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Factors influencing university performance of Associate in Arts graduates transferring to the state university system

Baldwin, Anne Lillie, Ed.D.

Florida International University, 1992

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

FACTORS INFLUENCING UNIVERSITY PERFORMANCE OF ASSOCIATE IN ARTS GRADUATES TRANSFERRING TO THE STATE UNIVERSITY SYSTEM

A dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Education in Community College Teaching

by

Anne L. Baldwin

1992

To Professors: Joseph B. Cook, George S. Morrison, and William Kurtines

This dissertation, having been approved in respect to form and mechanical execution, is referred to you for judgement upon its substantial merit.

Dean I. Ira Goldenberg
College of Education

The dissertation of Anne L. Baldwin is approved.

William Kurtines

George S. Morrison

Joseph B. Cook, Major Professor

Date of Examination:

Dean Richard L. Campbell
Division of Graduate Studies

Florida International University, 1992

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Anne L. Baldwin

1992

ABSTRACT OF THE DISSERTATION

Factors Influencing University Performance of Associate in Arts Graduates Transferring to the State University System

by

Anne L. Baldwin
Florida International University, 1992
Miami, Florida
Joseph B. Cook, Major Professor

The purpose of this study was to examine the factors behind the failure rates of Associate in Arts (AA) graduates from Miami-Dade Community College (M-DCC) transferring to the Florida State University System (SUS). In M-DCC's largest disciplines, the university failure rate was 13% for Business & Management, 13% for Computer Science, and 14% for Engineering. Hypotheses tested were:

Hypothesis 1 (H1): The lower division (LD) overall cumulative GPA and/or the LD major field GPA for AA graduates are predictive of the SUS GPA for the Business Management, Computer Science, and Engineering disciplines.

Hypothesis 2 (H2): Demographic variables (age, race, gender) are predictive of performance at the university among M-DCC AA graduates in Engineering, Business & Management, and Computer Science.

Hypothesis 3 (H3): Administrative variables (CLAST - College Level Academic Skills Test subtests) are predictive of university performance (GPA) for the Business/Management, Engineering, and Computer Science disciplines.

Hypothesis 4 (H4): LD curriculum variables (course credits,

course quality points) are predictive of SUS performance for the Engineering, Business/Management and Computer Science disciplines.

Multiple Regression was the inferential procedure selected for predictions. Descriptive statistics were generated on the predictors. Results for H1 identified the LD GPA as the most significant variable in accounting for the variability of the university GPA for the Business & Management, Computer Science, and Engineering disciplines.

For H2, no significant results were obtained for the age and gender variables, but the ethnic subgroups indicated significance at the .0001 level. However, differentials in GPA may not have been due directly to the race factor but, rather, to curriculum choices and performance outcomes while in the LD.

The CLAST computation variable (H3) was a significant predictor of the SUS GPA. This is most likely due to the mathematics structure pervasive in these disciplines.

For H4, there were two curriculum variables significant in explaining the variability of the university GPA (number of required critical major credits completed and quality of the student's performance for these credits). Descriptive statistics on the predictors indicated that 78% of those failing in the State University System had a LD major GPA (calculated with the critical required university credits earned and quality points of these credits) of less than 3.0; and 83% of those failing at the university had an overall community college GPA of less than 3.0.

DEDICATION

This research project is dedicated to my little free spirited super person, Lisa Leilani; to a dear supportive friend, Robert Peters; and to my family of origin for their subtle and, oftentimes, not so subtle values instillation.

ACKNOWLEDGEMENTS

Many persons and groups made it possible for this study to be pursued in depth and breadth. To all of those who are not specifically mentioned, I wish to express my very sincere appreciation for help and support so kindly given.

Special thanks are extended to:

Joseph B. Cook for his positive attitude, strong people skills, and ability to see the big picture;

George S. Morrison who taught all of us important life survival skills through versatility in competence;

Paulette Johnson who gives generously of her knowledge in such a lovely manner;

William Kurtines for his helpful guidance and his research contributions for the betterment of mankind;

Other Researchers for publishing their findings, thereby creating a national network;

Miami-Dade Community College Administrators and Staff for their wisdom and help in establishing policies and practices that strengthen the institution....and which enabled me to complete my doctorate....many, many thanks for all the support.

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CHAPTER 1

Introduction and Statement of the Problem

Preface

For nearly 30 years, debates have reverberated across the nation over the efficacy of the community college transfer mission (Adelman, 1989; Kintzer & Wattenbarger, 1985: Lombardi, 1979). These debates have resulted in the development of political, economic, cultural, legitimacy, and social undercurrents regarding egalitarianism through education (Alfred & Peterson, 1990). Undercurrents are given momentum by misperceptions grounded on studies, often of dubious quality.

Eaton (1990) notes that the parsity of national data based on longitudinal data collection and analysis, together with scant systematic state or institutional studies have put community colleges at the mercy of their critics. Even the mandated data reports sent to official national agencies are merely cross sectional for a given year, snapshots in a frame of time, and "from these data we impute of who to what. This is risky business," according to Adelman (1990). The acquisition of reliable transfer data is further complicated by the treatment of [raw] data in producing statistics; definitional dissimilarities involved in computations can produce a broad range of results and interpretations (Cohen & Brawer, 1982). Because of flawed methodology, inappropriate comparisons and questionable data, the impression is given that the contributions of the

transfer mission are diminutive in value and scope.

As yet unsettled is the debate over whether the likelihood of succeeding in a university is dependent upon the genesis of postsecondary education --- beginning at a junior/community college or at a university (Astin, 1977; Astin, 1990). Critics believe that community colleges fulfill their transfer mission to the extent that graduates continue their education at universities. Implicated are the differences of intent in student enrollments used for calculating the transfer rate (Cohen and Brawer, 1982; Cohen, 1989).

Others (Anderson, 1986; Gold, 1980) assert that students transferring from lower division institutions not only attain a lower cumulative grade point average (GPA) but graduate from universities at a lower rate than do university natives. The failure rate (Florida State Board of Community Colleges, 1989) and attrition rate of transfer students far exceed those of students beginning their postsecondary education at universities (Savage, 1984).

Are these conclusions well-grounded? Are they based on debatable assumptions? Might findings lifted out of context give inaccurate impressions? Are the conclusions artifacts of conceptual or methodological flaws? Would it be more helpful to think in terms of the extent to which transfers are adequately prepared to succeed at the universities and how we can better assist students to succeed? This research is directed at seeking answers to the questions stated in

the hypotheses of the dissertation, in addition to the related issues.

Statement of Problem

In the state community colleges (C.C.) of Florida, large numbers of Associate in Arts (A.A.) graduates in any given year are concentrated in a few of the community college's program areas (Business/Management, Computer Sciences, and Engineering). Many of the graduates in these disciplines successfully attain a baccalaureate degree in senior institutions and many are successful in persisting with a GPA of 2.0 or above. Nevertheless overall, 10%-15% of these A.A. graduates do not achieve a State University System (SUS) GPA that is high enough to allow them to acquire a baccalaureate degree (Division of Community Colleges, 1986, 1987, 1988, 1989). In some disciplines, the failure rates are even higher. For example, the failure rate in both the Physical Science and Life Science disciplines is over 16%. In a few areas (Forestry and Unclassified) the failure rate is beyond 22% for Associate in Arts graduates transferring to public universities. Consistently over the past several years, A.A. graduates transferring to the SUS show failure rates far in excess of the failure rates of SUS native students in most disciplines.

Rationale for the Study

In 1988-1989, the percent of community college A.A. graduates found in the upper division of the SUS was 57%. This compares to 43% of university natives in the upper division (Florida State Board of Community College, 1990). If those C.C. students who transferred without the associate degree were also counted, community college transferees in the SUS would account for 77% of the upper division enrollments in the Florida state public universities (Belcher & Baldwin, 1991). This reality is steadily and increasingly transforming the student demographics at the universities, rendering the traditional definition of university student less useful. Implied in changing demographics are changing enrollment patterns and the concomitant changing needs in student services.

Part-time enrollments in community colleges have reached the all-time high of 65% (Fernandez, 1987). The majority of these students (92%) hold jobs to sustain themselves as they try to improve their educational training (Fryer, 1990). "Stopping out" periodically (discontinuous registrations over major semesters) is not unusual. In metropolitan settings, large numbers of students are of minority (72%) or international extraction (Einspruch, 1990). In these settings, about 45% of the students may be 25 years of age or older (Morris, 1990). Approximately 65% need to be academically remediated (Belcher, 1990), some for extensive periods of time. C.C. students are often from a

lower or lower/middle socioeconomic background (Adelman, 1989). Many have family obligations, inadequate or time-diluted academic skills (Atherton, 1989), sparse financial resources, and self-doubt regarding their ability to upgrade their academic and economic levels.

Yet these students manage to overcome barriers to A.A. degree attainment. The graduates of community colleges represent the highest academic achievement for their respective institutions. While community colleges are open enrollment institutions, academic standards are imposed by a system of checks. Performance of these students is filtered through multiple academic screens, a number of them mandated by the state. The first of these filters is skills placement testing such as the Multiple Assessment Placement Services (MAPS), a College Entrance Examination Board test. Of the degree-seeking students tested for basic skills adequacy at Miami-Dade Community College (M-DCC), approximately 65% show a need for remediation in one or more academic skills. College preparatory (remedial) courses, however many, are taken preliminary to or in conjunction with college-level studies. Testing for each of these skills courses is customized by the instructor. Heavy attrition occurs among those requiring remediation; the more remediation needed, the higher the dropout rate. Enrollment levels decline as students pass through the sequence of performance quality measures. It is evident that the original number of students declaring A.A. degree intent

has, at this point, diminished markedly.

Through a minimum of 60 credit hours of collegiate requirements to degree, students have been tested and evaluated by a multitude of professors. Those who did not meet standards are dropped from the student population all along the path to degree acquisition. On average, it takes nearly four years and 84 credit hours for the M-DCC student to acquire an A.A. degree. A few students have taken as long as 22 years and 125 credit hours to attain an associate degree (Losak, 1989). Of those who intended to get an A.A. degree, only 1 in 3 eventually graduates.

It may be assumed that after the numerous lower division demands have been successfully met, the academic qualities needed to pursue studies leading to a baccalaureate degree is indicated. But this has not necessarily been the rule. Of concern to M-DCC personnel are the high failure rates in the SUS among M-DCC A.A. graduates. Many of those who failed at the university are majors in M-DCC's principal programs (Business Administration, Computer Sciences, and Engineering). As a result of these statistics on performance, the College's Academic Coordination Committee and the Office of the Vice-President for Education indicated the need for detailed and precise information on student academic results in the State University System.

Significance of the Study

Miami-Dade Community College is one of the largest community colleges in the nation and the largest, by far, in the state of Florida. The three disciplines of Engineering, Computer Sciences, and Business Administration comprise the College's major programs in terms of size of enrollments and graduations. These three programs are also the principal programs in the Florida State University System for size of enrollments and graduations. What is occurring at M-DCC regarding the differential failure percent of A.A. degree transferees compared to university native students is true throughout the higher education system of the state. To identify the behaviors and variables that contribute to transfer performance helps M-DCC and other public state higher education institutions to effectuate policy and practice more conducive to transfer student success.

As explained in Chapter 2, this issue is also a nation-wide one. Findings suggest a need to review the following: Curricular expectations, curriculum sequencing, course standards, grading practices, auxiliary academic support services, procedural strategies, alternative strategies, articulation intensification, and articulation extension and/or course leveling issue resolution.

Research Questions and Hypotheses

The research questions below were the central focus of the study. However, a number of related and enhancement statistics were also provided. The descriptive statistics, in conjunction with the inferential statistics, were designed to cross validate outcomes. Overlapping issues of transfer and graduation rates, and GPA differentials which furthered understanding of performance were included.

Research Question 1: Does the lower division overall GPA and/or the lower division GPA of the major field predict university GPA for the Engineering, Computer Science, and Business Management disciplines?

> Hypothesis 1: The lower division overall GPA and/or the lower division GPA of the major field for A.A. graduates are predictive of university GPA for the Engineering, Computer Science, and Business Management disciplines.

Research Question 2: Are there any demographic variables (ethnic, gender or age) predictive of performance at the university among M-DCC A.A. graduates in the Engineering, Computer Science, and Business Management disciplines?

> Hypothesis 2: There are demographic variables predictive of performance at the university among M-DCC A.A. graduates in Engineering, Computer Science, and Business Management.

Research Question 3: Are there administrative (test) variables predictive of university performance for the disciplines under study?

> Hypothesis 3: There are administrative variables predictive of performance at the university for the disciplines under study.

Research Question 4: Are there lower division curriculum variables predictive of university performance for the Engineering, Computer Science, and Business Management disciplines?

> Hypothesis 4: There are lower division curriculum variables predictive of university performance for the Engineering, Computer Science, and Business Management disciplines.

Definition of Terms

Concepts used are variously defined in national studies. It is not uncommon in summarizing studies for reporters to disregard qualifications attached to definitions. In so doing, accuracy and precision may be sacrificed. Conclusions based upon differing definitions can be misleading. Certainly, it is impossible for findings to be compared against each other when definitions are not identical. In this study, where definitions of concepts referenced differ from those listed below, differences will be addressed when pertinent to the text. The definitions in this study pertain to Miami-Dade Community College usage which, are often identical to the usage in other institutions. Some definitions may also be unique to this study or College. To be noted is the fact that there is no national standard definition of the terms used. As a result, terms that may be identical may not possess identical meanings in different contexts.

Acceleration Mechanism - Methods created by the State of Florida to shorten the time of study at a higher

education institution to degree award. These methods include Advanced Placement Program, College Level Educational Program, and Dual Enrollment.

Advanced Placement Program - An acceleration method enabling high school students to acquire college credits for college level courses that also apply to high school graduation. These subject tests are prepared by ETS.

Advisement and Graduation Information System (AGIS) - Is a system devised by M-DCC to inform students, very conveniently, of the individual's progress through the College's system; it includes updates of university requisite courses needed.

Articulation - is a process developed through the cooperative effort of universities and colleges, in which mechanisms were constructed to facilitate the movement of students from one higher education institution to another with minimum loss of credits. Many creative features evolved through articulation efforts (see Chapter 2 on articulation).

Articulation Agreements - In Florida, agreements protect the A.A. degree transfer student from having to retake courses taken in the community college for the General Education area; it insures that 60 L.D. college level credits are accepted toward the baccalaureate degree.

Associate in Arts degree - A degree largely earned in a two-year college with a curriculum which prepares students to move into the upper division baccalaureate program.

Associate in Science degree - A degree earned in a two-year college with a curriculum designed to prepare the student for entry into an occupation.

Attrition - Enrollment decrease due to dropping out by the student from the institution, thus terminating studies.

Cohort - The group of Associate in Arts graduates of M-DCC attending Florida International University, University of Florida, Florida State University, University of South Florida and Florida Atlantic University) in Fall Term 1988 who are majoring in Business Management, Computer Science or Engineering.

College Level Academic Skills Test (CLAST) - A test required by Florida for the acquisition of an Associate in Arts degree; examinees must pass all sections of the test (reading, computation, English, essay) in order to qualify for the opportunity to study for a baccalaureate degree. A student may be admitted conditionally pending the passage of the fourth section of the test by the time that 15 university credits are completed.

College Level Examination Program (CLEP) - A college level subject examination prepared by ETS; if passed, exemption is allowed for comparable course credits.

College Preparatory - Courses that are non-college in level designed to develop skills (in reading, English, writing, and mathematics) required for college level studies; are also called basic skills or remedial skills.

Collegiate - Used synonymously in this study to refer to any institution of higher education, be it university, upper division, lower division, two-year community college, junior college or four-year college.

Common Course Numbering System (CCNS) - Designates courses across all of the public community colleges in Florida and the public universities of Florida by identical course numbers. This enables the smooth transferral of course credits from one Florida higher education institution to another, thereby eliminating duplications in course taking.

Cumulative Grade Point Average for M-DCC - Excludes college preparatory course grade and English-as-a Second-Language course grades.

Cumulative Grade Point Average for the SUS - In the State University System of Florida, the university cumulative GPA excludes the cumulative GPA of courses taken at the transferring institution; only grades earned at the current university are used in the calculation of the term GPA or the cumulative GPA.

Division, Lower - Represents the freshman and sophomore years of the higher education curriculum (60 credits).

Division, Upper - Represents the junior and senior levels at universities and 4-year colleges.

Failure - Attaining a cumulative GPA of less than 2.00.

Florida Information Regional Network (FIRN) - A subsidiary computer system of the Florida Southeastern Region Data

Network, which allows the transmission and receipt of college student databases, financial database, personnel database, state mandated reports, and electronic transcripts.

First-Time-In-College (FTIC) - An enrollee who has not attempted a single college credit since graduating from high school or since attaining a General Education Diploma (GED) at the time of initial collegiate attendance. By definition, dual high school enrollees who subsequently graduate from high school and enroll in higher education are not FTIC.

Forgiveness Policy - According to articulation agreements in Florida, the GPA is based on the last grade of a repeated course rather than on the first course attempt.

Gordon Rule - A rule named after its originator, Florida Senator Jack Gordon, requiring a miminum number of written words in assignments for students in specific college courses.

Grade Point Average (GPA):

High - A cumulative GPA of 3.50 or higher.

Middle - A cumulative GPA of 2.00 - 3.49.

Low - A cumulative GPA less than 2.00.

Junior - A student at the university who has at least 60 cumulative credits of course work.

Limited Access Program (LAP) - Is one in which admission to the program is by qualification, usually regarding

course requisites and GPA standards.

Major Semester - The four-month (16 week) semesters usually called Fall and Winter terms.

Multiple Assessment Programs and Services (MAPS) - A test prepared by the College Entrance Examination Board (CEEB) administered to the first-time-in-college student in the community colleges of Florida who: 1) Is degree seeking, 2) Is registered for any English or mathematics course, 3) Is registered beyond 15 cumulative credits, 4) Currently attends high school as a dual enrollee, 5) Did not take or pass the SAT or ACT, or 6) Has entrance test scores older than three years at time of matriculation.

Performance requirements - Maintaining a GPA of at least 2.00 and following the college recommended curriculum.

Stop out - A student whose matriculation is discontinuous over major semesters.

Student Academic Support System (SASS) - A newly developed on-line system for university students to inform them of their individual progress through the university (courses and credits taken, needed,etc.).

Student On-Line Articulation system (SOLAR) - Is a new state of Florida public community college information system similar to the AGIS.

Tier1 - A variable name that designates critical university required courses for a program major who is intending to acquire an A.A. degree for transfer to a Florida

public university. (The criteria for selection of critical courses is found in Chapter 3, pages 63-65). Related to Tier1 courses are Tier1 credits, Tier1 quality points, and Tier1 GPA.

Tier2 - Designation for SUS courses supportive of the discipline. These are also courses required by the university. Related to Tier2 courses are Tier2 credits, Tier2 quality points, and Tier2 GPA.

Tier3 - Courses suggested by universities for students in specific programs which are not of top essential priority. Related to Tier3 courses are Tier3 credits, Tier3 quality points, and Tier3 GPA.

Tier4 - Courses somewhat related to the content of the major field. They may be electives but are more likely prerequisites to requisites. Related to Tier4 courses are Tier4 credits, Tier4 quality points, and Tier4 GPA.

Transfer - A student in one institution of higher education who moves to another institution of higher education.

Transfer mission - The statement of goal by the community college to prepare its students for eventual transfer to a baccalaureate program.

Transfer shock - The drop in grade point average of students during the first semester after transferring to another institution, attributed to the many adjustments necessitated in a new environment.

University eligible - An FTIC at a community college whose academic placement test scores are sufficiently high to

qualify for direct university admission.

University native, nontransfer - A student who begins postsecondary education at a particular university and remains there to degree attainment.

A list of acronyms is found in Appendix A.

Delimitations of the Study

Selected Omissions

1. Basic skills test scores were left out of the study. Also omitted were data regarding the student's compliance with the College's recommendations that basic skills course work be taken.
2. The basic skills courses taken by graduates were not analyzed as a potential factor influencing academic behavior.
3. English-As-A-Second-Language courses completed were left out of the study.
4. Only state universities with enrollments greater than 20 for Miami-Dade A.A. graduates in the three disciplines (Business Management, Computer Science, and Engineering) were among the population in the study.
5. M-DCC transfers who did not graduate with an A.A. degree were excluded.
6. A.S. degree graduates from M-DCC who may have been in these three programs were also excluded.
7. Those students in these three programs who subsequently

attained a bachelor or master's degree but who were still enrolled in the SUS in Fall Term 1988 were deleted from the study.

Other Delimitations

1. The cohort shown to be failing was selected from the 1988 fall term enrollments. It is now fall term 1991. With the passage of three years, some of these students may no longer be failing. However, others not identified in this category in 1988 may now be in academic difficulty.
2. Analysis was not specifically directed at whether those students who entered the SUS prior to the CLAST mandate could have succeeded at the university without the benefit of the CLAST; neither was the study concerned that success at the university of "non-CLAST takers" was a result of a solid lower division GPA and/or because of the number of critical major credits taken and/or because of the high quality points for major critical credits taken.
3. The rising CLAST standards may have precluded the entrance into the university of students who did not pass the test. The transcripts of those eligible to graduate but subsequently failed the test were not examined. It is not possible to know, at this juncture, whether these students would have succeeded at the university, had they matriculated in the upper division in spite of the CLAST barrier.

CHAPTER 2

Review of the Literature

Background

Introduction

The central focus of this dissertation is to examine the factors that influence the performance of Associate in Arts graduates who transfer to the universities. This is a frontier area of research and as such, there is scant literature dealing with factors influential to transfer performance. Only two external sources were found, and they were prepared through the Florida State Board of Education. Both of these studies, one for the Physical Sciences and the other for the Life Science discipline, corroborate the findings of this study; details are found further into this chapter under "Transfer Performance in Florida."

Approaching the dissertation research by reviewing minority performance yielded data belaboring the preponderance of failures, dropouts, and low test scores among minorities. No ethnic data were found examining academic behavioral characteristics, curricular variables or curricular structure as impacting university performance.

Three disturbing themes kept recurring in searching further for causative performance indicators. These issues coalesced in assaulting community colleges for inadequacy of mission fulfillment. The underpinnings of the issues were identical to that found in transfer performance data. Hence, these related issues will be aired and the miasma,

hopefully, cleared. The credibility of community colleges accomplishments is challenged in the literature. The relationship of these issues (GPA, graduation rates, transfer rates) to performance differentials at the university are dealt with deeper into this chapter.

While the majority of transfers succeed in the universities (GPA of 2.0 or better), 15% of transfer students do not perform adequately (-2.0 GPA). In some disciplines, the failure rate is beyond 20%. The task of examining factors underlying failure rates, presupposes the existence and operational effectiveness of a host of transfer program structures and database structures. This refinement task reaffirms and celebrates the successes of community colleges in their complex multi-faceted missions. It presumes success as a given, in spite of its many critics over the past thirty years. The criticisms are recognized as imprecisely conceived concepts which generate imprecise data, thereby creating difficulties (McCabe, 1984). This review will identify conceptual inaccuracies as they relate to the performance of community college transfers.

Mission

The transfer mission links the community college with four-year colleges. This transfer mission is fundamental and from its genesis has been the raison d'etre of the community college (Blood, 1986). Both the transfer mission and the occupational mission attract vast numbers of community college credit enrollments. Secondary yet

significant missions - General Education, student services, compensatory education, education in the fine arts, superior student servicing and the broad range of non-degree education - have contributed immeasurably to the betterment of the individual, the community, and the society. Community colleges have a long history of responsiveness to the changing needs of the workplace and society.

Beginning with the establishment in 1852 of Lasell Junior College in Auburndale, Massachusetts, the two-year college has evolved and is still evolving as a dynamic, multi-dimensional colossus. Landmarks in its evolution began with its legitimization as a transfer institution to the baccalaureate degree during the first quarter of the twentieth century (Vaughn, 1985). Significant progress in the evolution of community colleges was often due to initiatives at the state level. For example, California serves as a sterling model in championing state support with local control. This paved the way for the furtherance of the model nation-wide. Technical and occupational programs expanded the mission of two-year colleges. The impetus for career education was a response to massive economic problems rampant during the Great Depression. The need for specialized training to uplift the economy propelled Congress to pass vocational education bills.

