The Dissertation Committee for Wei Zhou Certifies that this is the approved version of the following dissertation:

A Predictive Model on Identifying Successful Institutional Practices Designed to Enhance the Performance of Community College Developmental Students

Committee:

William Moore, Jr., Supervisor

John E. Roueche

Norvell Northcutt

Cynthia Salinas

Margot Perez-Greene

Donald Green

A Predictive Model on Identifying Successful Institutional Practices Designed to Enhance the Performance of Community College Developmental Students

by

Wei Zhou, B.S.; M.S.

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Dedication

To those who had never imagined that they would attain the heights they have reached now.

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A Predictive Model on Identifying Successful Institutional Practices Designed to Enhance the Performance of Community College Developmental Students

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To keep the promise of providing successful higher education experience to all students, community colleges need to identify effective practices to enhance success for students coming through developmental education programs. Despite the existence of a wealth of research studies on student success in higher education which are focused on four-year institutions, few have generated concrete insights on community college students, who are more likely to be minority, non-residential, part-time, first-generation college students, and working adults with families. Therefore, community colleges are seeking theoretical models generated based upon empirical studies focused on developmental

students to identify and design effective practices to enhance the success of those students.

The purpose of this study was to develop a theoretical, predictive model, focused on developmental education student success, by examining the correlations between student characteristics and student success via intervening variables of student engagement. This study used data from spring 2004 Florida statewide Community College Survey of Student Engagement and the Florida State Student Database. Findings of this study supported the theoretical framework that student characteristics are predictors of student success, and the impacts of student characteristics on student success are affected by student engagement, which can be influenced by institutional practices. Therefore, community colleges may develop effective institutional policies and practices focusing on student engagement to increase developmental education student success. In addition, this study assists in identifying best practices which in turn provides valuable information to community colleges in reference to the most endangered students. Moreover, the model, which provided guidelines for institutional researchers including the operational definitions of all variables, the statistical analysis used, the methods of data collection, and identification of needed instrument, enables community colleges to monitor the progresses of institutional practices and keep moving forward in a changing environment.

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CHAPTER ONE: INTRODUCTION TO THE STUDY

BACKGROUND

The American Dream

The community college is uniquely American: it is open to all; it offers easy access; it provides a caring and supportive environment; and it enables students, regardless of their ability, to further their education, sharpen their job skills or change careers (Cohen & Brawer, 2003). The practice of open access to college has provided the opportunity for people to receive postsecondary education and training in order to reach career aspirations, receive job training and the attainment of learning at a higher level. With the open admission policy, students who are at different preparation levels are encouraged to the experience of higher education. Many community college students are students who are ineligible to enter four-year institutions of higher education. They come to community colleges and receive remediation of basic skills and deficiencies to obtain the college education that otherwise would have been out of their reach. Currently, community colleges enroll about half of all students in higher

education institutions in the United States and more academically underprepared students than any other types of postsecondary institutions (American Association of Community Colleges, 2006; Brint & Karabel, 1989; Moss & Young, 1995). Thus, the community college has represented the great American experience in higher education.

The Need for Developmental Education

At the same time, being an open door institution means that community colleges must provide quality educational opportunities to students lacking the basic knowledge and skills, study habits, and support networks that facilitate success in college-level work (Almeida, 1991). Community colleges are facing the challenge to place students with diverse knowledge and skill levels in appropriate levels of curriculum in which students have a chance to success. Therefore, community colleges have to sustain a balance between maintaining high academic standards and providing access to students with diverse academic abilities (Abernathy, 1985-86; Smittle, 1995). Roueche and Roueche (1993) stated that "community colleges have long been caught between a rock and a hard place – trying to provide access and opportunity to all who can profit, while maintaining academic standards in the face of increased student underpreparedness" (p.1).

To sustain the balance, developmental education is provided to offer remedial education services to students with academic skills below the minimum level required to succeed at college-level work. Currently, almost all community colleges provide developmental education to help students gain the knowledge and skills necessary to be successful in college-level work (Cohen & Brawer, 2003). The number of students entering institutions of higher education in need of developmental education for the basic academic skills necessary to succeed in college-level work continues to grow (Cohen & Brawer, 2003; McCabe, 2003). Two major sources of the growing numbers of underprepared students are high school graduates proceeding directly to college and adults returning to educational institutions. Of the students enrolling in community colleges, over half of them require some sort of developmental education, and the percentage of students needing developmental education is expected to increase in the next century (McCabe & Day, 1998; Roueche & Roueche, 1999). Robert McCabe pointed out that "in the upcoming decades, the role of higher education in teaching students who enter with academic deficiencies will expand and become increasingly important" (The National Center for Public Policy and Higher Education, 2000, p.180).

The Pursuit of Successful Practices

With the current decreasing federal and state funding, rising operational costs and increasing demands for accountability, "the North American public's love affair with its institutions of higher education has come to an end" (Roueche, Johnson, & Roueche, 1997, p.4). Policy makers, legislators, taxpayers, students, parents, accrediting agencies and other entities are demanding increased accountability in higher education institutions. The low success of developmental education students has been a major public concern for educational accountability (Alfred & Lum, 1988; Bailey & Alfonso, 2005).

Being recognized as the "right institutions in higher education to provide effective developmental education programs" (McCabe & Day, 1998, p.32), community colleges are eagerly willing to take on the challenge of preparing students with limited academic skills to be successful in college-level work. Currently, community colleges are examining successful developmental education models to identify successful institutional practices designed to enhance the success rates of community college developmental education students.

STATEMENT OF THE PROBLEM

Despite the existence of a wealth of research studies on student success in higher education which were focused on four-year institutions, few research studies have generated concrete insights on institutional policies and practices that enhance student success at community colleges. Insights obtained from current research in universities do not necessarily translate to community college students who are more likely to be minority, non-residential, part-time, first-generation college students, and working adults with families. Community colleges are seeking models based upon empirical studies. These studies, specifically focused on developmental education students, will assist in identifying and designing effective practices to enhance the success rates of developmental education students.

PURPOSE OF THE STUDY

The goal of this study was to develop a predictive model focused on developmental education students with specifically identified academic needs. The model contributed to the current research on student success theories and

provided guidelines for data analysis and the identification of good institutional practices. In addition, this study answered a question often raised by community college leaders: "We have the data, where is the information that provides the insights needed to institutionalize best practices?"

SIGNIFICANCE OF THE STUDY

Developmental education is a key component of the mission of today's community colleges. It is critical in keeping the American dream of the access to higher education. With the changes in the nation's demographics and the quest for a more skilled workforce, developmental education will continue to be in great demand because of the influx of underprepared students coming into community colleges.

To keep the promise of providing successful higher education experiences to all students, community colleges need to identify successful practices to enhance student success for students coming through developmental education programs.

This study has both theoretical and practical implications. Theoretically, the correlations determined between student characteristics and student success via intervening variables of student engagement contribute to the current research

of student success theories. Practically, the data analysis assists in identifying best practices which in turn provides valuable information to community colleges in reference to the most endangered students. In addition, the model, which provides guidelines for institutional researchers including the operational definitions of all variables, the statistical analysis used, the methods of data collection, and identification of needed instrument, enables community colleges to monitor the progresses of institutional practices and keep moving forward in a changing environment.

RESEARCH QUESTIONS

In this study, *student characteristics* included ten variables. They were *age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school drop-out, part-time enrollment, single parent,* and *with dependent other than spouse*.

Student engagement was measured by the nine factor model developed from the Community College Survey of Student Engagement (CCSSE) survey instrument, the Community College Student Report (CCSR). The nine variables (factors) included *faculty interactions, class assignments, exposure to diversity,*

collaborative learning, information technology, mental activities, school opinions, student services, and *academic preparation.*

Student success was measure by two major indicators, *cumulative course completion rate* and *cumulative Grade Point Average (GPA)*.

By examining the relationships among developmental education student characteristics, student engagement and student success, this study addressed the following questions:

- Are there significant relationships between student characteristics and student success?
- Which student characteristics can be used as predictors of student success?
- Are there significant relationships between student characteristics and student engagement?
- Are there significant relationships between student engagement and student success?
- Is increasing student engagement an effective institutional practice to close the gap between student characteristics and student success?

RESEARCH DESIGN

This study employed a quantitative approach. Florida community college developmental education students were used to investigate the relationships between student characteristics and student success indicators, the relationships between student characteristics and student engagement factors, and the relationships between student engagement factors and student success indicators.

ASSUMPTIONS

This study made several assumptions. First, it was assumed that all data provided by the Florida Community College System and Community College Survey of Student Engagement were accurate. Second, it was assumed that the Florida State Student Database included all students in need of developmental education. This assumption was made because of the state's mandatory assessment and placement policy. Third, it was assumed that the Community College Student Reports were representative of the student population in Florida community colleges. Fourth, it was assumed that students participating in the Community College Survey of Student Engagement shared a common

understanding of the items in the survey. Finally, it was assumed that Florida community college faculty shared a common standard in assigning student grades based on students' academic performance in the courses.

LIMITATIONS

This study used a dataset built on Florida community college students who were placed in developmental courses and who took the Community College Survey of Student Engagement during the spring 2004 semester. The study population was randomly selected, but only students enrolled in classes at mid-point of the semester (when the surveys were administered) were included in the study. Some students who did not succeed in college work had already dropped out of the classes. Thus, it was a survey on "survivors". Because of the different practices of developmental education student placement methodology throughout the nation, this student population may not represent any other state that utilizes different placement methodologies.

DEFINITION OF TERMS

Community college is an educational institution primarily accredited to award an associate degree as its highest diploma. Since their early years, community colleges have expanded their roles beyond the two years of pre-baccalaureate study. Today, they prepare people for the workforce, assist people to grow within their careers, offer a variety of services to local communities, and offer basic literacy instruction for people who failed to fully learn rudimentary skills in primary and secondary education, as well as for new immigrants to the United States. Moreover, they maintain courses for the personal interest of adults, i.e., fostering the spirit of lifelong learning (Cohen & Brawer, 2003).

