, sex, ASSET reading score, ASSET language usage score, ASSET math score and ASSET study skill score. If these variables were found to be directly related to academic performance, can they then be used to predict that performance? To what degree are they each related to grade

point average? And finally, acting as a group can they be useful in predicting success or failure?

This investigation has several practical purposes. If a positive and substantial relationship could be determined, high risk students could be identified early for intervention and support. These findings could be useful to high school seniors, freshmen entering college, parents, high school and college administrators, instructors, and counselors. Results would suggest approaches to student support systems as well as supply better information for advisement. Finally, the study draws attention to the need to integrate student assessment, advising, tutoring, instruction, and curriculum development.

#### Summary of Methodology

##### Population and Sample

The population of interest included Glen Oaks Community College students enrolled in course work for credit. This college is a small rural public community college established in south central Michigan in 1967. The sample data used in this study were drawn from new students entering Glen Oaks during the fall of 1988. All new students were included with the following exceptions: nursing students, senior citizens, continuing education students and high school guest students. The sample

included 374 students. All completed evaluations in reading, writing, math and study skills; enrolled in credit courses; attended; and received final grades.

### Instrument

The instrument used to measure reading, writing, math and study skills was ASSET (Assessment of Students for Successful Entry and Transfer) developed by the American College Testing Program for use with the community college student population. It was used for assessment of entering students in 22 of the 29 Michigan community colleges during 1988. The assessment is timed and can be completed in 1 1/2 hours. Student age and gender were collected from the Educational Planning Form. Grade point average at the end of the first semester was reported by the Office of the Registrar at Glen Oaks.

### Data Collection

The ASSET evaluation of students was completed at orientation sessions which took place before advisement and registration for fall. The Dean of Student Services at Glen Oaks supervised these assessment sessions as well as the self-scoring procedure. At the end of each session students were given appropriate information to use for interpretation of their scores.

### Statistical Procedures

The Pearson product moment correlation coefficient was used to test the direction and degree of linear relationship of the independent variables of age, reading, writing, math and study skills with the dependent variable first semester grade point average. The t-test for finding differences between group sample means was used to test for differences between male and female grade point averages. Finally, the step-wise multiple regression analysis was used to determine the simultaneous impact of the six variables on grade point average.

### Summary of Findings

Analysis of the data revealed that direct positive relationships were found between all variables and the dependent variable, grade point average. However, not all were statistically significant and none were substantial.

An hypothesis was postulated that the relationship between ASSET reading scores and first semester grade point average would be greater than zero. The findings of this research supports this hypothesis. However, the relationship ( $r = .11$ ,  $R \text{ squared} = .01$   $p < .05$ ) though statistically significant is not substantial. Only 1% of the variance in grade point average can be attributed to reading ability.

An hypothesis was postulated that the relationship



between ASSET language usage scores and first semester grade point average would be greater than zero. The findings of this research does not support this hypothesis ( $r = .07$ ,  $R \text{ squared} = .005$ ,  $p > .05$ ).

An hypothesis was postulated that the relationship between ASSET math scores and first semester grade point average would be greater than zero. The findings of this research does not support this hypothesis ( $r = .05$ ,  $R \text{ squared} = .003$ ,  $p > .05$ ).

An hypothesis was postulated that the relationship between ASSET study skill scores and first semester grade point average will be greater than zero. The findings of this research supports this hypothesis ( $r = .16$ ,  $R \text{ squared} = .03$ ,  $p < .05$ ). However, only 3% of the variance in grade point average can be accounted for by study skills. This is not substantial.

An hypothesis was postulated that the relationship between age and first semester grade point average would be greater than zero. The findings of this research supports this hypothesis ( $r = .24$ ,  $R \text{ squared} = .05$ ,  $p < .05$ ). Age accounted for 5% of the variance in grade point average which is not substantial but did prove to be statistically significant. Age when compared to other variables did have the highest  $r$  value of all.

An hypothesis was postulated that the differences in male and female groups on grade point average would be greater than zero. The findings of this research support

this hypothesis ( $t = -3.80$   $p < .05$ ). Females as a group report higher grade point averages.

An hypothesis was postulated that the independent variables of reading ability, writing ability, math ability, study skills, age, and gender can predict first semester grade point average. The findings of the research does not support the acceptance of this hypothesis. The variables of age, gender and study skills can account for only 10% of the variance in grade point average. The addition of the variables of reading, writing and math does not add to the predictive power of the other variables.

#### Conclusions Applied to Population

From the data analyzed in this study the following conclusions can be drawn:

1. ASSET writing and ASSET math scores do not discriminate successful students from unsuccessful students at Glen Oaks Community College.

2. Grade point averages cannot be predicted very well using the variables of age, sex, study skills or reading, writing or math ability at Glen Oaks Community College.

3. The factor of age does interact to some extent with grade point average. Older students at Glen Oaks tend to do better academically.

4. The factor of gender does interact to some extent with grade point average. Female students at Glen Oaks tend to do better academically.

5. The factor of study skills does interact to some extent with grade point average. Those students with higher ASSET study skill scores at Glen Oaks tend to do better academically.

6. Those students with higher ASSET reading scores will do better academically at Glen Oaks.

7. Students with higher grade point averages at Glen Oaks tend to be older, female students who have higher study skills and reading ability.

8. Students who are at risk at Glen Oaks are more likely to be younger males with lower study skills and reading ability.

There are many plausible explanations for the lack of predictive power for the variables studied. It may be that the results support the view that many instructors and counselors have maintained for some time. That is, numerous factors contribute to the grades obtained in a given semester. Predicting human behavior is a difficult thing to do. To attempt to do this with only a half dozen variables which are descriptive of a student is not possible. Perhaps, it is imperative that a multi-dimensional view of behavior be adopted, especially when trying to predict grades for an open-door community college student population. Several variables that have been established in the literature which could be used to try to increase the power to predict student academic performance include attendance, assessment and feedback, past academic

success in high school, and amount of faculty/student contact.

Another explanation may be that variables related to the environment at Glen Oaks were not considered. Many systems of support have been put in place at Glen Oaks. These systems could be working so that students who are deficient in basic skills at Glen Oaks experience academic success at the same rate that students who are strong in academic basic skills. All students receive assessment and feedback on those basic skills at the point of entry (orientation). Most students, especially full time students, receive advising and are appropriately placed in developmental course work if needed. Furthermore, all students have access to the Academic Opportunity Center, a learning lab staffed for one on one support. Faculty can further request that students receive peer tutoring if grades begin to deteriorate. Attendance is also monitored in most classes at Glen Oaks. Faculty refer names of absent students to the Dean who in turn contacts those students. In summary, this research may be supporting the notion that students at Glen Oaks can succeed academically regardless of incoming skills due to a comprehensive system of student support. The analysis of data on full-time students supports this explanation. The variables for this full-time student population sample were related to a lesser degree to grade point average than for the total sample. Full time students are more likely to receive

advising, placement and tutoring. On a closer look at full-time student data it appears that students who took placement advice were more likely to be successful.