Following the Second World War, the energetic ethos for rebuilding the nation as well as the world, and for extending democratic opportunities was also felt in the field of higher education. Returning veterans and those who had postponed postsecondary education took advantage of the generous spirit then pervading presidential commissions on higher education. Comprehensive and diversified education was readily and inexpensively available to whomever wanted it. The belief was strong that education was the key to solving existing problems and in materializing the tenets of our democratic system (Cohen, A. & Brawer, F., 1982).

The present evolutionary period began in the 1960's with state management of higher education. State administration manifested itself in the establishment of statewide systems funded principally by the state (Blood, 1986). Two-year colleges proliferated. Enrollment rose from 600,000 in 1960 (Smart & Ethington, 1985) to 5.7 million in 1989 (Parnell, 1990); the number of institutions grew from 663 to 1231 in that time frame. The role of two-year colleges multiplied to accommodate varieties of students and interests. In spite of their comprehensive nature, community colleges did not neglect their primary function, that of preparing students to transfer to the upper division of four-year colleges and universities. The floodgates of opportunity opened. Into these gates came streams of part-time students, minorities, older women, workers interested in upgrading their employment skills,

students wanting to enhance their personal interest, and people who were searching for their place in life.

Issues Related to Transfer Performance

Higher Education Institution of Origin: Who is More Likely to Succeed to Baccalaureate?

The attrition rate at community colleges is known to be unusually high. It is not a rarity to see percents bandied about attesting to this "fact". What is seldom seen are the definitions and selection criteria used in obtaining the rates. Attrition rate calculations have included non-credit enrollments. Continuing education students have been counted and so have those students taking remedial courses. Rates have included those who are upgrading their job skills; so have students who are taking courses to fulfill personal objectives become part of the base figure. The reverse transfers, some 33% who had already earned the baccalaureate degree, have been counted in calculating attrition (Adelman, 1989). Some formulae include students who withdrew.

The use of any of these enrollments could produce questionable attrition rates. Astin (1990) reflects on the sensibility of computing retention rates using the vast number of community college students who have no intention of earning a degree. Two-year college persistence is independent of the social integration model of Tinto (Losak, 1986); persistence rates of non-traditional students begin

to resemble that of traditional students given longitudinal tracking (Pascarella, Smart, Ethington; 1986). Equitably attained attrition rates are difficult to find due to operational definitions. When found, the qualifications essential to proper interpretation may be ignored (Adelman, 1990). Given the gross inaccuracies in calculating the attrition rate at community colleges, it is not surprising that the conclusions drawn are in line with the calculations. An analogy can be made with the truism regarding computer data input, which is "garbage in, garbage out." So then, is a student who begins higher education at a university more likely to succeed to baccalaureate than an FTIC beginning at a community college? Until an applicable universal model is developed, the answer will remain speculative and controversial. Given well-conceived formulation, and given academic intervention for those desiring to learn, it is very probable that rate differences would not be significant. Once an irrefutable model is in place, a dividend bonus is the meaningfulness of data for inter-institutional and national data analyses; valid comparisons can then be made.

Transfer and Graduation Rates: Who is More Successful?

Transfer rates from community colleges to universities are riddled with problems; problems stem from institutional specific/cross-sectional data rather than national/longitudinal data (Grubb, 1991). NCES (1986) found that about 49%

of direct entry high school students at four-year institutions earned the baccalaureate degree in four years. About 51% of the four-year college native students required between 5-7 years to attain the bachelor's degree. Four year institutions have been populated by two-year college transfers for nearly a century. One out of seven students attends the community college and university concurrently (Adelman, 1989). A "swirling" behavior characterized by students switching back and forth between community college and four-year institutions is reported by Clagett (1990). Increasingly larger numbers of part-time, minority, older women, those beginning college with academic deficiencies, and stopouts proceed onward to the universities. In 1989, 77% of the upper division of the Florida public university enrollments were transfers from community colleges and 50% of the undergraduates at the universities were former community college students (Belcher and Baldwin, 1991).

The traditional student (white, middle/upper class, 18-20 years old, residential, full-time male) is becoming the minority whose dominance is more likely to be seen in certain exceedingly selective institutions; non-traditional enrollment patterns may become the norm in public institutions of higher education (Garcia & Thompson, 1990). Naisbett (1984) predicts that the bellwether states (California, Florida, Connecticut, Washington, and Colorado) set trends which eventually infuse the entire nation and college enrollment demographics bear this out (Porter,

1989).

The pervasive issue of accountability to the state has not by-passed public universities. One outcome measure has, for a long time, been particularly troublesome for community colleges. At issue is the application by university-based researchers of the traditional success ratio of graduations to enrollments (McCabe, 1984). This model, devised for universities, was used to calculate the success rate for community colleges. For many years, this inaccurate application to community colleges has distorted data results and contorted the interpretation of the accomplishments of community college students.

The limitations of many outcomes studies is due to the lack of enabling resources to track students over the long term (Morris, 1985). Vorp (1989) thinks that the over-simplification in formula application is probably due to the lack of sufficiently sophisticated databases on the cohort level in many higher education institutions. These points are reinforced by Banks (1990) who observed that data difficulties arise from extrapolation from follow-up surveys and incomplete data supplied by senior institutions. Bernstein (1985) found that many states do not collect transfer data. Among those that do, there is not only a lack of consistency in definition of a transfer student, but there is no solid longitudinal data to track the flow of students through the collegiate system.

The national longitudinal database (NCES) was created

and "purified" at great effort (Adelman, 1989). Institutions are invited to use data from these archival efforts. However "clean" the NCES data might be, if users then create statistics founded on conceptual inaccuracies, the misleading results generated in turn, are no better than if the source data were inaccurate. The remedy to inaccurate computation rates is long overdue. Should not the proportion include only those enrollees who are seeking the A.A. degree and have met the credit definition of program enrollee? With the base student population of universities increasingly resembling that of community colleges, thoughtful critics are directing efforts to developing a uniform model for the calculation of success in transfers and graduations that considers the changing populations in higher education (Kintzer, 1983; Bender, 1990).

Disputed also is whether success ought to be measured by the historical four-year time frame for universities (NCES, 1986) and whether completions at community colleges ought not to be four or five years rather than the clearly inappropriate two years. A startling finding released by the National Association of Independent Colleges and Universities in 1990 reported by Wilson, states that only 15% of University students graduate in four years. After six years, fewer than 50% achieve a baccalaureate. The author of the NAICU report, O. Porter, was criticized for his methodological flaws. One criticism was that he did not

take into account enrollees who had no intention of earning a bachelor's degree. This criticism indicates that four-year institutions are becoming aware of the changing demographics of their student populations. This awareness could eventuate, through commonality of student base populations, in the development of a model acceptable to the broad undergraduate spectrum of institutions. A base of outcomes formula that excludes enrollments of non-credit and non-degree students has been advocated with vehemence. In 1984, McCabe proposed that the transfer rate delete specific categories of students who are obviously not baccalaureate seeking. Specifically, these are the students taking courses in college preparatory skills, are non-degree by declaration, are seeking the Associate in Science degree, are taking non-credit courses or already have the baccalaureate degree.

McCabe's proposal was intended to settle the transfer rate controversy by isolating and performing computations on transfer success using only the "true" transfer population. Packwood (1990) adds that institutional effectiveness be measured by multiple factors, rather than the common unitary factor alone. These factors would include degrees awarded and goal attainment of the non-degree seeking students who attend two-year colleges. Student transfers without the associate degree would complete the transfer success factors. Preceding the results of these outcome measures is the need to establish conceptually sound and uniform

instruments, and reliable tracking systems for measuring the outcomes.

It is clear that the commonality of students in community colleges and universities provides opportunities for educators to maintain greater degrees of collegiality and cooperation in solving issues universal to all parties.

Grade Point Average: Who is Smarter?

In 1990, the Florida Association of Community Colleges (FACC) reported that Parker, Florida State Board of Community Colleges Bureau Chief, sees no significant difference in the GPA of university native students and community college transfers. Much earlier in 1956, Bird concluded that there was no significant difference in performance between equivalent subgroups. Nickens (1972) saw little difference in their relative standing. Smart and Ethington (1985) asserted that university transfers did equally well when controlled for entering characteristics. Community college transfers often compare favorably with university natives after transfer (Vaughn & Templin, 1987). Among baccalaureate recipients, there were no GPA differences between community college transfer students and university native students (Phillippi, 1990). Studies comparing performance of transfer students with native students generally perceive the latter as having higher cumulative grade point averages and higher graduation rates. The issues underlying comparisons of GPAs of university

native students vs. transfer students are specious from the perspective of essential functions in higher education for human development. Jacobi, Astin, & Ayala (1987) comment that maximizing the intellectual and personal potential of the student is how institutions achieve excellence. The critical substance is that community college students, many of whom began college with multiple disadvantages, are succeeding at the university. If they then attain a degree, that is cause to rejoice. If they do not graduate but maintained at least a 2.0 GPA, they have succeeded in their university education. Their exposure to the intellectual and psychic excitement of a university environment is, in itself, a positive impact. Other tangible and intangible benefits of university training, the value added aspects, are beginning to be measured as part of quality control and assessing institutional effectiveness. Northeast Missouri State University (1984) pursued the value added aspects of higher education in terms of contribution to the well-being of the individual and to the social and economic well-being of the community by attitudinal and personal development. In light of these loftier purposes, differences within the successful GPA range seem trifling.

Relationship of the Dissertation to Issues

Each of the issues discussed has been on-going for decades. A great deal of the resources of higher education have been directed at studying them. Conclusions of these studies have generated controversy. Decisions have been

based on the conclusions drawn. Sensitivities have been rankled. These arguments are summarized in the three succeeding conclusions found in the literature: 1) College students who begin their work at community colleges short-circuit their educational careers, 2) The low transfer rates diminish this mission of two-year colleges, and 3) Transfer students perform on a lower academic level than native university students. In attempting to resolve these issues, many studies show a singular universal characteristic ...conceptual flaws... that result in methodological flaws. Conceptual defects (inconsistencies, incompleteness, misassumptions) eventuate in producing inaccurate data which, in turn, lead to the drawing of erroneous conclusions.

In executing the objectives of the dissertation, a major factor isolated for close scrutiny was the university GPA. Documents (Division of Community Colleges 1986, 1987, 1988, 1989) revealed a 10%-15% failure rate for A.A. transfers in three principal programs compared to the 1%-2% failure rate for native university students. One might speculate, is community college instruction of lesser quality than university-based instruction? Are community college students initially of lower achievement and is this the natural consequence? Are the students trying to beat the system? Are there conditions existing that set the stage for failure? Are there loopholes in the monitoring process? Do the articulation agreements (assuming they

exist) need to be reviewed? As with the three issues, questions hinting of imputation can go on and on fruitlessly.

The richness and interrelatedness of the data collected for this study will be directed at providing answers to the hypotheses, to many of the above questions, and serendipitously, the three long-standing national issues.

Relevant to the finding of the A.A. degree transfer failure rate is that the identical flaw underlying the three issues exists here, too. Considering the shock phenomenon and the initial higher education qualifications of students (Belcher & Baldwin, 1991), the flaw raises the question of whether the large gap in failure rates between the groups is not due to the base used in the computation of the failure rate. The conceptualization underpinning the definition of the data base has been the crux of the controversy in each of the issues. At this point for this performance study, it is known that the community college GPA for the freshman and sophomore years is not used in the calculation of the upper division cumulative GPA in Florida. However, at the university level, the GPA used to compare failure rates includes the cumulative work done during the freshman and sophomore years. It is readily understandable that a grade of "D" or "F" would have a much greater negative impact with the few credits earned of a transfer student than it would for the native who already has two year worth of credits for dispersing and neutralizing low quality points. The

conceptual flaw inherent in the base operator of the three issues is similar to the Florida system differential GPA bases. The State University System used unequal bases to calculate comparative GPA's. It is probable that conceptual and methodological flaws may be more pervasive across issues and across the nation than is currently recognized or articulated. Further discussions are found in the sections on transfer performance in Florida and transfer efforts and performance at Miami-Dade Community College.

Transfer Performance on the National Level

Overview

In the period of the sixties through the seventies, the nation was imbued with the spirit of egalitarianism and the drive to maximize individual potential. Higher education responded to the movement by sanctioning a horizontal curriculum and subscribing to the philosophy that the individual ultimately behaves in his best self-interest. Over the decades, however, results indicated that the erosion of the curriculum translated into the erosion of academic proficiency. It became apparent in the eighties that the nation's academic expectations were incompatible with economic needs, international competitiveness or the level of workers' skills. Standards of academic performance, directiveness, and academic support services were reinstated in some institutions of higher learning. States began to mandate entry and exit testing as a means of

promoting academic excellence. However, legislative mandates of higher standards without concomitant state funding to support the fulfillment of this goal became a heated issue and continues unabated as one state legislature after another tangles with budgetary problems. The economic recession of 1991 has exacerbated the issue of funding to achieve excellence.

The State of the Nation in Transfer Performance

Colleges have long been concerned with results of outcome measures, particularly as evidenced in attrition rates, transfer/graduation rates, and the grade point averages of their transfer students. The inaccuracies and conclusions drawn from the statistics have been troubling. Many colleges took laborious steps to mitigate the deficiencies perceived in student performance. But external pressure for intensification of effort to institute changes on a number of levels did not come until the 1980's.

Given the new federalism of the Reagan administration (1984), states assumed greater autonomy from national control. With the greater autonomy came greater budget demands. The fiscal responsibilities that the national government once shouldered were now transferred to the state level and, concomitantly, to the local level (U.S. News and World Report, 1991). Unforeseen was the severity of an inverse relationship....decreasing tax base income with increasing expenses. The cost of the many subsidized

programs and services did not equal the revenue expected. Monies for bailouts of corporations, financial institutions, and insurance underwriters exacerbated fund availability. Economic downturns further depleted funds. Legislatures began to look at education as a category for cutbacks. But funds had to be decreased "justifiably". In 1986, the National Governors Association declared that a "central strategy" for improving undergraduate educational quality would be assessment of learning (Blumenstyk, 1988). Since then, the majority of states have imposed assessment requirements on their colleges.

Accountability through monitoring and assessment took on special significance. Colleges were asked to report on how well they were meeting the objectives for which the funds were allocated. The long-standing concerns of community colleges regarding success rates acquired new meaning...produce or perish. The pressure was on to accelerate the finding of solutions for generating accurate data regarding success rates that truly represented reality. Meaningfulness of data meant that data had to be comparable across institutions and it became imperative to establish well-conceived, consistent definitions backed by databases that would support the concept.

The issues thus far discussed are endemic on the local, state, and national levels. Other factors exist that stoke the fires of the basic issues. According to Cohen (1989), 48% of all undergraduates attend community colleges and what

is problematic in the transfer issue is that two-year colleges do not enforce prerequisites. Cohen continues to note that courses taken lie on a linear plane and the progress of students is unmonitored, hence adversely affecting the transfer rate. Many colleges established programs to remedy the situation. California for example, initiated transfer center pilot programs in 1986 in its vast tri-partite system of higher education (Dyste, 1987). College systems, regional and national consortia, and local colleges are focused in overcoming this problem (Berman, 1990).

The transfer rate is also rooted in the nature of the enrollment patterns of non-traditional students. In a retrospective study, Garcia and Thompson (1990) found that the average time to [A.A.] degree acquisition at City Colleges of Chicago was 5.9 years or 9.2 semesters. This average was built from a range of 2-38 years of matriculation. Contrary to general perception, the authors viewed this time extensiveness as a testament to the perseverance and sacrifice of community college students. The Educational Record (1989) found that on average, achieving the A.A. degree took students more than five years. In a report by Porter (1989), the patterns of enrollment resulting in protracted time to degree were confirmed at a number of other institutions.

Time prolongation is due also to large numbers of students needing upgrade of academic skills to meet the

challenges of a collegiate curriculum. In a 1990 survey of 403 representative institutions of higher education, the Higher Education Research Institute (1990) found that a record high percentage of freshmen were in need of remediation.

The extremely high rates of under-prepared students led other researchers to ponder the nature of the nurture. Bennett is quoted in Parnell (1988) as stating that historically, researchers suggest that socio-economic background is the best indicator of educational success. Bennett believes that what is studied in high school has the greatest influence on educational success. Cousineau & Landon (1989) found that success was related to number of credits earned and GPA. Vaala (1989) finds that the most successful students had parents who had completed a postsecondary education program. However, fundamental to all views is the fact that both quality of guidance and courses selection are instrumental to producing successful students.

Across institutions of higher education in America, rates for data of all types are generated. Within institutions, definitions for the data may differ due to purposes for which the data were originally produced. Qualifications attendant to data, when available may be by-passed, thus creating a condition of internal invalidity. Outside of the institution, similar labels are attached to data which may be obtained by dissimilar procedures and/or

using varying definitions. Making comparisons to other institutions with these data is to generate potpourri and this occurs with greater frequency than one would like to admit. Internal validity and external validity of data are imperative sine qua non. Much of the controversy surrounding the fulfillment of college mission and performance comparisons stem from these data. Much time and resources are devoted to gathering and processing data that obfuscate what is actually occurring on the local and national levels. The factors identified by the National Institute of Education (1984) as barriers to the study of transfer function are of this genre.

Articulation Agreements

In efforts to more closely align academic standards and preparation of community college students for transfer to the universities, states developed articulation agreements. Articulation agreements are vital mechanisms for aiding community college graduates to flow through the university system. They set standards of performance and ensure that work already done will be honored. These agreements facilitated transfer through an elaborate and collaborative structure. The construction of agreements for articulation of transfer students has important requisites. Valid articulation agreements depend on the establishment of definitional and counting system commonality (Kintzer, 1983). Common and standardized databases statewide enable the exchange of precise data built from the same base

(Donovan, et al., 1988). The monitoring of articulation effectiveness rely on this database. Agreements vary greatly in scope and effectiveness across institutions having agreements. Some agreements are made between in-state community colleges and a university. Others may be between a community college and several universities. Several states have statewide agreements between community colleges and the university system of the states. These agreements differ in extent of coverage and specifics of provisions.

The Ford Foundation sponsors transfer opportunities (Rodriguez, 1987) which, in effect, are quasi-articulation agreements. Local upper and lower division institutions periodically discuss interlocking transfer issues. State coordination boards, school boards, state universities, and state community colleges may work cooperatively to develop support paths to the bachelor's degree (Richardson, 1984).

A national survey to compare articulation systems was conducted by Pica (1988). Of the 30 states identified as having articulation systems, 26 responded to the survey. The study found that articulation systems were either state mandated or developed through local initiatives. Oversight for policy enforcement was not always adequate. This resulted in the non-transferability of General Education core courses.

A vital element of the articulation agreements is the Common Course Numbering System (CCNS). The CCNS equated

course curriculum with a uniform numbering system of both sending and receiving institutions. Five states developed this practice but the CCNS was not always statewide. There are five critical components to servicing students in a system - CCNS, common statewide calendar, common transcript format, general education core, and a full-time articulation officer. Only one state has all of these mechanisms (Florida). Other states have mechanisms unique to themselves. For example, Kentucky has a common catalog for its fourteen community colleges. North Dakota has centralized the sending of transcripts from its administrative center. A few states have a feedback system to inform the transferring institution of the performance of its former student. Mandated testing for entrance into the university is prescribed by a few states. Aside from its educational merits, accountability to the consumer and to the taxpayer is resulting in the adoption of articulation mechanisms by more and more institutions.

For institutions that have established agreements, refinements to agreements are being considered. Knoell (1990) sees the need for vertical articulation, i.e., sequencing of courses. Administrators and faculty are concerned with the looseness of course sequencing (Palmer, 1986). Without solid curricular structures, baccalaureate acquisition is compromised (Palmer, 1990).

Once agreements are in place, it is necessary to monitor the progress of students to determine the effects of

agreements. According to Palmer (1986), tracking of students is not widely practiced. Tracking on the state level requires that colleges and the state division of higher education have sufficient resources to engage in sophisticated in-depth analyses. Analyses could then generate performance data helpful to institutional decision-making. Such decisions may have serious consequences for the students as individuals, the institutions, and the community.

Though the fifty states differ in characteristics, demographics, and postsecondary delivery systems, national reports treat data as if there were a national norm for data elements. The mixture of systems with non-comparable data produce misleading statistics and place higher education institutions in vulnerable positions. So critical is the issue of outcomes and effectiveness of programs that the conference of the American Association of Community/Junior Colleges designated 1991 the year of transfer and articulation. On agenda were legislative funding for the development of comprehensive student databases. Hopefully, this will eventuate in statewide systems and a national system that can accommodate similarities and the uniqueness within states.

Transfer Efforts and Performance in Florida

Florida leads the United States in educational technology in many areas (Campbell, 1990). One of these areas is in the statewide system of articulation for

transfer of students which began in 1959. The articulation system in Florida is a model for the nation, and perhaps, internationally (Florida State Board of Community Colleges, 1988). This system was built into the Florida Master Plan with the establishment of the 2+2, upper and lower division segmentation of higher education. The articulation system is a flexible and dynamic one. It has undergone a number of modifications, augmentations, and refinements since its inception. Implementation of high speed technology enabled the system to evolve rapidly. In 1989, Florida formed an Automated Information Commission for statewide data coordination and networking. The priority for this operation was to bring into the system those institutions that were not yet in the system. Institutions were given assistance in the conversion process and special loans, as needed. All Florida institutions would be linked to the student databases. The key element to the linkage from kindergarten through post-doctoral studies is the social security number. Out-of-state extensions are being worked out with Texas and plans for California are just beyond the horizon.

Electronic transcripts are already in effect from K-12; in 1991 all community colleges were scheduled for completion of conversion; universities are well into this aspect also. In 1988 Alaska was the only state in the union with electronic transfer of transcripts. Florida now joins Alaska for having installed this mechanism. SAT scores from

Florida are being hooked into the system and eventually the SAT scores of those who sat for the test outside of Florida will be linked to the Florida electronic test file.

State of the art communications have aided the furtherance of the articulation system. Without detailing each, educational institutions and state agencies have, from the genesis of the system, worked on the instruments of articulation listed as:

- Guaranteed credit transfer
- Open access while maintaining academic excellence
- Dissemination of articulation information
- Program review
- Acceleration mechanisms
- Entry and exit testing
- Feedback from transfer receptor institution
- Electronic networking
- Common course numbering system
- Forgiveness policy
- Gordon Rule writing prescriptors
- Common electronic transcript format
- Common calendar
- Limited access program fairness
- Articulation officer in each college
- General education core courses
- Foreign language requirement equitability
- Faculty to faculty discussion of issues
- Specific program articulation for the A.S. degree

- Oversight in the protection of agreements
- Instantaneous electronic accessibility through the counseling center of the individual's progress
- Articulation coordination committee to adjudicate conflicts involving students or institutions.

The development of the articulation instruments involved a number of commissions, committees, subcommittees, departments, agencies, and institutions throughout the state. Effectiveness studies are on-going processes.

In 1988 a major flaw was detected in the Florida articulation system...and this was the inadequacy in the dissemination of articulation information. By 1990, the State had instituted two systems, SOLAR and SASS to correct the deficiencies. Both SOLAR (Student On-Line Articulation) and SASS (Student Academic Support System) are electronic systems enabling students immediate access to information about their individual progress through the education system. The former was developed for community college students and the latter for university students.

The Florida Articulation Task Force keeps abreast of legislative requirements and makes recommendations for acceptance or repeal of mandates. Information about developments are dispersed to appropriate locations statewide for reaction and input.

The community college and university systems are interdependent systems (Florida State Board of Community Colleges, 1988); Florida Association of Community Colleges, 1990). This is clearly seen in the greater absolute number

and proportion of community college transferees in the SUS than university natives. Statistics of A.A. degree graduates versus university native students for fall term 1988 showed the intermeshing of both community college and university systems at 57% and 43%, respectively (Baldwin, 1990). In 1986-87 university student data showed that the combined community college transfers to the SUS (A.A. degree transfers, A.S. degree transfers, and non-degree community college transfers) comprised 72% of university enrollments as opposed to 28% university native student enrollment. Noted earlier, 77% of the students in the upper division of the Florida university system in 1989 were transfers (Belcher & Baldwin, 1991). With the passage of time, the proportionate contribution of enrollments from community colleges is increasing in domination of the university system enrollments.