Developmental education is defined by the National Association for Developmental Education (2001) as:

> A field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners, at all levels of the learning continuum. Developmental education is sensitive and responsive to individual differences and special needs among learners. Developmental education programs and services commonly address academic preparedness, diagnostic assessment and placement,

development of general and discipline-specific learning strategies, and affective barriers to learning. Developmental education includes, but is not limited to: all forms of learning assistance, such as tutoring, mentoring, and supplemental instruction; personal, academic, and career counseling; academic advisement; and coursework.

Open access refers to the practice of community colleges that offers "the student, regardless of his level of achievement, will receive the best education possible in the college commensurate with his needs, efforts, motivation, and abilities" (Moore, 1970, p.5).

Student engagement refers to "the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes" (Hu & Kuh, 2002, p.555).

Student success refers to the student's successful academic performance at the college. It is measured by cumulative course completion rate and cumulative grade point average (GPA) in this study.

SUMMARY

The American community college is unique in the world. It provides open access to higher education to all people. This practice also means that community

colleges welcome incoming students with different levels of academic skills. To keep the promise of providing quality higher education to all people, community colleges are seeking effective institutional practices on developmental education to prepare students with academic skills below the minimum level required to succeed in college-level work.

To contribute to the research on community college developmental education student success and to help identify effective institutional practices on developmental education, this study developed a predictive model to examine whether student characteristic variables are predictors for student success and institutional practices focusing on increasing student engagement can close the gap caused by predictors for student success.

ORGANIZATION OF THE STUDY

The dissertation consists of five chapters.

Chapter One provides an overview of the study, including the background, the statement of the problem, the purpose of the study, the significance of the study, research questions, the research design, assumptions of the study, limitations of the study and the definition of terms.

Chapter Two contains a review of relevant literature, covering the definition, history, and current situation of developmental education, conceptual perspectives of student success, effective practices of developmental education, characteristics of community college students, and student engagement.

Chapter Three discusses the methodology, including the introduction, the theoretical framework guiding this study, the data selection, the variables analyzed in the study (student characteristic variables, student engagement factors, and student success indicators), the research tool, and the research procedure of the study.

Chapter Four presents findings of this study, including a description of demographic data of the sample population, examinations of relationships between and among student characteristics, student engagement factors, and student success indicators, and the presentation of the developmental education student success model.

Chapter Five summarizes major findings, looks deeper at some seemingly unexpected discrepancies, presents guidelines for institutional policies and practices, and institutional researcher, and ends by some recommendations for future research.

CHAPTER TWO: REVIEW OF LITERATURE

INTRODUCTION

The American community college is unique in the world. It provides an open door admission policy to higher education for everyone who wants to have some college experience. The practice of open access to college has simultaneously produced the need for providing developmental education for students with knowledge and skills below the minimum level required to succeed in college-level work. In an era of increased demands on higher education institutional effectiveness, the success of community college developmental education students has drawn a lot of attention from educators, policy makers, researchers, and other entities. Community colleges are frantically searching for new and improved ways to enhance the success of their underprepared and often at-risk student population.

DEFINITION OF DEVELOPMENTAL EDUCATION

The purpose of developmental education is to provide underprepared students knowledge and skills necessary for them to be successful in college-level work. Historically, developmental education has been used interchangeably with various terms. The most frequently mentioned terms are remedial education, compensatory education and college preparatory.

"Remedial shares its root with remedy, meaning to heal, cure, or make whole" (Clowes, 1982-82, p.4). Remedial education refers to college courses that are designed to bring student knowledge and skills to the levels necessary to succeed in taking on college-level work (Roueche & Roueche, 1993). This term, however, connoted a negative image that "something in the student needed fixing" (Miller, 1996, p.12).

Compensatory education implies that "environmental deficiencies in the student's background needed to be 'compensated' for providing enriching experiences in school" (Miller, 1996, p.12). This term is also not well received "because basic attitudes and preferences are well established by the college years, there is little hope and limited evidence that direct intervention at this late stage is successful" (Clowes, 1982-83, p.5).

To describe the nature of the instruction, the state of Florida has chosen the term college preparatory as a practical term in research analyses and communications (Florida Department of Education, 2005).

Of all these terms, professionals in the field prefer the term developmental education as being the most accurate descriptor (Roueche & Roueche, 1993). Education is a developmental process. Students continuously learn new knowledge and skills to proceed to the next educational level. The term developmental implies that students can progress and ultimately master increasingly complex academic skills (Miller, 1996). Thus, developmental education is believed to better describe the full range of services being provided to students who are initially underprepared for college-level work (McCabe & Day, 1998).

The National Association for Developmental Education (NADE) provided a comprehensive definition of developmental education:

> Developmental education is a field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners, at all levels of the learning continuum. Developmental education is sensitive and responsive to individual differences and special needs among learners.

> Developmental education programs and services commonly address academic preparedness, diagnostic assessment and placement, development of general and discipline-specific learning strategies, and affective barriers to learning.
>
> Developmental education includes, but is not limited to: all forms of learning assistance, such as tutoring, mentoring, and supplemental instruction; personal, academic, and career counseling; academic advisement; and coursework. (NADE, 2001).

HISTORY OF DEVELOPMENTAL EDUCATION

The Early Days in the Universities

"History holds the truth; developmental education has a traditional place in American higher education. It is by no means a new arrival" (Brier, 1984, p.5). The history of developmental education is as long as the history of American higher education. The concept of providing remedial instruction to students at a higher education institution was first introduced at the founding of Harvard University, America's oldest institution of higher learning, in 1636. From the beginning, Harvard University was faced with the task of providing remediation

for its students. One of the major reasons is that most textbooks were written in Latin and courses were taught in Latin. New students had to learn Latin from tutors before they could be successful in their coursework (Boylan & White, 1987). Thus, the early instructional focus of these remediation programs was upon tutoring in the Latin-language-based education system (Arendale, 2002).

The need for developmental education continued into the 19th century. In the early to mid-1800s, higher education became more accessible to American people. New colleges were established in every state in the union. Most of these colleges were self-sustaining (Boylan & White, 1994). Therefore, they had to accept students who were not academically qualified. Brier (1984) stated that the college expansion exceeded the people coming to college at this time period. This resulted in the increasing amount of tutoring on college campuses (Boylan & White, 1987).

Not surprisingly, there was a shortage of tutors to take care of the rapidly increasing enrollment of students who needed help to get ready for their coursework. In 1849, the University of Wisconsin became the first higher education institution to offer a college preparatory program to provide academic preparation to students who were lacking basic skills for college-level work (Brier, 1984). Brubacher and Rudy (1997) stated that "as late as 1865, only 41 of 331 registered students were in regular college classes" (p.156) at the University of Wisconsin.

The passage of the fist Morril Act in 1862 during the Civil War and the second Morrill Act in 1890 greatly increased the access to higher education. Theses acts led to the creation of the land grant universities which opened the door of higher education to more middle class students. Many of the new universities opened college preparatory schools to prepare students for college-level work (Witt et al., 1994). By the end of the 19th century, over 80% of the nation's colleges and universities had established remedial programs based on the University of Wisconsin model (Boylan & White, 1987), and more than 40% of first-year students were involved in some sort of remedial programs (Ignash, 1997a).

At the beginning of the 20th century, over half of the students admitted to prestigious Ivy League schools such as Harvard University, Yale University, Princeton University, and Columbia University could not meet the entrance requirements, and as a result, all of these schools added developmental courses to their curricula (Wyatt, 1992).

At that time, a high school education was considered as an essential element of American life. Many high school graduates had the desire to pursue a college education. Some forward-thinking university presidents, such as William Rainey Harper, then-President of the University of Chicago, believed that a nationwide system of two-year liberal arts institutions affiliated with universities would be ideal to meet this request for access to higher education. Under his influence, the first junior college, Joliet Junior College, opened its door in 1901.

Other states, such as, California, Michigan, and Missouri, followed the lead. By 1931, over half of the states had junior colleges in some sort (Brint & Karabel, 1989).

The Movement towards Community Colleges

The junior college was designed to be "the university of the common man" (Witt et al., 1994, p.3). The purpose of the junior college was to serve a diverse body of students with varying goals. Students came to junior colleges with different levels of knowledge and skills. To reach their educational goals, many of them need to develop new skills that they had never learned in their previous education, or remediate skills already forgotten. Thus, remedial programs became a part of the American open-door institution from the very beginning (Cohen & Brawer, 2003).

Since their creation, junior colleges were encouraged by universities to provide remediation to those students not meeting university minimum entrance requirements. Many students coming to colleges were underprepared from high schools. They needed remedial education, or some remedial work for their specific academic shortcomings. With the opening of junior colleges, providing the lower level of academic curricula and preparatory skills was moved away

from universities. This arrangement allowed universities to retain their higher admission and academic standards (Brint & Karabel, 1989).

As the junior colleges evolved, they began to provide continuing education and vocational training, in addition to their traditional academic transfer function. As a result, junior colleges were developing into the modern community college system (Brint & Karabel, 1989). This development was accompanied by some other major movements that further opened the doors of access to higher education. The G.I. Bill of Rights of 1944 provided veterans of World War II access to a low-cost or no-cost college education. Consequently, veterans accounted for 49% of all college students by 1947 (Dotzler, 2003). As a result of the Civil Rights Movement, the Higher Education Act of 1965 opened the doors of higher education institutions to many students who had previously been denied access to higher education. Enrollments increased among minorities, women, disabled, and other non-traditional students. Many of these new students were underprepared or even unprepared for college-level work. Community colleges responded with remedial education programs designed to enhance student skills in the basic educational areas of reading, writing and mathematics.

It was clear that the problem of underprepared students was not going away. “By the late 1960s, practically every two-year institution was making some institutional effort to provide redemption for the increasing numbers of students who enrolled without the basic rudiments of a high school education” (Roueche & Snow 1977, p.7). “In 1984 between 30 and 40 percent of entering freshmen in

two-year colleges were reading below a seventh grade reading level, and the forecast was that 'there is little hope that they would show any noticeable improvement in the next two decades'" (Roueche &Roueche, 1993, p.44). A report from the U.S. Department of Education (National Center for Education Statistics, 2003) found that remedial courses were especially common at two-year institutions. Almost all public two-year colleges reported that they provided at least one remedial course in mathematics, reading or writing.