The literature supports the finding that older students do better academically. The plausible explanation is that older students have greater maturity and a sense of commitment. Education may be more urgent for them. Goals that have been previously frustrated due to a lack of credentials or training may now be a motivating force. Also, older students have often taken care of identity issues which consume younger students. They know they can compete in the adult world. They have often decided on a mate and have made major ethical and moral decisions for themselves that have served them well as adults. Their educational efforts seem to be more focused.

The literature also supports the findings that female students do better academically. This may be due to our cultural training that females are more "other" oriented and will try harder to please teachers. Another explanation may be that females have better communication skills which serve them well in an academic environment.

#### Implications

The review of the literature and the results of this investigation suggest the following implications:

1. Student service personnel at Glen Oaks Community College should be made aware of this research and discuss

possible implications even though a predictive model was not developed.

2. Counselors, faculty and administrators in community colleges should be made aware that a very limited amount of research is available on community college populations.

3. Counselors, faculty and administrators in community colleges should be aware of the results of the literature that are available on the predictive power of variables that have been studied. Relationships between grade point averages and variables are substantiated in the literature and can be helpful in developing orientations, tutoring support, advisement, assessment and curriculum development as well as in developing policies and procedures governing student attendance. This knowledge can be helpful and should be incorporated while reviewing all policies, goals and priorities as they relate to student success.

4. Successful student profiles should be developed as well as at risk profiles. Profiles for successful student interventions can be developed as well. It appears that successful students are more often older and female. Unsuccessful students are more often younger and male. Environments which support student success have a system of assessment and feedback, as well as orientation and advising before registration. Students are placed into appropriate classes and have a full system of support and

follow up. Attendance is monitored. It appears that student academic success at Glen Oaks Community College does not have to depend on entry level skills in reading, writing, and math.

#### Recommendations for Further Study

If the variables of reading ability, writing ability, math ability and study skills, age and gender only contribute 10% of the variance in grade point average at Glen Oaks one must ask what does contribute to student academic performance. The question of finding the discriminating variables remains to be explored. This research at Glen Oaks needs to be conducted.

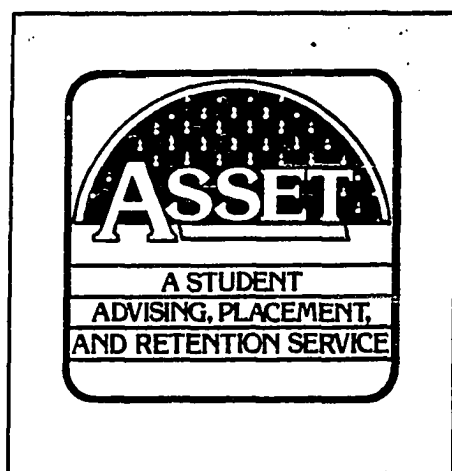
The literature review on variables predicting student success in community colleges leaves many gaps, especially in the area of evaluation of interventions designed to support success. This needs to be explored further so that professionals know rather than guess at what really works. Interview techniques that focus on qualitative variables can be explored. Students who have been successful as well as those who failed need to be surveyed with this in mind. Research on the community college population is not extensive or conclusive.

## APPENDICES



**Appendix A**

**ASSET Assessment Booklet**



**Assessment Booklet**

## LANGUAGE USAGE SKILLS

*11 minutes*

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**DIRECTIONS:** This unit consists of 16 sentences, each having 4 underlined parts. Some underlined parts are correct as they are; others are incorrect. Incorrect parts involve common errors in the use of the English language. For each underlined part mark "C" if it is correct and "I" if incorrect. You should assume that any part of a sentence which is not underlined is grammatically correct. Mark your answers by blackening the corresponding spaces on the Language Usage Skills section of the answer sheet. Now study the samples below. **Do not write in this book.**

---

### SAMPLES

<p>Many <u>College</u> students have not <u>chose</u> <u>their</u> majors when  <sub>1</sub> <sub>2</sub> <sub>3</sub>  they <u>arrived</u>.  <sub>4</sub></p>	<p>1. I  2. I  3. C  4. I</p>
--	---

<p>Although <u>most</u> of the group wanted <u>to swim</u>, some just  <sub>5</sub> <sub>6</sub> <sub>7</sub>  <u>set</u> in the sun.  <sub>8</sub></p>	<p>5. C  6. C  7. C  8. I</p>
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You will have 11 minutes to work on this unit. Work quickly and carefully.

**STOP. DO NOT GO TO THE NEXT PAGE UNTIL TOLD TO DO SO.**

## LANGUAGE USAGE SKILLS

11 minutes

Joe ordered two hamburgers<sup>1</sup>—and french fries at the restaurant and<sup>2</sup>, then couldn't eat<sup>3</sup> it all.<sup>4</sup>

Mary forgot to write thank-you notes<sup>5</sup> to her grandmother and aunt<sup>6</sup>, for the birthday presents they will send.<sup>7</sup>

Laura enjoyed Shakespeare's play *All's well that ends well* so much that<sup>8</sup>, she decided to become an actress.<sup>9</sup>

After a hard workday it's relaxing to sit<sup>10</sup> outside and watching the stars appear talking with your friends.<sup>11</sup>

The president and his advisers held<sup>12</sup> a press conference<sup>13</sup>, to explain one's views on the latest economic statistics.<sup>14</sup>

On July 16 1972, a program for retraining disabled workers was set up<sup>15</sup>, by the federal government.<sup>16</sup>

Mark jogs outdoors every morning before school until it<sup>17</sup> got cold out<sup>18</sup>, he jogs indoors after that.<sup>19</sup>

Scientists report that neither fish nor birds inhabit the valley because of pollution of it's water and air by waist<sup>20</sup> products.<sup>21</sup>

Medical science has made many advances<sup>22</sup>; there is even inoculations to prevent most childhood diseases.<sup>23</sup>

Bill used to want to be a Minister, but he has changed his mind<sup>24</sup>; and would now rather be a artist.<sup>25</sup>

The principal was un-able to help Bob and me so we went to see the school counselor.<sup>26</sup>

Neither Gail or Michael<sup>27</sup>, would have been a good choice for president of the senior class.<sup>28</sup>

The letter from TMD Corporation<sup>29</sup>, postmarked may 8, arrived two weeks later<sup>30</sup>; business transactions are delayed when the mail moves so slow.<sup>31</sup>

To obtain a lisencc<sup>32</sup>, a nurse must have graduated from a school approved of<sup>33</sup> by the State board of nursing.<sup>34</sup>

Oceanography is one of the smallest of the science fields<sup>35</sup>; the total number of oceanographers<sup>36</sup>, and related scientist were approximately 5,000.<sup>37</sup>

In many restaurants they have hosts who show each diner to their seat, bring menus<sup>38</sup>, and help you select a meal.<sup>39</sup>

**STOP. DO NOT GO TO THE NEXT PAGE UNTIL TOLD TO DO SO.**

## READING SKILLS

141

*20 minutes*

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**DIRECTIONS:** This unit has 5 passages, each followed by 8 questions. Read the passage, then choose the best answer to each question. You may look back at the passage as often as you wish. Mark your answers by blackening the corresponding spaces on the Reading Skills section of the answer sheet. **Do not write in this book.**

You have 20 minutes to work on this unit. Work quickly and carefully.