The performance of community college transfer students at the university is monitored at the state level through a number of reports prepared at the state level. These reports by transferring college and discipline level, show the aggregated university performance of students at each of the nine State universities. The local community college, thus apprised, is free to act on the data. Local reviews are periodically conducted in conjunction with these data. Issues that are pervasive and widespread are discussed regionally. These regional meetings are conducted by the Advisory Committee for the Summative Review of the A.A.

Program (Florida State Board of Education, 1989). The issue-oriented reviews address changes needed in state policy and funding priorities. Hearings are scheduled for findings and recommendations are made. Input from the local level thus help to form the basis for decisions on the state level.

A service offered by the State is the electronic transmission of data for local research purposes. This mechanism provides institutions endless possibilities for conducting research on the local level. Thus, the framework for proactive and leading edge research can occur. The longitudinal student database (Student Course Data File) by term has been collected by the State since 1974. Florida's flagship database is probably the only one in the country which is longitudinal and systematic (Howard, 1990).

If Florida is doing so much that is helpful for students, why are its community college graduates still failing in vast numbers (3,335 in 1988) at the universities? Two studies by the Florida State Board of Education intent on isolating the factors are cited below. The Florida State Board of Community Colleges is a large umbrella sheltering many entities. These entities, among other duties, engage on the State level in research using data collected by the Division of Community Colleges and the Division of Universities. In conjunction with the Florida Five Year Program Review Project, the education department studied science instruction in the postsecondary school programs

(State Board of Community Colleges, 1989; 1990). One conclusion drawn was that because science is highly sequential and structured with one skill acting as the prerequisite for the next skill; with one concept setting the foundation for the next concept, it is necessary for preparation to begin at the middle school level. This is true also for science related disciplines. The articulation for transfer, thus begins in childhood and involves all levels of the education system. The science instruction study was conceived as a result of concern with published standing in science showing that the United States lagged behind foreign countries.

The program review task force on the State level is currently investigating the performance in the living sciences discipline of community college transfers to the university. Findings show that the success of the science programs system-wide mirrors performance at the local level. Comparisons were made by the State of the differences between the GPA of C.C. transferees and those of the native university student. A conclusion drawn was that differences were partly due to the differences in methodology used in calculations, in addition to the effects of transfer shock. Transfer students who were interviewed stated that the university curriculum was more demanding. University faculty thought that limited student access on the one hand, and open access on the other hand, compelled university instructional level to mean ability. Time contraints

prevented the State from doing a transcript analysis. In-depth probes on the State level, thus help to monitor the state of health of Florida higher education institutions.

In addition to state agency studies, Florida enlists the services of external consultants to provide assessment of policies and practices and to make recommendations. In 1988, one such consultant, Hodgkinson, reconfirmed that Florida has a good comprehensive higher education system. It has two sophisticated research universities, a large community college that would win any nation-wide best in the nation contest. He concluded that high technology industries are attracted to Florida because of its system of higher education. But this system cannot stand alone. It is already suffering hardships due to part-time enrollments for which a full-time educational service infrastructure must exist.

Hodgkinson continues to explain that urban majority minorities present educational challenges. Among other requirements, teaching methodologies must consider the intensity of the learner's needs, learning styles and cultural values. Raising standards of educational attainment is one side of the educational coin; the other being, providing funds so that the resources will be available to raise students to the higher standards. Higher education is no better than the public education system...from kindergarten onward. In the interest of "enlightened pragmatism" these children will be the future

populations of higher education. The higher the quality of the public school system, the higher also will be the quality of students, later in postsecondary education. It is imperative that the leadership of higher education articulate with the public school system to work out standards, course sequences, and retention support structures. Higher education, business, industry, and the community will be heavily impacted by the quality of student emerging from the public schools. Educational services are costly....but these are growth production costs as contrasted with adult internment programs which are deficit reduction costs, and infinitely costlier. Florida is receiving judicious recommendations for maximizing human potential. The difficulty is in carrying forth recommendations consistently and persistently. Academic excellence does not exist without excellence in educational services . Articulation agreements are service mechanisms central to improving performance for transfer.

Transfer Efforts and Performance of Miami-Dade Community College Graduates

A report issued by the Florida State Board of Community Colleges (1990) stated that community college graduates perform as well as university natives in upper division courses for 25 disciplines. This conclusion was based on the annual aggregated Division of Community Colleges Program Review Level 1 data. While appreciating these successes as driving forces for further achievement, it is also important

to continue efforts to remove barriers to success. The literature, as the reader has seen, presents a great deal of controvertible research on success rates which compares the two major segments in higher education. With the exception of the two Florida studies noted earlier, there is scant research that examines the factors behind the failure rates of transfer students at universities.

Like the arithmetic mean, aggregated data mask extremes and minimize differences. Baldwin (1990) found that when State data for performance were disaggregated by each of Florida's twenty-eight community colleges on the individual program level, a different view emerged than is seen on the statewide level. For the fall term 1988 cohort from Miami-Dade Community College, there was a 10%-15% failure rate for the College's three principal programs. This compared to a 1%-2% failure rate for university native students. In an independent study occurring simultaneous to the M-DCC study, 16% of life sciences A.A. degree transfers, statewide, failed compared to a 2% failure rate for native university students (Florida State Board of Community Colleges, 1990). The Board surmises that the differences may be due to transfer shock and the different methods of GPA calculations between the two higher education systems. In the State's survey, it was opined that differences may be due to the advantage university native students have in being able to disperse difficult courses over four years. Faculty and students suggest that study effort intensify and that

prerequisites receive due attention.

Researching the factors behind the unsatisfactory performance of M-DCC transfer students at the university is one facet of many studies on-going at the College. Of much concern also is what happens to the community college student prior to A.A. degree acquisition. An example of concern translated into action follows. High attrition rates occur in some of the College's fundamental business courses. To remedy this phenomenon, a Camelot-based tutorial system was developed to supplement classroom instruction (M-DCC, 1990d) and this intervention effort proved effective. Miami-Dade has embarked upon another "first-of-its-kind-nationwide" comprehensive reforms project. Multi-faceted projects, encompassing a broad range of higher education initiatives, are engaged in by many of the College's personnel. From these projects, a better comprehension emerges of student behavioral patterns as well as institutional behavioral patterns and should better guide policy, planning, and practice. In the College's New Directions Project 1990 (M-DCC, 1990a), a retreat was held to discuss tough curricular issues reflecting the concerns of the new decade. Planned were modifications to a number of the College's programs - General Education, superior student, math and reading, the transfer degree, and the CLAST (College Level Academic Skills Test) curriculum. Changes in the State's CLAST standards necessitated reviewing the way students are being prepared (McCabe, 1990)

for exiting the institution to transfer to the upper division. Alternative pathways are being designed for students who perform well on the CLAST (M-DCC, 1990c). Standardization of advisement information is under preparation (M-DCC, 1990b).

Another project of great magnitude and far reaching consequences, conceived in 1986, is the Teaching Learning Project. This project is actually comprised of many sub-projects designed to ultimately facilitate student learning. Some aspects of the project are development of assessment instruments for all categories of college employees, growth incentives for M-DCC personnel, and classroom research. Classroom research is a mechanism to promote superior student outcomes. Instructors examine the effects on the learner of teaching behaviors. Maxwell (1991) at the governor's meeting to consider budget initiatives emphasized the importance of programs which allow concrete evaluation of outcomes.

Florida has the highest high school drop out rate in the nation (Hodgkinson, 1988). Young adults are leaving high school without employable skills and their resources for acquiring academic skills are unpromising. The demographics of Dade County, where the College is located, indicate serious increases in the need for educational services. Massive numbers of underprepared students greatly aggravate the problem of elevating academic abilities to cope with the College's curriculum. McCabe (1990) proposed

innovations to the College's facilities much akin to residential universities. Other new initiatives include money-back guarantee of employment for the A.S. degree, enriched academic path for the university eligible student, alternative testing mechanisms for CLAST preparation, more directive curricula, and broadening of articulation with independent colleges and universities.

Details were completed for an on-campus baccalaureate degree with a local private university. M-DCC (1985) proposed that the addition of upper division courses to M-DCC is a cost effective operation for the higher education system. In 1991, Turner of the University of South Florida came to the conclusion that prudent use of state funds demands large community colleges be converted to baccalaureate degree granting institutions.

Articulation agreements exist between M-DCC and more than forty universities throughout the United States (Passafiume, 1990). In some of these institutions, general agreements were made; in others, agreements were specific to the discipline. Some of these institutions are highly specialized (as for chiropractic preparation), and still other accredited institutions are located in foreign countries.

Institutional leadership is the key to effective transfer and articulation; this involves mutual trust and respect (Bender, 1990). The monitoring, reevaluation, and refinement of articulation agreements are on-going service

processes at Miami-Dade Community College and in the state of Florida. Quality performance by students is undergirded by quality of support services for students. But with the tremendous effort being made to help students through the higher education system, why are so many A.A. graduates still failing at the university? What is not being done or what is not being done sufficiently within the scope of our many endeavors? Chapter 3 outlines the specific details of variables that will be scrutinized to uncover factors influencing and predicting performance of A.A. graduates transferring to the universities.

Summary

The review of the literature revealed few research studies conducted or in progress, dealing with factors underlying the failure of graduates with an Associate in Arts degree transferring to the university. The two studies found are in development with the state board of education in Florida. One deals with the Physical Science discipline and the other with Life Science. In both of these studies, students are failing at the rate greater than 16%. The state's qualitative research suggests that students should take course requirements more seriously. Results found in the state studies are mirrored on the local level. Many of the students who are failing represent long term, self-sacrificing persisters who unknowingly engaged in collegiate behavioral patterns that did not serve their best interests.

Most states and institutions of higher education have not yet acquired longitudinal databases and the host of support systems and resources that would enable them to conduct research of this nature.

There was a great deal of peripatetic research which dealt with transfer rates, failure rate at the university of transfer students, and grade point average differentials. These studies did not examine the reasons behind the failures with substantive data analyses founded on firm definitional conceptualization. They normally concluded at citing differences with implied imputations. No studies were found on performance in the curriculum of the major discipline in linkage with ethnicity of A.A. graduates transferring to the university.

The National Center for Educational Statistics developed a longitudinal archival file from national survey responses matched against transcripts drawn (Adelman, 1989). Much can be found about transfer and student behavior over the long term from this file. Great pains were taken to verify data accuracy. Researchers are generally offered access to these files. Good data are essential but insufficient to good conclusions. Good data can be desecrated by subjecting them to conceptual impurities and/or methodological travesties.

The differential rate studies between success levels of transfer students and university natives have thus far resulted in the creation of schisms between reality and

perceived reality. Issues created from perceived reality jeopardize the constancy of the community college's transfer mission. It is taking the pervasive economic pressures of the nineties for efforts to coalesce among the various segments of the education system in resolving issues. A number of states and institutions are turning to model systems as guides to developing their own systems. National organizations are devoting conventions to themes that help to accelerate the creation of comparable bases structured on sound concepts. Perhaps the establishment of research soundness in problem resolution directions would allow students to succeed more abundantly at the university; and educators and students both, to better enjoy the fruits of their labors.

CHAPTER 3

Research Design

Methodology

Sample/Population

Over the past several years, examination of the GPA of SUS transferees with an A.A. from M-DCC revealed a consistent 10-15% failure rate compared to SUS natives. These rates were found for enrollments and graduations in M-DCC's largest programs....Business Administration, Engineering, and Computer Sciences.

Therefore, the M-DCC A.A. degree transfer sample/ population studied included those in the Engineering, Computer Science, and Business Management disciplines. The selection criteria also included state universities enrolling more than 20 M-DCC A.A. graduates (regardless of graduation year) in these disciplines. Universities identified were Florida International University, University of Florida, Florida State University, Florida Atlantic University, and the University of South Florida. The sample/population was selected from M-DCC A.A. graduates attending the SUS in the fall term of 1988-89.

The qualifying fall term 1988 cohort was divided into three groups. Low achievers had a GPA of less than 2.00, middle achievers a 2.00-3.49 GPA and high achievers were in the 3.50+ GPA group. Of the three groups studied, two groups (high and low achievers) were studied in totality, and the third group (middle achievers) was a systematic

sample. This latter group was a 12% systematic sample of every 8th qualified graduate whose record was in the SUS Student Course File. There were 564 subjects in the study. Table 3.1 gives the specific number and percent of subjects in the study for each of the three disciplines by achiever group. There were 21% (n=117) high achievers and 44% (n=247) low achievers. These two groups included everyone meeting the criteria noted previously. They constituted an exhaustive population. The middle achievers (as is true of all initial M-DCC registrants) were assigned sequential student numbers as they registered at random. Middle group achievers also conformed to the same selection criteria as the other two achiever groups. This middle achiever group consisted of 35% (n=200) of the total number of transcripts studied. Both university and community college transcripts of each member of the three achiever groups for each of the three disciplines were scrutinized for a multitude of behaviors (as outlined on pages 72-74).

Table 3.1

Cohort Sample of A.A. Graduates from Miami-Dade Community College in the SUS* in Fall Term 1988-89 for Business Management, Computer Science, and Engineering

Achiever (Ach) Group	Discipline (Disc)							
	Business Management		Computer Science		Engineer Sciences		Total	
	No.	% of Disc	No.	% of Disc	No.	% of Disc	No.	% of
High Achiever (> 3.5 GPA)	74	21	14	16	29	25	117	21
Middle Achiever (2.0-3.4 GPA)	128	35	32	36	40	35	**200	35
Low Achiever (< 2.0 GPA)	159	44	43	48	45	40	247	44
TOTAL	361	100	89	100	114	100	564	100

* FIU, UF, FSU, FAU, USF; n>20 in discipline.
** 12% systematic sample from a total of 1,653 middle achievers.

Preliminary Statistics

Statistical Analysis System (SAS) tables were generated for the three targeted programs. The statistics from the universities of interest - FIU, FAU, UF, FSU, and USF - were examined for their match against state generated tables. Verification of correctness completed made it possible to proceed with transcript draw decisions. Variables for the initial tables from transcript sampling showed the precise number of students who had failed in the SUS from these programs; it also showed how many were doing extremely well, and those between the two extremes. Reasonableness of task time involved for detailed transcript analyses and accuracy of conclusions to be drawn from the sample were considered. It later developed that time calculations for the expansiveness of numerous related elements had not been anticipated during the planning stages, and therefore, not factored into the time allocated for the study.

Transcript Impressions

Two sets of transcripts for each individual in the study were drawn for analyses, the M-DCC transcript and the corresponding student's university transcript. A total of 1,128 transcripts were studied. Approximately 63 variables were examined and coded for electronic processing, as appropriate. Some of the variables were used for file merging, some provided demographic information, some for cross-validation purposes, and the remaining were necessary

for scrutinizing the issues of the study. A few variables were included for use in future studies.

During the transcript analysis process, impressions were gleaned. These impressions follow:

High Requisite Type. Students took many of the courses recommended by the universities for their major, did well in these courses and succeeded in the SUS. They were apparently goal oriented and began taking major courses early in their college career. Though some of them may have changed majors, changes of major often occurred in fields having a heavy overlap of major requirements and this enabled success in spite of the switch. These students had strong mathematics backgrounds. They understood their capabilities and took only as many courses as they could handle aptly. They tended to fulfill minimum Associate in Arts degree graduation requirements; most remaining courses were dedicated to strengthening their major field. Often the number of credits taken in the major pushed the cumulative credits far beyond the minimum needed to graduate.

High Prerequisite Type. Students began college with academic deficits in basic academic skills and/or needed many prerequisites in order to take requisite courses. This prerequisite to requisite deficit was evident in the mathematics segments of the Computer Sciences and Business Administration programs. But the deficit was most apparent for the engineering specialties where many foundational

mathematics courses are required preliminary to university required mathematics, chemistry, and physics courses.

In disciplines which are highly structured and sequential, quality performance in the initial major courses is necessary to provide the necessary knowledge and skills for success in subsequent course work. Often at the time of graduation, only a few SUS major requirements had been taken. These students tended not to perform well in the SUS for the disciplines noted.

Sampler Type. Students appeared undecided about their area of subject concentration and so sampled courses trying to find some focus. When they were eligible to graduate, few major courses had been taken. A major may have been declared, but transcripts revealed that courses completed provided a liberal background with no subject concentration. These students tended to do poorly in the SUS for technically/scientifically oriented studies.

Marginal Type. Students struggled through their major courses, often failing them and repeating them, sometimes more than once or twice. Their final grade for the course repeated may have been a "C." Cumulative GPA for the major may have been marginal (low "C") and the overall GPA may have been somewhat higher than their major GPA, but just barely high enough to meet minimum GPA standards for graduation. Their performance level for the major courses in the lower division did not establish the necessary basis for success in the SUS in these disciplines.

Analyses

Introduction

The description that follows was the plan for possible data inclusions and analyses. In the initial data examination, characteristics were revealed that necessitated alteration of the plans somewhat; supplementary sources were called for, and additional diagnostic tools were implemented to enrich data output. Variable combinations that had not been initially conceived, were added later when they were perceived to be useful to overall perspective. Customized programming, using the SAS, revealed that most of the variables initially identified served purposes of the study. The protocol implemented was more extensive and exhaustive than originally planned.

Data analyses were conducted and the following objectives were met:

1) Ensured electronic data file integrity; anomalies were checked.
2) Deciphered the meaning of the data, acquired a feel for the data from initial scans of 1,128 transcripts.
3) Discussed with relevant M-DCC administrators those parameters which would be most useful to them, after the first scan of transcripts.
4) Developed data coding protocol for the transcripts that were congruous with research hypotheses.
5) Produced criteria for treating variant data.

6) Coded data for variables of interest from the transcript as well as from other sources.

7) Checked items selected for coding against guidelines. Checked coded data for accuracy.

8) Translated data to electronic files; examined electronic files for discrepancies.

9) Processed coded data and assessed descriptive statistics for relevance, trends, and significance.

10) Calculated univariate statistics and discovered relationships among variables.

11) Calculated multivariate correlations to test best order of regressor input; attended to multicollinearity, and examined residuals. Beta coefficients were examined for unusualness.

12) Answered the questions of:

    a) Adequate fit of data to the model

    b) Whether X, the regressor variable, influenced Y, the response variable for each hypothesis put forth

    c) Whether the model adequately predicted responses.

13) Cross-validated data output (across procedures, cross tabulations, plots, residuals).

Criteria for Tier Classification

The curricula for university required courses for the Business Management, Computer Science, and Engineering disciplines were numerous. As will be detailed in Chapter 4, the major field requirements alone could take 8 major terms to complete for a full-time engineering student

in the lower division. (See pages 124-128 for program requirements).

Because there are far more courses required than the most diligent and self-sacrificing of students could reasonably complete, the layering of courses into tiers was imperative. This "tiering" enabled courses selection to reveal the extent to which particular courses were vital to successful student performance at the university. The courses that were required overlapped across universities. At the same time, there were courses that were uniquely required by just one or two of the universities. Hence, it became incumbent to establish criteria for the placement of these multitude of courses into tiers. The criteria for classifying the four tiers of courses required or suggested for community college students by the universities follow:

TIER1 - Required*: Critical to Success

1) Recommended by multiple and/or primary** universities.
2) Required across subdisciplines of major.
3) Reasonable to background, core, skills of discipline.

TIER2 - Required - Supportive of Success

1) Not recommended by primary or many universities.
2) Appear peripheral to success in discipline.

* Universities differ in their judgment regarding the courses that are important for preparation in the upper division major.
**Primary universities are those to which large numbers of of M-DCC graduates transfer (FIU, FSU, UF, FAU, USF).

TIER3 - Suggested by Universities

1) Scattered/few universities agreed on inclusion in the curriculum.
2) Appear marginal to focus of discipline.

TIER4 - Related to Discipline

1) Not required as critical or not critical per se.
2) Not suggested.
3) Content in someway(s) connected to the major field.
4) May be prerequisite to requisite.
5) May be advanced courses---beyond requirements.

Descriptive and Inferential Statistics

Assuming that characteristics enabling students to graduate with an A.A. degree remain stable, questions arise as to why they fail in the upper division. Research was focused on determining the variables and the significance of the variables contributing to failure and success of A.A. graduates in the SUS. Quantitative analyses entailed both descriptive statistics and inferential statistics.

Four categories of descriptive and inferential statistics were collected and analyzed or generated and analyzed. They included data on the immediate study as well as data related to state and national issues that impacted this specific study. Issues were classified under the hypotheses set forth in Chapter 1.

The statistical method selected for the inferential analyses was multiple regression. Multiple regression was used for it is suited to the categorical, interval and ex post facto data of this project (Kerlinger, 1986; Cohen, 1968). Regression allowed the assessment of the influence of several variables simultaneously. The influence of each variable was seen in isolation or in combination with other variables. Each regressor in the model was evaluated through the partial F-test for its explanation of the response variable. The hierarchy of regressor contribution was given. All regressors that did not account for variability were eliminated.

Measuring academic success has been a problem historically and continues to be problematic. In limiting the number of variables for measurement, other factors necessarily omitted could impact results. On the other hand, by increasing the multitude of variables for measurement, issues arise concerning result attribution, dilution or redundancy of contribution. One of the classic measures of success is the cumulative grade point average. This project employed SUS cumulative GPA as the dependent variable against which the suspected variables contributory to the success or failure of M-DCC A.A. graduates transferring to the SUS were tested.

Hypothesized Predictors - The variables considered to differentially predict success or failure are given below. The best subsets of independent variables were identified for minimizing residuals in the pilot generation of data. Variables used for analyses are found in Table 3.2.

Table 3.2

Possible Predictor Variables

Variable	Definition
AGE	Age of student (independent)
ETHNIC	Ethnic category of student (independent)
MCLAST	CLAST mathematics score (independent)
RCLAST	CLAST reading score (independent)
WCLAST	CLAST writing score (independent)
GENDER	Sex of student (independent)
MAJORGPA	C.C. GPA for SUS required courses (ind.)
MDCGPA	M-DCC Cumulative GPA (independent)
MDMAJOR	M-DCC program major (independent)
SUSCGPA	SUS cumulative GPA (DEPENDENT VARIABLE)
TIER1	Critical to success - Number of critical SUS required major courses taken in the lower division (independent)
TIER1CR	Number of Tier1 credits associated with Tier1 courses (independent)
TIER1QP	Tier1 quality points used for GPA calculation (independent)
TIER2	Supportive of success - Number of other SUS required major courses taken in the lower division (independent)

Table 3.2 (continued)
Possible Predictor Variables

TIER2CR	Number of Tier2 credits associated with Tier2 courses (independent)
TIER2QP	Tier2 quality points used for GPA calculation (independent)
TIER3	Suggested for SUS - Number of SUS suggested courses taken in the lower division (independent)
TIER3CR	Number of Tier3 credits associated with Tier3 courses (independent)
TIER3QP	Tier3 quality points used for GPA calculation (independent)
TIER4	Courses related to major that are not in the categories above
TIER4CR	Number of Tier4 credits associated with Tier4 courses (independent)
TIER4QP	Tier4 quality points used for GPA calculation (independent)
TOTCRDIT	Total M-DCC credits completed

Exploratory data generation was performed to determine the contribution of each variable to the explanation of the phenomenon. It was possible from the initial findings for the researcher to reorder the variable input and to decide how to obtain best fit. Cross validation of variable data were performed. Possible variable input, regardless of variable order for constructing the models follow:

Research Question 1 (GPA variable)

$$Y1 = TIER1CR + TIER1QP + TIER2CR + TIER2QP + TIER3CR + TIER3QP + TIER4CR + TIER4QP$$

Y1 = MDCGPA + TIER1GPA + TIER2GPA +TIER2GPA +
TIER4GPA

Research Question 2 (demographic variable)

Y1 = ETHNIC + AGE + GENDER

Y1 = HISPANIC + BLACK + WHITE

Research Question 3 (administration variable)

Y1 = RCLAST + WCLAST + CCLAST

Y1 = MDCGPA + CLAST

Research Question 4 (curriculum variable)

Y1 = MDCGPA + TIER1 + TIER1CR + TIER1QP

Y1 = MDCGPA + TIER2 + TIER2CR + TIER2QP

Y1 = MDCGPA+TIER1CR+TIER2CR+TIER1QP+TIER2QP

Overall Prediction (and by discipline, if necessary)

Y1 = MDCGPA+TIER1CR+TIER1QP+TIER2CR+TIER2QP+
SUSEARN+SUSATMPT+ETHNIC+AGE+GENDER+RCLAST+
WCLAST+CCLAST+TOTCRDIT

Output revealed among other statistics, the maximum coefficient of determination ($R^2y.1,2...k$), F-ratio, beta weights, prob > F, and the square of the partial coefficient. The .05 alpha level was used although for some variables, probability occurred at the .0001 level. The problem of multicollinearity was dealt with through the redundancy reduction coefficient. Order input was researched for best effects. Additional mainframe processing controlled for gender, ethnicity, age and the variables previously listed in the equation entry.