Merisotis and Phipps (2000) summarized that "those halcyon days when all students who enrolled in college were adequately prepared, all courses offered at higher education institutions were 'college level', and students smoothly made the transition from high school simply never existed" (p.68).

CURRENT SITUATION OF DEVELOPMENTAL EDUCATION

The Continuous Need of Developmental Education

Today, developmental education is an important part of postsecondary education, and the need for developmental education is expanding. Economic, demographic and social forces are driving many underprepared students into institutions of higher education (McCabe & Day, 1998). Workforce requirements

are changing. In the last 50 years, there was a dramatic increase in the amount of education and training required for the workforce. Fifty years ago, the majority of jobs needed unskilled or semiskilled labor. Today, most of the jobs require at least some level of postsecondary education. Kazis and his colleagues predicted that in the coming decade, fourth-fifths of high school graduates would pursue some college education to acquire knowledge and skills necessary for the complex social, economic and political society they live in (Kazis, Vargas, & Hoffman, 2004). At the same time, the nation is moving rapidly into a demographically diverse society. McCabe and Day (1998) predicted that "by 2010, over half of those seeking to enter the work force nationwide will be minorities" (p.15). Moreover, "almost a third of African Americans and half of Hispanics have no high school diploma, and more than four-fifths of these growing populations have no postsecondary degree" (McCabe & Day, 1998, p.15). They concluded that in order for the United States to maintain a strong position in the global economy, all Americans need to acquire knowledge and skills through education. They further stated that "upward mobility in the labor force depends, quite simply, on education, and developmental education is that essential doorway of opportunity for millions of Americans" (McCabe & Day, 1998, p.17). Clearly, there has been and will continue to be a need for developmental education programs for underprepared students coming to college.

Over the last decade, there was an effort across the nation to remove developmental education from the four-year colleges and universities, which

would place an even greater share of the developmental education burden on the community colleges (Ignash, 1997b). Trustees of the City University of New York decided in 1999 to deny admission to remedial students from entry into their four-year institutions (Schrag, 1999). The 22-campus California State University system, one of the nation's largest university systems, planned to limit the proportion of regularly admitted freshman who need remedial help to 10% by 2007 (Selingo, 2000). The State of Florida passed legislation to phase out developmental education programs at the university system's four-year colleges (Florida Department of Education, 2005).

In response, McCabe and Day (1998) stated that community colleges are the right higher education institutions to provide effective developmental education to students in need. Community colleges are dedicated to balance access and quality and have worked successfully with underprepared students for decades. In many ways, developmental education has a better fit in the community college curriculum and environment. Community colleges provide smaller sized class and their faculty members are dedicated to teaching rather than research, therefore students in need of developmental education are provided more services geared towards their needs (Roueche & Roueche, 1993). In addition, states save money because credit hour costs are typically 30-40% less expensive in the community college than in a university setting.

The Calls for Effectiveness on Developmental Education

Despite a long history of positive achievements, such as cost effectiveness, maintaining the standards of education and retention, and availability to all ethnic groups (Boylan, Bonham, & Bliss, 1994), developmental education is facing criticism from educators, policy makers, business and industry leaders, and other entities.

State legislators have always questioned the provision of the developmental education. The perception is that taxpayers have already paid for the same education in secondary school, and now it is requesting taxpayers to pay for it a second time in the community college. As a result, some states have implemented more stringent accountability criteria for developmental education programs or limited the number of developmental courses that students may take (Abraham & Creech, 2000; Grubb, 2001; Losak & Miles, 1991).

At the same time, business and industrial community demand that higher education should provide employees capable of effective communications, problem-solving, learning, teamwork, and similar behaviors (Losak & Miles, 1991).

Meanwhile, educators are concerned that developmental education programs devalue academic standards of higher education. College faculty felt that their work environment would be improved if students were better prepared to handle course requirements (Boylan, Bonham, & Bliss, 1994).

As a result of these calls, developmental education must be evaluated and improved in order to meet the wide diversity of students' needs. Community colleges are expected to seek outcome measures as a means to document the results of large capital investments. Thus, community colleges will increase the academic preparation levels of students in a timely and cost efficient manner and be able to respond to the calls for educational accountability (McMillan, Parke, & Lanning, 1997). Being truly the open door institutions, community colleges must ensure that developmental education is indeed providing the service necessary to prepare students for college-level work. Currently, community colleges nationwide are seeking new and innovative models for efficiently and effectively delivering developmental education to their ever-increasing at-risk student population.

CONCEPTUAL PERSPECTIVES ON STUDENT SUCCESS

Because retention and degree completion are two key indicators of students success, the research on student success has focused on student persistence. A number of student persistence models have been developed over decades of research. These models fit into four categories, sociological, psychological, economic and organizational.

Sociological Models

Spady (1970) model. According to this model, the interaction between student attributes and the influences of various sources in the college environment, such as the academic and social systems, are important frameworks from which to examine student dropout behavior (Spady, 1970). In addition, the student dropout process is longitudinal and can be best explained by an interdisciplinary approach focusing on the interactive development between the student and the student's college environment. The student's decision to stay or withdraw is affected by the extent to which integration occurs. The primary assumptions and focus of this model are based on four-year institutions.

Tinto (1975, 1993) model. This is the most widely recognized and tested model of student persistence. The central idea of this model, transition from one culture to another, is from two main sources: Emile Durkheim's (1951) theory of suicide and Arnold van Gennep's (1960) study of rites of passage. According to Tinto's model, the process of student leaving college is a longitudinal process of interactions between the student and the social and academic systems of the college. The student's experiences in the college's systems continually modify the student's goal and institutional commitments and thus lead to persistence or to dropout.

This model distinguishes between the social and academic systems in an institution, seeing them as separate yet interconnected. The student's family background, individual attributes and pre-college educational experience interact with each other and affect both goal and institutional commitment. In the social system, institutional commitment affects student-student interactions and student-faculty interactions. Increased social system interactions lead to greater institutional commitment thus the student is less likely to leave college. In the academic system, goal commitment influences academic performance and intellectual development. The latter two in turn affect academic integration and thus the student is less likely to leave college.

Tierney (1992) criticized that Tinto created a flawed theoretical framework. He stated that Tinto misinterpreted the anthropological notion of ritual. Van Gennep's "rite of passage" is intra-cultural. Thus, the passage of an individual from one culture to another does not exist. In addition, ritual is governed by the culture. Therefore, it is never a matter of personal choices to participate in and depart from a ritual. He further argued that the focus of Tinto's model is on college attendance as an individual matter, thus it is against the use of cultural theorizing. Other researchers agreed that the notion of a unidirectional transition is inadequate (Yorke & Longden, 2004).

Moreover, the broadness of the constructs creates problems for the applications of this model. It is quite common that social and academic integration are interpreted and operationalized differently in various studies. This

makes the accumulation of research findings very difficult (Yorke & Longden, 2004). In addition, Tinto's model did not receive as strong empirical support for studies in commuter colleges as in residential institutions (Braxton & Hirschy, 2005).

In a discussion of whether to discard or further improve Tinto's model, Braxton (2000) states that because Tinto's model has obtained substantial empirical support from some aspects, it is better to work with a theoretical framework with empirical success than to start on a new theoretical approach.

Pascarella (1980) Model. This model was based on the work of both Spady (1970) and Tinto (1975). According to this model, student background characteristics interact with institutional factors. Both set of factors affect student-faculty interactions, college experiences, and educational outcomes. Educational outcomes directly influence the student's decision whether to stay in college. Although student-faculty interactions do not directly influence the student's decision whether to stay in college, they have indirect effects through educational outcomes, such as academic performance, intellectual development, satisfaction with college, and educational and career goals. Pascarella's model emphasizes the importance of student-faculty interactions while inherits other issues with Spady's and Tinto's models.

Psychological Models

Bean and Eaton (2000) model. This model finds useful of four psychological theories: attitude-behavior theory, coping behavior theory, self-efficacy and attribution theory. According to this model, the student comes to college with a complex set of characteristics and traits. The student's psychological state changes during various interactions with the institution. If the change is positive, the student has an increased sense of self-efficacy, reduced stress, increased confidence and a greater sense of personal control. This sense leads to social and academic integration, and thus commitment to the institution. This model agrees with Tinto's model in some aspects. However, Bean and Eaton (2000) acknowledged that their model is unable to deal with the various contributing theories.

Yorke and Longden (2004) suggested that there are some other psychological theories that can be applied to pursue persistence models. These theories include motivation, malleable self-theorizing, practical intelligence, emotional intelligence, and constructivism in learning and teaching.

According to the psychological perspective, whether to stay or leave college is solely controlled by the student. The student makes this decision depending on whether he is able to adjust to college. The problem of these theories of student persistence is that they rely solely on the student's ability to

adjust to college while ignore that the institution has impact upon student behaviors (Yorke & Longden, 2004).

Economic Models

According to economic models, students decide whether to stay or leave college based on their perception whether the investment in education gives back a good return on time, money and energy (Braxton & Hirschy, 2005). Therefore, students will stay in college to complete a degree program while taking on more financial burdens, if they foresee that they are getting a great financial future after college (Tinto, 1993). However, college experience has more than just financial rewards, it also has intellectual, social and intrinsic rewards. Economic models do not reflect the inclusion of these other rewards (Starks, 1989).

Organizational Models

Organizational models focus on organizational structure and behavior's impact upon students' decisions to stay or leave college (Braxton & Hirschy, 2005). However, these models do not include variables such as external factors and student-faculty interactions (Starks, 1989).

Non-traditional Student Persistence Model

Bean and Metzner (1985) model. This model recognizes that "the chief difference between the attrition process of traditional and nontraditional students is that nontraditional students are more affected by the external environment than by the social integration variables affecting traditional student attrition" (Bean & Metzner, 1985, p.485). According to this model, non-traditional students decide whether to stay or leave college based on their background variables, such as high school performance, family background, intent to leave, and educational goals; environmental variables, such as family responsibilities, finances, hours of employment, outside encouragement, family responsibilities, and opportunity to transfer; and academic achievements. With the emphasis on external environment, this model introduces factors only to a limited extent controllable by institutions through students' college experiences. Thus intervention strategies based upon this model are not practical (Webb, 1989). As a result, this model is not as widely received as Tinto's model in the community college field, although it has a focus on non-traditional students.

