1993

Effectiveness of developmental courses and the voluntary placement system at an Iowa community college

Karen Perry Pierson
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Effectiveness of development courses and the voluntary placement system at an Iowa community college

Pierson, Karen Perry, Ph.D.
Iowa State University, 1993
Effectiveness of developmental courses and the voluntary placement system at an Iowa community college

by

Karen Perry Pierson

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of

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For the Graduate College

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1993
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CHAPTER I. INTRODUCTION

Background for Study

Community College Role in Lowering Standards

The community college, which was once proclaimed by egalitarians as "democracy's college," "the people's college," and the "opportunity college," has been increasingly criticized for contributing to a steady decline of academic standards (Roueche, Baker, & Roueche, 1987). Evidence of this comes from studies such as the one conducted by the Center for the Study of Community Colleges in the late 1970s which reported that nationwide, students were required to write papers in only one in every four humanities classes and only one in every ten science classes (Cohen & Brawer, 1982).

Other researchers (Brint, 1989; Dougherty, 1991; Richardson & Martens, 1982; Roueche & Comstock, 1981) have found that students in American community colleges are rarely expected to demonstrate basic literacy skills (reading and writing) normally associated with freshmen-level courses. Faced with trying to teach a college-level course to students having only a twelfth grade reading level, community college faculty are often forced to compromise standards of instruction (Roueche, Baker, & Roueche, 1987). This is evident in courses designed for college transfer, as well as
general education courses for vocational and technical programs. The literacy level required to succeed in these demanding curricula such as accounting, computer science, electronics, automobile mechanics, and health sciences is rarely recognized (Roueche, Baker, & Roueche, 1987).

Need for Remediation

In addition to criticism for lowering academic standards in general, community colleges are further criticized for creating an illusion of upward mobility for the lower class. Several researchers assert that remediation has become the vehicle through which students are kept from having access to more academically challenging curricula which eventually leads to upward mobility (Karabel & Astin, 1975; Zwerling, 1976). This problem is particularly relevant for community colleges, as developmental or under-prepared students often comprise from 10-50% of the student body compared to 4-5% of the student body at four-year colleges (Smith & Clements, 1984).

This need for remediation reflects the weak academic preparation of the typical community college student. More than 50% have not earned above a "C" average in high school, taken no math courses above algebra, passed reading and writing proficiency at a minimal level, and are returning to a community college several years after leaving high school (Bray, 1984). According to the Cooperative Institutional
Research Program (CIRP) and data obtained from students in 24 urban colleges, community college matriculants present undistinguished high school achievement records, with only 10% being "A" students in high school (Cohen & Brawer, 1987).

In addition to serving low-achieving high school graduates, the community college also plays an important role in serving under-prepared adults. Since its inception at the beginning of this century, the community college has been viewed as a second chance for adults to learn what they failed to learn in public schools (Roueche, Baker, & Roueche, 1987). Job-oriented adult students are often served through the role the community college plays in economic development which includes upgrading the skills of the work force through education and training. This role of training under-prepared adults for the work force will continue because it is projected that between now and the year 2000, new entrants to the work force will be individuals from disadvantaged backgrounds, the type of student the community college has served so well for three decades (Hodgkinson, 1985; Hudson Institute, 1985; Johnston, 1987 reported in Cohen & Brawer, 1991).

One of the main functions of the community college, then, is to provide "developmental" or "remedial" courses to most of the entering freshmen who do not possess the basic literacy skills needed for academic success in regular curricula. By the late 1960s, community colleges offered more courses in
remedial reading, remedial writing, and remedial arithmetic than any other subjects (Roueche, 1984). By 1980, one-third of the enrollment in mathematics classes was in courses lower than algebra, and three out of eight students taking English classes were in remedial sections (Cohen & Brawer, 1987).

State political leaders, however, increasingly question the value of providing remedial education at public institutions of higher education (Jaschik, 1985). Their criticism stems from the philosophy that state funds should be spent on those who have demonstrated ability to learn. However, the mission and purpose of the community college is to provide opportunities for students to remediate basic skill deficiencies, thus providing opportunities to obtain a college education that would otherwise be out of their reach (Roueche & Baker, 1987).

Need for Outcomes Assessment

State higher education policy makers have recognized this philosophy of service to the under-prepared by intentionally concentrating the remedial function within two-year colleges (Colby & Opp, 1987). At the same time, many institutions are re-examining the effectiveness of their academic programs by assessing educational outcomes (Lum & Alfred, 1987). Twenty-one states have established testing at some level (admissions, placement, exit, "value added") to measure these outcomes.
(Hilleman, 1990). Yet, the question of what students can expect to gain from this remedial instruction, and at what level they will be able to succeed once enrolled in regular classes, remains mostly unanswered.

Increased demands for measuring student outcomes, along with increased importance of remedial programs to support the "open door" mission of the community college, have made it imperative that the community college conduct research on student outcomes in remedial courses or programs. A recent study completed by Kalsner (1991) found that 17% of the institutions surveyed were unable to provide enrollment data for developmental courses; 25% were unable to determine students' pass rates in developmental courses, and 47% were unable to provide retention rates (to second year) for freshmen who enrolled in such classes. In a National Center for Educational Statistics study reported in Schonberger (1985), 68% of the freshmen in remedial math passed the course, but only 35% of the schools kept retention data on remedial students separately. Therefore, student success in college-level work could not be evaluated.

Although some studies have been conducted which track the success of developmental students compared to other students, a need exists for each college to document the effects of its individual programs (Kulik, Kulik, & Schwalb, 1983). Without such monitoring, program personnel and administrators can never be certain about the accomplishments of specific
programs. Quantitative and controlled evaluations are important because effects of such programs are variable and they are too small in most cases to be detected.

Need for Research at Marshalltown Community College

Institutional research is often lacking at community colleges, yet institutional studies can contribute to our knowledge about the gains students may expect from participation in developmental programs. One such community college in Iowa, Marshalltown Community College, has identified lack of institutional research as a concern (Marshalltown Community College North Central Association (NCA) Self-Study Report, 1991). This concern was also expressed in a statement in an earlier (1982) NCA site visit report that "institutional research is virtually non-existent" (p. 4). This same site visit report (1982) indicated that Marshalltown Community College paid little attention to retention of students. In 1991, in order to address the need for more institutional research and address retention issues, self-study participants recommended that more research be conducted using ASSET, an ACT placement exam, (Marshalltown Community College North Central Association (NCA) Self-Study Report). Since ASSET had been adopted in 1986 as an advising tool to assist with accurate course placement of all students, self-study participants speculated its effective use would
decrease the number of students enrolled in classes for which they are not prepared. According to the Marshalltown Community College 1991 Self-Study, retention problems related to misplacement in classes had been reduced since 1982, although the report does not indicate to what degree. However, most faculty appear to be satisfied with the placement accuracy of the ASSET test. In 1991, 61% reported being very satisfied or satisfied, 7% were dissatisfied or very dissatisfied, and 32% were neutral (Marshalltown Community College NCA Self-Study, 1991).

In the fall of 1991, the researcher met with Marshalltown Community College administrators including the Vice President for Academic Affairs, the Dean of Instruction, and the Director of Admissions, who expressed concern for some faculty members' lack of satisfaction with the placement accuracy of the ASSET test, as well as a lack of research data describing the most appropriate cut-off scores for placement into developmental courses. Marshalltown Community College faculty and administrators perceive that the accurate use of ASSET advising recommendations can lead to greater retention. It is for this reason that the appropriateness of the advising recommendations are studied.
Assessing Student Outcomes at Marshalltown Community College

In addition to a concern for greater student retention, college administrators have increasingly turned their attention to student outcomes. In 1988, Arthur Cohen stated that the "hottest" issue in higher education today was "outcomes", since the general public as well as legislators are quite interested in whether expenditures for state resources are producing desirable educational outcomes (Cohen, 1988). At Marshalltown Community College, a self-study group found considerable evidence that the college is measuring student achievement outcomes as one aspect of institutional effectiveness, but the approach is not systematic (Marshalltown Community College North Central Association Self-Study, 1991).

On the basis of data available at the time of the self-study, it appeared that three measures which indicate institutional effectiveness in producing student achievement are: successful transfer to public universities, high rate of students passing licensure exams, and rate of placement in jobs related to the student's vocational program.

Another student outcome measure, student satisfaction, was also identified in the Marshalltown Community College North Central Association Self-Study, 1991. Graduates appear to be satisfied with their instruction and the college overall as measured by vocational-technical graduates in 1990.
Eighty-one percent said their instructors prepared them either "very well" or "reasonably well" for employment, while 16% said they were prepared for employment "well enough".

What appears to be lacking, however, is an analysis of what happens to students from the time they begin their studies at Marshalltown Community College to when they leave. Marshalltown Community College has no retention studies on file, and no student tracking system exists to determine the extent to which Marshalltown Community College students reach their goals. Without institutional data on all students, it is impossible to determine the success rate of certain subgroups based on student demographics. While some community colleges report research has been done on comparing student progress for students taking developmental courses, this research has not been conducted at Marshalltown Community College.

This type of research may become increasingly important to Marshalltown Community College personnel. According to the results of a community assessment questionnaire conducted in 1981 and again in 1991, 73% of the public rated developmental and remedial education as very important or important in 1981, while 90% rated it as very important or important in 1991. However, 100% rated it as very effective or effective in 1981, while 91% rated it as very effective or effective in 1991 (NCA self-study, 1991). Therefore, the public is increasingly assigning a greater importance to developmental and remedial
education, but rates it as less effective. This document addresses the need for the public to know what can be gained from developmental and remedial education.

Marshalltown Community College adopted the ASSET program in 1986. At that time, Form A was being used. A committee of faculty advisors decided to adopt the guidelines for placement recommendations based on ACT's recommendations from national samples. The appropriate developmental courses were then identified along with the corresponding courses for regular enrollment (see Appendices C, D, E, and F). In 1989, Marshalltown Community College adopted ASSET Form B, and converted the standard scores from Form A (see Appendices H, I, J, K, L, and M).

Need for Study

Although community colleges have been criticized for contributing to the lowering of academic standards, they have done so to accommodate the needs of under-prepared students. The question remains, however, does remediation effectively prepare students to succeed as well as those who do not need this instruction? And, does the voluntary placement system used to direct students into developmental classes assure the greatest level of success? There is a need to examine these two questions at Marshalltown Community College. Although some student outcome measures exist, Marshalltown Community
College has not determined what happens to students from the time they begin their studies to when they leave, or to what degree their goals are reached. In addition, Marshalltown Community College adopted a testing and advising program (ASSET) to decrease the number of students enrolled in courses for which they were not prepared, yet the effectiveness of this voluntary placement system has not been determined.

Research Problem

The research problem consists of two parts. First, it is to evaluate developmental course effectiveness by comparing student outcomes of Marshalltown Community College students who 1) are exempt from developmental courses, 2) complete developmental courses, or 3) are recommended to complete at least one course, but do not. Student outcome measures include: cumulative grade point average; total number of credits earned; retention to second semester; retention to second year; goal attainment for certificate, degree, and transfer; certificate awarded; and degree awarded.

Second, the relationship between ASSET test scores and course grades will be reviewed, as well as the degree to which ASSET test scores can be used to predict success in related courses. The following research questions guided this study:
Evaluation of Developmental Course Effectiveness

1. Is there a difference in student outcomes (cumulative grade point average; total credits earned; retention to second year; retention to second semester; goal attainment for certificate, degree, and transfer; certificate earned; and degree earned) among three groups of Marshalltown Community College students: (1) Exempt Group: those exempt from developmental skills courses in all four areas - reading, writing, numerical skills, and elementary algebra; (2) Completers Group: those who completed all four developmental skills courses (they may have been exempt from some); (3) Did Not Complete Group: those who were assessed as needing at least one developmental skills course and who did not complete at least one of those courses.

Evaluation of Voluntary Placement System

2. To what degree is the voluntary placement system based on ASSET scores effective in predicting success in regular college courses?

Statement of Purpose

The purpose of this study is to use an existing data set obtained through the Registrar at Marshalltown Community
College to identify three groups of students who were exempt from developmental courses, completed developmental courses, and who were recommended but did not complete such course(s). The three groups will then be compared on seven outcome measures to determine if there are any significant differences.

A different existing data set (students records including course grades and ASSET scores) will be used to identify the relationship between ASSET test scores and course grades of students in Psychology, Sociology, English Composition I, Elementary Algebra, Intermediate Algebra, College Algebra. Permission to use these data sets was granted by the Iowa State University Human Subjects in Research Committee (see Appendix A).

Definition of Terms

The following terms are used in this research study:

ASSET - an educational advising, course placement and retention planning tool developed by ACT specifically to serve students entering two-year academic institutions (ACT Technical Manual, 1990).

Developmental skills courses - courses specifically designed to remediate academic deficiencies. Course descriptions of Marshalltown Community College developmental skills courses can be found in Appendix G.
Groups relative to developmental skills courses: (1) Exempt Group: those exempt from developmental skills courses in all four areas - reading, writing, numerical skills, and elementary algebra; (2) Completers Group: those who completed all four developmental skills courses (they may have been exempt from some); (3) Did Not Complete Group: those who were assessed as needing at least one developmental skills course and who did not complete at least one of those courses.

Comprehensive Community College - term applied to those community colleges which are publicly supported, as compared to lower-division branches of private universities, or two-year colleges supported by churches or organized independently.

Research Hypotheses

Based on the research questions, the following hypotheses were developed.

Evaluation of Developmental Course Effectiveness

1. The cumulative grade point average of students in the Exempt and Completers groups is expected to be significantly higher than the grade point average of students in the Did Not Complete group.
2. The total credits earned of students in the Exempt and Completers groups is expected to be significantly higher than the total credits earned of students in the Did Not Complete Group.

3. Retention to second year for Arts and Sciences and Career Education students is expected to be greater for the Exempt and Completers Groups than it is for the Did Not Complete Group.

4. Retention to second semester for certificate students is expected to be greater for the Exempt and Completers Groups than it is for the Did Not Complete Group.

5. Goal attainment (for students whose goal was to earn a certificate) is expected to be greater for the Exempt and Completers Groups than it is for the Did Not Completers Group.

6. Goal attainment (for students whose goal was to earn a degree) is expected to be greater for the Exempt and Completers Groups than it is for the Did Not Complete Group.

7. Goal attainment (for students whose goal was to transfer) is expected to be greater for the Exempt and Completers Groups than it is for the Did Not Complete Group.

8. It is predicted that the Exempt and Completers Groups will earn a Certificate at a higher rate than the Did Not Complete Group.
9. It is predicted that the Exempt and Completers Groups will earn a Degree at a higher rate than the Did Not Complete Group.

Evaluation of Voluntary Placement System

10. There is a relationship between ASSET scores and grades earned in courses in the following areas:
   a) ASSET Reading Skills scores and Psychology grades
   b) ASSET Writing Skills scores and Psychology grades
   c) ASSET Reading Skills scores and Sociology grades
   d) ASSET Writing Skills scores and English Composition grades
   e) ASSET Numerical Skills scores and Elementary Algebra grades
   f) ASSET Elementary Algebra scores and Intermediate Algebra grades.