Multiple regression, as an analysis mechanism, was chosen because of its appropriateness for use with not only

experimental but with non-experimental designs; with continuous and with dichotomous variables (Greenberg, 1987). This analytic tool is being used increasingly and is the favored choice for statistical analyses among social and behavioral scientists (Pedhazur, 1982; Myers, 1988). The data systems of these sciences (and into which this study falls), are however, complicated and no model used is an absolutely perfect structure. Because the variables from too many data systems can result in tenuous conclusions with attribution uncertainty, the stepwise procedure was used. This regression procedure partialed out overlapping beta coefficients for each member of the subset. Intercorrelations thus weeded out, reduced redundancy of contribution.

Another strength for which the regression technique was selected is its control for effects due to omitted variables and unknown parameters (such as in this study - high school GPA, socio-economic status, motivation). The control for these error parameters in regression was programmed through the calculus. The estimated error terms minimized inflation of variance and determined the line of best fit.

Inflation of variance can also be due to overrepresentation because of sample size. Large sample sizes (200 and over) minimize sampling errors and, therefore, do not require the application of the shrinkage correlation formula. A good rule of thumb is, 30 subjects minimum for correlational studies and 10% of the population for

descriptive studies (Gay, 1987) or 30 cases for each variable (Cohen, 1969). In this study, the ideal sample size, exhaustive, was used for two achiever groups (high, n=117 and low, n=247). This eliminated the possible flaw of lack of representativeness. A systematic sample of 200 middle achievers (12% of all middle achievers) was included. Regression was also chosen for its ability to handle unequal cell sizes and proportions.

Table 3.3 presents the variables in the SUS files suitable for the analysis. There were 19 of these variables. The field sizes as well as definitions are listed below.

Table 3.3

Variables for Analysis: SUS Data File

Fields	Variable Name	SUS Data Definition
1-9	SSNO	Social Security number
10-16	STNUM	Student number
17	GENDER	Sex
18	ETHNIC	Race category
35-42	BDATE	Date of birth
70-74	CCLAST	CLAST computation score
76-80	CLASTR	CLAST reading score
82-86	CLASTW	CLAST writing score
100-104	MDCUMCR	M-DCC cumulative credits earned
105-107	MDCGPA	M-DCC cumulative GPA
115-119	MDMAJOR	M-DCC program major
222-226	SUS1YT	SUS first year term
227-231	SUSNAME	Name of university
232-237	SUS1PGM	First SUS major
238-243	SUSLSPGM	Last SUS major
247-249	SUSCGPA	SUS cumulative GPA
253-256	SUSEARN	SUS cumulative credits earned
261-264	SUSATMPT	SUS cumulative cred. attempted

Table 3.4 contains the variables for analysis from M-DCC transcripts. Some of the variables: 1) provide cross checks against other files, 2) function to merge files on common elements, 3) exist for the purpose of performing mathematical processes, and 4) identify cases. Some variables were placed on file to be used in future studies.

Table 3.4

Variables for Analysis: M-DCC Transcripts

Fields	Variable Name	Variable Definition
1-9	SSNO	Social Security number
11-17	STNUM	Student number
10-36	STUDNAME	Student name
42-43	MAJOR	Program code
44-55	MTITLE	Title of major program
56-58	MDCGPA	M-DCC cumulative GPA
61-62	CPREAD*	CP - Number of reading courses taken
64-65	CPMATH*	CP - Number of math courses taken
67-68	CPWRITE*	CP - Number of writing courses taken
70-71	ESL*	Number of ESL courses taken
73-74	CLEP*	Number of CLEP credits
76-77	WDRAWN*	Number of courses withdrawn
78-79	REPEAT*	Number of credits repeated
81-82	TIER1	Number of critical courses taken
84-86	TIER1CR	Number of critical major credits
88-90	TIER1QP	TIER1 quality points
92-92	TIER1GPA	Cum GPA for TIER1 courses

Table 3.4 (continued)

Variables for Analysis: M-DCC Transcripts

Field	Variable	Definition
97-98	TIER2	TIER2 supportive courses taken
100-102	TIER2CR	TIER2 supportive credits taken
104-106	TIER2QP	TIER2 quality points
108-110	TIER2GPA	Cum GPA for TIER2 courses
108-110	TIER3	TIER3 suggested courses taken
113-114	TIER3CR	TIER3 suggested credits taken
116-118	TIER3QP	TIER3 quality points
124-126	TIER3GPA	Cum GPA for TIER3 courses
129-130	TIER4	TIER4 related courses taken
132-134	TIER4CR	TIER4 related credits taken
136-138	TIER4QP	TIER4 quality points
140-142	TIER4GPA	Cum GPA for TIER4 courses
144-145	POSTAAMD	No. post A.A. M-DCC credits
147-149	TOTCRDIT	Total M-DCC credits taken
151-153	MAJORGPA	GPA for major courses
155-157	SUSEARN	Number of credits earned in SUS
159-161	SUSATMPT	Number of credits attempted in SUS
63-167	TCODE	Transcript identification code
170-220	COMMENT	Special notes on individual

* Data collected for future studies.

In short, the multiple regression statistical procedures were applied to examine the variables that might contribute to successful performance in the SUS, controlling for ethnicity and discipline. Descriptive analyses provided additional and supportive perspectives.

CHAPTER 4

Results, Analysis and Evaluation

This chapter is divided into four sections corresponding to the four hypotheses. While responding to the hypotheses stated in Chapter 1, interrelated issues addressed in the review of the literature are dealt with concurrently. These issues are included for three special timely reasons: 1) They are lingering inaccuracies that threaten the credibility of community colleges, 2) The credibility of mission fulfillment influences funding levels, particularly with the shortfall of federal and state revenues, and 3) The data collected for performance analyses lend themselves to studying these interrelated issues.

GPA Differentials and Interrelated Issues

Hypothesis 1: The overall lower division GPA and/or the lower division major field GPA for A.A.graduates are predictive of university GPA for the Business & Management, Computer Science, and Engineering disciplines.

The predictor variables with attendant descriptive statistical support are presented in the Hypothesis 1 section. This section covers Tables 4.1 through Table 4.14. Tables 4.1-4.8 deal with regression on university performance, and the community college failure rates at the state and local levels. Tables 4.9-4.14 address the low graduation and transfer rate controversies emphasized in the literature. For all tables in which data were not obtained

from the files described in Chapter 3, data sources are given at the bottom of the particular table.

The 10%-15% overall failure rate noted in Chapter 1 is consistent for as long as these data have been gathered by State educational agencies. To possibly counteract the failure rates, variables were identified to predict conditions and/or behaviors that might influence performance levels. In predicting university performance, a regression model was built after extensive cross check across methods. A full regression model procedure (Freund, et al., 1986) was a first approach to determine the significance of the model contribution of the independent variables to the explanation of the variance of university performance. All twenty-five relevant variables were structured into the exploratory model; the multiple regression R-square was 52.9%. However, 20 variables proved to be insignificant in predicting university performance when considered with all other variables in the model. Although each of these variables contributed only small increments to the variance, in totality the contribution was relatively substantial. Five variables from the exploratory procedure indicated significance. Further testing for verification followed (Freund and Littell, 1986). In order to determine if a smaller number of independent variables would explain a significant amount of variability of the GPAs, a stepwise regression procedure was applied to the prediction of GPA (SAS Institute Inc., 1986).

Table 4.1 contains the results for the stepwise model. The overall model is significant ($F=39.8$, $p<.0001$) with the independent variables explaining 41.8% of the variability of the cumulative university GPA. However, over 50% of the variance is still unexplained by the model. This condition may, to a large extent, be due to the redundant correlations among variables for which intercorrelational contributions had to be reduced. For each independent variable, the partial R-square is given after the variables above it are entered into the model. For example, the CLAST math variable explains 2.7% of the GPA variability over and above M-DCC GPA (35.9%).

Table 4.1

Prediction of University Grade Point Average
Stepwise Regression
Combined Disciplines of the Cohort
Miami-Dade Community College

Dependent Variable: Cumulative University GPA

Source	DF	SS	MS	F	Probability	R^2
Model	8	1551370	193921	39.8	0.0001	.4184
Error	443	2156143	4867			
Total	451	3707513				

Variable	B	Partial R^2	Model R^2	F	Prob
M-DCC GPA	69.64	0.3592	.3592	252.1	0.0001
CLAST Math	0.36	0.0269	.3861	19.6	0.0001
SUS Credits Earned	0.59	0.0125	.3985	9.2	0.0024
Tier1 Credits Earned	2.27	0.0104	.4089	4.8	0.0276
Tier1 Quality Points	1.02	0.0094	.4184	4.7	0.0293

The variability of the CGPASUS (cumulative university GPA) is explained to the greatest extent by the lower division GPA (nearly 36%). The second largest contributor to the variance in the model after M-DCC GPA is the scaled score on the CLAST computation test. Other variables significant at a .05 level are number of university credits earned, number of critical required major course credits earned at the community college, and the magnitude of the quality points used in the calculation of the GPA.

Table 4.2 displays the statistics for the predictor variables used in the cohort. Wide variability is evident for all measures used for the analysis. M-DCC grade point averages were spread through the entire range possible. Scaled CLAST computation score differences between minimum and maximum equalled 102 points. Assuming the 3 credit mode per course for SUS credits earned, individuals in the cohort ranged from one course to forty-nine courses. Quality points also included true outliers. The standard deviations for the last three variables are considerable and reflect the input of extreme values.

Table 4.2
Statistics for the
Predictor Variables Used in Analysis

Variable	N	Mean	Standard Deviation	Minimum	Maximum
M-DCC GPA	564	2.8	0.4	2.0	4.0
CLAST Math	465	318.3	29.7	230.0	432.0
SUS Credits Earned	564	27.8	20.1	3.0	148.0
Tier1 Credits Earned	543	18.4	9.1	3.0	54.0
Tier1 Quality Points	543	53.5	29.8	3.0	216.0

Table 4.3 gives the correlation matrix for the predictor variables used in the multiple regression analysis. All correlations were significant at the .05 level except correlations between Tier1 Credits earned with SUS Credits Earned and Tier1 Quality Points with SUS Credits Earned. As expected, the high correlation (.89) between Tier1 Credits earned and Tier1 Quality Points exists for they are both the essentials in GPA calculations. The relatively high correlation between CLAST Math and M-DCC Grade Point Average is accounted for by the fact that the disciplines for the cohort have a greater mathematics orientation than many other disciplines. Because Tier1 Quality Points are used in total cumulative GPA calculation, it is not surprising to see a correlation of .41.

The relationship between variables is important and the relationship among variables is also important. The Stepwise Regression procedure dealt with the multicollinearity seen in the table. In this process, the first variable entered had the most significant correlation with the dependent variable. All other variables entered and accepted in the model passed the test of probability significance and with redundancy removed, each in its turn. As noted for the Tier1 Quality Points in Table 4.1, the Model R^2 of .4184 was partialed to .0094. A second illustration lies in the Partial R^2 for Tier1 Credits earned being deflated to 0.0104. Intercorrelations of variables, thus removed, corrected for errors due to inflation of variance.

Table 4.3

Predictor Variables:
Correlations Among Variables Used in
Stepwise Regression

Variable	SUS GPA	MDCC GPA	CLAST Math	SUS Earned	TIER1 Earned	TIER1 Points
SUS GPA	--	--	--	--	--	--
M-DCC GPA	.57*	--	--	--	--	--
CLAST Math	.42*	.47*	--	--	--	--
SUS Earned Cred	.21*	.13*	.14*	--	--	--
Tier1 Earned Cred	.12*	.09*	.15*	.01	--	--
Tier1 Qual Points	.32*	.41*	.30*	.03	.89*	--

*Statistically significant at the .05 level.

Table 4.4 is an abbreviation of the data for the critical programs of Business & Management, Computer Sciences, and Engineering under study. Total SUS data include all disciplines in aggregation. For the three disciplines combined, there were 1,841 A.A. graduates who attained an SUS GPA of less than 2.0 and systemwide, 3,335 A.A. graduates failed in the university system. For the Business Management discipline, only 65 SUS natives failed as compared to 1,265 C.C. graduates. The absolute numbers and percents show large performance gaps between C.C. graduates and SUS natives.

Table 4.4

Performance of Associate in Arts Graduates Attending the Florida State University System in Business Management, Computer Sciences, and Engineering, 1988-1989

Discipline (Disc)	Students in SUS		GPA < 2.00 C. College		GPA < 2.00 Natives	
	C.College	Natives	No.	%	No.	%
Business	9,440	5,871	1,265	13.4	65	1.1
Computer	1,260	693	160	12.7	18	2.6
Engineering	2,950	2,755	416	14.1	80	2.9
Total 3 Disc	13,650	9,319	1,841	13.5	163	1.7
Total Disc SUS	33,167	23,818	3,335	10.7	500	2.1

Data Source: Program Review Level I Data Display, 1988-89

Performance data for all disciplines offered by the SUS in 1988-89 is given in Table 4.5. A comparison is made between Florida Community College A.A. graduates who transferred to the State's universities and the university native student. These data, as with much of the data nationwide, are contaminated by the use of different bases for computation of each group compared.

Two factors impact new transfers, one of which is the phenomenon of transfer shock. The other lies in a procedural practice. For Florida community college transferees, the practice in public universities is to calculate these GPAs starting with zero credits earned and zero GPA. With few credits accumulated, poor performance in one course can

drastically affect the university GPA of the transfer student negatively. Natives on the other hand, have their GPA calculated using a different base. All credits earned at the university are used in the calculation. Because native students have at least two years worth of quality points to neutralize the effects of poor performance in a course, in addition to the advantage of freedom from transfer shock, their GPAs can by these conditions, be much higher. Were the native student GPA base set to zero after 60 credits, just as those of transferees, the GPA comparisons would probably be less divergent.

Bearing the above in mind, in all 25 disciplines and for unclassified students shown in this table (Table 4.5), the percent of failures for community college A.A. graduates transferring into the SUS is much higher than that of university native students. Without regard to native student comparisons, the failure rate for community college A.A. graduate transfers was 16% for both physical sciences and life sciences; for forestry, the failure rate was 23%; and for unclassified students, 24%. Data in this table are aggregates for all nine state universities and all 28 community colleges. An exception exists among large counts; education majors community colleges and natives do not differ much. As noted in Chapter 1, it can be clearly seen that the problem of excessive failures is not peculiar to Miami-Dade Community College but is a system-wide problem.

Table 4.6 presents the Fall, 1988 cumulative GPA of Miami-Dade A.A. graduates attending major Florida state universities without regard to year of graduation. Total system data as well as specific university data are given. The data represent composites of all disciplines. The failure rate in aggregation is even higher than for the three disciplines of the cohort. Sixteen percent (n=623) of these transfers had unsatisfactory GPAs.

Table 4.5

Associate in Arts Graduates
Performance in State University System by Discipline
1988-1989 (Summer, Fall, Winter Terms)

	Unduplicated Upper Division Headcount		Percent Below 2.0	
	C. C.*	Natives	C.C.	Natives
Agriculture Science/ Business Production	151	232	13.9	3.4
Allied Health	305	239	5.9	2.0
Architec. & Env. Design	334	304	3.2	1.9
Business & Management	9,440	5,871	13.4	1.1
Communication & Communication Technology	1,908	1,954	9.1	1.1
Computer & Info. Science	1,260	693	12.7	2.6
Education	4,937	2,319	3.8	1.4
Engineering & Rel. Tech.	2,950	2,755	14.4	2.9
Foreign Language/Area & Ethnic Studies	141	182	3.5	2.2
Health Science	803	614	4.7	0.8
Home Economics	254	255	5.9	1.9
Law	135	10	8.8	0.0
Letters	684	1,005	7.0	1.4
Lib/General Studies & Multi/Interdisciplinary Studies	578	773	13.6	5.5
Library & Archival Sci.	1	0	0.0	0.0
Life Sciences	731	868	16.1	2.1
Mathematics	185	231	11.8	1.3

* Community College

Table 4.5
(continued)

Associate in Arts Graduates
Performance in State University System by Discipline
1988-1989 (Summer, Fall, Winter Terms)

	Unduplicated Upper Division Headcount		Percent Below 2.0	
	C. C.	Natives	C.C.	Natives
Parks & Recreation Manag.	46	58	0.0	0.0
Philos., Religion	53	75	5.6	1.3
Physical Science	340	327	16.1	4.5
Psychology	1,474	968	11.6	2.1
Public Affairs & Protective Services	1,299	699	10.7	3.2
Renew. Natural Resources (Forestry)	31	29	22.5	3.4
Social Science	2,338	2,514	11.9	3.1
Visual & Perform. Arts	714	697	5.0	1.0
Unclassified	75	146	24.0	6.8
Total	31,167	23,818	10.7	2.1

Source: Articulation 1989. Florida State Bureau of Community Colleges.

Table 4.6

Cumulative Grade Point Average (GPA) of
Miami-Dade Community College
Associate in Arts Graduates
Attending Major Florida State Universities
Fall 1988

	Florida University										Total Five Univers.		Others		Total SUS	
	FIU		UF		FSU		FAU		USF							
GPA	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0.1-1.9	535	16	33	16	25	13	18	17	8	10	619	16	4	6	623	16
2.0-3.4	2,422	74	158	75	157	79	81	76	65	82	2,883	75	49	76	2,932	75
3.5-4.0	310	10	20	9	17	8	7	7	6	8	360	9	12	18	372	9
Total	3,267	100	211	100	199	100	106	100	79	100	3,862	100	65	100	3,927	100

Data Source: Division of Community College GPA by University Matrix, Item 2 of College Annual Report.

Another variable assumed to affect the GPA and prolong the time to graduation is the enrollment status of the student. Table 4.7 gives the lower division enrollment status by university GPA groups of the A.A. graduates of M-DCC attending selected Florida state universities. For this study, full-time students were defined as those who took at least 12 credit hours each and every Fall and Winter (major) term. A part-time student took fewer than 12 credit hours each and every major semester. The combined enrollment status included those students who attended college full-time in some major semesters and part-time in other major semesters. Students in attendance in the combined category tended to matriculate as part-time students most semesters. Regardless of GPA category, most students attend on a combined basis (55%); the fewest attended part-time exclusively (12%).

Except in prolonging time to graduation and transfer, the enrollment status appears to have little bearing on the quality of performance for both the middle and high GPA groups. It was suggested that for highly technical and structured disciplines, the passage of time seriously attenuates memory and skills for the knowledge base. Examination of the transcripts for the low GPA group across disciplines, revealed that about 75% of those with a combined enrollment status attended college only one or two semesters full-time. Transcript analysis data beyond this table, indicate that for some students in certain

disciplines, retention is adversely affected when time to degree completion is excessively protracted.

Table 4.7

Lower Division Enrollment Status by University GPA Groups of Miami-Dade Associate in Arts Graduates Attending Selected Florida State Universities For the Business/Management, Computer Sciences, And Engineering Disciplines Fall Term 1988

ENROLLMENT	GRADE POINT AVERAGE							
	< 2.0		2.0-3.4		3.5 +		Total	
	No.	%	No.	%	No.	%	No.	%
Full-Time	72	29	74	37	40	34	186	33
Part-Time	11	5	30	15	26	22	67	12
Combined	164	66	96	48	51	44	311	55
Total	247	100	200	100	117	100	564	100

Are M-DCC A.A. graduates failing at the universities because they barely met minimal GPA standards for graduation from community colleges? Table 4.8 displays the GPA at both the lower and upper division for the cohort. Finer subsets of GPA are given for both the middle and high groups in this table in order to better differentiate within group differences. Associate in Arts degree requirements as well as Articulation Agreements between the community colleges and the Florida universities set minimum acceptable standard for the GPA at 2.00. Of the M-DCC graduates with a cumulative GPA of 2.0-2.4, 29% (n=71) have unacceptable

university GPAs. Of the A.A. transfers with a 2.5-2.9 M-DCC GPA, 54% (n=134) of them had less than a 2.0 cumulative university GPA. Together, the data for M-DCC graduates with < 3.0 GPA account for 205 or 83% of the failures at the university for this cohort.

Are these failures due to grade inflation in the lower division and/or not taking university requirements? Curriculum variables of Hypothesis 4 provide some answers to the question of why graduates and, especially, why those graduating with a GPA of 3.0 or above should be failing at the universities (Table 4.29). While not a large number, 28 students of this cohort who graduated with a GPA of 2.9 or lower (8%) attained a 3.0 or higher GPA at the university.

Table 4.8

Lower and Upper Division Grade Point Average
Of Miami-Dade Community College
Associate in Arts Graduates
Attending Major Florida State Universities
Fall Term 1988

M-DCC GPA	University Grade Point Average											
	< 2.0		2.0-2.4		2.5-2.9		3.0-3.4		3.5 +		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2.0-2.4	71	29	16	15	3	4	1	3	6	5	97	17
2.5-2.9	134	54	49	49	30	44	5	16	16	14	234	42
3.0-3.4	35	14	28	28	29	43	16	52	41	35	149	26
3.5 +	7	3	8	8	6	9	9	29	54	46	84	15
Total	247	100	101	100	68	100	31	100	117	100	564	100

The succeeding six tables (Tables 4.9-4.14) concern graduation and transfer rate issues. Critics often ask why community college students take so long a period of time before they graduate. The delay in transferring or graduating is related to certain types of behavior. Table 4.9 shows two kinds of actions -- number of courses withdrawn and number of courses repeated -- that contribute to delaying time to transfer. These withdrawals or repeats are for M-DCC graduates while in the lower division. The delay behaviors may be cumulative, that is, the same individual may have repeated the course or withdrawn from the course more than once. An inverse relationship is seen. The higher the university GPA, the fewer the number of courses withdrawn or repeated while preparing for transfer. The number of withdrawals and repeats elevates as the GPA drops. This supports the observation made during the transcript coding process that students in the high GPA group do better in assessing their abilities and time constraints. They took only as many courses as they could, given restrictions, to maintain high performance levels. The group failing at the universities accounted for 47% of course withdrawals and 57% of the course repeats. The middle GPA group repeated courses to a lesser extent than the low GPA group but to a far greater extent than did the high GPA group. The higher the number of course repeats and/or withdrawals, the longer it took to qualify for graduation.

Table 4.9

Number of Courses Withdrawn or Repeated at Miami-Dade Community College by Associate in Arts Graduates Attending Selected Florida State Universities Fall Term 1988

UNIVERSITY GPA GROUP	WITHDRAWN		REPEATED	
	NUMBER	PERCENT	NUMBER	PERCENT
3.5 - 4.0	72	16.3	21	8.1
2.0 - 3.4	163	36.8	90	34.7
0.0 - 2.0	207	46.9	148	57.2
Total	442	100.0	259	100.0

Table 4.10 gives baseline data on community college enrollees in Florida for issues discussion. Displayed are the rank by size of Associate in Arts enrollments. Data help to clarify the mission of community colleges and provide some insight into the fallacy of calculating transfer/graduation rates using the ratio of enrollments to completions. The public community colleges of Florida are listed in rank of A.A. enrollments from largest to smallest. Though the academic year is indicated as 1987-88, these ranks remain relatively constant across years. The enrollees on this table are defined by criteria. This means that students have 1) completed at least 25% or 24 credit hours of college level courses or 2) been admitted to limited access programs. Any degree-seeking student who has not met either criterion is not counted as a program

enrollee. Up to the point of program acceptance, the student is categorized as pre-degree seeking. Similarly, specific other criteria apply to Associate in Science enrollments.

Using Miami-Dade as an example, subtracting from college enrollments (91,565) the pre-degree/non-degree seeking enrollments (65,902), yields a proportional result in the last two columns of pre/non-degree seeking to degree seeking of 72:28. Only 28% of qualified enrollments intend to seek an A.A. degree. This 28% is the base over which completion rates can be equitably calculated. The proportions vary widely among Florida community colleges. The range of pre/no-degree to degree-seeking vary from a low of 88:12 at South Florida Community College and Florida Keys Community College to a high proportion of 39:61 at Tallahassee Community College.