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**STOP. DO NOT GO TO THE NEXT PAGE UNTIL TOLD TO DO SO.**

**READING SKILLS***20 minutes*

When an investor buys or sells stocks, bonds, or shares in mutual funds, an account executive handles the transaction. Account executives are employed by hundreds of small firms located in all parts of the country. However, most work for a few large firms based in New York City. The training required to become an account executive lasts about 6 months and is provided by employers. However, college coursework is considered an asset. Beginning account executives engaged in establishing a clientele are paid \$900 to \$1,200 a month. Once established, account executives spend most of their time servicing accounts and are paid on a commission basis.

1. An account executive handles the buying and selling of
  - A. bonds, shares in mutual funds, and insurance policies.
  - B. stocks, bonds, and insurance policies.
  - C. insurance policies, stocks, and shares in mutual funds.
  - D. shares in mutual funds, stocks, and bonds.
2. Most account executives are employed by
  - A. hundreds of small firms based in New York City.
  - B. a small number of large firms based all around the country.
  - C. a small number of large firms based in New York City.
  - D. hundreds of large firms based all around the country.
3. Most training for account executives is provided by
  - A. universities.
  - B. colleges.
  - C. clienteles.
  - D. employers.
4. For account executives, college coursework is
  - A. essential.
  - B. helpful.
  - C. of little value.
  - D. necessary for establishing a clientele.
5. Beginning account executives spend most of their time
  - A. servicing accounts.
  - B. building a clientele.
  - C. establishing firms.
  - D. taking college coursework.
6. The fact that an account executive is paid on a commission basis indicates he or she is
  - A. a college graduate.
  - B. established.
  - C. employed by a small firm.
  - D. employed by a New York firm.
7. Established account executives spend most of their time
  - A. servicing accounts.
  - B. training beginning account executives.
  - C. selling shares in mutual funds.
  - D. buying and selling stocks.
8. The work of an account executive would best be described as
  - A. secure.
  - B. physically demanding.
  - C. competitive.
  - D. dangerous.

Advertisements are produced by a team of commercial artists headed by an art director who originates the overall visual design. A layout artist works up a sketch of the director's idea, showing where various elements of the design will be in relation to one another. These elements are further refined by a renderer. For example, if the layout contains an automobile, the renderer makes a rough drawing of an automobile. An illustrator then produces the final drawing of the automobile. Like the art director, the illustrator must be imaginative but he or she must in addition possess a distinctive art style. A fifth member of the team does the lettering. The letterer needs precision more than imagination or style. Finally, the production artist produces the actual advertisement by assembling the separate contributions of the illustrator and the letterer.

9. An art director must have
- original visual ideas.
  - a good memory.
  - steady hands.
  - a dedication to art.
10. A layout artist must have the ability to
- draw cars and other objects well.
  - originate ideas.
  - produce final drawings.
  - execute an overall design.
11. According to the passage, imagination is required of both the art director and the
- letterer.
  - renderer.
  - production artist.
  - illustrator.
12. The ability to construct exact geometrical figures would be most useful to the
- production artist.
  - letterer.
  - renderer.
  - illustrator.
13. With which member of the team would the art director be most likely to communicate first?
- The illustrator
  - The layout artist
  - The renderer
  - The letterer
14. In terms of the work performed, which two jobs seem most alike?
- Art director and letterer
  - Illustrator and production artist
  - Letterer and production artist
  - Illustrator and renderer
15. The person whose work most reflects his or her own art style is the
- illustrator.
  - letterer.
  - production artist.
  - art director.
16. According to the passage, how many team members are involved in producing an advertisement?
- 3
  - 4
  - 5
  - 6

Both forestry aides and forestry technicians assist foresters in managing and caring for forest lands. Forestry aides collect and record data such as tree heights, diameters, and mortality. They also install and maintain instruments that provide information concerning rainfall and soil moisture levels. In addition, forestry aides instruct persons using the forest in fire precautions and prevention. If a fire does occur, they may lead firefighting crews. Forestry aides sometimes serve on road survey crews as rod handlers or chain handlers.

Forestry technicians, on the other hand, have more responsibility and more difficult duties. They supervise on-the-ground operations in timber sales, recreation-area use, and crews engaged in road-building projects that make timber accessible for harvesting. They may also engage in laboratory research related to forests and forestry.

17. Which is not mentioned as being among the duties of a forestry aide?
- Installing instruments
  - Recording measurements
  - Serving as a rod handler
  - Performing laboratory research
18. According to the passage, which statement is true?
- Forestry technicians supervise the use of recreational areas.
  - Forestry aides and foresters assist forestry technicians.
  - Forestry technicians and forestry aides have the same duties.
  - Forestry technicians are primarily concerned with measuring rainfall.
19. According to the passage, forestry technicians most often work as
- rod handlers or chain handlers.
  - collectors and recorders of data.
  - firefighters.
  - supervisors.
20. One reason mentioned in the passage for building roads in forest lands is to
- encourage tourism.
  - facilitate tree harvesting.
  - provide access to wilderness areas.
  - provide fire trails.
21. According to the passage, forestry aides help prevent forest fires by
- leading firefighting crews.
  - giving classroom lectures on fire prevention to school children.
  - conducting laboratory research on fire prevention techniques.
  - giving information on fire prevention to persons using the forest.
22. Which list correctly places forestry workers in descending (highest to lowest) order of responsibility?
- Foresters, forestry aides, forestry technicians
  - Forestry technicians, foresters, forestry aides
  - Foresters, forestry technicians, forestry aides
  - Forestry technicians, forestry aides, foresters
23. On-the-ground operations in timber sales are supervised by
- forestry technicians.
  - forestry aides and foresters.
  - forestry aides.
  - foresters.
24. The passage implies that forestry technicians require
- less training than foresters and forestry aides.
  - more training than forestry aides but less than foresters.
  - more training than foresters and forestry aides.
  - less training than forestry aides but more than foresters.



The job of auto body repair workers is to restore motor vehicles to their original condition. They do this by straightening bent frames, filling or removing dents, replacing unsalvageable parts, and preparing repaired or replaced parts for other workers who do the painting. Auto body repair workers depend upon their ability to use hydraulic jacks and heating torches to successfully straighten bent frames. To fill or remove fender and body dents, they must be able to apply filler material, operate acetylene and electric welding and cutting equipment, and handle a number of smaller hand and power tools such as drills, chisels, files, and hammers. Moreover, they must have considerable knowledge about material and labor costs so they can determine whether it is more economical to repair or to replace a particular part. Finally, they must be able to use grinders and sanders skillfully so that their handiwork is not noticeable after it has been painted.