11. Advising recommendations established by Marshalltown Community College faculty have identified the appropriate cut-off scores for the student's best chance of success in the following areas:
   a) ASSET Reading Skills for placement in Psychology
   b) ASSET Writing Skills for placement in Sociology
   c) ASSET Reading Skills for placement in Sociology
   d) ASSET Writing Skills for placement in English Composition
e) ASSET Numerical Skills scores for placement in Elementary Algebra

f) ASSET Elementary Algebra scores for placement in Intermediate Algebra

Statement of Assumptions

It is assumed Marshalltown Community College provides a comprehensive developmental education program designed to meet the needs of all students who enroll. It is also assumed that retention is a desirable student outcome at a community college.

It is assumed that academic competency is reflected in course grades, and that the more capable a student is, the further he or she will progress in accumulating college credits.

Limitations of the Study

It is a limitation of this study that students enrolled in more than one semester of developmental studies were not compared to those enrolled for only one semester. It is also a limitation that only full-time students were used to determine the effectiveness of developmental skills courses. This was necessary, however, since only full-time students were required to take ASSET at the time the subjects were
Identified.

It is a limitation that only students enrolling in developmental studies in their first or second semester were included in the study. This is a limitation because if students delayed their enrollment beyond their first two semesters, they would have received developmental instruction, but would not have been included in the group of recommended but did not complete.

Finally, it is a limitation that the effectiveness of developmental courses could not be analyzed by subject area due to a small number of completers.

Significance of the Study

This study will provide information for one community college to examine the impact of developmental course instruction on student outcomes. Marshalltown Community College faculty and administrators will also gain insights into the effectiveness of their voluntary placement system. This will enable them to more accurately recommend placement into developmental courses by making adjustments to their cut-off scores. Retention could be increased by reducing the number of under-prepared students enrolled in regular courses. Also, the number of students recommended for developmental courses who do not need such courses could be reduced.
CHAPTER II. REVIEW OF LITERATURE

Introduction

This chapter will first address the effectiveness of developmental education. It will then review the history of compensatory education in higher education, and specifically address the role of the community college. Various research designs will be reviewed along with appropriate measures of effectiveness. Studies similar to this study will then be examined.

Effectiveness of Developmental Education

Historical Perspectives

Colleges and universities have historically served under-prepared students. The problem was addressed by the University of Michigan as early as 1852. In 1862, Iowa State College established a remedial program for students with deficiencies in reading, writing, and math (Mickler & Chapel, 1989). In 1894, Wellesley College introduced its first course in remediation for academic deficiencies including study skills and organization (Cross, 1976). During the 1800s, Ivy League schools sought to maintain high academic standards by either not admitting under-prepared students or helping them
to stay in school by offering remediation (Smith & Clements, 1984).

During the 1930s and 1940s, remedial reading courses were added to college and university curricula. However, enrollment in such courses was limited, as only students with the ability to pay had access (Roueche & Snow, 1977). Greater access was achieved through the G.I. Bill in the mid 1940s, which was designed to assist post World War II and post Korean War under-prepared veterans (Smith & Clements, 1984).

The 1950s and 1960s brought an influx of applicants which caused colleges to adopt restrictive admission standards for students with learning problems (Roueche & Snow, 1977). However, the 1960s brought a change in commitment toward educational opportunity through the Civil Rights movement. Along with this came an accompanying increase in federal aid for social and educational problems (Smith & Clements, 1984). This federal support enabled colleges to develop comprehensive support programs for disadvantaged students including individual tutoring, guidance, learning centers, study skills courses, and other services (Kulik, Kulik & Schwalb, 1983).

**Role of Community College**

During the 1970s, the college-age group declined and universities became more competitive for the better-prepared student. Consequently, the proportion of less-prepared
students going to community colleges began to increase (Cohen & Brawer, 1982). Open-door community colleges responded by establishing programs of developmental or remedial studies for the staggering numbers of students who previously would have been denied access to college. (Kulik, Kulik, & Schwalb, 1983).

At the same time, literacy rates in general began to decline. Scholastic Aptitude Test (SAT) and American College Testing (ACT) scores began to show a consistent decline beginning in the mid-sixties (Roueche, 1980). In 1977, Hechinger reported that over one half of high school graduates could not read beyond a level required to graduate from grammar school. Roueche & Roueche (1982) found that more than one half of entering freshmen in community colleges read below the eighth grade level.

By 1970, most public two-year colleges had developmental, preparatory, or remedial courses (Cohen & Brawer, 1982). Most were distinct courses designed to prepare students to enter college transfer programs. However, the 70s also brought improvements in developmental programs by combining instruction with counseling programs and assigning specially trained faculty who were sensitive to the unique needs of developmental students (Cohen & Brawer, 1982). Institutional innovations, including individualized, self-paced, mastery, and programmed learning concepts, were employed for these special populations (Rounds & Anderson, 1985). The philosophy
prevailed that students would succeed in learning a given task to the extent that they both receive proper instruction and spent the appropriate amount of time learning (Pascarella & Terenzini, 1991).

Adult literacy is also a concern for community colleges which have typically addressed the need to raise literacy levels through their learning centers. In 1982, the Secretary of Education estimated there were 72 million American adults functioning at or below marginal levels of literacy (Cohen & Brawer, 1991). Pressure for workplace literacy will continue to have an impact on learning centers and developmental programs at community colleges which serve adult populations.

Lack of ability in basic skills is reflected in the number of entering freshmen who need remediation in reading, writing, and/or math in both two- and four-year institutions. According to one report, approximately one-third of all entering freshmen need remediation (Mickler & Chapel, 1989), while other reports indicate one-fourth of all college freshmen are enrolled in remedial or developmental courses in English, reading, and math (National Center of Education Statistics, 1985). Although most post-secondary institutions provide some sort of developmental program for under-prepared students, the majority of remedial and developmental instruction takes place on two-year college campuses (Boylan, 1986). Community colleges, have established these programs
over the protests of legislators as well as academicians in order to meet the needs of their learners (Parnell, 1985).

Research Design

Douchette and Hughes (1990) provide a series of questions designed to guide a college in assessing the performance of its basic skills and developmental education mission. They are divided into three areas: achieving educational outcomes, meeting student needs, and meeting community expectations. They are as follows:

Achieving Educational Outcomes

1. Are students attaining the skills identified as course and program objectives?
2. Are students completing courses and progressing through programs at reasonable rates?
3. Are students progressing to and succeeding at the next level of education? In post-secondary education programs?
4. Are students from different subgroups succeeding at comparable rates? Are students success rates comparable among various college programs for under-prepared students?

Meeting Student Needs

5. Are students' career and personal developmental
needs being met?

6. Are students satisfied with course and program content, teaching methodologies, and support services?

7. Are assessment tests placing students in courses appropriate for their skills?

8. Are developmental students being successfully integrated into college life?

Meeting Community Expectations

9. Are a reasonable number of high school dropouts, illiterate adults, and ESL students enrolling in appropriate college programs?

10. Does the college cooperate effectively with other service providers in the community?

11. Do college programs for under-prepared students assist in reducing related social and economic problems? (p. 25 & 26)

Boylan (1983) also identified questions which may be used to determine the degree to which a developmental program is accomplishing its mission. They include: the degree to which programs and services promote educational opportunity by providing under-prepared students with skills necessary for success and the degree to which students are retained who otherwise may be lost.
The question of increased educational opportunity for under-prepared students may be addressed by methods identified by Akst and Hecht (1980). These researchers found most evaluations of remedial programs have focused on effectiveness of instruction, or whether or not performance in subsequent course work is improved as a result. However, the most commonly used design (single group pre-test/post-test) cannot be used to attribute effectiveness of remedial programs due to a host of extraneous variables. Weaknesses also exist in the use of pre-post test scores since the ten- to fifteen-week term in which a student completes a developmental course is too short to show significant gain (Clowes & Anderson, 1984). Also the relationship between gain scores and the ability to succeed in regular courses is inconclusive (Richardson, Fish, & Okunm, 1983).

Regardless of the drawbacks inherent to these evaluation methods, they remain common methods of evaluation at community colleges. According to a survey of student assessment and remedial education in Michigan's public community colleges, the majority (97%) use course completion to evaluate individual student progress in remedial/developmental efforts (Argumendo, 1989). The second most used method was pre-test/post-test comparison (83%), followed by completion of modules/competency based material (59%).

A control group design allows the researcher to attribute any difference between post-program measures to the
effectiveness of the program itself. However, the remediated and exempted group are inequitable, and no conclusions can be drawn if the remedial group lags behind the exempted group following remediation (Akst & Hecht, 1980).

Measures of Effectiveness

The ultimate measure of success for students of any program has been defined by some researchers as completion of all courses and graduation (Clowes & Anderson, 1984). However, graduation is not considered the ultimate measure of success at a community college (AACJC, 1987). Few students actually earn degrees from community colleges. According to Adelman (1992), people attend community colleges not to earn degrees or credentials, but rather for specific information they feel most relevant to the current employment. Therefore, goal aspirations at entry may not be available, or may be unreliable.

While graduation rates may not be an appropriate measure of success for developmental courses, academic performance measures have greater acceptance. As early as 1950, Robinson identified academic performance (grade point averages in follow-up courses or persistence rates in college) as the "sine qua non" for validation of remedial courses. Increased grade point average and retention were again identified by Magarrell (1981) as the expected payoff from developmental
programs, whether designed to eradicate educational deficiencies (remedial) or to intervene at the time the need is recognized (developmental). In a thorough analysis of the research on the effectiveness of developmental education, Boylan (1983) identified effective developmental education activities as those which resulted in higher grades for those who participated in them compared to those who did not.

Persistence rates, however, may become meaningless if part-time students are included in the sample. Some researchers suggest one solution is to collect goal related information at entry, and report results in terms of rate of goal attainment (Bers, 1987).

Related Research

Early studies which investigated the impact of developmental studies on the success of students found positive results. Roueche and Kirk (1973) investigated four community college programs for under-prepared students. They found that students can learn when they are provided with caring and competent instructors, non-traditional methods, and well thought out programs that unite the resources of the college. After reviewing the literature on opportunities for the disadvantaged students in higher education, Gordon (1975) concluded that comprehensive, integrated support services contribute to student success, while isolated courses and
practices are not sufficient to make a difference. Positive results were again found in a study conducted by Cohen (1973) which concluded that developmental courses actually achieve what they set out to achieve – they remedy a specific problem and are more effective when accompanied by tutoring and other academic support services.

However, according to Kulik, Kulik, & Schwalb (1983), these general conclusions about effects of special programs for developmental students, however, were based on an unsystematic selection of studies and subjective interpretations. They were further criticized by these researchers for lacking the use of statistical tools, and for not combining results from various studies to chart relationships among variables. As an alternative to the previously identified narrative reviews of evaluation findings, Kulik, Kulik & Schwalb (1983) conducted a meta-analysis to synthesize evaluation findings on college programs for high-risk students. From a potential pool of 504 studies, the researchers selected 60 reports which met criteria set for inclusion in the study. The results identified positive effects of special programs when the measures of effectiveness were improvement in grade point average and persistence rates compared to a control group which did not receive special services.

A similar review of fifty-one reports from a potential of seventy-three submitted by colleges throughout the country was
conducted by Boylan in 1983. Most of the data cited, however, was obtained through program evaluation activities, where the purpose was program refinement or improvement, and negative data may have been omitted. Again, gains were greater for under-prepared students who participated in basic skill courses (than for a control group of similar students who chose not to participate) on outcome measures including grade point average and persistence rates.

Other studies used grade point average and other indicators of success to measure the impact of developmental courses on students who completed them compared to those who did not. In 1989, Parrish and Hiatt conducted a longitudinal study at Embry-Riddle Aeronautical University. Data related to academic performance, retention, and student satisfaction were collected on 226 students enrolled in fall 1986. Their conclusion was that developmental courses have a positive effect on student academic performance and claim a high degree of student satisfaction.

A similar study conducted at Georgia Southern in 1979 and published in 1987 by Boylan, again compared students who elected to take developmental classes to those who did not on outcomes measures such as 1) grades in selected core 2) overall grade point average in college, and 3) retention (number of quarters a student remained in school). The results showed that the developmental students performed initially better than those who did not take the courses, but
as they advanced, there was no significant difference. This initial success, however, encouraged the developmental students to stay in school on the average two quarters longer.

A control group consisting of low scorers who did not take the advice to take developmental course(s) was also used by Maring, Shea, & Warner (1987) along with an additional treatment group of students deficient at mid semester. Again, indicators of success included grade point average in semesters subsequent to participation in developmental classes, attrition rates, and indexes of student satisfaction. The results showed that subjects who completed reading and study skills did not differ from others in any meaningful way in terms of subsequent grade point average. They did, however, remain at the university in significantly greater numbers.

Lack of Research

Many colleges and universities do not employ adequate procedures for collecting and analyzing the data. Roueche, Roueche & Baker (1987) conducted a national study of all types of institutions on their response to low-achieving students. They found the data that had been collected was inadequate to describe levels of course achievements or failures. Also, the data collected was of program completion only and not of performance in future academic programs - the final and most
critical evidence of real success.

Further evidence of a lack of data was reported by Kalsner (1991) who found the following: 17% of the institutions surveyed were unable to provide enrollment data for developmental courses; 25% were unable to determine students' pass rates in developmental courses; and 47% were unable to provide retention rates (to second year) for freshmen who enrolled in such classes. In a National Center for Educational Statistics study reported by Schonberger (1985), the average pass rate for remedial courses was 68%. However, only 35% of the schools kept retention data on remedial students separately, so success in college level work could not be evaluated.

Community colleges in particular are less likely to provide evidence of student success than are public schools or four-year colleges. They are more likely to present anecdotal data than the ratio between number of students who begin and number who complete the program (Keyser & Floyd, 1987). This may be due to their relative inexperience in conducting longitudinal analyses of student flow and outcomes, and the lack of research support personnel (Bers, 1989). In 1987, the American Association of Community and Junior Colleges (AACJC) reported that less than 50% of colleges indicated they have a staff person whose responsibility includes planning (Bers, 1989). The current emphasis on student outcomes assessment, with demands for documentation of institutional
effectiveness, exceeds the capacity of most community colleges to conduct the necessary research.

Lum & Alfred (1987) identified several reasons why meaningful research on the outcomes of remedial education has not been a common activity in community colleges. They include: a lack of uniform definitions and measures for assessment of effectiveness, 2) lack of time or resources for faculty or staff to conduct empirical research 3) embarrassing research results showing negative cost-benefits of courses and programs.

Akst & Hecht (1980) also agree that lack of time and fear of results can be barriers to conducting this type of research, and add that the absence of a control group can be a limitation as well. As stated previously, community colleges have been criticized for offering programs designed to remediate skill deficiencies which do not produce the desired results. In their meta-analysis of studies done in 1983, Kulik, Kulik, & Schwalb found disappointing results in the effectiveness of special programs often associated with community colleges. Developmental and remedial studies programs had effects on grade point average that were indistinguishable from those of regular programs. In addition, special programs had little effect on persistence rates at community colleges.

These researchers speculated these results were due to an inappropriate choice of indices of program effectiveness since
community colleges serve non-traditional students. They also speculated that remedial and developmental studies may be too unchallenging to prepare students adequately for regular college courses.