Community colleges serve multiple missions whether one is studying for credit or not for credit. As their names indicate, they serve community needs and interests. Matriculants are studying for job upgrade, to satisfy proficiency needs, and to fulfill personal interests. Many students already hold various academic degrees. Those universities for whom similar accountability standards were imposed, realize that calculations are only reasonable with a base limited to students who intend to acquire a degree.

Table 4.10

Rank of Florida Community Colleges by Size of Associate in Arts Enrollments by Criteria 1987-88

	A.A. Enrolled	A.S. Enrolled	Number Pre/Non-Degree**	Total* College Enrollment	Percent Seeking Pre/Non-Degree	Percent Seeking Degree
Miami-Dade	18,348	7,315	65,902	91,565	72	28
St. Petersburg	13,015	5,229	39,030	57,274	68	32
Valencia	12,180	3,771	42,217	58,168	73	27
Hillsborough	9,990	4,019	10,894	24,903	44	56
Broward	9,937	6,062	59,820	75,819	79	21
Brevard	9,708	2,679	46,809	59,196	80	20
Santa Fe	8,350	2,135	16,190	26,675	61	39
FL/ Comm. College at Jax	8,110	3,035	61,237	72,382	85	15
Tallahassee	8,083	292	5,373	13,748	39	61
Palm Beach	7,600	1,715	41,477	50,792	82	18
Manatee	7,511	762	11,000	19,273	57	43
Pensacola	5,438	2,099	25,763	33,300	77	23
Daytona Beach	5,261	3,659	26,931	35,851	75	25
Seminole	4,542	1,422	30,568	36,532	84	16
Okaloosa-Walton	3,716	1,160	10,308	15,184	68	32
Polk	3,647	971	26,288	30,906	85	15
Edison	3,507	945	21,763	26,215	83	17

*Includes credit and non-credit enrollments based on AA-1 series and EA-3.
**Pre-degree seekers include freshmen who have not yet met program criteria; those awaiting limited access program entrance; college preparatory/supplementary/job related/other personal objectives enrollments

Table 4.10
(continued)

Rank of Florida Community Colleges by Size of
Associate in Arts Enrollments by Criteria
1987-88

	A.A. Enrolled	A.S. Enrolled	Number Pre/Non-Degree**	Total* College Enrollment	Percent Seeking Pre/Non-Degree	Percent Seeking Degree
Indian River	3,398	2,608	38,888	44,894	87	13
Central Florida	3,319	855	4,373	8,547	51	49
Gulf Coast	3,268	1,130	15,146	19,544	77	23
Pasco-Hernando	1,839	1,126	11,230	14,195	79	21
Lake City	1,662	1,096	4,933	7,691	64	36
St. Johns River	1,377	555	2,014	3,946	51	49
Chipola	1,341	257	3,901	5,499	71	29
South Florida	1,165	583	12,455	14,203	88	12
Lake Sumter	1,157	659	5,122	6,938	82	18
Florida Keys	684	357	7,800	8,841	88	12
North Florida	671	24	3,392	4,087	83	17
System Total	158,824	56,520	650,824	866,168	-	-

*Includes credit and non-credit enrollments based on AA-1 series and EA-3.
**Pre-degree seekers include freshmen who have not yet met program criteria; those awaiting limited access program entrance; college preparatory/supplementary/job related/other personal objectives enrollments

Source: Report for Florida Community College - Fact Book, June 1989, Table 9.

In terms of numbers of students graduating, the three A.A. disciplines at Miami-Dade noted to be of primary importance are given in Table 4.11. Together the Business/Management, Computer Sciences, and Engineering disciplines account for between 44% to 48% of the college's annual completions. The balance of graduations are due to the college's other 61 A.A. programs. Nationwide, these disciplines were also the most favored by undergraduate students.

Table 4.11

Associate in Arts Graduates in Selected Disciplines Compared to Total Graduations at Miami-Dade Community College 1987-1989

	YEAR					
DISCIPLINE	1987		1988		1989	
	No.	%	No.	%	No.	%
Business/Management	858	31	813	30	1059	32
Computer Science	256	9	192	7	201	6
Engineering	210	8	200	7	245	7
Total 3 Disc (10 pgms)	1324	48	1205	44	1505	45
Other Disc (61 pgms)	1457	52	1533	56	1806	55
Total All Graduates	2781	100	2738	100	3311	100

Source: Placement and Follow-up AA-1A for 1987, 1988, 1989.

There were 66% or 1,863 M-DCC graduates in fall term 1988 who continued their education in the upper division within one year after receiving the A.A. degree. These students are known as direct university entrants. Table

4.12 shows direct entrants into the nine public universities in the state of Florida by Miami-Dade A.A. graduates. Five universities drew the largest percent of the college's graduates as direct entrants. About 77% of M-DCC A.A. graduates attending Florida public universities enrolled in the upper division at Florida International University. The University of Florida and Florida State University are also popular choices. This table does not give data on the local private universities (such as University of Miami, Barry University, St. Thomas University) to which Miami-Dade graduates may have transferred. Direct entrance for this graduation class totaled 1,863 or 66% of the 2,793 A.A. graduates who could be tracked by the college's follow-up system.

Table 4.12

Direct University Entrants* into the Florida State University System by Miami-Dade Community Colleges Associate in Arts Graduates, 1988-1989

INSTITUTION	NUMBER	PERCENT
Florida International University	1,425	76.6
University of Florida	117	6.3
Florida State University	174	9.3
Florida Atlantic University	53	2.8
University of South Florida	49	2.6
University of Central Florida	21	1.1
Florida Agricultural & Mechanical	19	1.0
University of West Florida	3	0.2
University of North Florida	2	0.1
Total	1,863	100.0

*Matriculated at the university within one year following A.A. degree acquisition.
Data Source: Placement & Follow-up System, 1988-89.

For the fall term 1988, shown separately for Miami-Dade and the Florida community college system (Table 4.13), are all relevant categories of new transfers. These new transfer students either earned an A.A. or A.S. degree; many transferred before acquiring a degree. Only the five major universities are shown. More than 1 out of 7 new transfer students into Florida public universities (SUS) attended Miami-Dade. The rate of A.A. new transfers from M-DCC (72%)

and systemwide (75%) is very close. Of the new Fall 1988 transfers from Miami-Dade, 28% had no degree as compared to 25% systemwide. In the upper division of FIU, without regard to "newness" of transfer (as noted in Chapter I), 77% of enrollments are former M-DCC students. M-DCC is a large feeder institution into the State's university system. The feeder plan (2+2 -- two years in the lower division and two years in the upper division) was designed by agencies within the Florida Department of Education.

Table 4.13
New Fall 1988 Transfers
Community College Students Transferring into the
State University System

	Florida University												Total 5 Univers.	
	SUS		FIU		FSU		UF		USF		FAU			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Miami-Dade Community College														
Trans. with No Degree	318	28	211	27	29	24	32	29	11	22	18	38	301	27
Trans. with A.A. Degree	805	71	548	72	90	74	80	71	39	78	29	60	786	72
Transf. with A.S. Degree	9	1	6	1	2	2	-	-	-	-	1	2	9	1
Total Trans. Students	1,132	100	765	100	121	100	112	100	50	100	48	100	1,096	100
Florida Public Community College Transfer Students														
Transf. with No Degree	2,206	25	262	29	318	20	298	26	328	19	195	31	1,401	24
Transf. with A.A. Degree	6,312	73	635	70	1,221	79	848	73	1,377	81	406	64	4,487	75
Transf. with A.S. Degree	173	2	9	1	11	1	12	1	3	-	32	5	67	1
Total Transf. Students	8,691	100	906	100	1,550	100	1,158	100	1,708	100	633	100	5,955	100

Table 4.14 helps to explain the low graduation rates seen in the review of the literature. Data are for Florida public universities of Florida community college transfer students (for the five major universities). Entry for all years prior to 1985 is collapsed into the first data column. These are systemwide totals. During the 1988 fall term 54,118 community college transfer students were registered in the SUS. Of this total, 33% were new to the university; 23% were beginning their second year at the university; 15% were starting their third year and 8% of community college transferees were now in their fourth year at the university. There were 21% or 11,365 continuing community college students in the State University System from the years before 1985.

The pattern of matriculation while studying at the C.C. is likely to continue for these transferees in the SUS. Years to baccalaureate is expanding on a broad base at universities, due in large part to the high percentage of community college transfer students. Transfer students are "backed-up" in the university system, as shown by the date of entry in the table.

At the local university, FIU, the "backup" before 1985 was even greater -- 27% (n=2,291). Nearly 50% of community college transfer students will take more than 2 years in the upper division to acquire a baccalaureate degree. If the students in Florida public universities are representative of the students across the United States, public

Table 4.14

Florida Community College Transfer Students
Attending Selected Florida Public Universities in the Fall
Classified by Date of Entry Into the University
Prior to 1985 Through 1988

	Date of Entry										
	Prior to 1985		1985		1986		1987		1988		
Univ.	No.	% of Univ	No.	% of Univ	No.	% of Univ.	No.	% of Univ.	No.	% of Univ.	Total
FAU	1,146	20	429	8	923	16	1,374	24	1,801	32	5,673
FIU	2,291	27	687	8	1,194	14	1,648	20	2,650	31	8,470
FSU	937	13	462	6	1,110	15	1,916	26	2,956	40	7,381
UF	1,051	17	502	8	962	16	1,548	25	2,104	34	6,167
USF	2,159	23	800	9	1,347	14	2,177	23	2,912	31	9,395
Total 5 Univers.	7,584	20	2,880	8	5,536	15	8,663	23	12,423	34	37,086
Percent 5 Univers. by Year		68		66		69		69		70	
Total SUS	11,236	21	4,375	8	8,006	15	12,627	23	17,874	33	54,118

Source: Articulation Fall 1988, Table 4.

universities are heavily invested in students whose patterns of enrollment are non-traditional. Another finding from these data is that prolongation beyond the traditional four years to baccalaureate is common and that the national study by Porter (1989) is on course.

Summary of Hypothesis 1 and Related Issues

Hypothesis 1: The lower division cumulative GPA and/or the lower division GPA of the major field for A.A. graduates are predictive of the university GPA in the Engineering, Computer Science, and Business Management disciplines.

Regression analysis indicated that the overall lower division cumulative GPA and the lower division major discipline GPA were significant in explaining the variability of the university GPA. Descriptive statistics on the M-DCC GPA compared to the university GPA revealed that 83% of those failing at the university in this cohort had M-DCC GPAs of less than 3.0. In addition, 78% of those failing at the university had a lower division major field GPA of less than 3.0. The null is rejected. Both the overall and major field GPA achieved in the lower division are significant contributors to the variability of the university GPA. However, there is considerable overlap between the two lower division GPAs.

In the fall term of 1988, the statewide failure rate for community college Associate in Arts graduates who transferred to the State University System in the

Business/Management discipline was 13%; at M-DCC, it was 15%. Statewide for Computer Sciences, it was 13%; at M-DCC the failure rate was 14%. For the Engineering discipline, the failure rate for A.A. graduates in the SUS was 14%.; at M-DCC, it was 15%. There is indeed a commonality of failure rates across community colleges in Florida.

Other findings regarding lower division behavior concerned the number of course repeats and/or withdrawals at M-DCC. An inverse relationship was found. The higher the university GPA, the fewer the number of courses withdrawn or repeated while preparing for transfer in the lower division.

Related issues concerned differentials in GPA and graduation/transfer rates. The lower GPAs that are apparently earned by community college transfers as compared to university native students has been broadly publicized. Not as well known is the fact that different bases are often used to calculate these grade point averages. In Florida, native student GPAs utilize all quality points earned since the first course in the freshman year at the university. For community college graduates, however, the quality points of the first two years are ignored and only the points earned at the university are used in computing the university GPA. With the two years of buffer points eliminated, poor performance in a course or two, coupled with transfer shock, can put the transfer student in a

precarious academic position.

The graduation and transfer rates of community college students to the university are due to a convergence of socio-economic factors operating in the students' environment. These are non-traditional students in many respects. They are largely part-time students who are employed, have personal/family responsibilities, tend to be older, female, and of minority descent. Overall, the majority of students in the upper division of the university are populated with community college transferees and the patterns of enrollment these students exhibited while in the community colleges are becoming more and more pervasive at the university. This contributes to the low graduation rates.

Demographics and Related Findings

Hypothesis 2: There are demographic variables predictive of performance at the university among M-DCC A.A. graduates in the Engineering, Computer Science, and Business Management disciplines.

Tables 4.15 - 4.21 display details concerning the nature and demographics of Associate in Arts transfer students to universities. Table 4.15 presents ethnic data against a frame of graduation rates for Associate in Arts students. Ratios of enrollees and completers at M-DCC are given and compared to the Florida community college system. These enrollees have met the predetermined criteria for formal program admittance. Over the three comparison years, M-DCC had an annual completion rate of approximately 16% and the statewide completion rate for that same period was close to 11%.

Non-resident alien is the federal designation for visa students. The Other category is an aggregation of Alaskan Native, American Indian, Pacific Islander, and Asians including East Indians. Of the three major ethnic groups of interest, Black completions averaged 12% annually compared to 7% statewide. Hispanic completions at 16% drove collegewide rates. Statewide, 13% of the community college Hispanic students graduated with an A.A. degree. For the White A.A. graduates, there was a consistent 11% statewide, as compared to an average of 19% for M-DCC.

Table 4.15
Associate in Arts Enrollees by Ethnic Groups at M-DCC
Compared to the Florida Community College System

	1986-87 Completers			1987-88 Completers			1988-89 Completers		
	Enrollees	Number	%	Enrollees	Number	%	Enrollees	Number	%
Miami-Dade Community College									
Alien	1,181	159	14	1,148	159	14	1,035	210	20
White	4,548	870	19	5,000	944	19	5,121	999	20
Black	1,872	251	13	2,275	210	9	2,558	325	13
Hispanic	8,469	1,460	17	9,627	1,388	14	10,528	1,721	16
Other	260	41	16	299	37	12	389	56	14
Total	16,330	2,781	17	18,348	2,738	15	19,631	3,311	17
Community College System									
Alien	3,144	382	12	3,112	363	12	2,983	429	14
White	104,928	11,902	11	125,009	13,303	11	137,745	14,886	11
Black	11,432	813	7	12,826	807	6	14,378	988	7
Hispanic	12,734	1,848	15	14,909	1,823	12	16,670	2,240	13
Other	2,372	268	11	3,028	244	8	3,814	376	10
Total	134,610	15,213	11	158,884	16,540	10	175,590	18,919	11

Data Source: AA1A Summary Information from Florida State Board of Community Colleges.

According to the CCMIS Manual, formal enrollment is determined by the institution. An institution may delay formal program enrollment until the completion of 15 credits. At M-DCC, the completion of 24 credit is required for a student to be considered specific program enrollee. A Program Completer is a student who has completed the requirements for a degree, whether or not the student has applied for graduation.

Table 4.16 gives the gender and ethnic demographics by university discipline for the fall term 1988 M-DCC cohort. Note that Business/Management with its 361 enrollees tends to influence the ethnic proportions in the aggregation of disciplines; and that the large number of Hispanic students drive the ethnic proportions for all three disciplines. Hispanics far outnumber any other ethnic group and reach a high of 65% for engineering. The highest proportion of Whites is found in Business (28%). Black enrollments are heaviest in Computer Sciences (13.5%). With regard to gender, only in engineering do males dominate and to an overpowering extent, 86%. In both Business Management and Computer Science, female enrollments are about ten percentage points higher than male enrollments.

The distribution of university GPA by ethnic group for the cohort together and separated for each discipline is the subject of Table 4.17. Across disciplines, of the 147 White students in the cohort, 35% are in the high GPA group. In the middle GPA group, for the Engineering and Computer Science disciplines, Hispanic percents exceeded cohort Hispanic proportions. The low GPA group shows disproportionate numbers of Black students.

Table 4.16
Ethnicity and Gender by University Discipline of M-DCC A.A. Graduates
Attending Major Florida State Universities - Fall Term 1988

	Ethnicity											
	White		Black		Hispanic		Other		Total		Minority Total	
Gender	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Business/Management												
Male	53	52	10	40	99	45	6	50	168	46	115	68
Female	49	48	15	60	123	55	6	50	193	54	144	75
Within Ethnic Total	102	100	25	100	222	100	12	100	361	100	259	72
% Across Ethnic		28		7		62		3		100		
Computer Sciences												
Male	10	53	5	42	23	44	3	50	41	46	31	76
Female	9	47	7	58	29	56	3	50	48	54	39	81
Within Ethnicity	19	100	12	100	52	100	6	100	89	100	70	79
% Across Ethnic		21		14		58		7		100		
Engineering												
Male	21	81	7	88	64	87	6	100	98	86	77	79
Female	5	19	1	12	10	13	0	-	16	14	11	69
Within Ethnic Total	26	100	8	100	74	100	6	100	114	100	88	77
% Across Ethnic		23		7		65		5		100		
Total	147	26	45	8	348	62	24	4	564	100	417	74

Table 4.17
University Grade Point Average of
Ethnic Groups by Selected Disciplines in the
Major Florida State Universities of
Miami-Dade Associate in Arts Graduates
Fall Term 1988

Ethnic Group	Business		Computers		Engineering		Total	
	No.	%	No.	%	No.	%	No.	%
Grade Point Average 3.5 or Better								
White	37	50	6	43	8	28	51	44
Black	1	1	1	7	2	6	4	3
Hispanic	34	46	5	36	19	66	58	50
Other	2	3	2	14	0	0	4	3
Subtotal	74	100	14	100	29	100	117	100
Grade Point Average 2.0 Through 3.4								
White	35	27	6	19	9	23	50	25
Black	6	5	2	6	1	2	9	4
Hispanic	81	63	23	72	28	70	132	67
Other	6	5	1	3	2	5	9	4
Subtotal	128	100	32	100	40	100	200	10
Grade Point Average Less Than 2.								
White	30	19	7	16	9	20	46	19
Black	18	11	9	21	5	11	32	13
Hispanic	107	67	24	56	27	60	158	64
Other	4	3	3	7	4	9	11	4
Subtotal	159	100	43	100	45	100	247	100
Total	361	100	89	100	114	100	564	100

Table 4.18 is an extension in interpretation of Table 4.17; the university performance by proportion of ethnic group representation is shown. The set of figures in the top row gives the ethnic proportion for the disciplines. Ideally, the GPA proportions would be evenly distributed over the disciplines for each ethnic group. But this is not commonly the case. The term "over" is used to denote performance proportion exceeding the ethnic proportion (detailed on the previous table). Conversely, "under" indicates that the performance proportion is less than the ethnic proportion. "Par" means that performance proportion is equal to ethnic proportion.

White students are over-represented for the high GPA group in all disciplines. Black and Hispanic students are on par for Engineering and under for Business Management and Computer Science. For the middle GPA group, Hispanics are over-represented in the Computer Science and Engineering disciplines; Black students are under-represented. The low GPA group is over-represented by Black students for all disciplines; Hispanic students are over-represented for Business & Management.

Table 4.18

University Performance by Proportion of Ethnic Group Representation in Selected Disciplines in Major Florida State Universities of Miami-Dade Associate in Arts Graduates Fall Term 1988

ETHNIC GROUP	BUSINESS/MAN.	COMPUTER SC.	ENGINEERING	TOTAL
	Ethnic Proportions of Disciplines			
White	28.3	21.4	22.8	26.0
Black	6.9	13.5	7.0	8.0
Hispanic	61.5	58.5	64.9	61.7
Other	3.3	6.7	5.3	4.5
	100.0	100.0	100.0	100.0
	GPA 3.5 or Higher Performance Proportion			
White	Over	Over	Over	Over
Black	Under	Under	Par	Under
Hispanic	Under	Under	Par	Under
Other	Par	Over	Under	Par
	GPA 2.0 Through 3.4 Performance Proportion			
White	Par	Par	Par	Par
Black	Par	Under	Under	Under
Hispanic	Par	Over	Over	Over
Other	Par	Under	Par	Par
	GPA Less Than 2.0 Performance Proportion			
White	Under	Under	Par	Under
Black	Over	Over	Over	Over
Hispanic	Over	Par	Par	Par
Other	Par	Par	Over	Par

The values resulting from the full regression model discussed in the paragraphs preceding Table 4.1 are presented here, regressing university GPA on ethnicity. The demographic results of the sex and gender variables were insignificant at the .05 level. When the race variable was dummy coded, it was significant in explaining the variability of the university GPA. For both the Black and White ethnic groups, the probability of the values occurring by chance was .0001; for Hispanics, $p < 0.0$. The ethnic recombination using the Type I Sum of Squares with attendent procedures resulted in an overall race significance ($p < 0.01$). Corroborative reports found in the literature identify race as predictive of performance levels. In a report issued by Morris and Belcher (1991), minority status was a significant predictor variable for outcome measures among large Florida community colleges.

Table 4.19

Age, Sex, and Race Results
From the Full Regression Model
Regressing on University GPA

Variable	DF	F Value	Pr > F
Sex	1	1.01	0.3050
Age	1	0.58	0.4463
Race - Black	1	82.09	0.0001
Race - White	1	452.19	0.0001
Race - Hisp.	1	928.46	0.0
Overall Race	3	680.41	0.01

Table 4.20 deals with the number of credits earned at the university by the various age groups of M-DCC A.A. graduates attending major state universities of Florida in fall term 1988. The table does not show data for those who earned zero credits (often due to failure) but who may have attempted many credits over the years. The SUS data files delete these students. The impact of this category of failures, thus, cannot be evaluated. Credits earned were strictly university credits. Community college credits were omitted from the credit counts. There was a considerable spread of credits earned among the various age groups.

For those less than 25 years of age, 54% of the credits earned clustered between 1-18 fairly evenly. A distinct break occurred at 19-21 credits earned and from there, the percents generally decreased with the increase of credit ranges. In the credits earned category which is considered university senior (31-60+ credits), there were 29% in the under age 25 group.

For those between 25-34 years, credits earned persisted steadily into the upper credit ranges. This was the largest age group (46%). "Senior credit status" was attained by 44% of students in the 25-34 age category. For those 35-44 and 45 years and over, the small numbers staggered through most of the range. In the 35-44 age group, 42% were university seniors (by credit earned definition), and 49% were seniors for those 45 years or over. On the whole, percents for the age groups ranged from

Table 4.20

Credits Earned at the University by Age Groups of Miami-Dade Associate in Arts Graduates Attending Major Florida State Universities Fall Term 1988

CREDITS	< 25		25-34		35-44		45/Over		TOTAL	
EARNED	No.	%	No.	%	No.	%	No.	%	No.	%
1-3	20	8	12	5	3	9	1	5	36	6
4-6	24	10	17	6	0	0	0	0	41	7
7-9	22	9	18	7	4	11	0	0	44	8
10-12	24	10	11	4	2	6	2	9	39	7
13-15	21	9	23	9	4	11	2	9	50	9
16-18	21	8	19	7	2	6	1	4	43	8
19-21	10	4	14	5	1	3	1	5	26	5
22-24	12	5	12	5	1	3	3	14	28	5
25-27	11	4	5	2	1	3	1	5	18	3
28-30	11	4	16	6	2	6	0	0	29	5
31-33	9	4	11	4	0	0	0	0	20	3
34-36	10	4	9	3	2	6	2	9	23	4
37-39	2	1	18	7	1	3	1	5	22	4
40-42	6	2	9	3	3	9	0	0	18	3
43-45	8	3	2	1	1	3	2	10	13	2
46-48	6	2	8	3	1	3	1	5	16	3
49-51	6	2	8	3	1	3	1	5	16	3
52-54	4	2	10	4	1	3	1	5	16	3
55-57	3	1	11	4	0	0	0	0	14	2
58-60	4	2	7	3	2	6	0	0	13	2
61-63	5	2	4	2	0	0	0	0	9	2
64-66	2	1	5	2	0	0	1	5	8	1
67-69	1	0	2	1	0	0	1	5	4	1
70-72	2	1	3	1	1	3	0	0	6	1
73-75	0	0	2	1	1	3	0	0	3	1
76 +	5	2	4	2	0	0	0	0	9	2
Total - for Age	249	100	260	100	34	100	21	100	564	100
Percent for Age	--	44	--	46	--	6	--	4	--	100

0%-11% throughout the age and credit spectrum. This fact, coupled with the knowledge of student backup in the university system (Table 4.14), helps to explain the low annual baccalaureate graduation rate.