Lack of Models for Community College Students

Unfortunately, the dominant persistence theories are developed based primarily on full-time, traditional college aged, residential four-year institution students. While community college developmental education students are more likely to be ethnic minority, older, commuters, part-timers, coming from lower socioeconomic backgrounds, academically underprepared, with physical or learning disabilities, and international students. The persistence process of these students is different from traditional four-year institution students. Moreover, because each group has its own unique persistence-related concerns, the heterogeneity of community college students makes it more difficult to develop a comprehensive student persistence model. Community colleges seeking effective models have to rely more on "best practices" to develop their own.

EFFECTIVE PRACTICES ON DEVELOPMENTAL EDUCATION

Kezar (2001) stated that comprehensive research studies into the effectiveness of college developmental education intervention programs that would be generally applicable have not been conducted. Most efforts have

focused on relatively small programs. By reviewing the literature published in the past 30 years, Boylan and Saxon (1999) identified a set of effective practices on developmental education. Some of them are discussed in the following.

Tutoring

Tutoring is a frequently used college practice ever since the beginning of developmental education. Tutors are often students at the college who have demonstrated excellence in their academic skills. Tutors can help developmental education students to remediate specific deficits, review daily classroom materials, help with class and study notes, and develop effective study strategies.

Studies suggested that tutoring was an important component of successful programs for underprepared students (Roueche & Snow, 1977; Casazza & Silverman, 1996). Tutoring had a positive effect upon course completion, grades, retention and graduation. However, Boylan and his colleagues (1997) and Maxwell (1997) argued that there are inconclusive research findings into the effectiveness of tutoring.

Looking more closely at tutoring programs, Boylan and his colleagues (1997) found that students in tutoring programs with a tutor training component were more likely to have higher grade point averages and retention rates. This

suggests that adequate training of tutors is a key to the effectiveness of tutoring (Boylan & Saxon, 1999).

Computer Based Approaches

Tutoring is usually based on a one-to-one structure. Despite the effectiveness of tutoring, there are issues with the scheduling coordination of the student and the tutor, a suitable meeting place free from distraction and the communication with other relevant parties. In response, computer based approaches are offered as an alternative. Computer based programs are generally structured in such a way that a student can work at his own pace, on specific academic areas, and receive feedbacks on progress.

With the computer based approaches, more students learn in less time, have slightly higher grades on post-tests, and have improved student attitudes toward learning (Kulik & Kulik, 1991). Roueche and Roueche (1999) found the use of computers with developmental mathematics and writing students were extremely successful and greatly enhanced student success.

However, Boylan and Saxon (1999) stated that the computer based instruction was not as effective if it was used as the primary source of instruction in developmental education. Computer based instruction was more effective when it was combined with regular classroom intrusion. Cartwright (1996) pointed out

that computer based instruction works with students who are moderately or highly motivated for academic work. In addition, the successful use of computer based instruction is highly influenced by the comfort level of the student with computers. Because most of developmental education students at community colleges are over 25 years of age, they are facing an insurmountable barrier with the lack of comfort with technology, coupled with the already low academic skills.

Therefore, it was suggested that computer based approaches should be used only to supplement classroom instruction in developmental education (Boylan & Saxon, 1999).

Mandatory Assessment and Placement

To help incoming students to become more realistic about their college future, many community colleges around the nation began using placement tests to place first time college students into appropriate levels of the curriculum beginning in the late 1970's. These tests aimed to place screens on the open door so that students had to take additional coursework to satisfy preparatory requirements to certain programs of study. In 1985, Florida instituted mandatory placement testing, and other states, such as Georgia, New Jersey, and Texas, soon followed (Cohen & Brawer, 2003).

Roueche and his colleagues found that mandatory assessment and placement of developmental education students was a successful strategy and thus they advocated this effective practice (Roueche & Baker, 1987**;** Roueche & Snow, 1977). However, other researchers found that while mandatory assessment was related with student and program success in developmental education, mandatory placement had a negative impact on the retention of students at two-year institutions (Boylan, Bliss, & Bonham, 1997).

Boylan and Saxon (1999) explained that the inconsistency is probably due to the different student pools brought in by the voluntary and mandatory placements. If the placement is voluntary, a large number of academically weaker and less motivated students avoid taking developmental courses. If the placement is mandatory, a higher percentage of these less likely to be successful students contribute to the negative relationships between mandatory placement and student retention.

Organizational Models: Centralized vs. Mainstreamed

Roueche and his colleagues advocated a separate and centralized program for developmental education (Roueche & Kirk, 1973; Roueche & Roueche, 1999; Roueche & Snow, 1977). In the centralized model, faculty, students and budget are all housed in a separate organizational unit. The unit is dedicated to provide

developmental education courses and support. Students in centralized programs were found to be more successful in developmental education with higher rates of retention than students in mainstreamed programs (Boylan, Bliss, & Bonham, 1997). Roueche and Roueche (1999) further supported the centralized model by stating that the necessary support services are more likely to be present in the centralized model due to the recognition of the underprepared student population. With this centralized unit, it is much easier to coordinate ancillary services, such as tutoring, tutor training, and financial resources for the support of tutoring and computer based instruction and other necessary programs.

A separate unit dedicated to developmental education, however, takes the risk of fostering the marginalization of developmental education students and programs (Perin, 2002). The mainstreamed model, on the other hand, offers developmental education courses through regular academic departments. Developmental education courses are designed to be part of regular college offerings. Students preferred the mainstreamed model because they felt no difference with other students in the large college community (Commander & Smith, 1995; McCusker, 1999). The perception of being part of the large institutional community contributed to retention and student success.

In a close comparison of the two models, Boylan and Saxon (1999) stated that the most important is the coordination of services. This coordination is more easily established in a centralized program. However, a mainstream model with a strong coordination of developmental education services may be just as effective.

Learning Communities

Recognizing the importance of membership in one or more college communities, the concept of learning communities at the college level is introduced as a means of engaging and motivating students. For community college students, the classroom is the only academic community that they are likely to encounter in their lives. Thus, classroom-oriented learning communities are probably the best to apply Tinto's (1975, 1993) persistence model to achieve social and academic integration in college.

Learning communities typically organize a set of courses and groups of students as a cohort (Tinto, 1997). Some even have a residential component so that students in the same cohort live together (Kuh et al., 2005). With the formation of learning communities, students encounter learning as a shared rather than isolated experience, because they are enrolled in several courses linked together by a common theme with the same cohort of students and instructors. The instructors of these courses form a team to insure that the content of courses is related to one another. In this case, it is easier for students to make connections to the content and have a holistic understanding. This set-up creates "a community based on shared intellectual experiences and leavened by social interactions outside of class" (Kuh et al., 2005, p.198).

Research studies have shown that participation in learning communities increased student success (Cutright & Swing, 2005; Taylor et al., 2003; Tinto, 1997). However, community college developmental education students may find it difficult to participate in the learning communities because of the design of the model. Many of these students are working adults attending colleges part-time and during evenings. It is difficult for them to arrange a set of courses together. In addition, evening classes are usually taught by part-time faculty. This may make the learning communities less effective. As a matter of fact, the majority of studies that demonstrated the effectiveness of learning communities are on middle-class and traditional-age students (Taylor et al., 2003).

Researchers and practitioners need to find more effective and convenient way for non-traditional, community college students to participate in learning communities.

Collaborations with High Schools

Other effective practices on developmental education that have been frequently discussed include orientation, advising, counseling, mentoring, program evaluation, college-wide commitment, consistency of academic standards, and development of critical thinking (Bailey & Alfonso, 2005; Boylan & Saxon, 1999). One thing that seems to be always neglected is the collaboration with high schools. One of the main reasons that brought developmental education into existence and the main critics on developmental education is that many students were not well prepared by their high school curriculum.

Research studies have shown that students who were placed into developmental education classes in college usually did not have an adequate preparation from a rigorous college-preparatory curriculum during their high schools (Abraham & Creech, 2000; Grubb, 2001). Phipps (1998) found that in Maryland even "for students who completed college-preparatory courses in high school and immediately attended a community college, 40 percent needed math remediation, one in five required English remediation, and one out of four needed remedial reading" (p.8). Apparently, today's high school curriculum is out of synch with the knowledge and skill level required for students to move on to be successful in college-level work.

A Nation at Risk (1983) made recommendations to make high school curriculum more rigorous to better prepare students for college-level work. Community colleges should seek ways to work more closely with local high schools and set up programs in high schools to better preparing students for college. The efforts may include providing training for high school teachers, providing college students as tutors for high school students, and administering college placement tests to high school seniors to make them aware of where their deficiencies exist (Selingo, 2000).

However, this effort does not address returning students who have been out of high schools for a long time and thus have often forgotten the knowledge and skills they learned in high school, especially those knowledge and skills that have been rarely used, such as in mathematics.

CHARACTERISTICS OF COMMUNITY COLLEGE STUDENTS

Although a wealth of research studies exist on theoretical and practical aspects of student success in higher education, most of them focus on four-year institutions, which are more likely to have a homogenous traditional college-age student population. These researches have not generated concrete insights on the institutional policies and practices that would serve community colleges, because

community colleges have a more heterogeneous student population with diverse backgrounds and needs.

Community colleges embraces "the idea that education is essential to maintaining a democracy and improving society, and that education is key to equalizing opportunity for all citizens" (Roueche, Ely, & Roueche, 2001, p.11). Therefore, community colleges are established under important themes, such as open access, comprehensiveness, community-based, and lifelong learning. The profile of community college students reflected these themes. O'Banion (1994) stated that:

> Whereas students in four-year colleges and universities tend to be homogeneous along a number of dimensions, such as full-time, young, residential, and prepared for college, community college students are as diverse as American society in general and share special characteristics related to the special nature of community colleges. (p.24)

Baker (1998) and O'Banion (1994) characterized community college students as students:

- Of older age;
- With more females than males;
- With a high percentage of part-timers who hold jobs;
- With a high percentage of first-generation college attendees;

- With various attendance patterns (days, evening, weekends, or combinations thereof);
- With various motivational strengths;
- With various long-term goals;
- With limited skills in reading, writing, computing, and thinking;
- With many undecided students.