Placement Policy Impact on Developmental Studies

Critical to the success of any developmental program is the effectiveness of the placement policy. The two most common policies for placing students in developmental classes are 1) compulsory placement in appropriate developmental skills courses based on the results of a basic skills assessment instrument and 2) voluntary student enrollment which leaves the final choice of course matriculation to the discretion of the student (Lum and Alfred, 1987). Although the placement policy followed by a particular college has an effect on student achievement, colleges frequently do not have a full understanding of the impact that these policies have on student achievement (Roueche & Snow, 1977). A growing trend during the latter part of the 1980s has been increased involvement by state legislatures and governing boards in requiring remediation for academically deficient students entering colleges (Roueche, Baker, & Roueche, 1984). Therefore, it is more and more critical that placement policies with appropriate cut-off scores be adopted.

In 1987, Roueche, Baker, & Roueche conducted a national
survey of college programs for low-achieving students, and determined that over 50% of all American colleges and universities practice mandatory placement in mathematics, and slightly less than half of the institutions require reading placement. Most community colleges, however, do not have mandatory student placement in developmental classes. In Iowa, mandatory student enrollment in appropriate remedial course work at community colleges was first recommended in the 1984 First in the Nation in Education (FINE) report. However, a survey conducted in November 1991 revealed that in all but three of the fifteen community colleges, enrollment in developmental education is voluntary, and not all students who need developmental services take advantage of them. While testing services such as American College Testing (ACT) have conducted studies that determine the validity of using basic skill test scores for course placement, institutions are likely to have unique placement needs that require locally developed cut-off scores (ACT, 1990).

Summary

Developmental education has always been a part of American higher education. Community colleges have played a significant role since many under-prepared students enter through the open door. Although the majority of remedial and developmental instruction takes place on two-year campuses,
little research has been conducted to determine its impact on students' success in subsequent courses. When measures of effectiveness are used, they often include grade point average and persistence rates. Several related studies have found developmental courses and programs effective, yet the data necessary to conduct this type of research is often lacking, especially at community colleges.

The placement policy which guides students to take developmental courses is an important component of a developmental studies program. Community colleges generally have a voluntary placement system which does not require that students follow the recommendations of advisors. Although testing services such as ACT recommend general placement guidelines, individual colleges are recommended to examine the effectiveness of their initial cut-off scores.
CHAPTER III. METHODOLOGY

Introduction

Student outcomes relative to enrollment in developmental courses were examined to determine the impact of this enrollment. Also, the relationship between course grades and ASSET test scores was examined to determine the predictability of grades based on test scores. Expectancy tables were used to identify the effectiveness of the voluntary placement system based on ASSET scores.

This chapter reviews the study's methodology including the following: a description of the community college from which the subjects are drawn, subjects and sampling procedures for each part of the study, and a description of the data collection and analysis procedures.

Marshalltown Community College

The setting for this study is Marshalltown Community College located in Marshalltown, Iowa, a city of 30,000 located in central Iowa. Marshalltown Community College serves as a primary attendance center for more than 100,000 persons who live in the Iowa Valley Community College District (Merged Area VI) including Marshalltown, Grinnell, Tama, and Toledo. According to the 1991-1993 Marshalltown Community
College catalog, Marshalltown Community College is organized into eleven departments and two institutes which provide instruction and service.

As a comprehensive community college, Marshalltown Community College offers a wide variety of educational programs (Marshalltown Community College Catalog, 1992). The Associate in Arts and Associate in Science degrees are transfer degrees designed to meet the general education requirements of four-year institutions. Marshalltown Community College also offers non-transfer degrees including the Associate in General Studies and the Associate in Applied Science for career programs. In addition, Marshalltown Community College awards certificates of completion in ten vocational areas.

Students at Marshalltown Community College can be described by the following demographics according to the Marshalltown Community College Self-Study Report (1990-1991). The student body of Marshalltown Community College consists of both traditional and non-traditional age students (average age = 27). Students are predominantly white females (67%) and virtually all are caucasian (97%). Eighty-one percent enroll in Arts and Sciences and 19% in Vocational-Technical programs. From a total of 1,415 students, 59% enrolled full-time (12 or more hours) while the remaining 41% enrolled part-time (1 to 11 hours).
If one compares the academic preparation of students who were ASSET participants at Marshalltown Community College in fall 1991 to all ASSET participants in Iowa, using data from the 1991 ACT ASSET Program Entering Student Descriptive Report, differences are found only in the area of math preparation. For example, as can be seen in Tables 1 and 2,

Table 1. Overall high school grade average by category of Marshalltown Community College ASSET participants and all Iowa ASSET participants fall 1991

<table>
<thead>
<tr>
<th></th>
<th>Marshalltown Community College</th>
<th>All Iowa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>A- to A</td>
<td>24</td>
<td>04</td>
</tr>
<tr>
<td>B to A-</td>
<td>66</td>
<td>11</td>
</tr>
<tr>
<td>B- to B</td>
<td>157</td>
<td>26</td>
</tr>
<tr>
<td>C to B-</td>
<td>213</td>
<td>35</td>
</tr>
<tr>
<td>C- to C</td>
<td>130</td>
<td>21</td>
</tr>
<tr>
<td>D to C-</td>
<td>21</td>
<td>03</td>
</tr>
<tr>
<td>D- to D</td>
<td>03</td>
<td>00</td>
</tr>
<tr>
<td>Total</td>
<td>614</td>
<td>100</td>
</tr>
</tbody>
</table>

no significant differences were found between Marshalltown Community College ASSET participants and other Iowa participants on: grade point average ($X^2(6, N = 614 \text{ and } 4881) = 5.369, \ p \leq .05$), Reading Skills ($t (656) = 1.49, \ p \leq .05$), and Writing Skills scores ($t (656) = .854, \ p \leq .05$).

However, Marshalltown Community College ASSET participants scored significantly lower than all Iowa ASSET
Table 2. ASSET reading, writing, numerical skills, and elementary algebra ASSET scores for Marshalltown Community College and all Iowa participants fall 1991

<table>
<thead>
<tr>
<th>Variable</th>
<th>Marshalltown Community</th>
<th>All Iowa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>41.64</td>
<td>41.78</td>
</tr>
<tr>
<td>SD</td>
<td>5.89</td>
<td>5.99</td>
</tr>
<tr>
<td>N</td>
<td>657</td>
<td>5459</td>
</tr>
<tr>
<td>Writing Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>41.76</td>
<td>42.56</td>
</tr>
<tr>
<td>SD</td>
<td>5.91</td>
<td>6.00</td>
</tr>
<tr>
<td>N</td>
<td>657</td>
<td>5484</td>
</tr>
<tr>
<td>Numerical Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>36.91</td>
<td>39.73</td>
</tr>
<tr>
<td>SD</td>
<td>6.06</td>
<td>6.05</td>
</tr>
<tr>
<td>N</td>
<td>305</td>
<td>4123</td>
</tr>
<tr>
<td>Elementary Algebra Skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>33.39</td>
<td>36.24</td>
</tr>
<tr>
<td>SD</td>
<td>5.55</td>
<td>7.94</td>
</tr>
<tr>
<td>N</td>
<td>171</td>
<td>1569</td>
</tr>
</tbody>
</table>

Participants on the Numerical Skills test ($t (304) = -8.15, p \leq .05$) and on the Elementary Algebra Skills test ($t (170) = -4.69, p \leq .05$).

Marshalltown Community College ASSET participants can also be compared to other ASSET participants in Iowa by reviewing educational plan data shown in Table 3. Plans to transfer were significantly different for Marshalltown Community College ASSET participants and other Iowa ASSET participants ($X^2(4, N = 507$ and $5321) = 14.1, p \leq .05$). In the analysis, Marshalltown Community College students indicated they planned to transfer to either a two-
year, four-year, or other type of institution more often than other Iowa ASSET participants (see Table 3).

Another measure of goal aspiration, plan to earn a certificate or two-year degree at the community college, was significantly different for Marshalltown Community College ASSET participants and other ASSET participants. In this analysis, Marshalltown Community College ASSET participants responded "no, not planning to earn certificate or two-year degree" significantly more often than all Iowa ASSET participants (see Table 4).

In summary, Marshalltown Community College ASSET participants seem to be typical of all Iowa ASSET participants

### Table 3. Number of Marshalltown Community College participants and all Iowa ASSET participants who considered transferring (fall 1991)

<table>
<thead>
<tr>
<th>Considering transfer to</th>
<th>1991 Marshalltown CC</th>
<th>All Iowa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>A two-year college</td>
<td>27</td>
<td>05</td>
</tr>
<tr>
<td>A four-year college</td>
<td>192</td>
<td>38</td>
</tr>
<tr>
<td>Other type of institution</td>
<td>6</td>
<td>01</td>
</tr>
<tr>
<td>Not planning to transfer</td>
<td>168</td>
<td>33</td>
</tr>
<tr>
<td>Undecided</td>
<td>114</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>507</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4. Number of Marshalltown Community College ASSET participants and all Iowa ASSET participants who planned to earn a certificate or two-year degree (fall 1991)

<table>
<thead>
<tr>
<th>Earn Certificate or Two-Year Degree</th>
<th>1991 Marshalltown CC</th>
<th>All Iowa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Yes, two-year degree</td>
<td>285</td>
<td>47</td>
</tr>
<tr>
<td>Yes, certificate or diploma</td>
<td>153</td>
<td>25</td>
</tr>
<tr>
<td>Undecided</td>
<td>114</td>
<td>19</td>
</tr>
<tr>
<td>No</td>
<td>57</td>
<td>09</td>
</tr>
<tr>
<td>Total</td>
<td>609</td>
<td>100</td>
</tr>
</tbody>
</table>

on most measures of academic preparation (high school grade point average and ASSET scores), but score lower in math. Also, Marshalltown Community College ASSET participants' goals reflect a greater interest in transferring than in earning a certificate or two-year degree.

Instrumentation

The ASSET program is an educational advising, course placement, and retention planning tool developed by ACT specifically to serve students entering two-year academic institutions (ACT Technical Manual, ACT, 1990). It includes a Student Educational Planning Form designed to gather
information about students' demographic and educational background, as well as career and educational plans.

In order to support both course placement needs and career and academic advising needs, the original edition of ASSET (1982) included a two-level testing process for assessing the academic skills of incoming students. It included short tests in language usage, reading, and mathematics, as well as an optional more advanced battery of tests in mathematics and language usage.

In 1986, several major enhancements were added to the ASSET system including expansion of the data in the Entering Student Descriptive Report and the development of new ASSET tests released in 1989. Many new items were added to the new ASSET tests (Form B) which measure different skills from the original tests (Form A).

Due to the fact that student records from both 1988 and 1992 are examined in this study, data from both Forms A and B of the ASSET basic skills and advanced tests are included. A brief description of these forms is included along with reliability and validity measures.

Form A

Form A consists of tests in the area of Language Usage, Reading Skills, Numerical Skills, and Elementary Algebra. The Language Usage test is designed to assess basic skills in the
areas of punctuation, grammar, diction and style, sentence structure, capitalization, spelling, logic, and organization.

The Reading Skills test is designed to assess the ability of the examiner to read and understand factual material. It also tests the more subtle aspects of comprehension such as interpretation of information and extrapolation beyond given information.

The Numerical Skills test is designed to assess basic numerical skills in the performance of operations with whole numbers, decimals and fractions, and basic word problem solving skills involving arithmetic.

The Elementary Algebra test is designed to assess skills commonly acquired in the first high school algebra course. Content areas tested include operations with whole and rational numbers; properties of real numbers and number systems; formulas and equations; word problems involving real numbers; averages; absolute values; signed numbers; number theories; evaluation of algebraic expression; algebraic factoring; and linear equations in one unknown.

Reliability is measured by the Kuder Richardson formula, an estimate of internal consistency, or the degree to which items on a test relate to all other items on the test and to the entire test. The following coefficients were reported: Language Usage Skills (.87); Reading Skills (.91); Numerical Skills (.88); and Elementary Algebra (.76) (ACT Technical Manual, 1986).
Both content and criterion-related validity measures are available. Content validity was developed using a wide variety of input regarding the nature and content of college curricula through advisory councils, and feedback from user institutions. Criterion-related validity can be further classified by predictive and concurrent validity. Predictive validity is determined by administering ASSET tests early in the semester and correlating them with end-of-course grades. Seventy-five ASSET user institutions were used to develop these correlations. For Language Usage, correlations averaged across institutions ranged from .150 to .301 for related courses. For Reading Skills, correlations between ASSET and related courses ranged from .147 to .417. For Numerical Skills, mean correlations ranged from .270 to .417. For Elementary Algebra, the highest ASSET/course grade correlation was .270.

Concurrent validity was estimated by establishing correlations between ASSET test scores and scores for 4 tests of ACT Assessment scores for verbal and math sections of the SAT, and several other Reading and Language measures. Correlations were generally higher for Language Usage and Reading than Numerical Skills, and ranged from .33 to .81.
Form B

Form B consists of tests in the area of Writing, Reading, Numerical Skills, Elementary Algebra, Intermediate Algebra, and College Algebra. The Writing Skills test is designed to measure the student's understanding of three major areas including: 1) Usage and mechanics (punctuation and grammar); 2) Sentence structure; and 3) Rhetorical skills (organization, strategy, and style of standard written English).

The Reading Skills test is designed to measure reading comprehension as a product of skill in referring and reasoning. The test items require students to derive meaning from several texts by (1) referring to what is explicitly stated and determining the meaning of words through context, and (2) reasoning to determine implicit meanings and to draw conclusions, comparisons, and generalizations.

The Numerical Skills test is designed to assess basic numerical skills in the performance of operations with whole numbers, decimals, and fractions, and basic problem-solving skills involving arithmetic.

The Elementary Algebra test is designed to assess skills commonly acquired in the first high school algebra course. The content areas tested include evaluation of algebraic expressions, simplification of algebraic expressions, solution of quadratic equations, operations with polynomials, integer exponents, rational expressions, and solution of linear
equations.

The Intermediate Algebra Test is designed to assess skills commonly acquired in a second high school algebra course. The content areas tested include solutions of polynomial equations by factoring, graphs of linear equations, operations with radical and rational expressions, the distance formula, slope of a line, solution of linear inequalities, and simplification of radicals.

The College Algebra test is designed to assess skills commonly acquired in a pre-calculus course. The content areas tested include exponential functions, factorials operations with complex numbers, composition of functions, inverses of functions, linear inequalities and graphs and polynomials.

The reliability of Form B was determined by using a measure of internal consistency which reflects the degree to which the items on a test relate to all other items on the test and to the entire test. The Kuder Richardson formula (KR-20) reliability coefficients are as follows: Writing Skills, .87; Reading Skills, .78; Numerical Skills, .78; and Elementary Algebra, .86. Reliability coefficients for Intermediate Algebra, College Algebra, and Geometry were not available at the time of this report.

Two types of validity measures are available for Forms B and C. The first type is content validity, which is related to the extent to which the knowledge and subject matter measured by ASSET tests adequately represents the subject
matter of most common entry courses offered at two-year institutions. In order to address this issue, ACT surveyed English, Mathematics, and Reading departmental staff from more than 300 ASSET institutions to obtain recommendations regarding the desired content of the new tests. Content specifications were then developed through the recommendations of language arts and math advisory panels made up of leading faculty members from 18 two-year institutions. They not only determined the specific topics, but the proportion of items in each topic area.

The second measure of validity is criterion-related, which is a measure of the degree to which the skill level as measured by the ASSET test is related to course performance. In a sample of 23 institutions representative of ASSET users nationwide, it was found that as the mean test score values decrease, course grades also decrease from A to F. In other words, lower test scores are typically associated with lower course grades, and the higher test scores are associated with higher grades.