Nearly 57% of students were 25 years or older. The number of credits earned is, in a sense, an indicator of commitment to degree acquisition. Regression prediction for the full model revealed that age was insignificant in accounting for variability of university grade point average.

Table 4.21 shows the university GPA by age groups for the selected disciplines of the study. In the Business and Management discipline, 48% of those failing are older than 25. For the Computer Science majors, 54% of those who are failing are older than 25 and in Engineering, this low GPA group makes up 77% of those older than 25 years. For the high GPA group, equal proportions are under and over 25 for Business; about 63% are over 25 years of age for both Computer Sciences and Engineering.

It is clear that the greater overall proportion of those failing (54%) are 25 years or older. However, of the total cohort, 56% are 25 or older. The failure rate of the "older" students is proportionate to the population of these students. Descriptive and inferentail statistics support each other. The full regression model indicated that age is insignificant in accounting for variability of the university GPA. Differences in GPA seen in this table are

not due to the student's age.

Table 4.21

University GPA of Age Groups in Selected Disciplines
Miami-Dade Associate in Arts Graduates
Attending Major Florida State Universities
Fall Term 1988

AGE GROUPS	BUSINESS		COMPUTER		ENGINEER		TOTAL	
	No.	%	No.	%	No.	%	No.	%
3.5 OR HIGHER GPA								
< 25	37	50	5	36	9	31	51	44
25-34	26	35	6	43	15	52	47	40
35-44	9	12	2	14	3	10	14	12
45-Over	2	3	1	7	2	7	5	4
Total	74	100	14	100	29	100	117	100
2.0 to 3.4 GPA								
< 25	54	42	14	44	17	42	85	43
25-34	61	48	13	40	23	58	97	49
35-44	6	5	5	16	0	0	11	5
45-Over	7	5	0	0	0	0	7	3
Total	128	100	32	100	40	100	200	100
Less than 2.0 GPA								
< 25	83	52	20	46	10	23	113	46
25-34	67	42	18	42	30	67	116	47
35-44	4	3	3	7	2	4	9	4
45-Over	5	3	2	5	3	6	9	3
Total	159	100	43	100	45	100	247	100
GRAND	361	64	89	16	114	20	564	100

Summary of Hypothesis 2:

Hypothesis 2: There are demographic variables (sex, age, race) predictive of performance at the university among M-DCC A.A. graduates in the Engineering, Computer Science, and Business Management disciplines.

The full regression model addressed in Table 4.1 applied 14 race variables, variously combined, in attempting to isolate the interaction of race on university GPA. The age and sex variables were also built into the model. None of these regressors indicated significance in explaining the variability of the DV. However, when the demographic variables were dummy coded, values indicated that race was a significant predictor of university grade point average. The probability of chance occurence was 0.0001 for Black students and White students and 0.0 for Hispanic students. Recombining each ethnic group into the original variable gave an overall race significance at 0.01.

Ethnicity was examined in greater depth descriptively, in order to better understand the characteristics of differences in performance. While differences of performance are attributed to ethnicity, examination of samples of lower division transcripts of students failing at the university revealed characteristic behaviors that contribute to inadequate academic performance (scrutinized in Hypothesis 4).

Some behavioral outcomes follow from descriptive statistics. Proportionate to their absolute numbers, White

students are over-represented in the high university GPA group for all disciplines in the study. In this high group, Hispanic and Black students are on par (absolute number proportionate to percent of total ethnic) for Engineering, and under-represented for both Computer Science and Business/Management. For the middle university GPA group, Hispanics are over-represented for Computer Science and Engineering; Black students are under-represented. The low university GPA group is over-represented by Black students in all disciplines.

Administrative Variables

Hypothesis 3: There are administrative (test) variables - CLAST subtests - predictive of university performance (GPA) for the three disciplines under study.

Table 4.22 displays the results of the regression procedure for the CLAST test administration lifted from the full regression model described earlier. Only 451 A.A. graduates had CLAST scores. Most of those with no scores had graduated prior to the existence of the test or prior to the enforcement of this requisite. A few students who graduated with an A.A. degree and were attending the university had no scores and are, presumably, taking the test sometime in the future.

Examination of the initial output revealed a number of cases with high residuals. Records of the students showing outliers were examined to determine whether errors had been produced somewhere along the route to regression processing. The student records were without error and it was noted that most of the outlying cases were in the Business & Management discipline. When the disciplines were segregated into separate models, none of the independent variables were significant due to the small sample sizes for each discipline. Therefore, disciplines were combined in the prediction model for university GPA.

As seen in Table 4.1 the CLAST computation variable proved a significant contributor to predicting GPA and was second in significance only to the Miami-Dade cumulative

grade point average for variance explanation in a stepwise procedure. Other CLAST computation statistics are found in Tables 4.2, and 4.3. Neither the reading nor writing sections of the CLAST (Table 4.22) were significant predictors. The essay portion of the test was not considered for this study. The three disciplines under study are to varying extents more computation oriented than a diversity of other disciplines. CLAST reading and writing scores, for instance, may be very significant indicators for an English language major. There was no significant evidence of this for Business/Management, Computer Sciences or Engineering.

Table 4.22

Regression of University GPA on CLAST Administrative Variables

Source	DF	B	F Value	PR > F
CLAST Computation	1	0.36	23.73	0.0001
CLAST Reading	1	0.03	0.14	0.7127
CLAST Writing	1	0.06	0.02	0.8936

Summary of Hypothesis 3

Hypothesis 3: There are administrative variables (CLAST subtests) predictive of university performance (GPA) for the cohort under study.

The CLAST computation score was significant in explaining the variability of the university GPA for the Engineering, Business/Management, and Computer Science

disciplines. This significance appears to result from the mathematics content inherent in these disciplines. Neither the reading nor writing portions of the CLAST influenced university performance. Perhaps in fields more akin to language arts, these latter test scores would be significant in predicting university GPA. The null is rejected with regard to CLAST computation. CLAST computation scores are significant in predicting university GPA.

Curriculum Variables at the Lower Division

Hypothesis 4: There are lower division curriculum variables predictive of university performance for the Engineering, Computer Science, and Business Management disciplines.

Tables 4.23 to 4.34 deal with various aspects of the curriculum pursued or required at the community college. Curricular requirements and the structure of curricular requirements are influential on a number of levels. Effects on student performance can be seen as a result of specific types of courses taken, the number of major credits taken, and the quality of performance for the major credits.

Table 4.23 shows the program of major of the cohort while preparing for university transfer. Nearly 84% of the A.A. graduates directed their studies at the discipline of their major. Conversely, 16% of the A.A. graduates changed majors at the university.

Table 4.23

Program of Major in the Lower Division
Miami-Dade Associate in Arts Graduates Transferring to Selected Florida State University, Fall Term 1988

STATE UNIVERSITY DISCIPLINE	NUMBER	PERCENT
Business & Management	290	51.4
Engineering	102	18.1
Computer Science	80	14.2
Undecided/Pre-Bachelor of Arts	35	6.2
Other Majors	57	10.1
Total	564	100.0

The courses for the three disciplines are categorized into tiers (Table 4.24). "Tiering" was deemed imperative due to the vast number of courses required at the university. Tier1 courses are critical to success in the major (see pages 63-64 for selection criteria). For the engineering field, there are 15 courses (Tier1) or 42 credit hours of university required courses essential to success. Tier2 (supportive courses) are also courses required by the universities. They amount to 30 credit hours or 8 major courses. Florida universities also suggest courses for the major (Tier3). For the engineering discipline, 27 credits or 8 major courses are suggested. Tier4 is composed of courses that in some way relate in content to the field of major. They were presumed to have been primarily chosen by the student as electives and/or while in search of a major and/or as prerequisites to requisites.

Discounting related courses, a full-time engineering student taking all university major requirements and suggestions would spend more than eight Fall/Winter terms in the lower division (99 credits for 31 major courses). Adding General Education requirements of 36 credit hours would raise the student's full-time residency at the community college to 11 major semesters, an equivalent of 5.5 years for an A.A. degree. This assumes that no courses are repeated or withdrawn. While the engineering curriculum is the most stringent, universities also erect overwhelming expectations for the other two disciplines.

Table 4.24

University Curriculum Required for the Associate in Arts Degree Transfers for Selected Disciplines by Course Categories (Critical, Supportive, Suggested)

No. Credits	Course	Course Title
		ENGINEERING
		TIER1 (Critical Courses)
3	CHM 1040	General Chemistry
1	CHM 1041	General Chemistry Laboratory
3	CHM 1041	General Chemistry
1	CHM 1041L	General Chemistry Laboratory
3	CHM 1046	General Chem/Qualitative Analy.
1	CHM 1046L	General Chem/Qual Analysis Lab
3	CHM 1050	General Chem/Qualitative Analy.
2	CHM 1050L	General Chem/Qual Analysis Lab
5	MAC 2311	Calculus & Analytic Geometry 1
5	MAC 2312	Calculus & Analytic Geometry 2
5	PHY 2040	Physics with Calculus
1	PHY 2040L	Physics with Calculus Laboratory
5	PHY 2041	Physics with Calculus
1	PHY 2041L	Physics with Calculus Laboratory
3	MAP 3202	Differential Equation
		Total TIER1 = 42 credits for 15 major courses
		TIER2 (Supportive Courses)
3	CHM 1051	General Chem/Qualitative Analy.
2	CHM 1051L	General Chem/Qual Analysis Lab
4	COP 1200	Fortran/Applications
3	EGN 1001	Introduction to Engineering
5	EGN 1120C	Engineering Graphics
4	EGN 2311	Engineering Mechanics - Statics
4	EGN 2323	Engineering Mechanics - Dynamics
5	MAC 2313	Calculus & Analytic Geometry 3
		Total TIER2 = 30 credits for 8 major courses
		Total TIERS 1 & 2 = 72 credits or 23 major courses

Table 4.24
Engineering (continued)

No. Credits	Course	Course Title
		TIER3 (Suggested Courses)
3	ENC 1210	Technical Report Writing
4	SUR 1101	Surveying (B7 only)
3	APB 1150	Principles of Biology
3	MAS 2103	Linear Algebra
3	ECO 2013	Principles of Economics - Macro
3	ECO 2023	Principles of Economics - Micro
4	EEC 2111C	Engineering Circuit Analysis
4	EGN 2333	Mechanics/Materials (B7 only)
	Total TIER3 = 27 credits for 8 major courses	
	*** Total All Tiers = 99 credits or 31 major courses	

C5 Industrial C6 Chemical C7 Engineering Science
B7 Civil B8 Mechanical B9 Electrical
25 Ocean Engineering

ARCHITECTURE (Engineering)
Tier1 (Critical Courses)

2	ARC 1115	Architectural Communications 1
4	ARC 1126	Architectural Drawing 1
4	ARC 1312	Architectural Design 1
4	ARC 1314	Architectural Design 2
4	ARC 2461	Arc Materials & Construction 1
3	MAC 1114	Trigonometry
3	MAC 1140	Precalculus Algebra
3	MAC 2233	Business Calculus
3	PHY 2053	Physics
1	PHY 2053L	Physics Laboratory

Total TIER1 = 31 credits for 10 major courses

TIER2 (Supportive Courses)

4	ARC 2311	Architectural Design 3
4	ARC 2313	Architectural Design 4
4	ARC 2580	Architectural Structures 1
4	ARC 1471	Architectural Drawing 2
5	MAC 2311	Calculus & Analytic Geometry 1
3	APB 1150	General Education Biology
1	APB 1150L	General Education Biology Lab

Total TIER2 = 25 credits for 7 courses
Total TIERS 1 & 2 = 56 credits or 17 major courses

Table 4.24
(Architecture, continued)

No. Credits	Course	Course Title
		TIER3 (Suggested Courses)
1	ARC 2052	Architectural Computer Techniques
4	ARC 2053	Architectural Computer Applic.
2	ARC 2201	Theory of Architecture
3	ARC 2780	History of Architecture 1
3	ARC 2781	History of Architecture 2
4	CGS 1100	Introduction to Micro Usage
3	WOH 2012	History - World Civiliz. to 1715
3	WOH 2022	History - World Civil. from 1715
		Total TIER3 = 23 credits or 8 major courses
***		Total All TIERS = 79 credits or 25 major courses
		COMPUTER SCIENCES/BUSINESS DATA PROCESSING
		TIER1 (Critical Courses)
5 Both	MAC 2311	Calculus & Analytic Geometry 1
5 Both	MAC 2312	Calculus & Analytic Geometry 2
5 CS	PHY 2040	Physics with Calculus
1 CS	PHY 2040L	Physics with Calculus Laboratory
5 CS	PHY 2041	Physics with Calculus
1 CS	PHY 2041L	Physics with Calculus Laboratory
4 Both	COP 1120	COBOL
4 BDP	COP 1170	Intro to Comp. Programming, BASIC
4 BDP	COP 1200	Fortran/Applications
4 CS	COP 1210	Introduction to PASCAL
4 CS	COP 2211	Intermediate Programming, PASCAL
4 CS	COP 2401	Assembler Language
3 BDP	QMB 2100	Basic Business Statistics
3 Both	STA 2014	Statistical Methods
3 BDP	MAC 1102	College Algebra
3 BDP	MAC 2233	Business Calculus
		Total TIER1 BDP = 34 credits or 9 major courses
		Total TIER1 CS = 41 credits or 11 major courses

Table 4.24
(Computer Science, continued)

No. Credits	Course	Course Title
	TIER2 (Supportive Courses	
3 Both	ACG 2001	Principles of Accounting 1
3 Both	ACG 2011	Principles of Accounting 2
3 BDP	BUL 2111	Business Law 1
3 CS	MAP 2302	Intro to Differential Equation
3 CS	MAS 2103	Elementary Linear Algebra
Total TIER2 BDP = 9 credits for 3 courses		
Total TIER2 CS = 12 credits for 4 courses		
Total TIERS1/2 BDP = 43 credits or 12 major courses		
	TIER3 (Suggested Courses)	
3 CS	CHM 1040	General Chemistry
1 CS	CHM 1040L	General Chemistry Laboratory
4 Both	COP 2122	Advanced COBOL/On-Line Applic.
4 BDP	COP 1340	Intro to Operating System OS JCL
4 BDP	CIS 1000	Introduction to Data Processing
4 Both	CGS 1100	Introduction to Micro Usage
3 Both	SPC 1022	Intro to Speech Communication
3 Both	ECO 2023	Economics - Micro
3 Both	ECO 2013	Economics - Macro
Total TIER3 BDP = 25 credits or 7 major courses		
Total TIER3 CS = 17 credits or 6 major courses		
Total All TIERS BDP = 68 credits or 19 major courses		
Total All TIERS CS = 70 credits or 21 major courses		
	BUSINESS MANAGEMENT	
	TIER1 (Critical Course)	
3	ACG 2001	Principles of Accounting 1
3	ACG 2011	Principles of Accounting 2
4	CGS 1100	Introduction to Micro Usage
4	CIS 1000	Introduction to Data Processing
4	COP 1170	Intro to Comp. Programming, BASIC
3	ECO 2013	Economics - Macro
3	ECO 2023	Economics - Micro
3	MAC 1102	College Algebra
3	QMB 2100	Basic Business Statistics
3	STA 2014	Statistical Methods
3	MAC 2233	Business Calculus
Total TIER1 = 36 credits or 11 major courses		

Table 4.24
(Business, continued)

No. Credits	Course	Course Title
		TIER2 (Supportive Courses)
3	BUL 2111	Business Law 1
1	CGS 1400	Personal Computer DOS
3	MAC 1140	Pre-Calculus Algebra
5	MAC 2312	Calculus & Analytic Geometry 1
3	SPC 1022	Intro to Speech Communication
3	GEB 1011	Principles of Business
	Total TIER2 = 18 credits or 6 major courses	
	Total TIERS 1 & 2 = 54 credits or 17 courses	
		TIER3 (Suggested Courses)
4	COP 1200	Fortran/Applications
3	PSY 2012	Introduction to Psychology
3	PHI 1100	Introduction to Logic
	Total TIER3 = 10 credits for 3 major courses	
	Total All TIERS = 64 credits for 21 major courses	

How well do the Miami-Dade students comply with the requirements of the universities? The statistics for the course taking patterns of the cohort under scrutiny are found in Table 4.25. For the critical group of courses, 18% of the cohort took one or two courses and 23% took three to five courses. The highest percent (34%) took six to eight courses. A quarter of these students completed 9-13 major courses in the lower division. Some of these courses are valued at five credits. In comparison, university native students are commonly required to take a minimum of 6 major courses during their freshman/sophomore years. If community college graduates were put onto this latter standard, 41% of

community college graduates would be out of compliance.

For the tier2 (supportive) courses, 99% of the students took from one to five of them. High percentages of students completed one or two suggested or related courses. There is a wide discrepancy between the number of required major courses actually taken by students and the number of major courses required by the universities. The word "required" has since been changed to "recommended." This terminology change, does not however, address the substance of the problem.

Table 4.25

Number of Courses Completed for the University Curriculum Required of Associate in Arts Graduates Transferring to the State University System from Miami-Dade Community College in Fall 1988

Courses	Critical		Supportive		Suggested		Related	
Taken	No.	%	No.	%	No.	%	No.	%
1-2	102	18	423	75	523	93	458	81
3-5	133	23	135	24	36	6	94	17
6-8	192	34	4	1	0	0	6	1
9-12	121	22	2	0	4	1	6	1
13 +	16	3	0	0	1	0	0	0
Total	564	100	564	100	564	100	564	100

Table 4.26 presents the total number of credits taken by M-DCC graduates while in the lower division and the number of these credits devoted to major field preparation. These data are separated by tier categories. There were 21 students (4%) who took no critical courses although some had accumulated 73-99 community college credits. Although some students had taken as many as 99 credits hours at the time of graduation, they had taken only from 1-9 critical major credits (100 students or 18%). Many universities require at least 18 credit hours for major courses by the end of the sophomore year. For the cohort, 40% had 15 or fewer credits in the major field when they graduated even though credits accumulated may have exceeded 100. Close to 50% of the students exceeded 18 credit hours of major courses; 13% (n=75) took 28 or more major credits. Courses supportive of the major (Tier2) are also university requirements. More than 20% of the cohort took none of these courses. Nearly 50% of the them completed between 1-9 of these credits. Few students selected the university suggested courses (Tier3). Tier4 (related) courses were taken by 317 students. According to transcript analyses, these were electives but more commonly, the result of what appears to be uncertainty about major field selection and/or filling prerequisites to requisites.

Table 4.26
Course Category Credits Taken at
Miami-Dade by Associate in Arts Graduates
Attending Major Florida State Universities, Fall 1988

Course Category	M-DCC Total Credits Taken					Total	
	60-65	66-72	73-85	86-99	100+	No.	Percent
Critical							
0	11	4	5	1	0	12	4
1-3	13	12	3	6	0	34	6
4-6	10	10	8	3	0	31	5
7-9	15	8	12	3	1	37	7
10-12	9	13	13	6	2	43	8
13-15	10	30	11	8	0	59	10
16-18	18	11	22	8	3	62	11
19-21	18	21	23	10	3	75	13
22-24	13	25	35	14	6	93	17
25-27	5	11	12	4	2	36	6
28 +	2	9	21	21	24	75	13
Total	124	152	163	84	41	564	--
Percent	22	27	29	15	7	--	100
Supportive							
0	31	46	30	10	2	119	21
1-3	43	40	33	15	3	134	24
4-6	25	34	45	23	5	132	23
7-9	17	27	39	19	16	119	21
10-12	5	3	7	11	2	28	5
13 +	3	2	9	6	13	32	6
Suggested							
0	84	106	95	42	18	345	61
1-3	25	29	38	22	9	123	22
4-6	7	11	16	9	8	51	9
7-9	3	0	3	5	5	16	3
0-12	4	3	4	2	1	14	2
13 +	1	1	7	4	2	15	3
Related							
0	56	68	74	35	14	247	44
1-3	30	28	38	11	1	108	19
4-6	17	24	19	14	5	79	14
7-9	10	16	15	7	5	53	9
10-12	5	9	10	6	7	37	6
13-15	5	5	5	4	1	20	4
16 +	1	2	2	7	8	20	4

Did students with a higher university GPA take more major credits in the lower division than those who did not? Table 4.27 is directed at that question. The demarcation point of >18 major credits was applied in analyzing transferee performance because a minimum of 18 major credits is the expectation at the university for its native students during their freshman and sophomore years. For the high GPA groups, by discipline, 57% of Business Administration majors took more than 18 in-field critical courses. The middle university GPA group for Business/Management is similar in behavior to the high group with regard to taking more than 18 critical major credits in the lower division. For the low GPA group, 48% had taken more than 18 credits of critical courses.

For the Computer Science discipline, 50% of the high GPA group took more than 18 major critical credits but only 9% of the middle and lower GPA groups took more than 18 critical credits.

In the Engineering field, 52% of the high GPA students took 28 or more critical (Tier1) required university major courses while they were at the community college. A high percentage (76%) accumulated in excess of 18 major field credits. The two students who earned zero critical credits for engineering at Miami-Dade are known to have taken these required critical courses at the university. The middle group is similar to the high GPA group in its lower division behavior. In the low GPA group, 40% of these students took

28 or more credits of critical courses for their major. Overall, students who took many critical major courses tended to be successful at the university. Yet to be addressed is the question of level of achievement in the lower division for major courses.