STUDENT ENGAGEMENT

The last section of this chapter introduces student engagement, a concept that integrates some of the success theories and effective practices introduced in this chapter. Although this concept is also originated from four-year institution students, the underlying principles may well apply to community college students.

Student engagement is described by Hu and Kuh (2002) as "the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes" (p.555). These purposeful activities include the amount of time and effort students spent in studying, interacting with peers and faculty members, and utilizing institutional resources and support (Astin, 1993; Hu & Kuh, 2002). The amount of time and effort that students

engage in educationally meaningful activities is essential to student learning and personal development (Pace, 1980).

Research studies have shown that student engagement in quality educational practices is important to student success of all levels. Pascarella and Terenzini (1991, 2005) found a strong positive impact that student-faculty interactions have on students' academic achievements. Astin (1993) stated that the peer group has the most powerful influence on the undergraduate student's academic and personal development and the student-faculty interaction is the next powerful factor on educational outcomes.

Chickering and Gamson (1987) summarized the key educational practices that have significant positive impacts on student success in their "Seven Principles for Good Practice in Undergraduate Education". These principles include:

- Encourages contacts between students and faculty;
- Develops reciprocity and cooperation among students;
- Uses active learning techniques;
- Gives prompt feedback;
- Emphasizes time on task;
- Communicates high expectations;
- Respects diverse talents and ways of learning. (p.3)

Therefore, it is important for community colleges to focus their precious resources on these key principles to engage students to meaningful educational activities and thus lead to desired learning outcomes. "Emphasizing good educational practice helps focus faculty, staff, students and others on the tasks and activities that are associated with higher yields in terms of desire student outcomes" (Kuh, 2001, p.1).

Specifically designed for community colleges, the Community College Survey of Student Engagement (CCSSE) is developed to help colleges measure the extents to which students are engaged in meaningful educational activities and thus provide information about identifying the institutional practices and student behaviors that enhance student engagement (Marti, 2003; McClenney, 2004). The survey questions are based on the good educational practices developed by many experts. The emphasis on student engagement and good institutional practices shifts the current focus of educational quality away from resources and inputs, but towards student experience and success (Kuh, et al., 2001). The surveys are distributed to randomly selected student population from CCSSE member institutions and the results are open to those institutions.

With appropriate applications focusing on developmental education students, the availability of CCSSE and other models that systematically take into account of current student success theories and "best practices" will help community colleges identify effective institutional practice on those students' success.

CONCLUSION

Developmental education has been a vital component of higher education throughout history. Because of developmental education, people with diverse preparation levels have enjoyed access to higher education. Today's knowledge-based global economy requests workforce to have at least some postsecondary education (Drucker, 1999). Under the current demographic, economic, and social situation of our society, there are a lot of and will be more underprepared students coming into institutions of higher education. Thus, developmental education was, is and will be a significant part of the mission of community colleges for the foreseeable future (McCabe & Day, 1998). Community colleges need to identify effective developmental education policies and practices and implement them so as to keep the promise of providing quality higher education for their students.

Unfortunately, very few research studies on program effectiveness in higher education focus on developmental education students in community colleges. Community colleges need to critically search the best information that they can find. Instead of looking for "the answer" to the best theory and practice, community colleges must move forward based on the best information available and "monitor the progresses as thoroughly and rigorously as possible" (Bailey & Alfonso, 2005, p.4). The pursuit of student success is a constant and continuous process in a constantly changing environment.

CHAPTER THREE: METHODOLOGY

INTRODUCTION

In this study, the researcher was guided under the ontology of positivism (Crotty, 2003). The researcher believed that knowledge can be found in the object. Thus, the task of the researcher was to discover the knowledge and make predictions based on the knowledge. To reach this goal, a quantitative methodology was employed to examine the relationships among student characteristics, student engagement factors and student success indicators. Particularly, this study examined:

1) Whether certain student characteristics can be used to predict student success;
2) Whether the variability caused by student characteristics with regard to student success can be influenced by institutional practices on student engagement.

THEORETICAL FRAMEWORK

This study was based on the theoretical framework that students come to community colleges with different background and behavioral patterns, which have significant impact on student success in college. Community colleges can alter this impact by designing institutional policies and practices to influence students' experiences in college. This framework can be visualized in the following (Arrow indicates significant impact):

Flow Chart Demonstration of Theoretical Framework

Student Characteristics

↓

(School Experience ------ Influenced by Institutional Interventions)

↓

Developmental Education Student Success

This theoretical framework considers the heterogeneous characteristics associated with community college students and focuses on student experiences that can be influenced by institutional policies and practices. Thus, it is a more pertinent and useful model for community colleges, especially developmental education students, than the models introduced in the Chapter Two.

DATA SELECTION

The state of Florida understands well that it is vital to have a well-educated workforce for its economic future. Facing the embarrassment as having the fourth largest population in the nation (United Stated Census Bureau, 2001) but ranked 26th in the percentage of residents with a Bachelor's degree (Mortenson, 2000), Florida community colleges and universities are working hard to prepare the Floridians well situated for the need of the knowledge-based economy.

The state of Florida passed legislation that mandates no universities, except Florida A&M University, can offer developmental education (Florida Department of Education, 2005). This mandate makes Florida community colleges the primary providers of developmental education. Universities in Florida provide developmental education to their students in need through articulation agreements with their local community colleges.

In 1985, Florida community college system became the first to implement mandatory placement testing and course enrollment restrictions (Florida Department of Education, 2005). This requirement states that incoming students present ACT, SAT, or Computerized Placement Test (CPT) scores. These placement examinations assess student skills in three areas: mathematics, reading

and writing. Students are placed in college-level courses or appropriate developmental courses according to their examination scores. Depending upon their placement test scores, students may be placed into one, two or all three areas mentioned above. Each area usually requires one or more developmental courses to satisfy the requirements.

In addition to the same placement requirement, Florida community colleges have developed a set of common prerequisite courses, a prescribed course of study to guide students in choosing appropriate coursework that will prepare students for college-level work.

In 2003, Florida community college system joined Community College Survey of Student Engagement (CCSSE) as a system to administer the survey. In spring 2004, Florida community colleges took the CCSSE survey the first time as a statewide effort. This study used a dataset based on spring 2004 Florida statewide CCSSE survey information matched by the 2002-2004 Florida State Student Database information (Greene, 2004).

STUDENT CHARACTERISTICS

As described in Chapter Two, community college students are typically students who are:

- Enrolling in college on a part-time base and with various attendance patterns;
- First-generation college students with little support;
- More likely to be minority students and foreign-born students;
- More women than men, especially returning women;
- Older than their four-year institution counterparts and with an average age of 29;
- Poor, financially challenged and thus economically driven;
- Underprepared for college-level work;
- With no known pathways to success;
- With poor self-image and unreachable or unknown goals;
- Working 30 hours or more per week.

(Baker, 1998; O'Banion, 1994; Roueche, Milliron, & Roueche, 2003)

According to these descriptions and routine institutional data collection practices, student characteristics in this study included the variables of age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, and with dependent other than spouse (Florida Community College System, 2004).

The student characteristics were operationally defined as follows:

Age refers to the legal age of the student as reported by the student.

Ethnicity refers to ethnic origin of the student as reported by the student. For the purpose of this study, it is classified as (1) American Indian or other Native American, (2) Asian, Asian American or Pacific Islander, (3) Black or African American, Non-Hispanic, (4) White, Non-Hispanic, (5) Hispanic, Latino, Spanish, and (6) Other.

Gender refers to the gender of the student as reported by the student. For the purpose of this study, it is classified as (0) male, or (1) female.

Financial aid need indicates whether the student needs financial aid as determined by the Financial Aid Office. For the purpose of this study, it is classified as (0) does not, or (1) needs financial aid.

First generation college student indicates whether the student is a first generation college student in his or her family as reported by the student. For the purpose of this study, it is classified as (0) is not, or (1) is a first generation college student.

Full-time work indicates whether the student works full-time while enrolling in the community college as reported by the student. For the purpose of this study, it is classified as (0) does not, or (1) works full-time.

High school dropout indicates whether the student dropped out of high school and did not complete a high school diploma before coming to the community college as reported by the student. For the purpose of this study, it is

classified as (0) finished high school, or (1) dropped out of high school and did not complete a diploma before coming to the community college.

Part-time college enrollment indicates whether the student enrolls at a part-time or full-time status as determined by the course load. For the purpose of this study, it is classified as (0) full-time, or (1) part-time.

Single parent indicates whether the student is a single parent during college enrollment as reported by the student. For the purpose of this study, it is classified as (0) is not, or (1) is a single parent.

With dependent other than spouse indicates whether the student has one or more dependents other than spouse during college enrollment as reported by the student. For the purpose of this study, it is classified as (0) does not have, or (1) has one or more dependents other than spouse.

STUDENT ENGAGEMENT

Student engagement is measured by the Community College Survey of Student Engagement (CCSSE) survey instrument: the Community College Student Report (CCSR). The CCSR is administered to students through a random selection process. It contains thirty-eight individual response items. These items are represented in a nine factor model. The nine factors are faculty interactions,

class assignments, exposure to diversity, collaborative learning, information technology, mental activities, school opinions, student services, academic preparation. The internal validity and reliability of the CCSR are established through an analysis of its psychometric properties (Marti, 2003; Greene, 2004).