Equivalency of Form A and Form B

Since Form A was constructed to measure different skills from Form B, like-named sub-tests (e.g., Reading Skills, Writing Skills, Numerical Skills, and Elementary Algebra) from the two different forms cannot be construed as being
equivalent to one another. Therefore, only scores from Form A were used for Part I, and only scores from Forms B were used for Part II.

Subjects, Sampling Procedures, Data Collection and Data Analysis

Subjects for this study were derived from two different populations. Approval to use these subjects in this research project was granted by the ISU Human Subjects Committee (see Appendix A). Approval to use student records to collect the data was obtained from Marshalltown Community College (see Appendix B). A description of these subjects and their respective populations, as well as sampling procedures and data analysis is as follows.

Part I

Purpose

The purpose of this part is to compare different groups of Marshalltown Community College students relative to their enrollment in developmental courses on measures of student success. The three groups being compared include: 1) Exempt Group: those exempt from developmental skills courses in all four areas - reading, writing, numerical skills, and
elementary algebra; 2) Completers Group: those who completed all four developmental skills courses (they may have been exempt from some); 3) Did Not Complete Group: those who were assessed as needing at least one developmental skills course, and did not complete at least one of those courses. Student outcome measures include: 1) cumulative grade point average; 2) total credits earned; 3) retention to second year; 4) retention to second semester; 5) goal attainment for certificate, degree, and transfer; 6) certificate earned; and 7) degree earned.

Subjects

Subjects for Part I were students who enrolled for the first term at Marshalltown Community College in fall 1988, who enrolled for 12 or more credit hours, and who were also ASSET participants.

Procedure for Subject Selection

The procedure for selecting subjects consisted of the following. A printout was obtained from the Registrar at Marshalltown Community College identifying all students enrolled fall 1988. This list originally included 1,299 names. In order to determine which students had enrolled for the first time fall 1988, and those who also enrolled full
time, computerized student records were used. Names of students who were not full time (enrolled in 12 or more credit hours) and enrolled for the first time at Marshalltown Community College were eliminated. This resulted in a sample of 369 names. Subjects whose records could not be located (N=5), and those who did not participate in ASSET (N=50), were further eliminated. This resulted in a remaining 314 subjects.

**Characteristics of Sample**

A description of the characteristics of the subjects is as follows. The age range was from 22 to 76 with a mean of 25.35. There were 125 (40%) males, and 189 (60%) females. Sixty-seven percent were enrolled in Arts and Sciences programs, while 33% were enrolled in Vocational-Technical programs. Ninety-four percent had earned a high school diploma, while 5% had earned a GED. This sample is very similar to Marshalltown Community College students (described in the 1991 NCA Self-Study) in age, yet represents fewer females proportionately (60% versus 67%), and fewer Arts and Sciences students (67% versus 81%).

Table 5 summarizes subjects' self-reported high school grade point averages (ASSET Educational Planning Form question 11). In this sample, 62% reported a grade point average between B and C, while 61% of 1991 Marshalltown Community
College ASSET participants reported a similar grade point average, and 60% of all Iowa ASSET participants reported the same. Therefore, the academic preparation of the sample is very similar to other Marshalltown Community College students, as well as other Iowa ASSET participants.

It was reported earlier in this chapter that Marshalltown Community College students plan to earn a two-year degree or certificate less often than other Iowa community college students. This is consistent with the sample, as 73% plan to earn a two-year degree or certificate compared to 72% in the 1991 sample, and 76% of all Iowa ASSET participants.

Also in terms of goal aspirations, it was reported that Marshalltown Community College students plan to transfer more often than other Iowa community college students. While 44%
of Marshalltown Community College students planned to transfer in 1991, compared to 40% of other Iowa community college students, the 1988 sample reflected an even greater percentage (52%). In this way, Marshalltown Community College students may be described as different from other community college students in Iowa.

A final aspect of goal attainment is whether or not students who planned to transfer actually did transfer. A total of 162 students indicated on the ASSET Educational Planning Form their intention to transfer to either a four-year or two-year college or university. One-hundred-ten of these students were successfully contacted with the following results: 73 (66%) had transferred to a four-year college; 10 (9%) had transferred to a two-year college; and 27 (25%) had not transferred.

Data Collection

The advisor's recommendation to enroll in the following courses were recorded for each student: Developmental Reading, Reading Improvement I or II, Basic English, Study Skills, Study Skills Arithmetic, and Elementary Algebra (See appendices D, E, F, and G for advising recommendations, and Appendix H for course descriptions). Enrollment information for these courses for fall 1988 and spring 1989 was then used to determine if the student followed the recommendation. For
each subject area, students were then classified as: 1) exempt from developmental course; 2) recommended to take and completed developmental course; or 3) developmental course recommended and enrolled in but not completed, or not enrolled in.

Due to the few number of completers in each of the subject areas, (Language Usage = 12; Reading = 18; Numerical = 7; and Elementary Algebra = 22), the groups were combined to form the following: 1) Exempt Group: those exempt in all four areas - reading, writing, numerical skills and elementary algebra; 2) Completers Group: those who completed all four developmental skills courses (they may have been exempt from some); and 3) Did Not Complete Group: those who were assessed as needing at least one developmental skills course and who did not complete at least one of those courses.

The following information was then collected for each subject from either the Registrar, or from the student's ASSET Planning Form (see Appendix C): 1) type of high school certificate (high school certificate or GED); 2) overall high school grade point average (by category ranging from 1-7); 3) gender; 4) age; 5) ASSET Language Usage, Reading, Numerical, and Elementary Algebra scores; and 6) major. Majors were further classified as one- or two-year programs which were later matched to the retention outcome measure (one-year students were tracked to second semester enrollment, and two-year students were tracked to second-year enrollment.
Students' plans to earn a certificate or two-year degree were recorded from the ASSET Educational Planning Form (question 21) as either: (a) yes, two-year degree; (b) yes, certificate or diploma; (c) no, not planning to earn a two-year degree, certificate, or diploma; or (d) undecided. For the students who responded "yes" to degree, whether or not a two-year degree was earned by spring 1991 was recorded. For the students who responded "yes" to certificate or diploma, whether or not a certificate was earned by fall 1989 was recorded. This allowed the student the expected time to graduate, plus an additional semester (certificate students) or year (degree students).

In order to determine whether or not students who intended to transfer (ASSET Educational Planning Form question 21) actually did so by spring 1992 (expected date of graduate plus another year), records were used from the Marshalltown Community College Placement Office. In addition, a phone survey was conducted to further locate students whose plans could not be verified through these records. Two attempts were made to reach each student before a "could not reach" was recorded. In most cases, family members rather than the students themselves provided information.

In addition to goals identified and attained, other outcome measures included: cumulative grade point average the last term in which the student was enrolled; retention to second year for students in two-year programs, and retention
to second semester for students in one-year programs; and total credits earned by spring 1992 (including credits earned from other colleges).

Data Analysis

A one-way analysis of variance was used to determine if there is a significant difference between the average number of credits earned by students in the three groups relative to developmental course enrollment.

A one-way analysis of variance was also used to determine if there is a significant difference between the average cumulative GPA by students in the three groups relative to developmental course enrollment.

A chi-square analysis was used to determine if retention (to second semester for certificate students and second year for degree students) is independent of group membership relative to developmental course enrollment.

A chi-square analysis was also used to determine if rate of goal attainment (for a certificate, a degree, or transfer) is significantly different between the three groups relative to developmental skills enrollment.
Part II

Purpose

The purpose of this part is to determine the relationship between ASSET scores and course grades, and the degree to which course grades can be predicted based on ASSET scores.

Subjects

Subjects consisted of 480 students who were ASSET participants after 1989, and who enrolled at Marshalltown Community College in the spring of 1992 in one of the following courses: Psychology, Sociology, English Composition, Introduction to Algebra, Intermediate Algebra, and College Algebra.

Data Collection

The following information, collected for each subject, was either provided by the Registrar, or obtained from the student's ASSET Planning Form (see Appendix C). Only students with ASSET scores Form B were used for this analysis since Form A scores were not equivalent. This resulted in a total sample of 480 enrolled in the following courses: Psychology (n=112), Sociology (n=66), English Composition (n=72),
Elementary Algebra ($n=69$), Intermediate Algebra ($n=85$), and College Algebra ($n=76$). ASSET test scores were recorded in the following areas: Writing Skills, Reading Skills, Numerical Skills, Elementary Algebra Skills, Intermediate Algebra Skills, and College Algebra Skills.

Data Analysis

Data analysis for assessing the relationship between ASSET test scores and course grades is as follows. A Pearson correlation was calculated to determine the degree of relationship between ASSET scores and course grades. Secondly, in order to create an expectancy table which categorized test scores by advising recommendations, three categories were formed reflecting the following: 1) exempt from developmental courses; 2) decision zone; and 3) recommend developmental courses. The number of students in each category by test area can be found in Tables 6a and 6b.

For each analysis, in order to create one group of students who had not succeeded, and categories which reflected a four-point scale, a 1 was assigned to F, D, withdrawals, no credit (Q), and audit. Therefore, a 1 indicated lack of completion or success, 2 (C) and 3 (B) indicated somewhat higher degrees of success; and a 4 (A) indicated the highest
degrees of success. The number in each grade category is found in Table 7.

A chi-square analysis was then carried out to examine (by course) whether or not ASSET test scores varied significantly by course grade.

Table 6. Number of students categorized by advising recommendation.

A. Recommendations based on ASSET writing skills and ASSET reading skills for students enrolled spring 1992

<table>
<thead>
<tr>
<th></th>
<th>Writing</th>
<th></th>
<th>Reading</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>1 - Exempt from developmental courses</td>
<td>128</td>
<td>40.0</td>
<td>175</td>
<td>54.7</td>
</tr>
<tr>
<td>2 - Decision zone</td>
<td>92</td>
<td>28.7</td>
<td>72</td>
<td>22.5</td>
</tr>
<tr>
<td>3 - Recommend developmental courses</td>
<td>100</td>
<td>31.3</td>
<td>73</td>
<td>22.8</td>
</tr>
<tr>
<td>Total</td>
<td>320</td>
<td>100.0</td>
<td>320</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Group 1 - ASSET Writing scores between 45 and 54.
Group 2 - ASSET Writing scores between 39 and 44.
Group 3 - ASSET Writing scores between 23 and 38.

Group 1 - ASSET Reading scores between 43 and 53.
Group 2 - ASSET Reading scores between 38 and 42.
Group 3 - ASSET Reading scores between 23 and 37.
Table 6 (continued)

B. Recommendations based on ASSET numerical skills, elementary algebra, intermediate algebra, and college algebra for students enrolled spring 1992

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>1 - Exempt</td>
<td>50</td>
<td>32.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - Dec. zone</td>
<td>17</td>
<td>11.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - Recommend dev. course</td>
<td>88</td>
<td>56.8</td>
<td>79</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>100.0</td>
<td>79</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Group 1 - ASSET Numerical scores between 42 - 55
Group 2 - ASSET Numerical scores between 40 - 41
Group 3 - ASSET Numerical scores between 23 - 39

Group 1 - ASSET Elementary scores between 48 - 55
Group 2 - ASSET Elementary scores between 46 - 47
Group 3 - ASSET Elementary scores between 23 - 45

Group 1 - ASSET Intermediate Algebra scores 48 - 55
Group 2 - ASSET Intermediate Algebra scores 44 - 47
Group 3 - ASSET Intermediate Algebra scores 23 - 43

Group 1 - ASSET College Algebra scores 49 - 55
Group 2 - ASSET College Algebra scores 45 - 48
Group 3 - ASSET College Algebra scores 23 - 44
Table 7. Frequency of students by grade categories for students enrolled in psychology, sociology, English composition, introductory algebra, intermediate algebra, and college algebra spring 1992

<table>
<thead>
<tr>
<th>Grade Categories</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>F, D, W, Q, and Audit</td>
<td>185</td>
<td>38.5</td>
</tr>
<tr>
<td>C</td>
<td>90</td>
<td>18.8</td>
</tr>
<tr>
<td>B</td>
<td>109</td>
<td>22.7</td>
</tr>
<tr>
<td>A</td>
<td>96</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>480</td>
<td>100.0</td>
</tr>
</tbody>
</table>
CHAPTER IV. RESULTS

Introduction

The principal purpose of this part of the study is to evaluate developmental course effectiveness by examining student outcomes at Marshalltown Community College. The effectiveness of the voluntary placement system is also identified by examining the relationship between ASSET scores and course grades.

Part I

Purpose

The purpose of this part is to compare student outcomes of the following groups: Exempt Group: those exempt from developmental skills courses in all four areas - reading, writing, numerical skills and elementary algebra; Completers Group: those who were assessed as needing one to four developmental skills courses and who completed those courses; and Did Not Complete Group: those who were assessed as needing at least one developmental skills course and who did not complete at least one of those courses. Student outcome measures include: cumulative grade point average, total number of credits earned, retention to second semester,
Hypothesis Testing

The following hypotheses were tested:

**Null hypothesis one:** There is no significant difference in the cumulative grade point average among students in the three developmental skills course enrollment groups (Exempt, Completers, and Did Not Complete).

Mean grade point averages and standard deviations are shown in Table 8.

The one-way analysis of variance indicated a significant cumulative grade point average effect, $F (2,311) = 4.4431$, $p \leq .05$. A post-hoc Scheffe procedure indicated the difference was between group 1 and group 3.

A larger standard deviation is found in the Did Not Complete Group than either the Exempt or Completers Groups. This implies a greater variation in grade point average within the group.

These results indicate that students in the Exempt Group had higher cumulative grade point averages at the time they left the institution than students in the Did Not Complete Group. Those who completed developmental courses did not achieve a significantly higher grade point average than the Did Not Complete Group. Thus, the expectation that the
Table 8. Number, mean cumulative grade point average, and standard deviation of developmental skills course enrollment groups

<table>
<thead>
<tr>
<th>Number</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exempt Group</td>
<td>45</td>
<td>2.750</td>
</tr>
<tr>
<td>Complete Group</td>
<td>17</td>
<td>2.441</td>
</tr>
<tr>
<td>Did Not Complete Group</td>
<td>252</td>
<td>2.271</td>
</tr>
<tr>
<td>Total</td>
<td>314</td>
<td>2.349</td>
</tr>
</tbody>
</table>

cumulative grade point average of both the Exempt and Completers Group would be significantly higher than the Did Not Complete Group is only partially supported.

Null hypothesis two: There is no significant difference in the total credits earned among students in the three Developmental Skills course enrollment groups (Exempt, Completers, and Did Not Complete).

Mean numbers of credits earned are shown in Table 9.

A one-way analysis of variance indicated an insignificant credit effect, $F(2,311) = .0741$, $p \geq .05$. These results indicate that the number of credits a student accumulates is independent of his/her completion of developmental skills courses. Thus, the initial prediction (in Chapter 1) that students in the Exempt and Completers Group would earn
Table 9. Number, mean number of credits at time of graduation, and standard deviation of developmental skills course enrollment groups

<table>
<thead>
<tr>
<th>Number</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exempt Group</td>
<td>43.3111</td>
<td>22.8023</td>
</tr>
<tr>
<td>Complete Group</td>
<td>41.2353</td>
<td>22.9878</td>
</tr>
<tr>
<td>Did Not Complete Group</td>
<td>41.7421</td>
<td>27.1286</td>
</tr>
<tr>
<td>Total</td>
<td>41.7421</td>
<td>26.280</td>
</tr>
</tbody>
</table>

significantly more credits than the Did Not Complete Group is not supported.