Table 4.27
University GPA and the M-DCC Course Taking Patterns of A.A. Graduates of M-DCC Attending Major Fla. State Universities

Business/Management

Credits Earned	Critical		Supportive		Suggested		Related	
	No.	%	No.	%	No.	%	No.	%
University Grade Point Average 3.5 or Above								
0	1	1	12	16	54	73	41	56
3	5	7	21	28	16	22	14	19
4 - 6	3	4	18	25	2	3	7	9
7 - 9	4	5	18	25	1	1	4	5
10-12	3	4	3	4	1	1	3	4
13-15	7	9	0	0	0	0	2	3
16-18	9	12	1	1	0	0	2	3
19-21	10	14	0	0	0	0	1	1
22-24	22	31	0	0	0	0	0	0
25-27	4	5	0	0	0	0	0	0
28+	6	8	1	1	0	0	0	0
Total	74	100	74	100	74	100	74	100
University Grade Point Average 2.0 Through 3.4								
0	6	2	20	16	77	60	49	39
3	8	6	37	29	41	32	31	25
4 - 6	7	5	33	26	8	6	21	17
7 - 9	4	5	30	23	2	2	12	9
10-12	8	6	4	4	0	0	7	5
13-15	8	6	1	0	0	0	6	2
16-18	18	14	2	2	0	0	1	1
19-21	25	20	0	0	0	0	0	0
22-24	28	23	0	0	0	0	0	0
24-27	11	9	0	0	0	0	1	1
28+	5	4	1	0	0	0	1	1
Total	128	100	128	100	128	100	128	100
University Grade Point Average Less Than 2.0								
0	4	1	32	20	129	81	63	40
3	14	9	61	39	25	16	41	26
4 - 6	7	3	46	29	5	3	24	16
7 - 9	8	5	17	11	0	0	20	13
10-12	7	3	2	0	0	0	6	4
13-15	18	12	0	0	0	0	2	1
16-18	25	17	0	0	0	0	1	0
19-21	25	17	1	1	0	0	1	0
22-24	32	21	0	0	0	0	0	0
25-27	9	6	0	0	0	0	0	0
28+	10	6	0	0	0	0	1	0
Total	159	100	159	100	159	100	159	100

Table 4.27 (continued)
University GPA and the M-DCC Course Taking Patterns of A.A. Graduates of M-DCC Attending Major Fla. State Universities

Computer Science								
Credits Earned	Critical		Supportive		Suggested		Related	
	No.	%	No.	%	No.	%	No.	%
University Grade Point Average 3.5 or Above								
0	0	0	9	65	4	29	7	50
3	0	0	2	14	2	14	3	22
4 - 6	0	0	2	14	4	29	1	7
7 - 9	3	22	0	0	1	7	0	0
10-12	2	14	1	7	1	7	2	14
13-15	2	14	0	0	0	0	0	0
16-18	0	0	0	0	2	14	1	7
19-21	4	29	0	0	0	0	0	0
22-24	1	7	0	0	0	0	0	0
25-27	0	0	0	0	0	0	0	0
28+	2	14	0	0	0	0	0	0
Total	14	100	14	100	14	100	14	100
University Grade Point Average 2.0 Through 3.4								
0	1	3	10	31	3	9	12	38
3	3	9	4	12	5	16	6	19
4 - 6	2	6	8	26	4	13	7	22
7 - 9	2	6	7	22	3	9	2	6
10-12	8	25	3	9	7	22	3	9
13-15	9	29	0	0	6	19	2	6
16-18	4	13	0	0	3	9	0	0
19-21	1	3	0	0	1	3	0	0
22-24	1	3	0	0	0	0	0	0
25-27	1	3	0	0	0	0	0	0
28+	0	0	0	0	0	0	0	0
Total	32	100	32	100	32	100	32	100
University Grade Point Average Less Than 2.0								
0	1	2	17	40	11	26	23	54
3	3	7	4	9	12	28	5	13
4 - 6	6	14	7	16	8	19	4	9
7 - 9	10	24	11	26	6	14	3	7
10-12	10	23	4	9	4	9	4	9
13-15	6	14	0	0	2	4	1	2
16-18	3	7	0	0	0	0	2	4
19-21	3	7	0	0	0	0	1	2
22-24	0	0	0	0	0	0	0	0
25-27	0	0	0	0	0	0	0	0
28+	1	2	0	0	0	0	0	0
Total	43	100	43	100	43	100	43	100

Table 4.27 (continued)
University GPA and the M-DCC Course Taking Patterns of A.A. Graduates of M-DCC Attending Major Fla. State Universities

Engineering								
Credits Earned	Critical		Supportive		Suggested		Related	
University Grade Point Average 3.5 or Above								
	No.	%	No.	%	No.	%	No.	%
0	2	7	4	14	15	52	27	94
3	1	3	1	3	6	21	0	0
4 - 6	1	3	3	10	5	17	1	3
7 - 9	1	3	6	22	0	0	0	0
10-12	0	0	4	14	0	0	0	0
13-15	2	7	3	10	3	10	1	3
16-18	0	0	4	14	0	0	0	0
19-21	2	7	3	10	0	0	0	0
22-24	2	7	0	0	0	0	0	0
25-27	3	10	1	3	0	0	0	0
28+	15	53	0	0	0	0	0	0
Total	29	100	29	100	29	100	29	100
University Grade Point Average 2.0 Through 3.4								
0	1	2	5	12	27	68	4	10
3	0	0	2	5	7	18	5	13
4 - 6	2	5	9	23	5	12	10	25
7 - 9	2	5	15	38	1	2	6	15
10-12	3	8	1	2	0	0	7	18
13-15	3	8	7	18	0	0	3	7
16-18	0	0	1	2	0	0	2	5
19-21	3	7	0	0	0	0	0	0
22-24	4	10	0	0	0	0	0	0
25-27	4	10	0	0	0	0	1	2
28+	18	45	0	0	0	0	2	5
Total	40	100	40	100	40	100	40	100
University Grade Point Average Less Than 2.0								
0	5	11	10	23	24	54	21	47
3	0	0	2	4	9	20	3	7
4 - 6	3	7	6	13	10	22	5	11
7 - 9	3	7	15	34	2	4	6	13
10-12	2	4	6	13	0	0	5	11
13-15	4	9	3	7	0	0	3	7
16-18	3	7	2	4	0	0	0	0
19-21	2	4	0	0	0	0	0	0
22-24	3	7	0	0	0	0	0	0
25-27	2	4	0	0	0	0	0	0
28+	18	40	1	2	0	0	2	4
Total	45	100	45	100	45	100	45	100

Table 4.28 presents the GPA for critical credits earned at M-DCC for each discipline in the study. Most students with zero critical credits had changed majors. One-fourth of the graduates in Business Management either attained a major GPA less than 2.0 or had a major GPA that was marginal to 2.0. For Computer Science, 20% were in this latter category; 100% of these students took zero or up to 15 credits only. Recall that universities required 41 credits for Tier1 courses in the Computer Science discipline (Table 4.24). For those in the Engineering discipline, nearly equal numbers attained a major GPA of less than 2.0 or had a major GPA adjacent to 2.0. Together these two marginal groups constitute 44% of the Engineering students in the cohort. These data confirm observations made during transcript coding that students who fail at the university, graduated from the lower division with a marginal overall GPA and a slightly lower major GPA.

Table 4.28
Grade Point Average For Critical Credits Taken at Miami-Dade Community College

Critical Credits	Critical (Tier1) Courses GPA				Total
	< 2.0	2-2.4	2.5-3.4	3.5+	
		Business Management			
0	11	0	0	0	11
3	2	7	13	5	27
4-6	0	4	6	7	17
7-9	1	3	9	3	16
10-12	1	3	8	6	18
13-15	3	6	20	4	33
16-18	4	10	30	8	52
19-21	4	10	35	11	60
22-24	1	11	44	26	82
25-27	1	6	13	4	24
28+	1	1	15	4	21
Total	29	61	193	78	361

Table 4.28 (continued)
Grade Point Average For Critical Credits Taken at
Miami-Dade Community College

Critical	Critical (Tier1) Courses GPA				
Credits	<2.0	2-2.4	2.5-3.4	3.5+	Total
		Computer Science			
0	2	0	0	0	2
3	1	1	2	2	6
4-6	1	3	3	1	8
7-9	0	2	4	9	15
10-12	2	2	11	5	20
13-15	1	3	7	6	17
16-18	0	0	7	0	7
19-21	0	0	4	4	8
22-24	0	0	0	2	2
25-27	0	0	1	0	1
28 +	0	0	1	2	3
Total	7	11	40	31	89
		Engineering			
0	11	0	0	0	11
3	0	0	1	0	1
4-6	2	1	3	0	6
7-9	0	2	3	1	6
10-12	1	2	1	1	5
13-15	1	3	4	1	9
16-18	1	0	1	1	3
19-21	0	1	5	1	7
22-24	2	4	2	1	9
25-27	1	1	6	1	9
28 +	6	12	22	11	51
Total	25	26	48	18	117

How did students with inadequate or barely adequate grade point averages in their majors perform at the university? Table 4.29 answers this question. Shown is the cohort with disciplines combined. The Miami-Dade grade point averages have been further divided into five categories in order to bring out finer performance

distinctions. The divisions are a) Less than 2.0, b) 2.0-2.4, c) 2.5-2.9, d) 3.0-3.4, and e) 3.5 and over. Of those with a university GPA of less than 2.0, 17% had M-DCC major GPAs of less than 2.0. A second group failing in the SUS had major discipline GPAs of 2-2.4 (27%). There was a 34% failure rate for A.A. graduates at the university among those who attained a 2.5-2.9 major GPA in the lower division. In all, the previous three groups having less than a 3.0 GPA in their critical major courses total 78% of the failures in this study. Of those who had an M-DCC major GPA of 3.0 or above, failure at the university appears to be due to insufficient number of critical required university major course credits earned at the community college. Though 16% (n=92) had changed majors at the university, many of them did take courses belonging to these disciplines while in the lower division.

For students who succeeded at the university, most performed with varying degrees of adequacy in their majors at M-DCC and took more required major courses than those who failed at the university. Predictions of significance for Tier1 Credits earned and Tier1 Quality Points (Table 4.6) align with descriptive findings. There were students with few major credits and low major GPAs from the community college who are succeeding at the university. It appears that individual personal characteristics (such as maturity, goal orientation) are operating here beyond the variables studied which produce countervailing performance in the SUS.

Table 4.29

Critical Courses GPA and University GPA for
Critical Credits Earned at
Miami-Dade Community College

Tier1 Credit	M-DCC GPA < 2.0	2-2.4	2.5-2.9	3-3.4	3.5+	Total
		Less than 2.0 University GPA				
0	10	0	0	0	0	10
3	1	5	0	9	2	17
4-6	3	6	4	3	1	17
7-9	1	7	5	2	6	21
10-12	4	2	7	4	3	19
13-15	4	8	8	4	3	27
16-18	5	6	13	6	2	32
19-21	3	9	13	2	1	28
22-24	3	9	17	4	2	35
25-27	1	4	4	6	0	11
28+	17	11	10	3	0	30
Total	41	67	83	37	19	247
		2.0-3.4 University GPA				
0	9	0	0	0	0	9
3	1	3	0	4	2	10
4-6	0	2	0	5	4	11
7-9	0	0	2	4	2	8
10-12	0	5	5	3	6	19
13-15	0	5	6	5	5	21
16-18	0	5	5	9	2	21
19-21	1	4	8	11	4	28
22-24	0	6	12	5	10	33
25-27	0	4	6	6	0	16
28+	1	4	6	8	5	24
Total	13	38	50	60	40	200
		3.5+ University GPA				
0	2	0	0	0	0	2
3	1	0	0	3	3	7
4-6	0	0	0	0	3	3
7-9	0	0	2	1	5	8
10-12	0	0	1	0	4	5
13-15	1	1	2	4	3	11
16-18	0	0	1	3	5	9
19-21	0	2	1	5	11	19
22-24	0	2	1	5	17	25
25-27	1	0	0	1	5	7
28+	0	1	5	3	12	21
Total	5	6	13	25	68	117

Table 4.30 shows the semester credit hours earned by Florida Community College transfer students at the time of transfer to the State University System. Three successive years of data are displayed. For 1988, there were more than 44,000 transfers. Those accumulating 59 or fewer credits reflect transfers without the associate degree. The percent of those graduating with 60-74 credits has been increasing gradually since 1986. For 1988, 11% graduated from the community colleges with 75-89 earned credits. Between 90-210+ credits were accumulated at the time of transfer by 8% of the associate degree graduates. It is clear that students expend far more of their time, money, and energy attempting to satisfy community college A.A. requirements and university major program requirements than the 60 transfer credits allowable by Articulation Agreements.

Table 4.30

Semester Credits Earned* at Time of Transfer by Florida Community Colleges Students** Transferring into the State University System, 1986-1988

	1988		1987		1986	
Credit	Number	Percent	Number	Percent	Number	Percent
1 - 59	7,729	17	7,397	18	7,990	20
60 - 74	28,302	64	25,982	63	24,573	62
75 - 89	4,742	11	4,532	11	4,072	10
Subtotal	33,044	75	30,515	74	28,645	73
90-210+	3,552	8	3,196	8	2,829	7
Total***	44,325	100	41,108	100	39,464	100

* Articulations Agreements permit the transfer of 60 credits.
** Disregards year of transfer, degree status of C.C. transfer.
*** Zero credits or missing data omitted.

Table 4.31 presents the analysis of criterion which defines a program major. To be counted as a major in a declared program, an A.A. student at M-DCC must have earned 24 credits excluding English as a Second Language and college preparatory courses. Again the middle GPA and high GPA groups are similar to each other in behavior; more than 75% of those who declared their major had taken major discipline courses within 24 college credits. It can be inferred that these students attained a standard for themselves beyond institutional guidelines. A reality not shown in this table is that many students in these two GPA

groups already had a cluster of major program courses behind them by the time the criterion of 24 credits hours was attained. No monitoring occurs at that point regarding whether major discipline courses have been taken. Declarations of major are, in fact, intent declarations.

For the low GPA group, only 54% had taken a major course within 24 college credits. This group, to a large degree, had many required courses to complete before qualifying for courses in the program of major; many were still in search of a major.

Table 4.31

Criterion* Analysis for Definition of Program Major of Transferring Miami-Dade community College Associate in Arts Graduates to Selected Florida State Universities** Fall Term 1988

	Achiever Group											
	Criterion						Criterion					
	Met		Not Met		Total		Met		Not Met		Total	
Program	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
	Low (<2.0)						Middle (2.0 - 3.49)					
Engineer.	19	42	26	58	45	100	31	78	9	22	40	100
Computer Science	24	56	19	44	43	100	25	78	7	22	32	100
Business Administ.	90	57	69	43	159	100	98	77	30	23	128	100
Total	133	54	114	46	247	100	154	77	46	23	200	100
	High (3.5 - 4.0)						Combined Groups					
Engineer.	25	86	4	14	29	100	75	66	39	34	114	20
Computer Science	11	79	3	21	14	100	60	67	29	33	89	16
Business Administ.	53	72	21	28	74	100	241	67	120	33	361	64
Total	89	76	28	24	117	100	376	67	188	33	564	100

*Criterion for a program major - earned 24 credits excluding ESL and college preparatory courses.

**Selected Florida universities - FIU, UF FSU, FAU, USF

Table 4.32 displays university credits earned as opposed to university credits attempted. These variables are given for each GPA group. Ideally, a student should earn as many credits as are attempted. For the high GPA group, 76% of the students fit this ideal. These students would appear diagonally in the table. Of the 117 persons in the high GPA group, 3 students were outliers in attempting far more credits than earned. Their transcripts revealed a history of dropped and withdrawn courses. Persons above the diagonal attempted a few more than earned. The middle GPA group is akin to the high group in setting reasonable goals and attaining those goals. This table also supports the impressions gleaned during the transcript coding process.

In the low GPA group, only 35% of the students earned as many credits are they attempted and many are seen above the diagonal indicating they attempted more than they earned. The volume of attempted credits to earned credits represents course repeats, withdrawals, and drops. These failures did not appear in the Florida Department of Education tables because only those who succeeded in earning credits are included in GPA calculations. It is difficult to conceive that anyone would attempt 28+ credits and earn only 3.

Table 4.32
University Credits Earned vs.
University Credits Attempted for Each
GPA Group of M-DCC Associate in Arts Graduates
Attending Major Florida State Universities

Credits Earned	Credits Attempted 3	6	9	12	15	18	21	24	27	28+	Total
	GPA 3.5 or Above										
1-3	4	2	2							2	10
4-6		9	1	1							11
7-9			9	2			1				12
10-12				6	3	2					11
13-15					5	2					7
16-18						4	1	1			6
19-21							2	1	1	1	5
22-24								2		3	5
25-27									6	2	8
28 +										42	42
Total	4	11	12	9	8	8	4	3	8	50	117
	GPA 2.0 Through 3.4										
1-3											0
4-6											0
7-9			3								3
10-12				7	2						9
13-15					10	3		2	1		16
16-18						9	2	3		2	16
19-21							6	2	1	1	10
22-24								4	4	1	9
25-27									4	3	7
28 +										130	130
Total			3	7	12	12	8	11	10	137	200
	GPA Less Than 2.0										
1-3	3	2	8	6		2	1	2		1	25
4-6		5	6	10	1	1	1	1	2	3	30
7-9			2	8	5	2	5	2	1	4	29
10-12				1	5	4	2		3	4	19
13-15					1	5	7	5	3	7	28
16-18						3		5	3	10	21
19-21							2		2	7	11
22-24								3	2	9	14
25-27										3	3
28 +										67	67
Total	3	7	16	25	12	17	18	18	16	115	247

Table 4.33 gives the two curriculum predictors of university GPA. These are the credits earned for the critical university required Tier1 courses and the quality points of the Tier1 credits that are used in the major field GPA calculation. Both variables were significant at the .05 level.

Table 4.33
Prediction of University GPA
Lower Division by Curriculum Performance

Variable	DF	B	F Value	Prob > F
Tier 1 Credits Earned	1	2.27	4.8	0.0276
Tier 1 Quality Points	1	1.02	4.7	0.0293

Table 4.34 contains univariate statistics obtained during the regression model building stage. While only five variables qualified for the model, statistics for other variables tested during model building are a record of lower division behaviors and accomplishments. They also provide a summary of the diversity of Associate in Arts graduates attending Florida state universities.

The range of performance outcomes within variables and across variables is wide, indeed. For a number of variables, the range is as broad as it could possibly be. For example, Tier1 quality points ranged from a low of 3 to a high of 216. SUS cumulative grade point average spanned from .25 to 4.0. While severely restrictive ranges

adversely influence the ability to predict with a high degree of surety, extreme manifestations may help predictions if intercorrelations are not effusive. Recall from Table 4.3 that a number of variables are correlated. The extremes of behavior seen here, are due to the nature of the open door policy; the range of abilities is greater and this relates to the diversity of performance levels. Neither quality nor quantity checks are made against the majors declared. Monitoring for major discipline courses completed or GPA of discipline courses is neither a state of Florida mandate nor a general community college practice.

Table 4.34

Univariate Statistics for Potential Predictors
Combined Disciplines of the Cohort
Miami-Dade Community College

Variable	Mean	SD	Range
M-DCC GPA	2.8	0.4	2-4
Total M-DCC Credits	77.0	15.4	61-161
Tier1 No. Courses	6.3	3.2	1-19
Tier1 Credits	28.0	9.0	3-54
Tier1 Quality Points	53.5	29.8	3-216
Tier1 GPA	208.0	0.7	1.1-4.0
Tier2 Credits	705.0	13.8	1-253
Tier2 Quality Points	19.9	12.5	3-96
CLAST Math	318.0	29.6	230-432
CLAST Reading	305.0	27.8	233-412
CLAST Writing	310.0	39.5	243-401
SUS Credits Attempted	36.0	24.4	3-148
SUS Credits Earned	27.8	20.1	3-131
SUS Cumulative GPA	2.3	0.8	.25-4.0

Summary of Hypothesis 4

Hypothesis 4: There are lower division curriculum variables predictive of university performance for the Engineering, Computer Science, and Business & Management disciplines.

The large number of university required major courses for each of the disciplines of the cohort were leveled into tiers. Tiering was deemed necessary because of the plethora of university courses offered. The criteria list for determination of "tiering" is found in Chapter 3, page 63. Tier1 consisted of major required courses essential to success at the university. The correlates of Tier1 courses were Tier1 credit hours (TIER1CR) taken and the Tier1 quality points (TIER1QP) achieved. Stepwise regression results indicate that both of these latter variables were significant predictors of university performance. Descriptive tables were created in order to examine the inferential outcomes more closely.

According to information in the SUS catalogs, university native students are required to take at least 18 major credits during their first two years. If this standard were applied to M-DCC A.A. graduates, 40% of those in this cohort would be out of compliance. This latter point does not consider course tiers.

Viewing university GPA from the perspective of the number of major curriculum credits taken, 57% of Business majors in the high GPA group took more than 18 in-field

credits as compared to 48% of the low GPA students. For the Computer Science discipline, 50% of the high group took more than 18 critical credits as contrasted with 9% of the low GPA group. For the high GPA Engineering majors, 52% took 28 or more critical credits whereas, 40% of those in the low GPA group did so.

The GPAs that are 2.0 or marginal to 2.0 for the major curriculum courses taken at M-DCC are cited. For the Business discipline, it was 25%; in Computer Science, it was 20%; and for Engineering, 44%. The quality of attainment for the major field exhibited by these students does not provide a solid foundation for the work to come in their specialty. Cross tabulations of the M-DCC major GPA (from Tier1 credits earned and Tier1 quality points) and university GPA show that 78% of those students who failed at the university had a lower division major GPA of less than 3.0 and 83% of those failing at the university had an overall M-DCC GPA of less than 3.0. A GPA in the two point range does not appear to be high enough for many students to succeed at the university.

Descriptive results on the predictors support the predictions. The null is rejected; there are curriculum variables predictive of university grade point average.

CHAPTER 5: Summary, Conclusions, Recommendations and Implications

Summary

Problem and Rationale

In the 28 Florida community colleges (C.C.), consistently over the past years in which statewide data were available, the failure rate among the Associate in Arts (A.A.) graduates transferring to the State University System (SUS) has been approximately 12%. In a few disciplines, failure rates have exceeded 20%. In some of the largest disciplines statewide (Business Management, Computer Science, and Engineering) students from community colleges moving into the public universities are failing at a ratio far in excess of failures rates compared to university native students (13.5% vs. 1.7% respectively). One might expect high failure rates during the freshman year in higher education. Two out of three degree-seeking students are eliminated for academic reasons from C.Cs. Community college graduates represent their institution's highest achievers and they have, as juniors, already successfully survived numerous academic hurdles during the first two years of higher learning.

Community college A.A. graduates in Florida comprise, on average, 57% of the upper division (UD) in the SUS. If degree status (acquired A.S., no A.A. degree) were disregarded, the population in the upper division of the university would be made up of 77% former community college

students. Clearly, the demographics are changing and the enrollment patterns at the universities are changing...both of which reflect the characteristics of their feeder institutions. These characteristics include dominant percents of part-time enrollments, minorities, women, employed students, older students, and students carrying personal and/or family responsibilities.

The statewide failure rate for CC A.A. graduates is also manifested at one of the nation's largest two-year institutions, Miami-Dade Community College (M-DCC). M-DCC's three disciplines of Business Administration, Computer Sciences, and Engineering make up nearly 50% of its graduations. Failure rates of A.A. graduates, particularly in these three disciplines, at the State universities are of concern to community college personnel. This study investigated the factors contributing to university performance of community college Associate in Arts graduates attending Florida State universities. Hypotheses set forth were:

1. Hypothesis 1: The overall cumulative GPA in the lower division and/or the lower division major field GPA for A.A. graduates are predictive of the university GPA in the Engineering, Computer Science, and Business Management disciplines in the state of Florida.
2. Hypothesis 2: There are demographic variables predictive of university performance among M-DCC A.A. graduates in Engineering, Computer Science, and Business

Management.

3. Hypothesis 3: There are administrative (test) variables predictive of university performance for the disciplines under study.

4. Hypothesis 4: There are lower division curriculum variables predictive of university performance for the Engineering, Computer Science, and Business Management disciplines.

Review of the Literature

Aside from the usual search in current journals, the hard bound volumes and microfiche collections, a national computer network was accessed with creative combinations of key words to try to ferret out pertinent sources. The area investigated in this study, is apparently a frontier, a largely unexplored one. Two studies were found dealing with performance of A.A. graduates transferring to the university. They were Florida State Board of Education systemwide studies, still in progress. Both provided verification on the Physical Science and Life Science disciplines but with even higher failure rates. Transfer shock and the methodological differences in GPA calculations were identified as accounting for part of the GPA differences. Time constraints prevented the State from analyzing transcripts.

Studies on ethnicity belabored the differentials of dropout rates, failure rates, and low test scores of

minority groups but did not deal with factors influential in university performance as a result of lower division accomplishments. Curriculum studies were as vast and broad ranged as ethnic studies and also did not specifically pertain to the problem at hand.

Many studies were indirectly related to the present investigation. These studies revealed issues revolving around three points - transfer/graduation rates, success rates as affected by higher education institution of origin, and GPA differentials. Essentially, concerns surrounding these issues raised the question of the community college's ability to fulfill the transfer mission. In a period of severe revenue shortfall, the loss of credibility could result in greater funding decreases. The richness of the data collected for this study could also provide some possible answers to the issues involved.

The Research Design

Miami-Dade Community College A.A. graduates attending Florida public universities in the fall term of 1988 who had Business Management, Computer Sciences or Engineering as a university major were the subjects of this study. Only universities with at least 20 M-DCC A.A. graduates in these disciplines were included. The institutions involved were Florida International University, University of Florida, University of South Florida, Florida Atlantic University, and Florida State University. All subjects in the high GPA

(3.5+) and the low GPA (<2.0) groups were studied in their entirety. A 12% systematic sample was obtained for the middle GPA group (2.0-3.4) drawn in randomized order by social security number. There were 564 subjects in the study. University transcripts and community college transcripts were coded for these subjects. Data from the Division of University files at the State capitol were obtained.

Multiple regression, both the General Linear Models and Stepwise, provided statistics for predictions. Built into the models were GPA variables, demographic variables, administrative variables, and curriculum variables. Predictors were identified and detailed descriptive statistics were applied to explore the nature of the predictors. Variables not commonly considered were scrutinized to determine affects on performance. Findings are intended to suggest directions or intensification of directions to minimize failures of A.A. graduates transferring to the universities.

Conclusions

Hypotheses

Hypothesis 1 - The community college cumulative grade point average of Associate in Arts graduates does, indeed, explain the variability of the university GPA in the Engineering, Computer Science, and Business Management disciplines. Descriptive statistics generated on this GPA

predictor demonstrated that of those failing in the SUS, 83% had a lower division cumulative GPA of less than 3.0.