25. To straighten bent frames, the auto body repair worker uses
- hydraulic jacks and welding torches.
  - hydraulic hammers and welding torches.
  - heating torches and hydraulic jacks.
  - heating torches and electric welding equipment.
26. As used in the passage, the term unsalvageable applies to parts that are
- less expensive to replace than repair.
  - less expensive to repair than replace.
  - no longer manufactured.
  - unnecessary.
27. Which pastime is most likely to prove useful to a prospective auto body repair worker?
- Woodworking
  - Racing stock cars
  - Metal sculpturing
  - Tuning car engines
28. Which task is **not** generally performed by auto body repair workers?
- Replacing damaged parts
  - Repainting restored parts
  - Sanding restored parts
  - Deciding whether or not a part is salvageable
29. Which reference work would be most useful to an auto body repair worker?
- Welding Handbook*
  - Guide to the Repair of Automobile Engines*
  - Motor Vehicle Wiring Specifications*
  - Origins of Automotive Design*
30. Acetylene and electric welding and cutting equipment is used primarily to
- straighten bent frames.
  - prepare work for painting.
  - fill or remove dents.
  - repair unsalvageable parts.
31. Which is **not** mentioned as a tool used by auto body repair workers?
- Drill
  - Jack plane
  - Chisel
  - File
32. The title "auto body repair worker" is somewhat misleading because auto body repair workers
- work on auto engines as well as auto bodies.
  - build new auto bodies as well as repair old ones.
  - replace parts as well as repair them.
  - are really managers who direct the work of others.

Approximately 36,000 dental hygienists are employed in the United States. Most of them work under supervision of dentists in private offices. There they perform oral prophylaxis (the cleaning and polishing of teeth and the massaging of gums), take X rays, administer prescribed medication, and assist dentists in treating patients. In addition to these tasks, hygienists who work in public school systems, the second largest employer of hygienists, train children in oral hygiene, suggest classroom projects in dental health, and develop assembly programs. Some dental hygienists are employed by public health agencies where they assist in dental research. A smaller number become teachers in schools of dental hygiene. For those seeking employment in private offices, 2 years of post-high school training is usually sufficient. However, to teach, engage in research, or work in public school systems, a 4-year college degree is generally required.

33. Most dental hygienists work in
- schools.
  - public agencies.
  - private offices.
  - hospitals.
34. According to the passage, 36,000 dental hygienists are employed
- by dentists in private offices.
  - as part-time workers.
  - in the United States.
  - as teachers.
35. Not included among the duties of dental hygienists is
- prescribing medication.
  - cleaning teeth.
  - taking X rays.
  - teaching oral hygiene.
36. Dental hygienists who work in public schools train
- children in oral prophylaxis.
  - children in oral hygiene.
  - teachers in oral hygiene.
  - dentists in oral prophylaxis.
37. Hygienists who assist in dental research are usually employed by
- schools of dental hygiene.
  - public health agencies.
  - private laboratories.
  - private dental offices.
38. More dental hygienists are employed by public health agencies than by
- schools of dental hygiene.
  - dentists in private offices.
  - all other employers combined.
  - any other employer.
39. Dental hygienists are not qualified to
- take X rays.
  - extract teeth.
  - administer prescribed medication.
  - assist dentists in treating patients.
40. In general, dental hygienists need only 2 years of training beyond high school if they plan to work in
- public school systems.
  - schools of dental hygiene.
  - private dental offices.
  - public health agencies.

**STOP. DO NOT GO TO THE NEXT PAGE UNTIL TOLD TO DO SO.**

**NUMERICAL SKILLS***18 minutes*

---

**DIRECTIONS:** This unit has 32 questions, each of which is followed by 5 possible answers. You are to choose the correct answer to each question. For some questions, the fifth choice for an answer will be "Not given." Whenever none of the first 4 possible answers is correct, choose "Not given" as your answer. Mark your answers by blackening the corresponding spaces on the Numerical Skills section of the answer sheet. Do your figuring on the scratch paper provided. **Do not write in this book.**

You will have 18 minutes to work on this unit. Work quickly and carefully.

---

**STOP. DO NOT GO TO THE NEXT PAGE UNTIL TOLD TO DO SO.**

## NUMERICAL SKILLS

*18 minutes*

1.  $19 + 7 = ?$ 
  - A. 26
  - B. 29
  - C. 36
  - D. 37
  - E. Not given
2.  $83 - 45 = ?$ 
  - A. 32
  - B. 38
  - C. 42
  - D. 48
  - E. Not given
3.  $14 \times 13 = ?$ 
  - A. 152
  - B. 162
  - C. 172
  - D. 182
  - E. Not given
4.  $36 \div 9 = ?$ 
  - A. 3
  - B. 4
  - C. 5
  - D. 6
  - E. Not given
5.  $72 \div 6 = ?$ 
  - A. 7
  - B. 8
  - C. 9
  - D. 13
  - E. Not given
6.  $.06 + .4 = ?$ 
  - A. .01
  - B. .10
  - C. .406
  - D. .46
  - E. Not given
7.  $.9 - .3 = ?$ 
  - A. 6.0
  - B. .6
  - C. .06
  - D. .12
  - E. Not given
8.  $.8 - .002 = ?$ 
  - A. 7.98
  - B. .0798
  - C. .06
  - D. .006
  - E. Not given
9.  $2.1 - .03 = ?$ 
  - A. 1.7
  - B. 2.07
  - C. 2.13
  - D. 2.4
  - E. Not given
10. 4% of 50 = ?
  - A. .2
  - B. .54
  - C. 2.0
  - D. 5.4
  - E. Not given
11.  $1.5 \times 7 = ?$ 
  - A. .105
  - B. .75
  - C. 1.05
  - D. 7.5
  - E. Not given
12.  $.8 \times .06 = ?$ 
  - A. .48
  - B. .86
  - C. 4.8
  - D. 8.6
  - E. Not given
13.  $.24 \div 4 = ?$ 
  - A. .06
  - B. .6
  - C. 1.2
  - D. 6.0
  - E. Not given
14.  $\frac{3}{8} + \frac{1}{2} = ?$ 
  - A.  $\frac{4}{16}$
  - B.  $\frac{4}{15}$
  - C.  $\frac{7}{8}$
  - D.  $1\frac{1}{8}$
  - E. Not given
15.  $\frac{3}{4} + \frac{1}{8} = ?$ 
  - A. 1
  - B.  $\frac{4}{12}$
  - C.  $\frac{3}{8}$
  - D.  $\frac{1}{4}$
  - E. Not given