A larger standard deviation is found in the Did Not Complete Group than either the Exempt or Completers Groups. This implies a greater variation of scores within the Did Not Complete group than is found in the other two groups.

Null hypothesis three: Retention to second year (for Arts and Sciences and Career Education students) is independent of developmental skills course enrollment groups (Exempt, Completers, and Did Not Complete).

Table 10 contains descriptive information about the three groups relative to their retention to the second year.

A chi-square statistic used to test this hypothesis was not significant, \( (X^2(2, N = 254) = .12626, p \geq .05) \). This indicates that retention to second year is independent of
Table 10. Retention of arts and science and career education (two-year) students relative to developmental skills enrollment

<table>
<thead>
<tr>
<th>Count Groups relative to developmental skills enrollment*</th>
<th>Col</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention Categories*</td>
<td>Pct</td>
<td>Pct</td>
<td>Pct</td>
<td>Pct</td>
<td></td>
</tr>
<tr>
<td>1 (yes)</td>
<td></td>
<td>63.9%</td>
<td>60.0%</td>
<td>64.5%</td>
<td>64.2%</td>
</tr>
<tr>
<td>2 (no)</td>
<td></td>
<td>36.1%</td>
<td>40.0%</td>
<td>35.5%</td>
<td>35.8%</td>
</tr>
</tbody>
</table>

Column Total

<table>
<thead>
<tr>
<th>Column</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>15</td>
</tr>
<tr>
<td>203</td>
<td>254</td>
</tr>
</tbody>
</table>

* Groups relative to developmental skills are defined as follows: 1) Exempt in all four developmental skills areas; 2) Exempt or complete in all four developmental skills areas; and 3) Recommended but did not complete at least one developmental skills course.

Retention categories are defined as follows: 1) yes - enrolled fall 1989; and 2) no, not enrolled fall 1989.

Thus, the initial expectation that retention to second year would be greater for students who were members of the Exempt or Completers Groups than for students in the Did Not Complete Group is not supported.
Null hypothesis four: Retention to second semester for certificate students is independent of developmental course enrollment groups (Exempt, Completers, and Did Not Complete).

The students in the Exempt and Completers groups were combined into one group and compared to those in the Did Not Complete group.

Table 11 contains descriptive information about the two groups relative to their retention to second semester. The chi-square analysis was used to test this hypothesis.

Table 11. Retention of certificate students (one-year) students relative to developmental skills enrollment

<table>
<thead>
<tr>
<th>Count</th>
<th>Groups relative to developmental skills enrollment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Col Pct</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Retention Categories&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (yes)</td>
<td>10</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>90.9%</td>
<td>83.7%</td>
</tr>
<tr>
<td>2 (no)</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>9.1%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Column Total</td>
<td>11</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<sup>a</sup> Groups relative to developmental skills enrollment are defined as follows: 1) Exempt or complete in all four developmental skills areas; and 2) Recommended but did not complete at least one developmental skills course.

<sup>b</sup> Retention categories are defined as follows: 1) yes - enrolled spring 1989; and 2) no, not enrolled spring 1989.
Since the assumptions of the table could not be met (cells with expected frequency < 5 = 25%), the results of the chi-square are not reported. Although the results cannot be evaluated statistically, the Exempt and Complete Group were retained to second semester at a higher rate than the Did Not Complete Group.

Null hypothesis five: Goal attainment (for students whose goal was to earn a certificate) is independent of developmental skills course enrollment groups (Exempt, Completers, and Did Not Complete).

The students in the Exempt and Completers groups were combined into one group and compared to those in the Did Not Complete group.

Table 12 contains descriptive information about the two groups relative to their success in reaching their goal of earning a certificate.

The chi-square analysis was used to test this hypothesis. A significant chi-square was not found between the two groups, \((X^2(1, N = 314) = .01942 \ p \geq .05)\). This indicates that goal attainment (for students whose goal was to earn a certificate) is independent of group membership relative to developmental skills course enrollment. Thus, the initial prediction that goal attainment (for students whose goal was to earn a certificate) would be greater for the Exempt and Completers Group than for the Did Not Complete Group, was not supported.
Table 12. Goal attainment of students whose goal was to earn a certificate relative to developmental skills enrollment

<table>
<thead>
<tr>
<th>Count Groups relative to developmental skills enrollment*</th>
<th>1</th>
<th>2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate Goal Categoriesb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (yes)</td>
<td>5</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>8.1%</td>
<td>7.5%</td>
<td>7.6%</td>
</tr>
<tr>
<td>2 (no)</td>
<td>57</td>
<td>233</td>
<td>290</td>
</tr>
<tr>
<td></td>
<td>91.9%</td>
<td>92.5%</td>
<td>92.4%</td>
</tr>
<tr>
<td>Column</td>
<td>62</td>
<td>252</td>
<td>314</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Groups relative to developmental skills enrollment are defined as follows: 1) Exempt or complete in all four developmental skills areas; and 2) Recommended but did not complete at least one developmental skills course.

b Certificate goal categories are defined as follows: 1) yes - goal was to earn a certificate and received a certificate; and 2) No-goal was not to earn a certificate.

**Null hypothesis six:** Goal attainment (for students whose goal was to earn a degree) is independent of developmental course enrollment groups (Exempt, Completers, and Did Not Complete).

Table 13 contains descriptive information about the three groups relative to their success in reaching their goal of earning a degree.

A chi-square was used to test this hypothesis. A significant chi-square was not found between the three groups,
Table 13. Goal attainment of students whose goal was to earn a degree relative to developmental skills enrollment

<table>
<thead>
<tr>
<th>Count</th>
<th>Groups relative to developmental skills enrollmenta</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Col</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Pct</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.7%</td>
<td>5.9%</td>
<td>15.9%</td>
<td>14.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>93.3%</td>
<td>94.1%</td>
<td>84.1%</td>
<td>86.0%</td>
<td></td>
</tr>
</tbody>
</table>

Degree Goal Categoriesb

1 (yes) 3 1 40 44

2 (no) 42 16 212 270

a Groups relative to developmental skills are defined as follows: 1) Exempt in all four developmental skills areas; 2) Exempt or complete in all four developmental skills areas; and 3) Recommended but did not complete at least one developmental skills course.

b Degree goal categories are defined as follows: 1) yes - goal was to earn a degree and received a degree; and 2) no - goal was not to earn a degree.

\(X^2(2, N = 314) = 3.67183, p > .05\). This indicates that goal attainment (for students whose goal was to earn a degree) is independent of group membership relative to developmental skills course enrollment. Thus, the initial prediction that goal attainment (for students whose goal was to earn a degree) would be greater for the Exempt and Completers Group than for the Did Not Complete Group, was not supported.
Null hypothesis seven: Goal attainment (for students whose goal was to transfer) is independent of developmental course enrollment groups (Exempt, Completers, and Did Not Complete).

Table 14 contains additional descriptive information about the three groups relative to their success in reaching their goal of transferring to another institution.

Table 14. Goal attainment of students whose goal was to transfer relative to developmental skills enrollment

<table>
<thead>
<tr>
<th>Count</th>
<th>Groups relative to developmental skills enrollment&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Col Pct</td>
<td></td>
<td>16</td>
<td>4</td>
<td>63</td>
<td>83</td>
</tr>
<tr>
<td>Transfer Goal Categories&lt;sup&gt;b&lt;/sup&gt;</td>
<td>35.6%</td>
<td>23.5%</td>
<td>25.0%</td>
<td>26.4%</td>
<td></td>
</tr>
<tr>
<td>1 (yes)</td>
<td>29</td>
<td>13</td>
<td>189</td>
<td>231</td>
<td></td>
</tr>
<tr>
<td>2 (no)</td>
<td>64.4%</td>
<td>76.5%</td>
<td>75.0%</td>
<td>3.6%</td>
<td></td>
</tr>
<tr>
<td>Column Total</td>
<td>45</td>
<td>17</td>
<td>252</td>
<td>314</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Groups relative to developmental skills are defined as follows: 1) Exempt in all four developmental skills areas; 2) Exempt or complete in all four developmental skills areas; and 3) Recommended but did not complete at least one developmental skills course.

<sup>b</sup> Transfer goal categories are defined as follows: 1) yes - goal was to transfer and transferred to a 2- or 4-year institution; and 2) no-goal was not to transfer.
A chi-square analysis was used to test this hypothesis. A significant chi-square was not found between the three groups, \( \chi^2 (2, N = 314) = 2.26563, p > .05 \). This indicates that goal attainment (for students whose goal was to transfer) is independent of group membership relative to developmental course enrollment. Thus, the prediction that goal attainment (for students whose goal was to transfer) would be greater for the Exempt and Completers Group than for the Did Not Complete Group, was not supported.

Null hypothesis eight: Whether or not a student received a certificate is independent of developmental course enrollment groups (Exempt, Completers, and Did Not Complete).

Table 15 contains descriptive information about the three groups and the rate at which they earned a certificate.

A chi-square analysis was used to test this hypothesis. Since the assumptions of the table could not be met (cells with expected frequency < 5 = 50%), the results of the chi-square are not reported. Although the results cannot be evaluated statistically, both the Exempt Group and the Completer Group earned a certificate at a higher rate than the Did Not Complete Group.

Null hypothesis nine: Whether or not a student received a degree is independent of group membership relative to groups and the rate at which they earned a degree.
Table 15. Certificate earned relative to developmental skills enrollment

<table>
<thead>
<tr>
<th>Count Groups relative to developmental skills enrollmenta</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Col Pct</td>
<td>6</td>
<td>2</td>
<td>29</td>
<td>37</td>
</tr>
<tr>
<td>Certificate Categoriesb</td>
<td>66.7%</td>
<td>100.0%</td>
<td>59.2%</td>
<td>61.7%</td>
</tr>
<tr>
<td>1 (yes)</td>
<td>3</td>
<td>0</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>2 (no)</td>
<td>33.3%</td>
<td>0.0%</td>
<td>40.8%</td>
<td>38.3%</td>
</tr>
<tr>
<td>Column</td>
<td>9</td>
<td>2</td>
<td>49</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

a Groups relative to developmental skills are defined as follows: 1) Exempt in all four developmental skills areas; 2) Exempt or complete in all four developmental skills areas; and 3) Recommended but did not complete at least one developmental skills course.

b Certificate categories are defined as follows: 1) yes—earned a certificate by fall 1989; and 2) no—did not earn a certificate by fall 1989.

Table 16 contains descriptive information about the three groups and the rate in which they earned a degree.

A chi-square analysis was used to test this hypothesis. A significant chi-square was not found between the three groups ($\chi^2(2, N = 254) = 2.71917, p \geq .05$). Thus, the initial prediction that the Exempt and Completers Group would earn a degree at a higher rate than the Did Not Complete Group, was not supported.
Table 16. Degree earned relative to developmental skills enrollment

<table>
<thead>
<tr>
<th>Count</th>
<th>Groups relative to developmental skills enrollment&lt;sup&gt;a&lt;/sup&gt;</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Col</td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree Categories&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (yes)</td>
<td></td>
<td>8</td>
<td>4</td>
<td>72</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.2%</td>
<td>26.7%</td>
<td>35.5%</td>
<td>33.1%</td>
</tr>
<tr>
<td>2 (no)</td>
<td></td>
<td>32</td>
<td>11</td>
<td>131</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td></td>
<td>77.8%</td>
<td>73.3%</td>
<td>64.5%</td>
<td>66.9%</td>
</tr>
<tr>
<td>Column</td>
<td></td>
<td>36</td>
<td>15</td>
<td>203</td>
<td>254</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

<sup>a</sup> Groups relative to developmental skills are defined as follows: 1) Exempt in all four developmental skills areas; 2) Exempt or complete in all four developmental skills areas; and 3) Recommended but did not complete at least one developmental skills course.

<sup>b</sup> Degree categories are defined as follows: 1) yes - earned a degree by spring 1991; and 2) no - did not earn a degree by spring 1991.

Compliance with Voluntary Placement System Guidelines

The data presented an opportunity to analyze the differences among the mean ASSET test scores in relationship to the cut-off scores. Although these scores are not currently being used, the analysis has implications for the current voluntary placement system since the conversion from Form A to Form B was made using the same percentile ranking.
For example, the mean is above the cut-off for basic skills recommendation in the Language Usage area (Mean = 48.420, cut-off = 41), yet is below the cut-off for Reading (Mean = 27; cut-off = 29); Numerical Skills (Mean = 19.079, cut-off = 20); and Elementary Algebra (Mean = 11.913, cut-off = 15). This resulted in a relatively small percentage of students recommended to complete basic skills courses related to Language Usage (13%) compared to higher percentages for Reading (52%), Numerical Skills (60%), and Elementary Algebra (84%)(see Table 17).

Table 17. Number of students who completed the recommended developmental skills courses

<table>
<thead>
<tr>
<th></th>
<th>Number Exempt</th>
<th>Number Rec. to Complete</th>
<th>Number Completing</th>
<th>Number Not Completing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Language</td>
<td>314</td>
<td>272</td>
<td>87</td>
<td>42</td>
</tr>
<tr>
<td>Reading</td>
<td>313</td>
<td>149</td>
<td>48</td>
<td>164</td>
</tr>
<tr>
<td>Numerical</td>
<td>127</td>
<td>51</td>
<td>40</td>
<td>76</td>
</tr>
<tr>
<td>Ele.Alg.</td>
<td>185</td>
<td>29</td>
<td>16</td>
<td>156</td>
</tr>
</tbody>
</table>

Note: f = number of subjects
Also in Table 17, the number of completers is compared to the number of non-completers by test area. Language Usage shows a high percentage of completers (29%), while Reading also shows a high percentage (35%). However, relatively few students complete Numerical Skills (7%), and Elementary Algebra (14%).

In summary, when the mean was above the cut-off score for developmental course recommendation, as in the case of Language Usage, fewer students are recommended to enroll, yet a relatively high percentage complete the course. This may have reflected a more appropriate cut-off score, and a more efficient use of the voluntary placement system. Of course, another criterion to be examined in part II of this study is how well Exempt students succeed in regular courses.

Summary

Students in the Exempt and Completers group did not do better than the students in the Did Not Complete group on the following outcomes measures: total credits earned, retention to second year (two-year students), retention to second semester (one-year students), goal attainment (for students whose goal was to earn a certificate, degree, and transfer), certificate earned, and degree earned. However, the cumulative grade point average of the Exempt group was higher.
than the Did Not Complete group, but not significantly higher than the Completers.

Part II

Purpose

Another purpose of the study was to determine if ASSET scores can be used as predictors of success in certain courses, as well as to evaluate the present ASSET guidelines for placement into developmental courses. If all the subjects were placed in courses appropriate to their ability level (and therefore were succeeding in the courses), one would expect correlations between placement test scores and course grades to be low. However, the voluntary placement system is not being followed closely, as evidenced by the number of students who complete the developmental courses for which they are recommended (Language Usage - 29%, Reading - 35%, Numerical - 7%, and Elementary Algebra - 14%).