Performance data for the aggregation of disciplines for the entire state of Florida show that, overall, 12% of the students at the public universities who graduated from the State's community colleges with an A.A. degree have unsatisfactory cumulative GPAs (<2.0). In the Physical Science and Life Science disciplines, the failure rate, systemwide, for community college A.A. graduates was 16%. Failure rates exceeded 20% in some disciplines.

For the three disciplines of the study, State failure rates mirror those at Miami-Dade. For Computer Science in system aggregation, the rate of failure was 13%; for M-DCC it was 14%. The failure rate for Business Management for the state's 28 community colleges was 13%; at M-DCC, it was 15%. In the Engineering discipline, the state rate was 14% and for Miami-Dade, it was 15%. There is, indeed, a commonality between the Miami-Dade Community College failure rate among its A.A. degree graduates transferring to the state universities and the state of Florida aggregated failure rate for its community college graduates transferring to the public universities.

Some issues addressed from the review of the literature included GPA differentials between native university students and the low graduation/transfer rates of community college students. With regard to the former issue, the university GPA of community college transferees to Florida

public universities is considerably lower than that of the GPA of native university students. Different formulae are used for the calculation of native student GPA and community college GPA, which puts community college graduates at a disadvantage. Lower division grades are not used in calculating the university GPA.

However, failure rates could be greater for those students who attempted credits but earned no credits included in data displays; students with zero GPAs are systematically omitted from the state's data tables. These latter students may represent more severe cases of failure. At this point, no data are available to evaluate this subgroup.

Concerning the low graduation/transfer rates of community college students, the characteristics of these enrollments described in the problem statement foster prolongation of time to graduation. The majority of degree-seeking community college students are non-traditional in their enrollment patterns and characteristics (as gender, age, ethnicity). The greater part of Florida's upper division is comprised of former community college students and the enrollment and graduation patterns exhibited in the lower division are likely to continue in the upper division.

Hypothesis 2 - There are demographic variables predictive of performance at the university among M-DCC A.A. graduates in the Engineering, Business & Management, and

Computer Science disciplines.

Gender, age, and ethnicity were built into the full regression model. Various combinations of the demographic variables were used to predict university GPA. None of these combinations was significant in accounting for the variability of the university grade point average. However, ethnicity was a significant contributor to the variability of the university GPA. Each of the ethnic subgroups displayed probabilities less than .0001. The null was, therefore, rejected.

The demographic potential predictor variables were examined descriptively to develop further insight into behavior patterns. Proportional ethnic differences were seen among the White, Hispanic, and Black students in the cohort. White students were proportionately over-represented in the high GPA group in all disciplines. Hispanic and Black students were on par (absolute enrollments proportional to percent of ethnic group) for Engineering, and under-represented for Computer Science and Business/ Management. In the middle GPA group, Hispanic students were over-represented in Computer Science and Engineering; Black enrollments were under-represented. For the low university GPA group, Black students were over-represented in all three disciplines.

Hypothesis 3 - There are administrative variables (CLAST subtests) predictive of university performance (GPA)

for the Business/Management, Engineering, and Computer Science disciplines.

CLAST math was identified as a significant predictor in the full regression model. Stepwise regression statistics placed the CLAST computation variable as the second biggest contributor to explaining university GPA, redundancy removed. The mathematics component inherent in the content of these disciplines probably influenced CLAST accountability for the variability of the university GPA. Neither the reading nor the writing portions of the CLAST proved significant predictors. However, for disciplines that are more language arts oriented, the CLAST reading, writing, and essay scores may be strong predictors. The null is rejected. The CLAST computation score is predictive of university GPA for the Business/Management, Computer Science, and Engineering disciplines.

Hypothesis 4 - There are lower division curriculum variables predictive of university performance for the Engineering, Business & Management, and Computer Science disciplines.

The Florida public universities required a large number of credits for the lower division major field (99 credits or 31 courses excluding 36 General Education credits) for the Engineering discipline and very high for the other two disciplines. The abundance of course offerings made it difficult for students to know which of the many required courses were most essential for success in their major.

Therefore, these major requirements were placed into tiers (Tier1 - critical to success, Tier2 - supportive of success, Tier3 - suggested for the major, and Tier4 - related to the major). Criteria for "tiering" are in found on pages 63-64. Even with the "tiering" to delimit those critical for transfer success, the Engineering curriculum for TIER1 major field credits alone, amounted to 42 credits.

Universities generally require at least 18 credits in the field of the major for the native university student. Thus, using 18 credits as a base, transcript analysis of the cohort revealed that 40% of these A.A. graduates took fewer than the base number of critical major credits.

Two curriculum variables were found in the regression procedure to be significant in accounting for university GPA variability. They are a number of critical major credits (TIER1CR) taken and the quality points used in calculating GPA of the critical major credits taken (TIER1QP).

Descriptive statistics were generated on these two curriculum predictors as well as other curricular variables to further understand the impact of the curriculum on SUS performance. Students who took many critical university required credits and did well in them succeeded in their majors at the university. Conversely, those who took few of the critical courses and/or passed them marginally or were mediocre in these major critical courses had difficulty at the university. The Tier1 critical university required

courses are essentially the vertical articulation and sequential courses advocated by Knoell (1990) and Palmer (1986, 1990).

Comparing those in the high GPA group by discipline with those in the low GPA group for critical major curriculum credits completed, 57% of the high Business and Management group completed more than 18 credits, while, 48% in the low GPA group did so. In the Computer Science field, 50% of the high GPA students took more than 18 credits but only 9% of the low group completed more than 18 major credits. For the Engineering discipline, 52% of the high GPA group took an excess of 28 major credits, whereas, 40% of the low GPA group exceeded this number.

The GPA achieved for the major credits indicated that 78% of those failing at the university had a lower division TIER1 major GPA of less than 3.0. Considering community college overall GPA compared to the university GPA, 83% of those failing at the university had a lower division cumulative GPA of less than 3.0.

Descriptive results support regression results. The null is rejected; there are curriculum variables predictive of university grade point average for the Engineering, Business/Management, and Computer Science disciplines. Lower division curriculum requirements for university transfer, the structuring of the requirements, and the prerequisites needed for the requisites significantly impact the performance of A.A. graduates transferring to the state

universities. The enforcement and monitoring of requisite completion is crucial to transfer success (Cohen, 1989).

Recommendations and Implications

1. Required Major Courses

The vast array of major courses required by universities presents a dilemma of choice for the student. Some of the required courses are more instrumental in preparing the student to succeed in the university than other required courses. It appears that criteria need to be established to delineate those that are most essential for the major, given the broad spectrum of choices. The study shows that those students who took the critical courses in sufficient numbers and did well in those courses tended to have little difficulty with the upper division curriculum. Prescriptiveness for disciplines that are highly structured and sequential is a solution.

2. Monitoring For Recommended Major Courses

A system for monitoring whether major courses are actually taken in the lower division that are required by universities would better prepare the student for the rigors of university education. The issues attendant to monitoring and the monitoring system are numerous. The majority of community college students who are seeking the transfer degree enter higher education with academic skills deficits and must, therefore, spend semesters however many, making up those deficits. These same students are also likely to need

preparation for many prerequisite courses that are foundational to the university requisite courses. Would monitoring for major courses erect still another barrier to graduation? Is monitoring an obligation of the community college or is it the student's responsibility? Is the student, particularly the marginal student capable of following through with guidelines, if not monitored? If the decision were made to monitor, what would be the minimum number of major credits a student must have to be classified a bona fide program major? Why is this minimum number considered reasonable?

Who should do the monitoring? How will the monitoring be done? What resources will be involved in developing such a system? How much time and money will developing such a system cost? What will the upkeep of such a system involve? How will evaluation of the effectiveness of the monitoring system be conducted? Who will conduct the evaluation? What will be done if a student does not meet the major course criteria established? How extensive is this a problem for university native students on the specific discipline level? How do universities approach this problem among native university students? And so on.

3. GPA of Recommended Major Courses

A sizable percent (78%) of students failing at the university had a cumulative GPA in their major of less than 3.0. Even with a major GPA within the range of 2.5-2.9, 34% of the A.A. graduates of the cohort failed at the

university. As a group, many of these students graduated with an overall marginal GPA. Their major GPA may have been less than 2.0. Is a major GPA of 2.0 adequate for success in the upper division? When one takes into account the fact that the average community college graduate at M-DCC completes 85 college credits for a degree and takes an average of 4.5 years to graduate, are we then imposing more barriers that would increase the level of frustration and discouragement? Should there be different path options for A.A. students who can achieve and are intent upon achieving a baccalaureate as opposed to those who are studying for "added-value" benefits? Would this be opening a pandora box of philosophical and technical problems? Are not these problems appropriate for state level articulation committees?

4. Calculation of University GPA

The method used by the university to calculate the grade point average of transfer students presumes grade inflation and differences of standards across institutions. This concern is understandable. The current practice at the university is to set the community college transfer students' GPA base at zero credits earned at the university and build from there. The maximum number of credits transferable, according to Articulation Agreements, is 60. At 60 credits, upper division status begins for university native students. When comparisons are made regarding the performance of community college transfers and university

native students, would it not be equitable to cut off the first 60 credits of the native student's points? Both groups of students would then be starting at the same beginning base and, one group would not be sheltered for low quality points while the other group did not receive the same advantage.

5. Replication of the Study

Drawing the university transcripts and the community college transcripts for analyses of other cohorts for the disciplines and year(s) of special interest, would help to put the issue of the performance quality into better perspective. While the failure rate is common throughout the Florida community college system, institutions differ in the specific discipline for which research resources might best be allocated. For the short term holistic view, the cross tabulation of cumulative GPA in the lower division against the cumulative university GPA (from the SUS cartridge) could confirm or disconfirm the GPA demarcation point essential for success after transfer.

6. Counseling in the Lower Division

Counseling services have been in existence for a long time and have been used extensively by students throughout their college tenure. Part of the counseling process would involve monitoring for major courses taken and major GPA. Interest and aptitude inventories are instruments which help to match the student with a future career. Students having many deficits or/and are uncertain about where to channel

academic energies, appear to need more guidance. Student services are of paramount importance to student success. All instructional staff would continue to be part of the counseling system.

7. Articulation Prior to College

In certain disciplines, math and science in particular, structure and sequence are natural and unyielding characteristics. These discipline characteristics demand a prescriptive curriculum. Earlier courses provide the foundation for what follows. Control of previous knowledge is mandatory in order to grasp subsequent knowledge. It is not a rarity to already be behind in achievement for these disciplines while still in the middle school. The quality of entering college freshmen is dependent upon preparation prior to college (Hodgkinson, 1988). Articulation efforts extending through the building blocks of earlier education are significant to successful attainment in higher education.

8. Ethnic Differentials

Both the university and the lower division transcripts of individual students failing at the university (depicted in Table 4.18) require fine examination. To be determined are the precise behaviors that foreshadowed failure after university transfer. Beyond curricular variables, overall GPA, major GPA, and CLAST tests, examination needs to be focused on basic skills test scores. The nature of college preparatory courses completed, prerequisites to the

requisites taken, and the degree of success in these courses impact performance in higher education. Secondary school transcripts are a concrete source of the pre-collegiate curriculum of these students.

9. Follow-up Research

Beyond this study, three continuing studies are essential for furthering the understanding of factors that contribute to performance at the university. First, those students who had attempted credits but earned none and those who have zero grade point averages are automatically excluded from State data displays and calculations. The transcripts of these students (both lower and upper divisions) need to be examined to determine the nature of their failures. Having determined that, further follow-up might be called for to remedy conditions operating unfavorably to positive achievement.

Three years have elapsed since the transcripts and records of students in this study were drawn. Later transcripts drawn of those who failed may reveal a "turn around." If these students are performing successfully in 1992, qualitative research may reveal insights and conditions that are helpful. Appropriately directed questions may indicate conditions beyond those obtainable from quantitative scrutiny that are helpful to college personnel and M-DCC students.

Having devoted a great deal of time to quantitative scrutiny, a third study, also qualitative, would be to track

(by questionnaire and/or interview) those students who failed and are still in the same status. It might be useful to know whether their failures were due to life's circumstances, personal characteristics, circumstances beyond their control, previously unidentified conditions, procedural barriers, policy/practice difficulties, personality conflicts, etc. Student perceptions may be quite different than administrative perspectives.

Discussion

There was an inverse relationship between the number of courses withdrawn and/or repeated. The higher the university GPA, the fewer the numbers of course withdrawals and repeats. Conversely, the higher the number of courses withdrawn/repeated, the lower the GPA. This may be indicative of the difficulties those with lower GPAs experience attempting to obtain a higher education degree.

The SUS utilizes two different formulae to calculate the GPA of the student in the university's upper division. Setting the transfer student's GPA to zero in calculating cumulative GPA in the upper division can have adverse effects on the transferee. The "risk factor" is increased should a student do poorly in a course or two soon after transfer. But for the university native, junior year GPAs are not only devoid of the transfer shock phenomenon, but more advantageously, at least two years worth of quality

points have already been accumulated to dissipate the effects of upper division poor course grades.

To illustrate and underscore the point, a hypothetical example is constructed. Suppose both the native university student and the A.A. graduate transferring to the SUS enter the upper division with a 3.0 GPA and 60 semester credits. Both take six credits in their first junior year term and fail one course but earn a "C" grade (6 quality points) in the other course. Assuming three credits per course, the native had accumulated 180 quality points going into the junior year, and with the additional 6 of the latest course, has 186 quality points. The GPA calculation is thus 186/66 or a 2.82 GPA. In contrast, the transfer student (whose GPA begins at zero going into the university) has 6 quality points divided by 6 semester credits or a 1.0 GPA. The university native student is further advantaged in being distanced from the transfer shock phenomenon.

Would it be equitable to apply the community college quality points and credits earned when calculating higher education performance? The concern of universities regarding grade inflation in the lower division could be dissipated by setting the GPA to zero at the junior year for both community college transfer students and university native students.

Grade point average comparisons between the groups are flawed with the use of disparate methodologies. In the national literature, rates of many kinds are calculated

using different bases, and not uncommonly, different components within the base. These variant rates are then compared as if definitions and formulae were uniform.

Discounting transfer shock, the differential in GPA may not be as large as appears presently, were the identical formula used for both groups. It is expected that the mean overall GPA of the community college graduate would be lower, given the initial differences of both groups. However, the differential in failure rate between the community college A.A. graduate at the university and the native university student would be narrowed.

The Level I Data Display tables are a major source of information about performance at the universities of community college graduates. Students who earned no university credits and those with zero GPAs are deleted from the Level I Data Display. This occurs in order to accommodate an empirical mathematical characteristic. Some students have attempted numerous credits and earned none. The size of these deletions and, therefore, the seriousness of the problem have yet to be determined. These students appear to be more critical cases of failure.

Though multiple regression analysis identified ethnicity as significant in accounting for the variability of the university grade point average, the differences among the races may not have been due to race per se, but to specific lower division behaviors of the students. Academic

behaviors such as compliance with university major course requirements and grades earned in critical major courses tend to influence subsequent course performance outcomes, regardless of the race of the student.

Those most likely to do well at the university may have built the foundations for their success while studying in the lower division, and not unreasonably, in their pre-collegiate curriculum. A marginal major field GPA in the lower division hardly sets a proper foundation for excellence in any field of endeavor. Students may also be eligible to graduate with an A.A. degree before completing the prerequisites to the university requisites, and without taking university requisites.

The failure rate may well be indicative of problems entrenched in our society that pre-existed lower division collegiate training by many years. These problems need to be dealt with if the cycle of unpreparedness is to be broken.

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Appendix A

ACRONYMS

AGIS - Advisement and Graduation Information System

A.A. Degree - Associate in Arts degree

A.S. Degree - Associate in Science degree

CCNS - Common Course Numbering System

CGPA - Cumulative Grade Point Average

CLAST - College Level Examination Program

CP - College Preparatory (remedial)

DCC - Division of Community Colleges

DU - Division of Universities

ERIC - Educational Resources Information Center

FACC - Florida Association of Community Colleges

FAU - Florida Atlantic University

FIRN - Florida Information Regional Network

FIU - Florida International University

FSU - Florida State University

FSBCC - Florida State Board of Community Colleges

FTIC - First time in college

GPA - Grade Point Average

HERI - Higher Education Research Institute

LAP - Limited Access Program

MAPS - Multiple Assessment Programs and Services test

M-DCC - Miami-Dade Community College

NAICU - National Association of Independent Colleges and Universities

NCES - National Center Educational Research

NIE - National Institute of Education SASS - Student

Academic Support System

SDCF - Student Date Course File

SOLAR - Student On-Line Articulation

SUS - State University System (of Florida)

UF - University of Florida

USF - University of South Florida

Appendix B

MATERIALS

1. Program Review Level I Data Display

The Associate in Arts (A.A.) degree programs in Florida are monitored by the State Board of Education through the Division of Community Colleges (DCC), using Division of Universities (DU) data. This monitoring, called program review/evaluation was mandated by Section 240.318 of the Florida Statutes. Published annually is a Program Review Level I Data Display for each of the State's 28 community colleges. The A.A. programs are designed to satisfy the first two years of undergraduate education; the student then transfers into a state university as a junior.

To better articulate performance between the two levels of higher education institutions, the DCC summarizes the performance of the transfer student at the university in an annual tabular report. These data for any given state community college are distributed to the pertinent colleges. Statistics presented include the frequency and percent of community college transferees and university natives for a number of variables. Among these variables are mean cumulative GPA, graduation rate, GPA rate at or above 3.0 and GPA rate below 2.0 for each discipline. Comparisons can thus be made between the academic performance of community college transferees and the performance of university native students for all disciplines in the university.

2. The SUS Student Data Course File (SDCF)

This is a complex series of electronic tapes or cartridges which contain numerous data elements for the records of each and every Florida community college transferee enrolled in a specific term in the SUS. Among elements on this file are the discipline code, cumulative grade point average, cumulative credit hours earned, first year of attendance, last year of attendance, degrees earned, test scores, and student demographics. The SDCF of M-DCC student records for the fall term of 1988-1989 for the targeted disciplines (Business Management, Computer Science, and Engineering) in the state universities of interest were accessed for analyses.

3. Adders File

This is a batch file that contains 35 variables coded from the analysis of 1,128 transcripts. The Adders data file were merged into the principle research study file. Statistical Analysis System (SAS) programming were designed to manipulate data and perform a variety of statistical operations using Adders batch data as well as data from other merged electronic files.

4. The Statistical Analysis System (SAS)

The mainframe SAS software was accessed and the author customized programming for each statistical facet of the study. Various files were merged, batches read in, file integrity validated; descriptive and inferential procedures were operationalized.

5. Statistical Data

Data from a number of Florida education departments and divisions were used intact, but primarily extracted and reformatted to produce descriptive tables relevant to the study.

Appendix C

PROCEDURES

1. Verification of Data Tables Prepared by State Agency

As part of the College's program review process, data gathered from various sources regarding the performance of M-DCC programs were examined. In the examination of the Level I Data Display from the State Board of Education for M-DCC A.A. graduates, a consistently high failure rate was observed over the latest years. An attempt was made to replicate the fall 1987 data tape against A.A. program review tables of SUS performance. It was discovered that the tape had been written over with other data such that the technicality prevented data replication. Term data from the DU were then obtained through the DCC and the interinstitutional Research Council.

The fall term 1988 electronic tape, thus obtained, underwent a programming tape readability process involving many steps before a file could be created. A customized SAS program was written to replicate data prepared by the state agency. Data replication from the SUS Student Data Course File was intended to verify statistics sent to M-DCC in the Level I Data Display from the state's Division of Community Colleges. When the raw data files were printed, a number of anomalies appeared which made it difficult to decipher the data. Interpretation could not be made and valid statistics could not be generated until the mystery of the

anomalies was resolved.

2. File Integrity: The SDCF

Apparent anomalies seen throughout the SUS files fell into two broad categories: a) Many terms in attendance in the SUS or degree awarded with zero cumulative credits earned and zero cumulative GPA, b) Few terms in attendance in the SUS with either high numbers of credits accumulated or the baccalaureate awarded.

A number of specific cases from both categories were identified. It was determined that the details from forty such transcripts would be sufficient to provide clues to the anomalies. The transcripts from both M-DCC and the SUS institutions for these subjects were thus obtained for analysis. In the analysis, patterns began to emerge; more transcripts were examined to substantiate earlier observations.

For the category of students with many terms/zero credits, two subgroups surfaced. The first group consisted of students awarded the baccalaureate who returned to the university in the fall term 1988 for the first time after graduating. Reenrollment after degree attainment was apparently programmed at the state level to set the credit counter to zero, and since no credits had yet been earned, cumulative credits remained a zero. Other many terms/zero credit students were accounted for by those who enrolled at the university over a period of terms but subsequently withdrew or repeatedly failed in courses taken. Therefore,

zero credits were earned.

The second category (few terms/many credits) did indeed consist of students who attended the university few terms and quickly amassed credits. These data were accurate. The students attended each and every term - fall, winter, spring, summer - and continually exceeded the normal full-time credit load. Some of them had attended out-of-state universities after graduating from M-DCC and those university credits counted toward the baccalaureate.

These findings were discussed by telephone on November 20, 1989 with C. Cole, programmer for the State's Management Information System (MIS) Bureau and with J. Roddenberry, analyst with the DCC. It was ascertained at that time that zero cumulative credits could also occur because of missing data...that is, incomplete record information transmittal from the institution. Confirmation in programming, data input, and data element interpretation would now enable the replication of the State Data Display statistics to verify M-DCC failure rates. Because the DCC deletes all cases with zero GPA and/or zero cumulative earned credits from statistical tables, these identical elements were omitted in this M-DCC study for the purpose of achieving records/data comparability.

3. Nature of the SUS Files

- File credits are set to zero if courses are taken after the Bachelor or Master's degree is awarded.
- Non-degree cumulative credits are summed as if the

student were seeking a degree.

- Non-degree and unclassified records start at zero.
- Everyone is on the file who attends the SUS any particular term. The DCC unduplicates records across terms.
- At the MIS Bureau, electronic data are not written over but at M-DCC, newer data are written over the data of earlier terms. Conversion to generational data sets occurred but only three generations of data were saved at any given time. Each generation is equivalent to one term. Cartridges are now used (1991) in place of tapes. Each cartridge consists of at least three terms. For practical purposes, three generations of data are replaced with each new cartridge. Because the replacement is automatic (as programmed on the mainframe), it is important to write data used for long term or longitudinal studies to a separate batch file in order to safeguard the data. Once erased, it can not be recreated for the SUS raw data are merged with a number of other dynamic M-DCC files when first created. Trying to recreate from hard copies that are filed here and there over periods of time, can be difficult, time consuming, and tedious.
- Records are omitted of those students with zero cumulative credits earned; some of them have a high

number of credits attempted. (This has the effect of mitigating quantity of failures showing in calculations).

- A memorandum dated March 1, 1989 from C. Maxwell, Division Director in Tallahassee, confirmed that records with zero cumulative credits earned or zero GPA are omitted from the data display calculations.
- Universities are given a specific time frame for records input. The State is still working on timely responses in order to reduce the number of records having zero data.
- Data errors exist in electronic files. Errors might occur at the local level or they could rise at the State level at any stage of data processing.
  Data edits do not find all errors, nor all types of errors, the latter of which needs to be programmed.
- Student Data Course File Elements
  Element 1061 and 1087 deal with cumulative hours accepted for transfer that will apply to the current degree. Element 1068 concerns type of student at date of entry; this student must be a "J" (transfer from a Florida community college).

4. Preliminary Statistics

SAS tables were generated for the three targeted programs. The statistics from the universities of interest - FIU, FAU, UF, FSU, and USF - were examined for their match against state generated tables. Verification of

correctness now made it possible to proceed with transcript draw decisions. Variables for the initial tables from transcript sampling showed the precise number of students who had failed in the SUS from these programs; it also showed how many were doing extremely well, and those between the two extremes. Reasonableness of task time involved for detailed transcript analyses and accuracy of conclusions to be drawn from the sample were considered. It later developed that time calculations for the expansiveness of the details of numerous related elements to be included in the study had not been anticipated during the planning stages, and therefore, not factored into the study.

The study, in finality, consumed far more time than could have been planned. Unforeseen mechanical and technical problems, personnel scheduling delays, and projects reprioritizing necessitated changes in the deadlines scheduled.