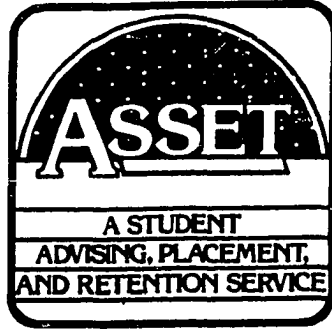
16.  $\frac{1}{2} - \frac{1}{8} = ?$   
 A.  $\frac{1}{16}$   
 B.  $\frac{1}{10}$   
 C.  $\frac{1}{8}$   
 D.  $\frac{3}{8}$   
 E. Not given
17.  $4 - \frac{3}{8} = ?$   
 A.  $\frac{1}{8}$   
 B.  $1\frac{3}{8}$   
 C.  $3\frac{3}{8}$   
 D.  $3\frac{5}{8}$   
 E. Not given
18.  $3 \times \frac{2}{3} = ?$   
 A.  $\frac{2}{3}$   
 B.  $\frac{5}{3}$   
 C.  $\frac{6}{3}$   
 D.  $3\frac{2}{3}$   
 E. Not given
19.  $2 \div \frac{1}{4} = ?$   
 A.  $\frac{1}{8}$   
 B.  $\frac{1}{2}$   
 C. 2  
 D. 8  
 E. Not given
20. A piece of cloth measures 3 yards, 1 foot, and 4 inches in length. What is its length in feet?  
 A. 8  
 B.  $8\frac{1}{4}$   
 C.  $9\frac{1}{4}$   
 D.  $9\frac{3}{4}$   
 E.  $10\frac{1}{4}$
21. A flagpole 15 feet high casts a shadow of 5 feet. At the same time, a nearby building casts a 30-foot shadow. How many feet high is the building?  
 A. 90  
 B. 75  
 C. 60  
 D. 45  
 E. 35
22. If the length of a living room is 18 feet, what will it measure in inches on a blueprint whose scale is  $\frac{1}{4}$  inch to the foot?  
 A.  $2\frac{3}{4}$   
 B.  $4\frac{1}{2}$   
 C.  $18\frac{1}{4}$   
 D.  $20\frac{1}{2}$   
 E. 25
23. As shown on a travel map, one route measures  $5\frac{1}{8}$  inches and the other  $5\frac{1}{2}$  inches. If 1 inch represents 40 miles, what is the difference in distance between the two routes?  
 A. 10 miles  
 B. 15 miles  
 C. 20 miles  
 D. 25 miles  
 E. 30 miles
24. If a part-time worker's daily pay was \$15 for Monday and Tuesday, and \$25 for Wednesday, Thursday, and Friday, what was the worker's average daily pay for the five days?  
 A. \$20.00  
 B. \$20.50  
 C. \$21.00  
 D. \$21.50  
 E. \$22.00
25. The wages of 3 newspaper carriers totaled \$108 for 4 weeks' work. How much will 5 carriers earn if they work for 3 weeks each at the same weekly rate?  
 A. \$108  
 B. \$115  
 C. \$127  
 D. \$135  
 E. \$150
26. Property valued at \$15,000 is assessed for  $\frac{2}{3}$  of its value. If the tax levy is \$3 per \$100 of assessed value per year, what is the yearly tax bill?  
 A. \$150  
 B. \$300  
 C. \$400  
 D. \$450  
 E. \$600
27. If the price of a \$15 pair of jeans is reduced by one-third, how much tax must be paid on the pair of jeans in a state having a 3% sales tax?  
 A. \$.15  
 B. \$.30  
 C. \$.40  
 D. \$.45  
 E. \$.60
28. The total length of fence along the front and one side of a city lot is 450 feet. If the front fence is twice as long as the side fence, what is the length of the side fence?  
 A. 450 feet  
 B. 300 feet  
 C. 200 feet  
 D. 150 feet  
 E. Not given

29. A carpenter had a piece of lumber measuring 8 ft.  $6\frac{3}{4}$  in. long. How much must the carpenter saw off to be left with a piece 6 ft.  $11\frac{7}{16}$  in. long? (Note: Assume the saw cut has no width.)
- A. 1 ft.  $6\frac{1}{2}$  in.
  - B. 1 ft.  $7\frac{1}{8}$  in.
  - C. 1 ft.  $7\frac{7}{16}$  in.
  - D. 2 ft.  $5\frac{7}{16}$  in.
  - E. Not given
30. A race track measures 5 miles long. If an automobile travels the track in 3 minutes, what is its average rate of speed in miles per hour?
- A. 30 m.p.h.
  - B. 50 m.p.h.
  - C. 60 m.p.h.
  - D. 80 m.p.h.
  - E. 100 m.p.h.
31. If grapefruit are sold at 29 cents each or three for 80 cents, how much is saved on each grapefruit by buying them three at a time?
- A.  $2\frac{1}{4}$  cents
  - B.  $2\frac{1}{3}$  cents
  - C. 3 cents
  - D. 7 cents
  - E. 9 cents
32. The average of two numbers is -12. If one of the numbers is 7, what is the other number?
- A. - 5
  - B. -17
  - C. -31
  - D. -42
  - E. Not given

**STOP. DO NOT GO TO THE NEXT PAGE UNTIL TOLD TO DO SO.**

Appendix B

ASSET Study Skills  
Inventory Booklet



# THE ACT ASSET STUDY SKILLS INVENTORY BOOKLET

## General directions:

This inventory is designed to help you describe your study methods and should take approximately 15 minutes to complete. Please read the following instructions carefully.

Items 1 through 60 ask you to describe your study methods by indicating how often you do certain things. Possible responses to each item are:

- A. Not often ..... (0-15% of the time)
- B. Sometimes ..... (16-50% of the time)
- C. Frequently or usually ..... (51-85% of the time)
- D. Almost always ..... (86-100% of the time)

For each item, mark the response (A, B, C, or D) on your answer folder that comes closest to describing your study methods.

**Do not turn to the next page until told to do so.**

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### Instructions for survey items:

Items 1 through 60 ask you to describe your study methods by indicating how often you do certain things. Possible responses to each item are:

- A. Not often ..... (0-15% of the time)
- B. Sometimes ..... (16-50% of the time)
- C. Frequently or usually ..... (51-85% of the time)
- D. Almost always ..... (86-100% of the time)

For each item, mark the response (A, B, C, or D) on your answer folder that comes closest to describing your study methods.

### You may now start the study skills survey.

1. I study in a specific place where I can avoid distractions.
2. I lack interest in improving my study skills.
3. I follow a specific study schedule.
4. My other responsibilities outside of school leave me too little time for studying.
5. I rank my personal and study needs in order of importance and divide my time on this basis.
6. I get too tired or sleepy to study efficiently.
7. Social activities cause me to neglect homework assignments.
8. I start working on a long-term project as soon as it is assigned.
9. I finish my assignments before they are due.
10. I keep my notes and papers well organized.
11. I seek counseling or tutoring to help me correct poor study habits.
12. When studying with classmates, we cover major points that I have missed or have not clearly understood.
13. When I study a textbook chapter, I turn the topic headings into questions and search for the answers as I read.
14. When called for, I can summarize information from the text in diagram form.
15. When I finish reading an assignment, I can only recall a few facts.
16. In reading a textbook assignment, I study the illustrative materials (graphs, diagrams, tables, etc.) and relate them to the text.
17. I need help from my instructor or classmates in relating tables to the text.
18. I complete review questions when they are provided in my textbooks.
19. I take notes from my textbook readings.
20. My interpretation of charts agrees well with the text.