Prediction of Course Success

Null hypothesis ten: For students enrolled spring 1992, there is no relationship between ASSET scores and grades earned in courses in the following areas:

a) ASSET Reading Skills scores and Psychology grades
b) ASSET Writing Skills scores and Psychology grades
c) ASSET Reading Skills scores and Sociology grades
d) ASSET Writing Skills scores and English Composition grades
e) ASSET Numerical Skills scores and Elementary Algebra grades
f) ASSET Elementary Algebra and Intermediate Algebra grades

The Pearson correlation was used to test this hypothesis. Table 18 includes all the correlations generated through this analysis. This table can be summarized as follows. ASSET Reading scores were the best predictors of course grades, with significant correlations with grades in Psychology (.35), English Composition (.36), Elementary Algebra (.33), and College Algebra (.36). Significant correlations were also found with ASSET Writing Skills and grades in Sociology (.35) and Psychology (.26). ASSET Numerical Skills scores were significantly correlated with Elementary Algebra (.54), Intermediate Algebra (.29), and College Algebra (.58) grades. A significant negative correlation was found between ASSET Elementary Algebra and grades in the Elementary Algebra test (-.54). This correlation may be spurious due to the few number of students who took the Elementary Algebra test.

The correlations relevant to the current advising recommendations are as follows:
a) The correlation found between ASSET Reading Skills scores and Psychology grades was statistically significant ($r = .35, p > .05$). This would indicate that ASSET Reading Skills scores can be used to predict Psychology grades.

Table 18. Correlation matrix

<table>
<thead>
<tr>
<th>Course Grade</th>
<th>Writing Skills</th>
<th>Reading Skills</th>
<th>Numerical Skills</th>
<th>Elementary Algebra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psych</td>
<td>.26*</td>
<td>.35*</td>
<td>.01</td>
<td>.12</td>
</tr>
<tr>
<td>N=112</td>
<td>N=75</td>
<td>N=75</td>
<td>N=26</td>
<td>N=15</td>
</tr>
<tr>
<td>Soc</td>
<td>.35*</td>
<td>.05</td>
<td>.30</td>
<td>-.27</td>
</tr>
<tr>
<td>N=66</td>
<td>N=34</td>
<td>N=34</td>
<td>N=15</td>
<td>N=8</td>
</tr>
<tr>
<td>Eng. Comp.</td>
<td>.21</td>
<td>.36*</td>
<td>.17</td>
<td>.15</td>
</tr>
<tr>
<td>N=72</td>
<td>N=48</td>
<td>N=48</td>
<td>N=26</td>
<td>N=8</td>
</tr>
<tr>
<td>Ele. Alg.</td>
<td>.21</td>
<td>.33*</td>
<td>.54*</td>
<td>-.54*</td>
</tr>
<tr>
<td>N=69</td>
<td>N=53</td>
<td>N=53</td>
<td>N=40</td>
<td>N=15</td>
</tr>
<tr>
<td>Int. Alg.</td>
<td>.07</td>
<td>-.01</td>
<td>.29*</td>
<td>-.08</td>
</tr>
<tr>
<td>N=85</td>
<td>N=55</td>
<td>N=55</td>
<td>N=24</td>
<td>N=22</td>
</tr>
<tr>
<td>Col. Alg.</td>
<td>.24</td>
<td>.36*</td>
<td>.58*</td>
<td>-.21</td>
</tr>
<tr>
<td>N=76</td>
<td>N=55</td>
<td>N=55</td>
<td>N=24</td>
<td>N=11</td>
</tr>
</tbody>
</table>

* Significant at .05 level

Bold indicates those correlations relevant to current recommendations.
b) The correlation found between ASSET Writing Skills scores and Psychology grades was statistically significant \((r = .26, p \geq .05)\). This would indicate that ASSET Writing Skills scores can be used to predict grades in Psychology.

c) The correlation found between ASSET Reading scores and Sociology grades was not statistically significant \((r = .05, p \leq .05)\). This would indicate that ASSET Reading scores cannot be used to predict grades in Sociology. This correlation may be low due to the variation of instructor requirements. Since the correlation is higher with Writing Skills \((r = .35, p \geq .05)\), the instructor may have emphasized this skill to a greater extent.

d) The correlation found between ASSET Writing scores and English Composition grades was not statistically significant \((r = .21, p \leq .05)\). This would indicate that ASSET Writing Skills scores cannot be used to predict grades in English Composition.

e) The correlation found between ASSET Numerical Skills scores and Elementary Algebra grades was significant \((r = .54, p \geq .05)\). This would indicate that ASSET Numerical Skills scores can be used to predict Elementary Algebra grades.

f) The correlation found between ASSET Elementary Algebra scores and Intermediate Algebra grades was not significant \((r = -.08, p \geq .05)\). This would indicate that ASSET Elementary Algebra scores cannot be used to predict Intermediate Algebra grades.
Summary

Based on advising recommendations, significant correlations were expected and found for ASSET Reading and Psychology, ASSET Writing and Psychology, and ASSET Numerical Skills and Elementary Algebra. Significant correlations were expected but not found for ASSET Reading and Sociology, ASSET Writing and English Composition, and ASSET Elementary Algebra and Intermediate Algebra.

Other correlations were found which were not expected. They include: ASSET Writing and grades in Sociology; ASSET Reading and grades in English Composition, Elementary Algebra and College Algebra; ASSET Numerical Skills and grades in Intermediate Algebra and College Algebra; and a negative correlation between ASSET Elementary Algebra and Elementary Algebra grades.

Evaluation of Placement Guidelines

Null hypothesis eleven: Advising recommendations established by Marshalltown Community College faculty have identified the appropriate cut-off scores for the student's best chance for success in the following areas:

a) ASSET Reading Skills for placement in Psychology
b) ASSET Writing Skills for placement in Psychology
c) ASSET Reading Skills for placement in Sociology
d) ASSET Writing Skills for placement in English Composition

e) ASSET Numerical Skills for placement in Elementary Algebra

f) ASSET Elementary Skills for placement in Intermediate Algebra

A chi-square analysis was used to test the components of this hypothesis, and expectancy tables were generated. The results are as follows:

a) ASSET Reading Skills for Placement in Psychology (Table 19)

The chi-square could not be used since the assumptions of the table could not be met (cells with expected frequency less than five equalled 8 of 12 or 66.7%). Table 19 can be summarized as follows:

Sixty-seven percent of students who were Exempt from Developmental Reading (ASSET Reading Skills scores 43-53) received an A or B in Psychology, whereas 33% received "C" or lower. Conversely, 42% of the lowest scoring students (ASSET Reading Skills scores 23 through 37 who were recommended to take Reading Improvement I or II) received an "A" or "B", whereas 58% received a "C" or lower. These results reflected the correlational findings that ASSET
Table 19. Expectancy table of grade categories by advising recommendation categories for ASSET Reading Skills for students enrolled in Psychology spring 1992

<table>
<thead>
<tr>
<th>Count Col.</th>
<th>Grade Categoriesa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Pct</td>
<td></td>
</tr>
<tr>
<td>Degree Categoriesb</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>16.3%</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>21.4%</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>33.3%</td>
</tr>
<tr>
<td>Column</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

a Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

b Advising Recommendation categories are defined as follows: 1) ASSET Reading scores 43 through 53 - exempt from developmental courses; 2) ASSET Reading scores 38 through 42 - recommend Developmental Reading; and 3) ASSET Reading scores 23 through 37 - recommend Reading Improvement I or II.

Reading Skills scores are valid predictors of Psychology grades.

b) ASSET Writing Skills for placement in Psychology (Table 20)

A chi-square was used to test this hypothesis. A significant chi-square was found between the three groups ($X^2(2, N = 75), p \leq .05$). Table 20 can be summarized as follows:
Table 20. Expectancy table of grade categories by advising recommendations categories for ASSET Writing Skills for students enrolled in Psychology spring 1992

<table>
<thead>
<tr>
<th>Grade Categories*</th>
<th>Count</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Col.</td>
<td>Pct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advising Recommendation Categories^</td>
<td></td>
<td>7 4 9 13</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>21.2% 12.1% 27.3% 39.4%</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>4.2% 29.2% 41.7% 25.0%</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>38.9% 22.2% 27.8% 11.1%</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column</td>
<td></td>
<td>15 15 24 21</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20.0% 20.0% 32.0% 28.0%</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

^Advising recommendation categories are defined as follows: 1) ASSET Writing scores 45 through 54 - exempt from developmental courses; 2) ASSET Writing scores 39 through 44 - Composition Lab recommended; and 3) ASSET Writing scores 23 through 38 - Basic English recommended.

Sixty-seven percent of students who were exempt from developmental writing courses (ASSET Writing Skills scores 45-54) received an "A" or "B" in Psychology, whereas 33% received a "C" or lower. Conversely, 39% of the lowest scoring students (ASSET Writing scores 23 through 38) who were recommended to take Basic English or Study Skills received an "A" or "B" in Psychology, whereas 61% received...
a "C" or lower. These results reflect the correlational findings that ASSET Writing Skills scores are valid predictors of Psychology grades.

c) **ASSET Reading Skills for placement in Sociology** (Table 21)
The chi-square could not be used since cells with expected frequencies less than five equalled 11 of 12, or 91.7%.

Table 21 can be summarized as follows:

Twenty-nine percent of students who were exempt from Developmental Reading (ASSET Reading Skills scores 43-53) earned an "A" or "B" in Sociology, whereas 71% received a "C" or lower. Conversely, none of the lowest scoring students (ASSET Reading Skills scores 23-37) who were recommended to take Reading Improvement I or II earned an "A" or "B" in Sociology, and 100% received a "C" or lower. These results reflected the correlational finding that ASSET Reading Skills scores are not valid predictors of Sociology grades. The percent of failures is somewhat high, indicating that students may not have had the basic skills to succeed.

d) **ASSET Writing Skills for placement in English Composition** (Table 22)

The chi-square could not be used since the cells with expected frequency less than five equalled 9 of 12, or 75%.

Table 22 can be summarized as follows:
Table 21. Expectancy table of grade categories by advising recommendations categories for ASSET Reading Skills for students enrolled in Sociology spring 1992

<table>
<thead>
<tr>
<th>Count Col.</th>
<th>Grade Categories&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pct</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td>Advising Recommendation Categories&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>9</td>
<td>5</td>
<td>1</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>28.6%</td>
<td>42.9%</td>
<td>23.8%</td>
<td>4.8%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>80.0%</td>
<td>0.0%</td>
<td>20.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25.0%</td>
<td>75.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>Column</td>
<td>8</td>
<td>19</td>
<td>5</td>
<td>2</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23.5%</td>
<td>55.9%</td>
<td>14.7%</td>
<td>5.9%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

<sup>b</sup>Advising Recommendation categories are defined as follows: 1) ASSET Reading scores 43 through 53 - exempt from developmental courses; 2) ASSET Reading scores 38 through 42 - recommend Developmental Reading; and 3) ASSET Reading scores 23 through 37 - recommend Reading Improvement I or II.

Fifty-eight percent of students who were exempt from developmental English courses (ASSET Writing scores 45-54) received an "A" or "B" in English Composition, whereas 42% earned a "C" or lower. Conversely, 35% of students who were recommended to take Basic English or Study Skills (ASSET Writing scores 23-38) received an "A" or "B", whereas 65% received a "C" or lower. These results reflect
Table 22. Expectancy table for grade categories by advising recommendations categories for ASSET Writing Skills for students enrolled in English Composition spring 1992

<table>
<thead>
<tr>
<th>Advising Recommendation Categories</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td><em>Pct</em></td>
<td>41.7%</td>
<td>0.0%</td>
<td>25.0%</td>
<td>33.3%</td>
<td>100.0%</td>
</tr>
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<td>2</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td><em>Pct</em></td>
<td>7.7%</td>
<td>38.5%</td>
<td>30.8%</td>
<td>23.1%</td>
<td>100.0%</td>
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<td>3</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td><em>Pct</em></td>
<td>34.8%</td>
<td>30.4%</td>
<td>30.4%</td>
<td>4.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Column 1</td>
<td>14</td>
<td>12</td>
<td>14</td>
<td>8</td>
<td>48</td>
</tr>
<tr>
<td><em>Pct</em></td>
<td>29.2%</td>
<td>25.0%</td>
<td>29.2%</td>
<td>16.7%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

* Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

Advising recommendation categories are defined as follows: 1) ASSET Writing scores 45 through 54 - exempt from developmental courses; 2) ASSET Writing scores 39 through 44 - Composition Lab recommended; and 3) ASSET Writing scores 23 through 38 - Basic English recommended.

the correlational findings that ASSET Writing Skills scores are not valid predictors of English Composition grades.

Group 2 (Composition Lab recommended) had the same rate of success as Group 1 (Exempt). That is, 46% earned a "C" or lower, while 54% received an "A" or "B". This may further suggest that the cut-off score should be raised to
further prevent under-prepared students from enrolling in regular courses.

If the Reading Skills test had been used to predict success in English Composition, 31% of the Exempt students would have received a "C" or lower. This compares to a 42% failure rate using the Writing Skills test as a predictor. This supports the suggestion that Reading Skills be used for placement in English Composition (see Table 23).

e) **ASSET Numerical Skills for placement in Elementary Algebra**
(\textit{Table 24})

The chi-square could not be used since the cells with expected frequency less than five equalled 10 of 12, or 83%. Table 24 can be summarized as follows:

Fifty-eight percent of the students who were Exempt from Study Skills Arithmetic (ASSET Numerical Skills score 42-55) earned an "A" or "B" in Elementary Algebra, whereas 42% received a "C" or lower. Conversely, 8% of students who were recommended to take Study Skills Arithmetic (ASSET Numerical Skills scores 23-39) earned an "A" or "B" in Elementary Algebra, whereas 92% received a "C" or below. These results reflect the correlational findings that ASSET Numerical Skills scores are valid predictors of Elementary Algebra grades. The percent of failure is somewhat high, indicating students may not have had the basic skills to succeed in the course.
Table 23. Expectancy table for grade categories by advising recommendations categories for ASSET Reading Skills for students enrolled in English Composition spring 1992

<table>
<thead>
<tr>
<th>Column</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pct</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>14</td>
<td>15</td>
<td>48</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Advising Recommendation Categories

<table>
<thead>
<tr>
<th>Advising Recommendation Categories</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>21.1%</td>
<td>10.5%</td>
<td>36.8%</td>
<td>31.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>50.0%</td>
<td>21.4%</td>
<td>14.3%</td>
<td>14.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>20.0%</td>
<td>46.7%</td>
<td>33.3%</td>
<td>0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Column  Total

<table>
<thead>
<tr>
<th></th>
<th>14</th>
<th>12</th>
<th>14</th>
<th>8</th>
<th>48</th>
</tr>
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<tbody>
<tr>
<td>Total</td>
<td>29.2%</td>
<td>25.0%</td>
<td>29.2%</td>
<td>16.7%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*a Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

*b Advising recommendation categories are defined as follows: 1) ASSET Writing scores 45 through 54 - exempt from developmental courses; 2) ASSET Writing scores 39 through 44 - Composition Lab recommended; and 3) ASSET Writing scores 23 through 38 - Basic English recommended.

f) ASSET Elementary Algebra Skills for placement in Intermediate Algebra (Table 25)

The chi-square could not be used since the number of non-empty rows or column is > one. Table 25 can be summarized as follows: There were no students in the exempt (high)
Table 24. Expectancy table for grade categories by advising recommendations for ASSET Numerical Skills for students enrolled in Elementary Algebra spring 1992

<table>
<thead>
<tr>
<th>Count Col.</th>
<th>Grade Categories&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advising Recommendation Categories&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>1</td>
<td>41.7% 0.0% 8.3% 50.0% 100.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>100.0% 0.0% 0.0% 0.0% 100.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>88.0% 4.0% 4.0% 4.0% 100.0%</td>
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<tr>
<td>Column Total</td>
<td></td>
<td>30</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>75.0% 2.5% 5.0% 17.5% 100.0%</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

<sup>b</sup> Advising recommendation categories are defined as follows: 1) ASSET Numerical Skills scores 42 through 55 - exempt from developmental courses; 2) ASSET Numerical Skills scores 40 through 41 - decision one; and 3) ASSET Numerical Skills scores 23 through 39 - recommend Study Skills Arithmetic.

group. Twenty-seven percent of the students who were recommended to take Elementary Algebra (ASSET Elementary Algebra scores 23-45) received an "A" or "B", whereas, 73% received a "C" or lower. These results reflect the correlational findings that ASSET Elementary Algebra scores are not valid predictors of Intermediate Algebra grades.
Table 25. Expectancy table for grade categories by advising recommendations for ASSET Elementary Algebra for students enrolled in Intermediate Algebra spring 1992

<table>
<thead>
<tr>
<th>Advising Recommendation Categories</th>
<th>Count</th>
<th>Grade Categories</th>
<th>Col. Pct</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td>3</td>
<td>13</td>
<td>100.0%</td>
<td>3</td>
<td>100.0%</td>
<td>2</td>
<td>100.0%</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column</td>
<td>13</td>
<td>13</td>
<td>59.1%</td>
<td>3</td>
<td>13.6%</td>
<td>2</td>
<td>9.1%</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

*b Advising recommendation categories are defined as follows: 1) ASSET Elementary Algebra scores 48 through 55 - exempt from Elementary Algebra; 2) ASSET Numerical Skills scores 46 through 47 - decision zone; and 3) ASSET Elementary Algebra scores 23 through 45 - recommend Elementary Algebra.