This study used the above nine factors to operationalize student engagement. Each factor is based on several survey response items and rescaled to be between 0 and 1. Following is a description of the response items included in each factor:

Faculty Interactions contains the following six response items associated with the survey question *"In your experience at this college, during the current school year, about how often have you done each of the following?*

- Discussed grades or assignments with an instructor
- Talked about career plans with an instructor or advisor
- Discussed ideas from your readings or classes with instructors outside of class
- Worked with instructors on activities other than coursework
- Received prompt feedback (written or oral) from instructors on your performance
- Asked questions in class or contributed to class discussions

Class Assignments contains the following three response items associated with the survey question "*In your experience at this college, during the current school year, about how often have you done each of the following?*

- Prepared two or more drafts of a paper or assignment before turning it in
- Worked on a paper or project that required integrating ideas or information from various sources
- Made a class presentation

Exposure to Diversity contains the following three response items associated with the survey question "*In your experience at this college, during the current school year, about how often have you done each of the following?*

- Had serious conversations with students of a different race or ethnicity other than your own
- Had serious conversations with students who differ from you in terms of their religious beliefs, political opinions, or personal values
- Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)

Collaborative Learning contains the following four response items associated with the survey question "*In your experience at this college, during the current school year, about how often have you done each of the following?*

- Worked with other students on projects during class
- Worked with classmates outside of class to prepare class assignments
- Participated in a community-based project as a part of a regular course
- Tutored or taught other students (paid or voluntary)

Information Technology contains the following two response items associated with the survey question "*In your experiences at this college during the current school year, about how often have you done each of the following?"*

- Used the Internet or instant messaging to work on an assignment
- Used email to communicate with an instructor

Mental Activities contains the following five response items associated with the survey question "*During the current school year, how much has your coursework at this college emphasized …?"*

- Analyzing the basic elements of an idea, experience, or theory
- Synthesizing and organizing ideas, information, or experiences in new ways
- Making judgments about the value or soundness of information, arguments, or methods
- Applying theories or concepts to practical problems or in new situations

- Using information you have read or heard to perform a new skill

and one response item associated with the survey question *"In your experiences at this college during the current school year, about how often have you …?"*

- Worked harder than you thought you could to meet an instructor's standards or expectations

School Opinions contains the following six response items associated with the survey question *"How much does this college emphasize each of the following?"*

- Providing the support you need to help you succeed at this college
- Encouraging contact among students from different economic, social, and racial or ethnic backgrounds
- Helping you cope with your nonacademic responsibilities (work, family, etc.)
- Providing the support you need to thrive socially
- Providing the financial support you need to afford your education
- Encouraging you to spend significant amounts of time studying

*Student Service*s contains the following five response items associated with the survey question *"How often do you use the following services?"*

- Academic advising/planning
- Career counseling
- Peer or other tutoring

- Skill labs (writing, mathematics, etc.)
- Computer lab

Academic Preparation contains the following four response items associated with the survey questions "*During the current school year, about ...*"

- How many assigned textbooks, manuals, books, or book-length packs of course readings did you read?
- How many papers or reports of any length did you write?

and the survey question "*To what extent …*"

- Have your examinations challenged you to do your best work at this college?

STUDENT SUCCESS

Student success was primarily measure by *Grade Point Average* (*GPA*). GPA is defined as:

GPA = ∑ [(Course Grades) * (Credit Hours Earned)] / ∑ (Credit Hours Earned)

Note:

The letter course grade to number course grade conversion:

A = 4; B = 3; C = 2; D = 1; F = 0.

In addition, *course completion* was used as a separate measure for students who did not complete their attempted credits due to various reasons.

Course completion is defined as:

Course Completion = ∑ (Credit Hours Successfully Completed) / ∑ (Credit Hours Attempted)

Note:

Successful completion of a course is measured by completing a course with a grade of a "C" or higher for courses with letter grades, or with a "Pass" for courses with completion grades.

RESEARCH TOOL

Computer programs and software for analyzing quantitative data provides an easy access for the applications of complicated statistical techniques (Cramer, 2003).

This study used the Statistical Package for Social Sciences (SPSS) as the primary research tool for doing quantitative analysis:

SPSS is a software package used for conducting statistical analyses, manipulating data, and generating tables and graphs that summarize data.

> Statistical analyses range from basic descriptive statistics, such as averages and frequencies, to advanced inferential statistics, such as regression models, analysis of variance, and factor analysis. SPSS also contains several tools for manipulating data, including functions for recoding data and computing new variables as well as merging and aggregating datasets. SPSS also has a number of ways to summarize and display data in the form of tables and graphs. (Information Technology Services, 2001, p.2).

SPSS is easy-to-use and does not require elaborate codes to conduct complex analyses. Researchers do not need to spend hours getting acquainted with the statistical analysis procedures and teach assistants how to conduct analyses, write, examine and correct codes (Green & Salkind, 2005). Thus, SPSS is the most widely-used statistical analysis package in social and behavioral science research (Cramer, 2003). It is also the primary statistical package used in research courses in the College of Education at the University of Texas at Austin, such as the core research course Quantitative Research Design & Analysis instructed by Dr. Norvell Northcutt.

RESEARCH PROCEDURE

The goal of this study was to examine the relationships between:

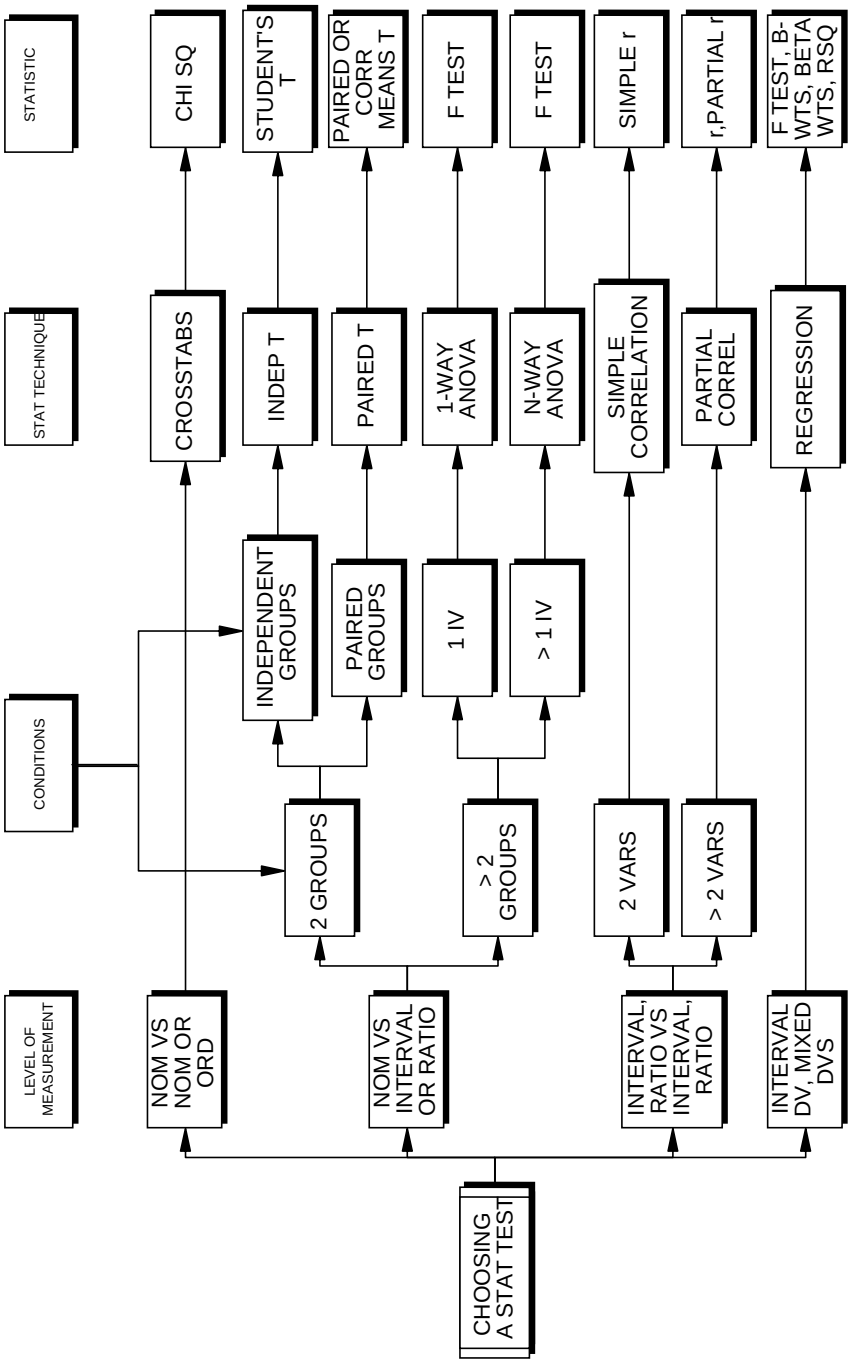
1) Student characteristics and student success indicators;

2) Student characteristics and student engagement factors;

3) Student engagement factors and student success indicators.

According to the decision matrix (Figure 1) created by Dr. Norvell Northcutt at the University of Texas at Austin, the best approach to examine the above three relationships was multiple regression analysis. Multiple regression is a statistical test used to predict the variance of an interval dependent variable based on a set of mixed types of independent variables (predictors) (Cramer, 2003). Multiple regression can determine what proportion of the variance of the dependent variable is associated with a set of independent variables through a significance test of the coefficient of multiple determination (R^2). It can also determine the relative predictive importance of the independent variables though assessing the significance of partial regression coefficients (Garson, 2006).

Figure 1. Decision matrix for statistical study



SUMMARY

This study was to analyze a dataset based on spring 2004 Florida statewide CCSSE student survey information matched by the 2002-2004 Florida State Student Data Base information. In the analysis, this study employed a quantitative methodology to examine the relationships among student characteristics, student engagement factors and student success indicators. Specifically, this study used the multiple regression model of the SPSS package to examine the relationships between and among student characteristics, student engagement factors, and student success indicators. The goal of this study was to examine whether certain student characteristics can be used to predict student success and whether the variability caused by student characteristics with regard to student success can be influenced by institutional practices on student engagement.

CHAPTER FOUR: FINDINGS

INTRODUCTION

To keep the promise of providing successful higher education experiences to all students, community colleges are seeking models based upon empirical studies focused on developmental education students to assist in identifying and designing effective practices to enhance the success of developmental education students. By examining the relationships between and among student characteristics, student engagement and student success, this study developed a predictive model focused on developmental education students with specifically identified academic needs.