GO ON TO THE NEXT PAGE

21. As I study a textbook, I try to rephrase the main ideas in my own words.
22. I find that main ideas and less important points are hard to separate.
23. I try to detect major trends in graphs, tables, or diagrams.
24. I practice drawing my own graphs from textbook problems.
25. I begin each class lecture with the intention to remember and record important ideas.
26. I use the course outline to organize important ideas and facts for future note taking.
27. I review notes from previous class sessions before attending the next session.
28. After each class I type or rewrite my lecture notes.
29. I take notes in class.
30. I date and identify notes for different classes.
31. When reviewing past readings, I get lost in the details and lose sight of main themes.
32. I get behind when taking class notes.
33. In looking over previous lectures, I write down or recite major points and common ideas.
34. I use the library to get in-depth information for my course.
35. I can find resources on my own in the library.
36. When referencing films, diskettes or cassettes, I easily identify the producer, the date of publication, and the publisher.
37. When reading a journal article, I separate fact from opinion.
38. When necessary, I track down original sources (outside of the library) for information I need to solve a problem.
39. I cross-check outside references for accuracy.
40. I carefully look up answers to incorrect test responses well before the next exam.

**GO ON TO THE NEXT PAGE**

41. When studying for a test, I make up questions of my own, then write out answers to the questions.
42. When it's appropriate to do so, I plan my study strategy with a group of classmates.
43. I review my reading assignments along with my lecture notes to look for common ideas.
44. I go over my test papers to decide if I should study harder next time.
45. I find preparing for multiple-choice tests a difficult task.
46. I use class notes for review.
47. I follow a specific set of procedures when preparing for tests.
48. I do well on tests that I have studied for.
49. In preparing for a test, I review similar tests given during the term.
50. I do most of my studying for tests at the last minute.
51. In study sessions, I find that my classmates give better answers to possible questions than I do.
52. I take a test with the intention to work hard.
53. I take a few minutes to check over my answers before turning in my test paper or answer sheet.
54. Before starting a test, I look it over to plan how much time to spend on certain sections or questions.
55. I spend so much time on the first part of a test that I don't finish within the time limit.
56. I record important formulas and facts on paper before taking a test based on this information.
57. I practice a memory technique appropriate for the kind of test (multiple choice, sentence completion) I am taking.
58. In taking a test, I tend to answer the first questions in detail and forget relevant facts about later questions.
59. When directions are not clear, I ask questions before the test begins.
60. When taking an essay exam, I make a rough outline before answering a question.

**STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.**

**STOP**

Appendix C

ASSET Self-Scoring  
Answer Folder



**Self-Scoring Answer Folder**



**THE ACT ASSET PROGRAM**  
 The American College Testing Program  
 P.O. Box 168  
 Iowa City, Iowa 52243

LAST NAME (Please Print) \_\_\_\_\_ FIRST NAME \_\_\_\_\_

STUDENT/SOCIAL SECURITY NUMBER \_\_\_\_\_

Language Usage Skills

1	11	21	31	41	51	61
2	12	22	32	42	52	62
3	13	23	33	43	53	63
4	14	24	34	44	54	64
5	15	25	35	45	55	
6	16	26	36	46	56	
7	17	27	37	47	57	
8	18	28	38	48	58	
9	19	29	39	49	59	
10	20	30	40	50	60	

Reading Skills

1	9	17	25	33
2	10	18	26	34
3	11	19	27	35
4	12	20	28	36
5	13	21	29	37
6	14	22	30	38
7	15	23	31	39
8	16	24	32	40

Numerical Skills

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

Algebra Skills

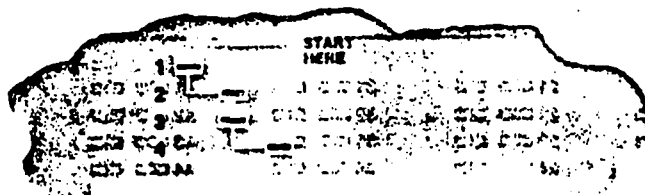
Indicate which test you are completing. (Darken One)	1	10	19
	2	11	20
	3	12	21
	4	13	22
	5	14	23
	6	15	24
	7	16	25
	8	17	26
	9	18	27
Elementary Algebra			
Intermediate Algebra			
College Algebra			

Advanced Language Usage

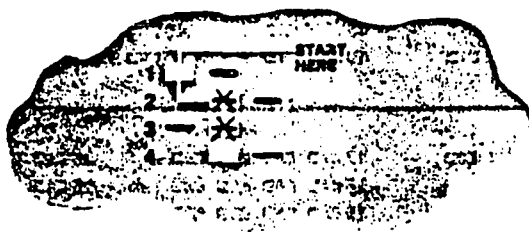
1	11	21	31	41
2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
5	15	25	35	45
6	16	26	36	
7	17	27	37	
8	18	28	38	
9	19	29	39	
10	20	30	40	

## DIRECTIONS FOR SCORING THE ASSET MEASURES

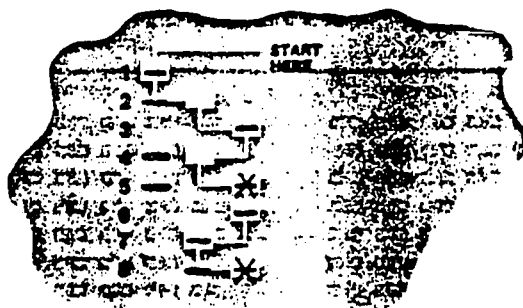
**STEP 1**—To determine how many correct answers you have on an ability measure, follow the lines that connect the white boxes and count the number of white boxes with a dark line **IN** or **MOSTLY** in them. In the example below, all of the boxes are counted as being correct.



**DO NOT** count a box with an X in it (  ), or one that does not contain a dark line (  ). The boxes in the example below are **NOT** counted as being correct.



**STEP 2**—Now, for practice, follow the lines and count the correct answers in the boxes below.



You should have counted boxes 1, 3, 6, and 7 as correct answers. If you do not understand these examples, please ask the supervisor for help.

**STEP 3**—First score the Language Usage measure on page 5 and put the score in the Language Usage box located at the top of that page. Then do the same for the other measures. Wait for the next instructions from your supervisor.



<b>YOUR ASSET SCORES</b>	
<b>LANGUAGE USAGE SKILLS SCORE</b>	<b>READING SKILLS SCORE</b>
<b>NUMERICAL SKILLS SCORE</b>	<b>ALGEBRA SKILLS SCORE</b>
	<input type="checkbox"/> Elementary
	<input type="checkbox"/> Intermediate
	<input type="checkbox"/> College
LAST NAME (Please Print) _____ FIRST NAME _____ STUDENT/SOCIAL SECURITY NUMBER _____	

**Language Usage Skills**

Write your score in the box above labeled Language Usage Skills Score.