The percent of failure is somewhat high, indicating students may not have had the basic skills to succeed.

If Numerical Skills had been used to predict Intermediate Algebra grades (see Table 26), 50% of the Exempt group would have received a "C" or lower, compared to a 73% failure rate using the Elementary Algebra test as a predictor. This supports the suggestion that the Numerical Skills is a better predictor for Intermediate Algebra grades than Elementary Algebra test (see Table 26).
Table 26. Expectancy table for grade categories by advising recommendations for ASSET Numerical Skills for students enrolled in Intermediate Algebra spring 1992

<table>
<thead>
<tr>
<th>Count Col.</th>
<th>Grade Categories&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pct</td>
<td>1</td>
</tr>
<tr>
<td>Advising Recommendation Categories&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>50.0%</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>75.0%</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
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<tr>
<td>Column</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>54.2%</td>
</tr>
</tbody>
</table>

<sup>a</sup>Grade categories are defined as follows: 1) F, D, Withdrawal, Q (no credit, and audit); 2) C; 3) B; and 4) A.

<sup>b</sup>Advising recommendation categories are defined as follows: 1) ASSET Numerical Skills scores 42 through 55 - exempt from developmental courses; 2) ASSET Numerical Skills scores 40 through 41 - decision one; and 3) ASSET Numerical Skills scores 23 through 39 - recommend Study Skills Arithmetic.

**Summary**

These results reflect the correlational findings that ASSET Reading scores are valid predictors for Psychology, but not for Sociology. ASSET Writing Skills are valid predictors of Psychology grades, but not English Composition, and ASSET Numerical Skills are valid predictors for Elementary Algebra,
but ASSET Elementary Algebra scores are not valid predictors for Intermediate Algebra.

It was also found that if ASSET Reading had been used as a predictor for graders in English Composition, and ASSET Numerical Skills had been used as a predictor for grades in Intermediate Algebra, fewer students would have earned failing grades.
CHAPTER V. DISCUSSION

Introduction

The central purpose of this research study was to evaluate course effectiveness by comparing student outcomes (cumulative grade point average; total credits earned; retention to second year; retention to second semester; goal attainment for certificate, degree, and transfer; certificate earned; and degree earned) among three groups of Marshalltown Community College students: (1) Exempt Group: those exempt from developmental skills courses in all four areas - reading, writing, numerical skills, and elementary algebra; (2) Completers Group: those who completed all four developmental skills courses (they may have been exempt from some); (3) Did Not Complete Group: those who were assessed as needing at least one developmental skills course and who did not complete at least one of those courses. Also, the voluntary placement system based on ASSET score ranges was examined to identify the relationship between ASSET test scores and course grades.

Marshalltown Community College Students

Since the subjects for this report are Marshalltown Community College students, it is helpful to know how these students compare to other community college students in Iowa.
so that these results can be used by other community colleges with similar needs and interests. Marshalltown Community College ASSET participants are similar to all Iowa ASSET participants on most measures of academic preparation (high school grade point average and ASSET scores), but lower in math. According to a survey conducted by the Iowa Bureau of Educational and Student Services regarding student and developmental education (October, 1991), 59% of the students tested in all Iowa community colleges were recommended to take developmental math courses. At Marshalltown Community College, 60% of the students who took the Numerical Skills test were recommended for Basic Arithmetic, while 84% who took the Elementary Algebra test were recommended to take Elementary Algebra.

Although Marshalltown Community College students were advised to take developmental math courses, few completed them. Only 7% completed Basic Arithmetic, and 14% completed Elementary Algebra (see Chapter 4). Statewide, students enrolled in developmental math and Elementary Algebra at higher rates (34% and 70%, respectively), but this cannot be used as an exact comparison, since the measure for Marshalltown Community College students was completion of such courses.

In areas other than math, Marshalltown Community College students score as high as other community college students in Iowa on ASSET, and they score higher (one standard deviation
above the mean) than community college sophomores on the Collegiate Assessment of Academic Proficiency Writing Skills test (CAAP) (Marshalltown Community College institutional research, November, 1992).

On measures of goal aspiration (consider transfer and plan to earn a certificate/two-year degree), Marshalltown Community College students were more determined to transfer than all other Iowa ASSET participants, yet not as determined to earn a certificate or diploma or a two-year degree. This finding may help Marshalltown Community College administrators to view the outcomes attained by their students in relationship to their goals. Specifically, Marshalltown Community College students may not be expected to be retained to graduation at the same rate as other Iowa community college students, as their goals reflect a greater desire to transfer, compared to receiving a certificate or degree. However, Marshalltown Community College students are not unique when compared nationwide in their relative lack of interest in earning a credential from their community college. In 1992, Adelman found that only 20% of community college attenders actually earn an Associate degree.

**Developmental Course Effectiveness**

Students in the Exempt and Completers group did not outperform the students in the Did Not Complete group on any
outcome measure (cumulative grade point average; total credits earned; retention to second year; retention to second semester; goal attainment for certificate, degree, and transfer; certificate earned; and degree earned) except cumulative grade point average, where the Exempt Group performed significantly higher than the Did Not Complete Group. (This result conflicts with the findings of Boylan (1983) who found that effective developmental education activities result in higher grades for those who participated than for those who did not.)

In addition, on total number of credits earned and retention (length of time a student stays at the institution) it was predicted that the Exempt Group and the Completers Group would do better than the Did Not Complete Group. The results indicate that the number of credits a student accumulates is independent of his/her completion of developmental skills courses. Retention to second year (for degree students) and second semester (for certificate students) is also independent of developmental course enrollment groups (Exempt, Completers, and Did Not Complete).

Thus, although the Completers were not found to out-perform those in the Did Not Complete Group, both groups were generally as successful as the Exempt Group on these outcomes. Several explanations are possible. First, these results may imply that weaker students "catch up" to more capable students. However, this cannot be attributed to developmental
skills courses directly, as students who are advised to take developmental skills courses but don't do as well as those who complete them. It may be hypothesized that special assistance is being provided throughout the institution for weaker students which leads to a positive impact on retention. This hypothesis is supported by research conducted by Maring, Shea, and Warner (1987) who found developmental students (who tend to drop out at a greater rate than regular students) remained at the university at the same rate as students who were exempt from developmental courses when special assistance was provided.

The same interpretation can be made about the remaining outcome measures including goal achievement and degree or certificate/diploma earned. The three groups were not found to vary significantly, which implies that once a goal is identified, it is achieved at the same rate regardless of enrollment in developmental studies. Completion of the prescibed developmental course does not appear to enhance the student's ability to reach his or her goal.

On the other hand, students who needed developmental education had various levels of exposure to it, and for most of them, whatever experience they had may have been educationally beneficial for them. The Exempt Group, of course, was defined as those exempt from developmental skills courses in all four areas - reading, writing, numerical skills, and elementary algebra. This group, then, was
comprised of a homogeneous group of relatively high-achieving students. However, the Completer Group was defined as those who completed all four developmental courses and may have been exempt from some. Thus, the students who completed developmental courses in each academic area were combined into a small heterogeneous group who enrolled in every developmental course their advisor suggested, and completed it. The Did Not Complete Group was defined as those who were assessed as needing at least one developmental skills course and did not complete at least one of those courses. Therefore, students in this group may have completed one course in the area they felt most deficient, or the course most available, and not completed the other recommended courses. In addition, this group consisted of some students who may have enrolled but not completed the developmental course with a passing grade. Whatever experience they had may have enhanced their performance on the outcome measures of this study.

Prediction of Course Success

It was found that ASSET Reading Skills are the best predictors of success for Psychology and English Composition (as expected). However, ASSET Reading Skills does not predict success in Sociology, as expected. A significant correlation does exist between ASSET Writing Skills and Sociology. This
raises questions about the manner in which grades are
assigned. Another question raised is why so many students
receive low grades in Sociology (79% received a "C" or lower).
Marshalltown Community College faculty and administrators may
want to examine this.

It was also found that ASSET Reading Skills are good
predictors of success in Elementary and College Algebra. This
correlation is somewhat surprising, and may be explained by
assuming the ASSET Reading Skills test measures a general
ability to learn. This general learning ability may be
complimented by the willingness of Elementary and College
Algebra instructors to provide supplementary learning
experiences in algebra, as well as teaching to the ability of
the students. Although this may help students who have a
general reading ability, most (75%) of the students with low
math skills (as measured by ASSET Numerical Skills) failed the
course (see Table 24). This is also true for students in
Intermediate Algebra, as 54% of students with low math skills
(as measured by ASSET Numerical Skills) failed to receive a
"C" or above.

ASSET Numerical Skills can be used to predict success in
math courses beyond Elementary Algebra, but ASSET Elementary
Algebra is negatively associated with grades in Elementary
Algebra, Intermediate Algebra, and College Algebra. This
correlation indicates that scoring high on the ASSET
Elementary Algebra test does not predict success in any
Algebra class. This may be due to a mismatch between the content of the ASSET test and the actual course content and should be reviewed by Marshalltown Community College faculty and administrators.

This same analysis should be conducted for the expected (yet not found) correlation between ASSET Writing and English Composition. Marshalltown Community College faculty and administrators may want to further analyze the closer relationship between ASSET Reading Skills and English Composition than the expected and nonexistent relationship between ASSET Writing Skills and English Composition.

Along with these correlation results, data on the relationship of the mean to the cut-off score should be considered when adjusting the advising recommendations. It appears that when the cut-off score is closer to the mean, as in the case of Reading and Numerical Skills, placement is more successful. When the cut-off scores are set too high, as in Writing Skills, too many students are exempt from developmental skills and hence fail English Composition.

Recommendations

It is recommended that faculty advisors at Marshalltown Community College take greater ownership in improving the effectiveness of the voluntary placement system. This could be accomplished by first examining the reasons why students do
not follow the advising recommendations, by either choosing not to enroll, or not completing the courses once enrolled. This could be accomplished through a survey of students inquiring why they chose to remediate certain deficiencies and not others.

Faculty should specifically examine the content of the ASSET Writing Skills and Reading test compared to the content of English Composition. This examination would then provide guidance as to whether or not Writing Skills should continue to be used for placement in English composition, or whether Reading Skills should be used for placement.

Faculty should also examine the content of the Numerical Skills of the Elementary Algebra tests in relationship to the content of the Intermediate Algebra course. This examination would provide guidance as to whether Numerical Skills should be used as a better predictor.

It is further recommended that Marshalltown Community College explore the reasons why Marshalltown Community College ASSET participants score lower in math than other Iowa ASSET participants. This should be pursued with area high schools, the primary source of Marshalltown Community College students.

Implications of Future Research

Institutional research is critical to understanding institutional effectiveness and specifically student outcomes.
In order to further this effort, Marshalltown Community College must develop an effective data base of student records and achievement patterns.

Additional research could be conducted to further understand the long-term effects of the initial math deficiency students present to Marshalltown Community College, and the degree to which they maintain this deficiency. This study could examine the math success of students who transfer from Marshalltown Community College to four-year institutions.

An additional study could examine the reasons why students at Marshalltown Community College desire to transfer to four-year colleges at a higher rate than students from other Iowa community colleges. Is this due to a lack of vocational-technical programs which lead to Associate degrees, or is it due to the accessibility of many four-year colleges in the surrounding area?

Additional studies could be designed to determine the implications of the findings that developmental courses do not necessarily enhance a student's ability to succeed once enrolled in developmental courses. This research could be directed at identifying the factors which lead to the effectiveness of developmental courses and the placement system which supports them.
REFERENCES


Marshalltown Community College Catalog. (1992). Marshalltown, IA.


ACKNOWLEDGEMENTS

My first acknowledgement goes to my husband, Dwight, since in any true partnership, nothing can be accomplished without a direct impact on the other. It has been through his sacrifice and hard work, as well as mine, that I was able to achieve this long-sought degree. His encouragement and understanding of the process enabled me to persevere, and for this I am grateful.

Our children, Ashley and Whitney, also deserve special recognition for their patience and understanding as mom worked on her "study". Ashley, now 11 years old, cannot remember a time when her mother was not in school. Whitney, now 6, spent many afternoons sharing mom with a kitchen timer which determined when she could dominate my thinking.

My parents, Paul and Pat Perry, as well as my in-laws, John and Jeanette Tomlin, have taken a special interest in my goal, and always encouraged me in subtle ways. I am grateful for their encouragement and shared joy in this accomplishment.

Throughout the years I was blessed with special friends at both Iowa Western Community College and Briar Cliff College who encouraged me throughout my many life changes. One special friend, Bonnie Gioiello, always understood that part of me that wanted to know more and to do more than seemed immediately possible. Although she was not always present, she was with me every step of the way.

I was fortunate to have two major professors, Larry Ebbers
and Mary Huba. Dr. Ebbers was a consistent and loyal advisor throughout my ten-year association at Iowa State University. He supported more than one dissertation idea and change of direction throughout my three moves and four different jobs. In his absence, Dr. Huba assisted me with data analysis and with most of the writing. I am particularly indebted for her willingness to meet me at odd hours and unconventional places including the comfort of her own home. She provided me with the structure to proceed, and set high standards. I am grateful to her for adapting to my time restraints, and working diligently during the last several months.