The purpose of this chapter is to present the data analysis of this study according to research questions stated in Chapter One:

- Are there significant relationships between student characteristics and student success?
- Which student characteristics can be used as predictors of student success?
- Are there significant relationships between student characteristics and student engagement?

- Are there significant relationships between student engagement and student success?
- Is increasing student engagement an effective institutional practice to close the gap between student characteristics and student success?

DESCRIPTION OF DEMOGRAPHIC DATA

Florida Community College Representation

This study included 1800 Florida community college students who had participated in spring 2004 CCSSE survey and who had been placed into at least one developmental education course from year 2002 to 2004. All 28 community colleges in the state of Florida were represented in this sample (Table 1-2).

Table 1. Florida community college representation (Part 1)

Community College Name	Number of Students	Percent
Broward Community College	1	.1
Broward Community College	86	4.8
Central Florida Community College	131	7.3
Chipola College	22	1.2
Daytona Beach Community College	54	3.0
Edison Community College	54	3.0
Florida Community College at Jacksonville	230	12.8
Florida Keys Community College	22	1.2
Gulf Coast Community College	109	6.1
Hillsborough Community College	16	.9
Indian River Community College	81	4.5
Lake City Community College	3	.2
Lake-Sumter Community College	42	2.3
Manatee Community College	3	.2
Miami Dade College	239	13.3
North Florida Community College	1	.1
Okaloosa-Walton Community College	49	2.7
Palm Beach Community College	95	5.3

Table 2. Florida community college representation (Part 2)

Community College Name	Number of Students	Percent
Pasco-Hernando Community College	58	3.2
Pensacola Junior College	83	4.6
Polk Community College	152	8.4
St. Petersburg College	54	3.0
Santa Fe Community College	7	.4
Seminole Community College	28	1.6
St. Johns River Community College	9	.5
South Florida Community College	53	2.9
Tallahassee Community College	89	4.9
Valencia Community College	29	1.6
Total	1800	100.0

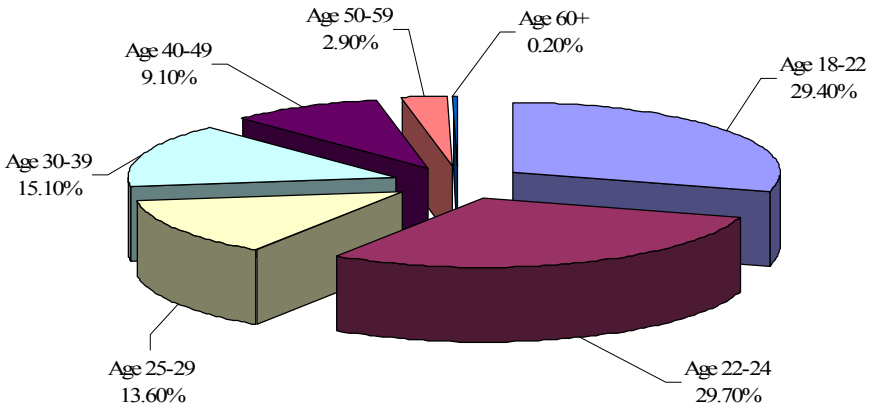
Student Age Distribution

As described in Chapter One, community colleges enroll more students of non-traditional college age (Traditional college age refers to age 18 to 24). Student ages in this sample population ranged from 18 to 72 (Table 3). Figure 2 presents a pie chart of student age distribution to help visualize the distribution.

Table 3. Student age distribution

Age	Number of Students	Percent
18-22	530	29.4
22-24	535	29.7
25-29	244	13.6
30-39	271	15.1
40-49	164	9.1
50-59	52	2.9
60+	4	.2
Total	1800	100.0

Figure 2. Student age distribution



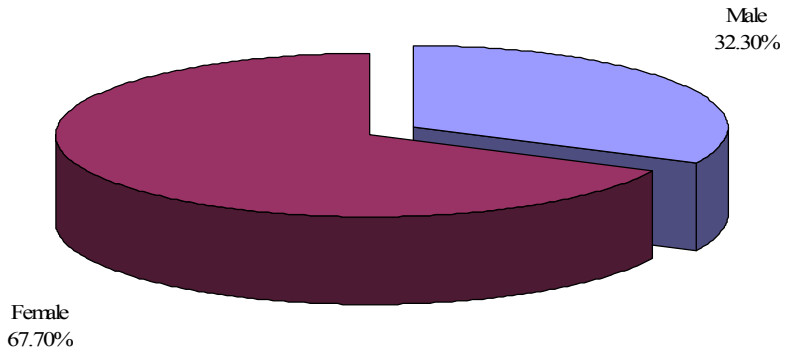
Student Gender Distribution

Community colleges today enroll more female students than male students. As expected, female students comprised twice as many as male students in this sample (Table 4, Figure 3).

Table 4. Student gender distribution

Gender	Number of Students	Percent
Male	581	32.3
Female	1219	67.7
Total	1800	100.0

Figure 3. Student gender distribution



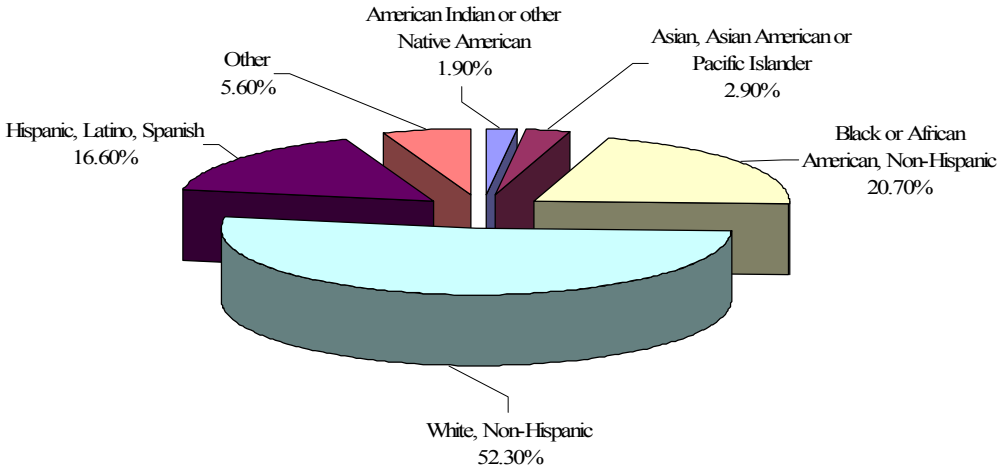
Ethnicity Distribution

All ethnicity groups were represented in this sample, with 1) White, non-Hispanic (over half), 2) Black or African American, non-Hispanic (two-fifths), and 3) Hispanic, Latino, Spanish (one-sixth) being the three biggest groups (Table 5, Figure 4).

Table 5. Student ethnicity distribution

Ethnicity	Number of Students	Percent
American Indian or other Native American	35	1.9
Asian, Asian American or Pacific Islander	52	2.9
Black or African American, Non-Hispanic	372	20.7
White, Non-Hispanic	942	52.3
Hispanic, Latino, Spanish	298	16.6
Other	101	5.6
Total	1800	100.0

Figure 4. Student ethnicity distribution



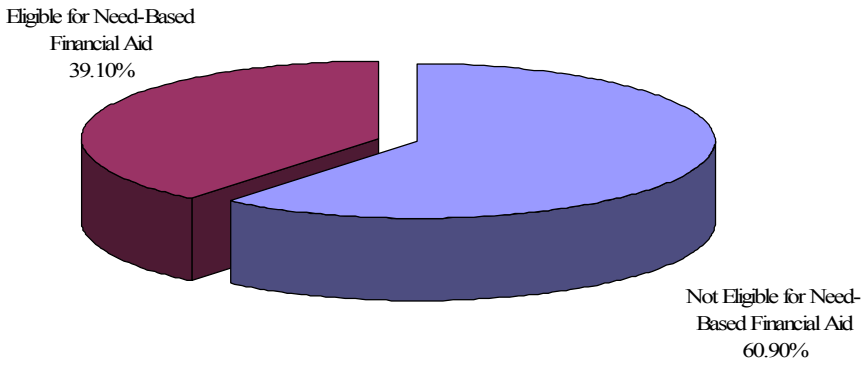
Financial Aid Need Percentage

Almost two-fifths of students in the sample were eligible for need based financial aid in this sample (Table 6, Figure 5).

Table 6. Percentage of students eligible for need based financial aid

Financial Aid Need	Number of Students	Percent
Not Eligible for Need-Based Financial Aid	1096	60.9
Eligible for Need-Based Financial Aid	703	39.1
Total	1799	99.9

Figure 5. Percentage of students eligible for need based financial aid



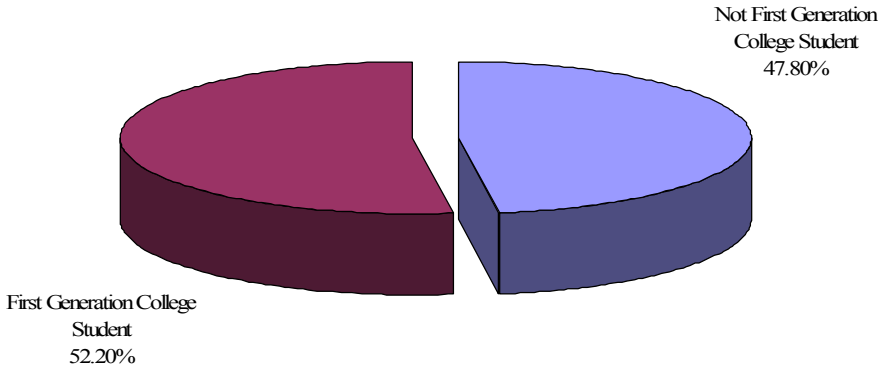
First Generation College Student Percentage

Over half of students in this sample were first generation college students (Table 7, Figure 6).