**Reading Skills**

**Numerical Skills**

**Algebra Skills**

**Advanced Language Usage**



# THE ACT ASSET STUDY SKILLS INVENTORY ANSWER SHEET

\_\_\_\_\_

Last name                      First name                      Middle initial                      Student number                      Date

## Directions

Items 1 through 60 ask you to describe your study methods by indicating how often you do certain things. Possible responses to each item are:

- A. Not often ..... (0-15% of the time)  
 B. Sometimes ..... (16-50% of the time)  
 C. Frequently or usually ..... (51-85% of the time)  
 D. Almost always ..... (86-100% of the time)

For each item, circle the response (A, B, C, or D) that comes closest to describing your study methods. If you decide to change a response, mark the incorrect response with an X and circle a new response.

1. A B C D  
 2. A B C D  
 3. A B C D  
 4. A B C D  
 5. A B C D  
 6. A B C D  
 7. A B C D  
 8. A B C D  
 9. A B C D  
 10. A B C D
- ↓
11. A B C D  
 12. A B C D  
 13. A B C D  
 14. A B C D  
 15. A B C D  
 16. A B C D  
 17. A B C D  
 18. A B C D  
 19. A B C D  
 20. A B C D

21. A B C D  
 22. A B C D  
 23. A B C D  
 24. A B C D  
 25. A B C D  
 26. A B C D  
 27. A B C D  
 28. A B C D  
 29. A B C D  
 30. A B C D
- ↓
31. A B C D  
 32. A B C D  
 33. A B C D  
 34. A B C D  
 35. A B C D  
 36. A B C D  
 37. A B C D  
 38. A B C D  
 39. A B C D  
 40. A B C D

41. A B C D  
 42. A B C D  
 43. A B C D  
 44. A B C D  
 45. A B C D  
 46. A B C D  
 47. A B C D  
 48. A B C D  
 49. A B C D  
 50. A B C D
- ↓
51. A B C D  
 52. A B C D  
 53. A B C D  
 54. A B C D  
 55. A B C D  
 56. A B C D  
 57. A B C D  
 58. A B C D  
 59. A B C D  
 60. A B C D

Do not turn to the next page until told to do so.

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**Scoring instructions:**

The circled numbers on this page correspond to the answers you chose on the previous page. To obtain your score on this inventory:

1. For each part (A through F) add the circled numbers, ignoring any that have been crossed out with an X.
2. Record each sum in the space given at the bottom of each part.
3. Transfer the sum for each part to the appropriate line in the box in the lower left corner of this page.
4. Add the sums for each part together and record your total score.

**Part A**

1. 1 2 3 4  
 2. 4 3 2 1  
 3. 1 2 3 4  
 4. 4 3 2 1  
 5. 1 2 3 4  
 6. 4 3 2 1  
 7. 4 3 2 1  
 8. 1 2 3 4  
 9. 1 2 3 4  
 10. 1 2 3 4

Part A = \_\_\_\_\_

**Part B**

11. 1 2 3 4  
 12. 1 2 3 4  
 13. 1 2 3 4  
 14. 1 2 3 4  
 15. 4 3 2 1  
 16. 1 2 3 4  
 17. 4 3 2 1  
 18. 1 2 3 4  
 19. 1 2 3 4  
 20. 1 2 3 4

Part B = \_\_\_\_\_

**Part C**

21. 1 2 3 4  
 22. 4 3 2 1  
 23. 1 2 3 4  
 24. 1 2 3 4  
 25. 1 2 3 4  
 26. 1 2 3 4  
 27. 1 2 3 4  
 28. 1 2 3 4  
 29. 1 2 3 4  
 30. 1 2 3 4

Part C = \_\_\_\_\_

**Part D**

31. 4 3 2 1  
 32. 4 3 2 1  
 33. 1 2 3 4  
 34. 1 2 3 4  
 35. 1 2 3 4  
 36. 1 2 3 4  
 37. 1 2 3 4  
 38. 1 2 3 4  
 39. 1 2 3 4  
 40. 1 2 3 4

Part D = \_\_\_\_\_

**Part E**

41. 1 2 3 4  
 42. 1 2 3 4  
 43. 1 2 3 4  
 44. 1 2 3 4  
 45. 4 3 2 1  
 46. 1 2 3 4  
 47. 1 2 3 4  
 48. 1 2 3 4  
 49. 1 2 3 4  
 50. 4 3 2 1

Part E = \_\_\_\_\_

**Part F**

51. 4 3 2 1  
 52. 1 2 3 4  
 53. 1 2 3 4  
 54. 1 2 3 4  
 55. 4 3 2 1  
 56. 1 2 3 4  
 57. 1 2 3 4  
 58. 4 3 2 1  
 59. 1 2 3 4  
 60. 1 2 3 4

Part F = \_\_\_\_\_

**Add sums:**

Part A = \_\_\_\_\_

Part B = \_\_\_\_\_

Part C = \_\_\_\_\_

Part D = \_\_\_\_\_

Part E = \_\_\_\_\_

Part F = \_\_\_\_\_

**Total score** = \_\_\_\_\_

**Appendix D**

**ASSET Educational Planning  
Form**

ASSET Educational Planning Form  
BACKGROUND AND PLANS SUMMARY

Keep the gold copy of this form with you during your attendance at the institution.

Today's date: Month Day Year

(Please print)  
NAME OF CAMPUS \_\_\_\_\_

1. NAME \_\_\_\_\_  
Last First MI

Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ ZIP Code \_\_\_\_\_

2. Student/Social Security number \_\_\_\_\_  
Area code \_\_\_\_\_ Telephone number \_\_\_\_\_

3. DATE OF BIRTH \_\_\_\_\_  
Month Day Year

4. IS ENGLISH YOUR FIRST (PRIMARY) LANGUAGE?  1 Yes  2 No

5. SEX  1 Male  2 Female

6. ARE YOU A VETERAN?  1 Yes  2 On active duty  3 No

7. ETHNIC BACKGROUND  
 1 Black/Afro-American  8 Puerto Rican/Cuban/Other Hispanic  
 2 American Indian/Alaskan Native  7 Filipino  
 3 White/Caucasian  8 Other  
 4 Mexican American/Chicano  9 Prefer not to respond  
 5 Asian/Pacific Islander

8. TYPE OF HIGH SCHOOL CERTIFICATE  
 1 High school diploma  5 Foreign secondary  
 2 GED  6 Not a high school graduate  
 3 Proficiency exam  7 Still in high school  
 4 Certificate of completion

Name of high school \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ HS code (see list) \_\_\_\_\_