I am also grateful for the support of other members of my committee including Dr. Dan Robinson, Dr. Don McKay, and Dr. Don Goering. I am also indebted to the Student Services staff at Marshalltown Community College who shared their time and space with me as I gathered data from student files.
APPENDIX A: IOWA STATE UNIVERSITY COMMITTEE ON USE OF HUMAN SUBJECTS IN RESEARCH APPROVAL FORM
Checklist for Attachments and Time Schedule

The following are attached (please check):

12. □ Letter or written statement to subjects indicating clearly:
   a) purpose of the research
   b) the use of any identifier codes (names, #’s), how they will be used, and when they will be
      removed (see Item 17)
   c) an estimate of time needed for participation in the research and the place
   d) if applicable, location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, note when and how you will contact subjects later
   g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13. □ Consent form (if applicable)

14. □ Letter of approval for research from cooperating organizations or institutions (if applicable)

15. □ Data-gathering instruments

16. Anticipated dates for contact with subjects:
   First Contact
   ________________________________  Last Contact
   September 1, 1992                  August 15, 1993
   Month/Day/Year                      Month/Day/Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual
    tapes will be erased:
    ________________________________
    Month/Day/Year

18. Signature of Departmental Executive Officer
    ________________________________  Date
    Department or Administrative Unit

19. Decision of the University Human Subjects Review Committee:
    ____ Project Approved     ____ Project Not Approved     ____ No Action Required

    ________________________________  3-23-15
    Patricia M. Keith             Date
    Name of Committee Chairperson  Signature of Committee Chairperson
APPENDIX B: LETTER OF APPROVAL, MARSHALLTOWN COMMUNITY COLLEGE
January 31, 1992

Mrs. Karen Pierson
711 - 2nd Street S.W.
State Center, IA 50247-5042

Dear Karen:

Permission is hereby granted for you to research data from Marshalltown Community College for your doctoral dissertation which will determine the correlation between ASSET test scores and grades received among other hypotheses. We will permit you to review student records as they relate to ASSET test scores, transcripts, and transfer records. Our staff will assist you as best we can.

We look forward to your results, and hope that a model for future use can be constructed.

Sincerely,

[Signature]
William M. Simpson, Ed.D.
Dean of the College

- Sylvia Grandgeorge
- Gary Baker
- Dr. McCright
- Janet Mead
APPENDIX C: ASSET PLANNING FORM
### Skill Area: Language Usage

<table>
<thead>
<tr>
<th>Number Correct</th>
<th>Course Recommendations by Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-39 (1st - 35th percentile)</td>
<td>Basic English, English as a Second Language</td>
</tr>
<tr>
<td>40-41</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td>42-47</td>
<td>English I and Lab</td>
</tr>
<tr>
<td>48-49 (73rd - 77th percentile)</td>
<td>Technical Writing (for V-T students)</td>
</tr>
<tr>
<td>50-64 (81st - 100th percentile)</td>
<td>Communication Skills (Medical and Dental Assistants)</td>
</tr>
<tr>
<td></td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>English Composition</td>
</tr>
</tbody>
</table>

### Categories for Developmental Course Recommendation

Scores between 0 and 41 were coded as "yes", recommended for developmental courses.

Scores between 42 and 64 were coded as "no", not recommended for developmental courses.

*If your score falls in a "Decision Zone," you will need to decide which direction you will want to go. Your skills appear to be on the borderline in terms of your readiness for the higher course. The lower level course would offer a good review and skill building experience. If you should choose the higher course, you will find that you must apply good study skills and probably more time than other students to be successful. You may wish to discuss your options with a counselor before you make your decision.
### APPENDIX E

**1988 MARSHALLTOWN COMMUNITY COLLEGE ADVISING RECOMMENDATIONS BASED ON ASSET SCORES FOR READING SKILLS; CATEGORIES FOR DEVELOPMENTAL COURSE RECOMMENDATION**

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Number Correct</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Skills</td>
<td>0-18</td>
<td>Reading Improvement I and/or Reading Improvement II</td>
</tr>
<tr>
<td></td>
<td>19-20 (44%)</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>21-27 (68%)</td>
<td>30:07 Developmenta Reading</td>
</tr>
<tr>
<td></td>
<td>28-29 (74%)</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>30-40 (77th - 100th percentile)</td>
<td>Speed Reading</td>
</tr>
</tbody>
</table>

**CATEGORIES FOR DEVELOPMENTAL COURSE RECOMMENDATION**

Scores between 0 and 29 were coded as "yes", recommended for developmental courses.

Scores between 30 and 40 were coded "no", not recommended for developmental courses.

*If your score falls in a "Decision Zone," you will need to decide which direction you will want to go. Your skills appear to be on the borderline in terms of your readiness for the higher course. The lower level course would offer a good review and skill building experience. If you should choose the higher course, you will find that you must apply good study skills and probably more time than other students to be successful. You may wish to discuss your options with a counselor before you make your decision.
APPENDIX F

1988 MARSHALLTOWN COMMUNITY COLLEGE ADVISING
RECOMMENDATIONS BASED ON ASSET SCORES FOR NUMERICAL SKILLS;
CATEGORIES FOR DEVELOPMENTAL COURSE RECOMMENDATION

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Number Correct</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical Skills</td>
<td>0-17</td>
<td>Study Skills</td>
</tr>
<tr>
<td></td>
<td>18-20</td>
<td>Arithmetic</td>
</tr>
<tr>
<td></td>
<td>(55th - 65th percentile)</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>21-32</td>
<td>(69th - 100th percentile)</td>
</tr>
</tbody>
</table>

CATEGORIES FOR DEVELOPMENTAL COURSE RECOMMENDATION

Scores between 0 and 20 were coded as "yes", recommended for developmental courses.

Scores between 21 and 32 were coded as "no", not recommended for developmental courses.

*If your score falls in a "Decision Zone," you will need to decide which direction you will want to go. Your skills appear to be on the borderline in terms of your readiness for the higher course. The lower level course would offer a good review and skill building experience. If you should choose the higher course, you will find that you must apply good study skills and probably more time than other students to be successful. You may wish to discuss your options with a counselor before you make your decision.
1988 MARSHALLTOWN COMMUNITY COLLEGE ADVISING
RECOMMENDATIONS BASED ON ASSET SCORES FOR ELEMENTARY
ALGEBRA; CATEGORIES FOR DEVELOPMENTAL COURSE RECOMMENDATION

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Number Correct</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Algebra</td>
<td>0-12</td>
<td>Elementary Algebra</td>
</tr>
<tr>
<td></td>
<td>13-15</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>(83rd - 90th percentile)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-25</td>
<td>Intermediate Algebra</td>
</tr>
<tr>
<td></td>
<td>(92nd - 100th percentile)</td>
<td></td>
</tr>
</tbody>
</table>

CATEGORIES FOR DEVELOPMENTAL COURSE RECOMMENDATION

Scores between 0 and 15 were coded as "yes", recommended for developmental courses.

Scores between 16 and 25 were coded as "no", not recommended for developmental courses.

*If your score falls in a "Decision Zone," you will need to decide which direction you will want to go. Your skills appear to be on the borderline in terms of your readiness for the higher course. The lower level course would offer a good review and skill building experience. If you should choose the higher course, you will find that you must apply good study skills and probably more time than other students to be successful. You may wish to discuss your options with a counselor before you make your decision.
APPENDIX H

DESCRIPTION OF COURSES AT MARSHALLTOWN COMMUNITY COLLEGE
1991-1993 CATALOG

30:05 Reading Improvement I
Developmental of vocabulary and comprehension through self-instructional materials. Specific program determined by diagnostic tests.

30:06 Reading Improvement II
Continued development of vocabulary and comprehension through self-instructional materials.

30:07 Developmental Reading
Development of reading rate through the use of self-instruction materials.

30:02 Study Skills
Improvement in reading, note-taking and types of approaches to be used in different subjects. Individualized instruction. Guidance in career choices.

40:01 Study Skills Arithmetic
Review of basic operations involving whole numbers, decimals, fractions, ratio and proportion, measurement and percents. New topics include combining terms, operations with signed numbers and elementary word problems.

41:03 Elementary Algebra
A beginning course in algebra. Variables, signed numbers, equations, polynomials, exponents and radials.

30:01 Basic English
Principles of English grammar, punctuation, spelling and composition. Organization or written papers and reports.
## APPENDIX I

### 1990 MARSHALLTOWN COMMUNITY COLLEGE ADVISING

RECOMMENDATIONS BASED ON ASSET SCORES FOR WRITING SKILLS;
CATEGORIES USED IN EXPECTANCY TABLE.

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Scaled Score</th>
<th>Course Recommendations by Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>23-36 (1st - 27th percentile)</td>
<td>Basic English and Study Skills</td>
</tr>
<tr>
<td></td>
<td>37-38</td>
<td>English as a Second Language</td>
</tr>
<tr>
<td></td>
<td>39-42</td>
<td>Decision Zone</td>
</tr>
<tr>
<td></td>
<td>43-44 (64th - 70th percentile)</td>
<td>English I and Composition Lab</td>
</tr>
<tr>
<td></td>
<td>45-54 (76th - 100th percentile)</td>
<td>Technical Writing (Vo-Tech students)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>English Composition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Business English and Composition Lab (POI students)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Business English (POI students)</td>
</tr>
</tbody>
</table>

**CATEGORIES USED IN EXPECTANCY TABLE:**

- **Group 1** - ASSET Writing scores between 45 and 54
- **Group 2** - ASSET Writing scores between 39 and 44
- **Group 3** - ASSET Writing scores between 23 and 38
If the score falls in a "Decision Zone," the student needs to decide which direction you will want to go. The student's skills appear to be on the borderline in terms of readiness for the higher course. The lower level course would offer a good review and skill building experience. If the higher level course is chosen, the student will find that she/he must apply good study skills and probably more time than other students to be successful. The student may wish to discuss these options with a counselor before making this decision.
1990 MARSHALLTOWN COMMUNITY COLLEGE ADVISING
RECOMMENDATIONS BASED ON ASSET SCORES FOR READING SKILLS;
CATEGORIES USED IN EXPECTANCY TABLE.

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Scaled Score</th>
<th>Course Recommendations by Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>23-35</td>
<td>Reading Improvement I or II</td>
</tr>
<tr>
<td></td>
<td>38-40</td>
<td>Developmental Reading</td>
</tr>
<tr>
<td></td>
<td>(38th - 49th percentile)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>41-42</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>43-53</td>
<td>Speed Reading</td>
</tr>
<tr>
<td></td>
<td>(67th - 100th percentile)</td>
<td></td>
</tr>
</tbody>
</table>

CATEGORIES USED IN EXPECTANCY TABLE:

Group 1 - ASSET Reading scores between 43 and 53
Group 2 - ASSET Reading scores between 38 and 42
Group 3 - ASSET Reading scores between 23 and 37

*If the score falls in a "Decision Zone," the student needs to decide which direction you will want to go. The student's skills appear to be on the borderline in terms of readiness for the higher course. The lower level course would offer a good review and skill building experience. If the higher level course is chosen, the student will find that she/he must apply good study skills and probably more time than other students to be successful. The student may wish to discuss these options with a counselor before making this decision.
**APPENDIX K**

**1990 MARSHALLTOWN COMMUNITY COLLEGE ADVISING RECOMMENDATIONS BASED ON ASSET SCORES FOR NUMERICAL SKILLS; CATEGORIES FOR EXPECTANCY TABLE.**

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Number Correct</th>
<th>Course Recommendations by Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical Skills</td>
<td>23-39</td>
<td>Study Skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arithmetic</td>
</tr>
<tr>
<td></td>
<td>40-41</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>(50th - 56th percentile)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>42-55</td>
<td>Elementary Algebra</td>
</tr>
<tr>
<td></td>
<td>(62nd - 100th percentile)</td>
<td></td>
</tr>
</tbody>
</table>

**CATEGORIES USED IN EXPECTANCY TABLE:**

- Group 1 - ASSET Numerical scores between 42 and 55
- Group 2 - ASSET Numerical scores between 40 and 41
- Group 3 - ASSET Numerical scores between 23 and 39

*If the score falls in a "Decision Zone," the student needs to decide which direction you will want to go. The student's skills appear to be on the borderline in terms of readiness for the higher course. The lower level course would offer a good review and skill building experience. If the higher level course is chosen, the student will find that she/he must apply good study skills and probably more time than other students to be successful. The student may wish to discuss these options with a counselor before making this decision.
### APPENDIX L

**1990 MARSHALLTOWN COMMUNITY COLLEGE ADVISING RECOMMENDATIONS BASED ON ASSET SCORES FOR ELEMENTARY ALGEBRA; CATEGORIES FOR EXPECTANCY TABLE**

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Number Correct</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Algebra</td>
<td>23-45</td>
<td>Elementary Algebra</td>
</tr>
<tr>
<td></td>
<td>46-47</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>48-55</td>
<td>Intermediate Algebra</td>
</tr>
</tbody>
</table>

**CATEGORIES FOR DEVELOPMENTAL EXPECTANCY RECOMMENDATION:**

- **Group 1** - ASSET Elementary Algebra scores 48-55
- **Group 2** - ASSET Elementary Algebra scores 46-47
- **Group 3** - ASSET Elementary Algebra scores 23-45

*If the score falls in a "Decision Zone," the student needs to decide which direction you will want to go. The student's skills appear to be on the borderline in terms of readiness for the higher course. The lower level course would offer a good review and skill building experience. If the higher level course is chosen, the student will find that she/he must apply good study skills and probably more time than other students to be successful. The student may wish to discuss these options with a counselor before making this decision.*
APPENDIX M

1990 MARSHALLTOWN COMMUNITY COLLEGE ADVISING
RECOMMENDATIONS BASED ON ASSET SCORES FOR INTERMEDIATE
ALGEBRA; CATEGORIES FOR EXPECTANCY TABLE

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Number Correct</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algebra</td>
<td>23-43</td>
<td>Intermediate Algebra</td>
</tr>
<tr>
<td></td>
<td>44-47</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>48-55</td>
<td>College Algebra</td>
</tr>
</tbody>
</table>

CATEGORIES USED IN EXPECTANCY TABLE:

- Group 1 - ASSET Intermediate Algebra scores 48-55
- Group 2 - ASSET Intermediate Algebra scores 44-47
- Group 3 - ASSET Intermediate Algebra scores 23-43

*If the score falls in a "Decision Zone," the student needs to decide which direction you will want to go. The student's skills appear to be on the borderline in terms of readiness for the higher course. The lower level course would offer a good review and skill building experience. If the higher level course is chosen, the student will find that she/he must apply good study skills and probably more time than other students to be successful. The student may wish to discuss these options with a counselor before making this decision.
APPENDIX N

1990 MARSHALLTOWN COMMUNITY COLLEGE ADVISING
RECOMMENDATIONS BASED ON ASSET SCORES FOR COLLEGE ALGEBRA;
CATEGORIES FOR EXPECTANCY TABLE

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Number Correct</th>
<th>Course Recommendations by Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Algebra</td>
<td>23-44</td>
<td>College Algebra</td>
</tr>
<tr>
<td></td>
<td>45-48</td>
<td>Decision Zone*</td>
</tr>
<tr>
<td></td>
<td>49-55</td>
<td>Calculus I or Trigonometry, if not taken previously or covered in senior Mathematics course</td>
</tr>
</tbody>
</table>

CATEGORIES FOR DEVELOPMENTAL EXPECTANCY RECOMMENDATION:

Group 1 - ASSET College Algebra scores 49-55
Group 2 - ASSET College Algebra scores 45-48
Group 3 - ASSET College Algebra scores 23-44

*If the score falls in a "Decision Zone," the student needs to decide which direction you will want to go. The student's skills appear to be on the borderline in terms of readiness for the higher course. The lower level course would offer a good review and skill building experience. If the higher level course is chosen, the student will find that she/he must apply good study skills and probably more time than other students to be successful. The student may wish to discuss these options with a counselor before making this decision.