9. CREDITS EARNED AFTER HIGH SCHOOL  
Quarter credits \_\_\_\_\_ Semester credits \_\_\_\_\_

10. HIGHEST DEGREE/CERTIFICATE EARNED AFTER HIGH SCHOOL  
 1 Have not attended  5 Bachelor's degree  
 2 Some credits/courses  6 Master's degree or beyond  
 3 Certificate or diploma  7 Other \_\_\_\_\_  
 4 Associate degree

Last school attended after high school \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Institution code (see list) \_\_\_\_\_

11. OVERALL HIGH SCHOOL GRADE POINT AVERAGE  
 1 A- to A (3.5-4.0)  5 C- to C (1.5-1.9)  
 2 B to A- (3.0-3.4)  6 D to C- (1.0-1.4)  
 3 B- to B (2.5-2.9)  7 D- to D (0.5-0.9)  
 4 C to B- (2.0-2.4)

12. COURSES COMPLETED AND GRADES EARNED

	High School		After High School	
	# of years studied	Last grade received	# of years studied	Last grade received
1 English	_____	_____	_____	_____
2 Business Math	_____	_____	_____	_____
3 Algebra	_____	_____	_____	_____
4 Calculus	_____	_____	_____	_____
5 Science	_____	_____	_____	_____
6 Foreign Language	_____	_____	_____	_____
7 Computer Skills	_____	_____	_____	_____
8 Vocational Skills	_____	_____	_____	_____

24. RELEASE OF INFORMATION  
 1 Yes I hereby authorize release of this information (including assessment results)  
 2 No to other postsecondary institutions, so they may contact me about their educational programs and related opportunities.

Student's signature \_\_\_\_\_ Date \_\_\_\_\_

13. ENROLLMENT PLAN  
Term Year Time Credits planned first term  
 1 Fall 19\_\_  1 Day  
 2 Winter  2 Evening  
 3 Spring  3 Day and evening  
 4 Summer I  
 5 Summer II

14. CAREER GOAL \_\_\_\_\_  
Type of work or name of occupation Career code (see list)  
How sure are you of your choice in number 14?  
 1 Very sure  2 Fairly sure  3 Not sure

15. INTEREST REGION (from ACT, CPP, VIESA, DISCOVER) \_\_\_\_\_

16. EDUCATIONAL MAJOR OR PROGRAM \_\_\_\_\_  
Name of first choice Program code (see list)  
How sure are you of your choice in number 16?  
 1 Very sure  2 Fairly sure  3 Not sure

17. EMPLOYMENT HOURS PLANNED PER WEEK WHILE ENROLLED  
 1 None  3 11-15  5 21-30  
 2 1-10  4 16-20  6 31 or more

18. AMOUNT OF EDUCATION PLANNED  
 1 Classes only; no certificate or degree  
 2 One- to two-year certificate or diploma program  
 3 Two-year college degree  
 4 Four-year college degree  
 5 Graduate or professional study beyond four-year degree

19. CONSIDERING TRANSFER TO ANOTHER SCHOOL LATER?  
 1 Two-year college  4 Not planning to transfer  
 2 Four-year college/university  5 Undecided about transfer  
 3 Other type of institution

Name of institution being considered \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Institution code (see list) \_\_\_\_\_

20. MOST IMPORTANT REASON FOR ATTENDING THIS TERM  
 1 Learn skills to get a new job  5 Improve basic skills in English, reading, or math  
 2 Learn skills to advance in job  6 Take courses for personal interest  
 3 Transfer to four-year college  7 Other \_\_\_\_\_  
 4 Satisfy general education requirements

21. PLAN TO EARN CERTIFICATE OR TWO-YEAR DEGREE?  
 1 Yes, two-year degree  3 Undecided  
 2 Yes, certificate or diploma  4 No

22. WOULD LIKE HELP WITH  

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 Financial aid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9 Personal concerns
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2 Finding work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 Learning disability
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3 Learning English	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11 Physical disability
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4 Reading skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12 Health problem
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 Study skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13 Computer information
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6 Writing skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14 Work experience credit
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7 Math skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 Day care information
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8 Choosing major/career	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16 _____

23. GRADES EXPECTED FIRST TERM  
 1 A- to A (3.5-4.0)  3 C- to C (1.5-1.9)  
 2 B to A- (3.0-3.4)  4 D to C- (1.0-1.4)  
 3 B- to B (2.5-2.9)  7 D- to D (0.5-0.9)  
 4 C to B- (2.0-2.4)

25. COUNSELOR-ADVISOR  
Name and code \_\_\_\_\_ Telephone number \_\_\_\_\_

SKILLS ASSESSMENT SUMMARY

	Score	Results
BASIC SKILLS	A	Language Usage Skills _____
	B	Reading Skills _____
	C	Numerical Skills _____
	D	Study Skills _____
ADVANCED SKILLS	E	Elementary Algebra _____
	F	Intermediate Algebra _____
	G	College Algebra _____
	H	Advanced Language Usage _____
CAREER SKILLS	J	Clerical Speed Accuracy _____
	K	Space Relations _____
	L	Mechanical Reasoning _____
	I	_____
ADDITIONAL SKILLS	II	_____
	III	_____
	IV	_____
	V	_____
	VI	_____

COURSE RECOMMENDATIONS

Area	Institution Recommendations		Student's Plan	
	Dept./Number	Course name	Dept./Number	Course name
English/Writing/Communications	_____	_____	_____	_____
Reading	_____	_____	_____	_____
Mathematics	_____	_____	_____	_____
Study Skills	_____	_____	_____	_____
Additional Courses	_____	_____	_____	_____

LOCAL ITEMS

	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	F	G	H	I	J
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										

Appendix E

Letter from Human Subjects  
Institutional Review Board



Western Michigan University  
Kalamazoo, Michigan 49008-3899

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*Human Subjects  
Institutional Review Board*

TO: Margaret Lynn Wonnacott  
FROM: Ellen Page-Robin, Chair *EP R*  
RE: Research Protocol  
DATE: May 23, 1988

This letter will serve as confirmation that your research protocol, "A Study of the Effects of Reading Comprehension, Language Usage Skills, Numerical Skills and Study Skills as determined by ASSET on Academic Performance of Community College Students," has been approved as exempt by the HSIRB.

If you have any questions, please contact me at 387-2647.

Appendix F

Letter from Dr. Philip Ward  
Endorsing Research



May 3, 1988

Dr. Beverly Belson  
Western Michigan University  
Kalamazoo, MI 49008

Dear Dr. Belson:

ASSET evaluations have been a regular part of our orientation process for several years at Glen Oaks Community College. The addition of the ASSET study skill component to the regular assessment of math, reading and language usage will not present a problem.

I am aware of the research project on the predictability of ASSET for student success that Lynn Wonnacott is about to implement. This has my approval. It will not only enhance our efforts to design appropriate policies and programs to assist in our college mission in assuring student success but the results may also assist other rural community colleges in their endeavors to do the same.

Sincerely,



Philip G. Ward  
President

PGW/bw

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