Table 7. Percentage of first generation college students

First Generation College Student	Number of Students	Percent
No	861	47.8
Yes	939	52.2
Total	1800	100.0

Figure 6. Percentage of first generation college students



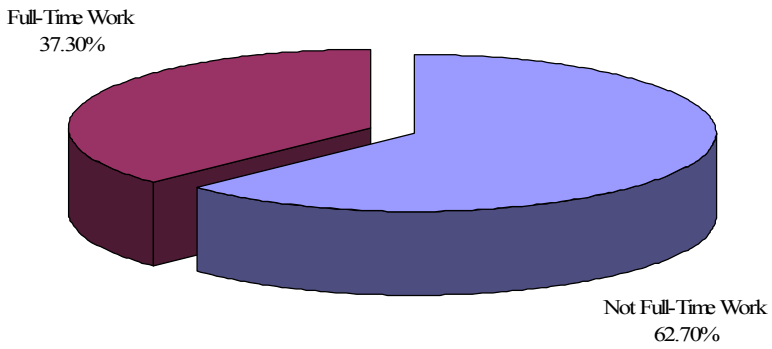
Full-Time Work Percentage

Almost two-fifths of students in this sample worked full-time while enrolling in college classes (Table 8, Figure 7).

Table 8. Percentage of students working full-time during college enrollment

Full-Time Work Student	Number of Students	Percent
No	1129	62.7
Yes	671	37.3
Total	1800	100.0

Figure 7. Percentage of students working full-time during college enrollment



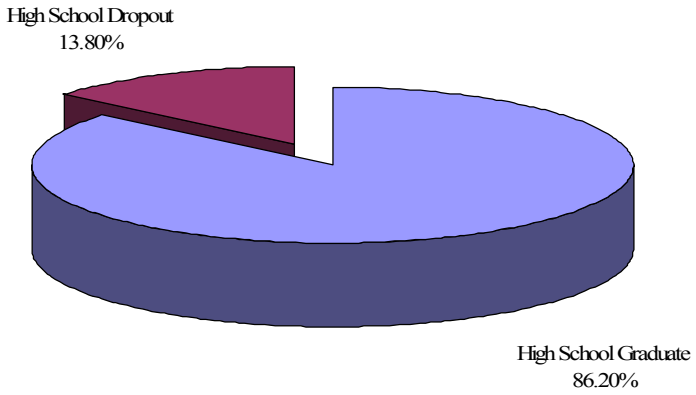
High School Dropout Percentage

Almost 15% of students in this sample never finished high school before they enrolled in college classes (Table 9, Figure 8).

Table 9. Percentage of high school dropout students

High School Dropout Student	Number of Students	Percent
No	1552	86.2
Yes	248	13.8
Total	1800	100.0

Figure 8. Percentage of high school dropout students



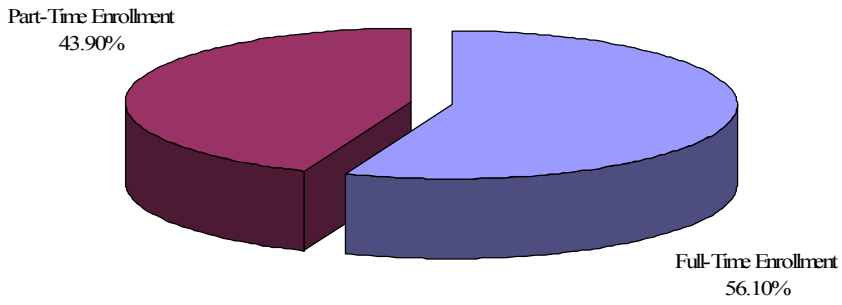
Part-Time Enrollment Percentage

Overall two-fifths of students in this sample enrolled part-time in college classes (Table 10, Figure 9).

Table 10. Percentage of students enrolled pat-time in college classes

Part-Time Enrollment Student	Number of Students	Percent
No	1009	56.1
Yes	791	43.9
Total	1800	100.0

Figure 9. Percentage of students enrolled pat-time in college classes



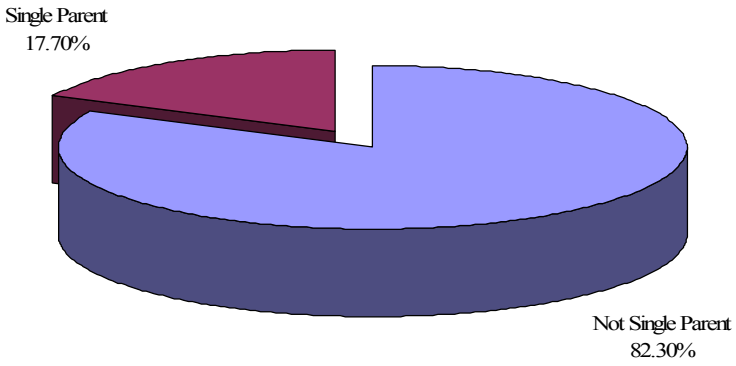
Single Parent Percentage

Almost one-fifth of students in this sample were single parents during their enrollment in colleges (Table 11, Figure 10). .

Table 11. Percentage of students who were single parents

Single Parent Student	Number of Students	Percent
No	1450	82.3
Yes	318	17.7
Total	1800	100.0

Figure 10. Percentage of students who were single parents



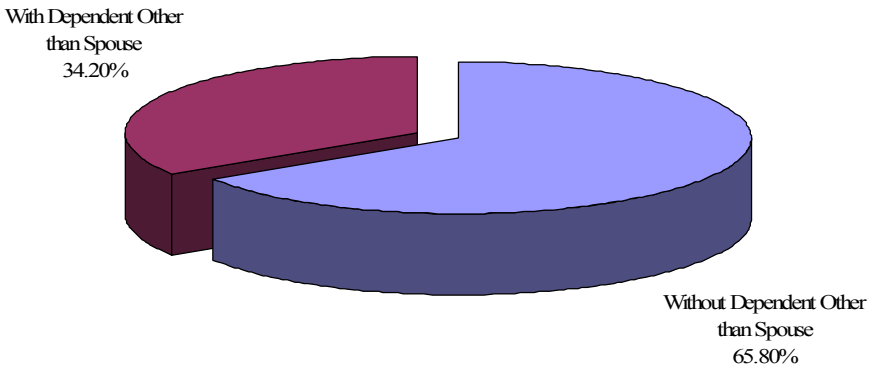
With Dependent Other than Spouse Percentage

Over a third of students in this sample had dependent other than spouse during their enrollment in colleges (Table 12, Figure 11).

Table 12. Percentage of students with dependent other than spouse

Student with dependent other than spouse	Number of Students	Percent
No	1185	65.8
Yes	615	34.2
Total	1800	98.2

Figure 11. Percentage of students with dependent other than spouse



RELATIONSHIPS BETWEEN STUDENT CHARACTERISTICS AND STUDENT SUCCESS

Student Characteristics and GPA

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and student cumulative GPA between school year 2002 to 2004.

The overall regression model was significant at below 0.01 level ((Table 13), indicating that student characteristics can be predictors of student GPA.

Of the ten student characteristics, five of them contributed significantly (at below 0.05 level, Table 14) to the model. They were student age, ethnicity, first generation college student, single parent, and with dependent other than spouse.

Table 13. Regression model summary of student characteristics vs. student GPA

Model	R	R Square	F	Significance
Student Characteristics vs. Student GPA	.318	.101	12.228	.000

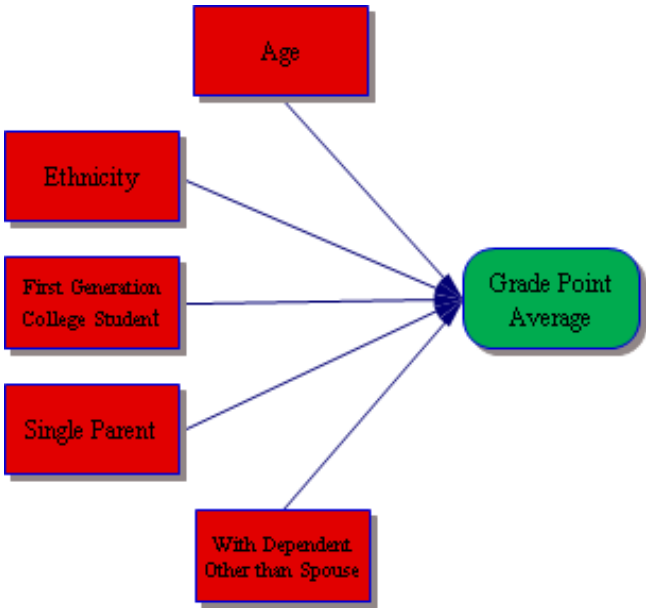
Table 14. Relationships between student characteristics and student GPA

Student Characteristics vs. GPA	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	2.094	.134		15.673	.000*
Age	.021	.003	.269	7.927	.000*
Ethnicity	.055	.025	.064	2.201	.028*
Gender	.020	.048	.013	.422	.673
Financial Aid Need	-.039	.047	-.025	-.823	.411
First Generation College Student	-.130	.058	-.067	-2.253	.024*
Full-Time Work	-.023	.047	-.015	-.496	.620
High School Dropout	.042	.065	.019	.651	.515
Part-Time Enrollment	-.082	.047	-.054	-1.748	.081
Single Parent	-.202	.073	-.105	-2.783	.005*
Dependent Other than Spouse	.179	.066	.116	2.714	.007*

* Significant impact at below 0.05 level.

Figure 12. Relationships between student characteristics and GPA

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and GPA are presented in Figure 12.

Student Characteristics and Course Completion Rate

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single

parent, with dependent other than spouse and student cumulative course completion rate between school year 2002 to 2004.

The overall regression model was significant at below 0.01 level (Table 15), indicating that student characteristics can be predictors of student course completion rate.

Of the ten student characteristics, seven of them contributed significantly (at below 0.05 level, Table 16) to the model. They were student age, ethnicity, first generation college student, high school dropout, part-time enrollment, single parent, and with dependent other than spouse.

Table 15. Regression model summary of student characteristics vs. student cumulative course completion rate

Model	R	R Square	F	Significance
Student Characteristics vs. Course Completion	.236	.056	6.471	.000

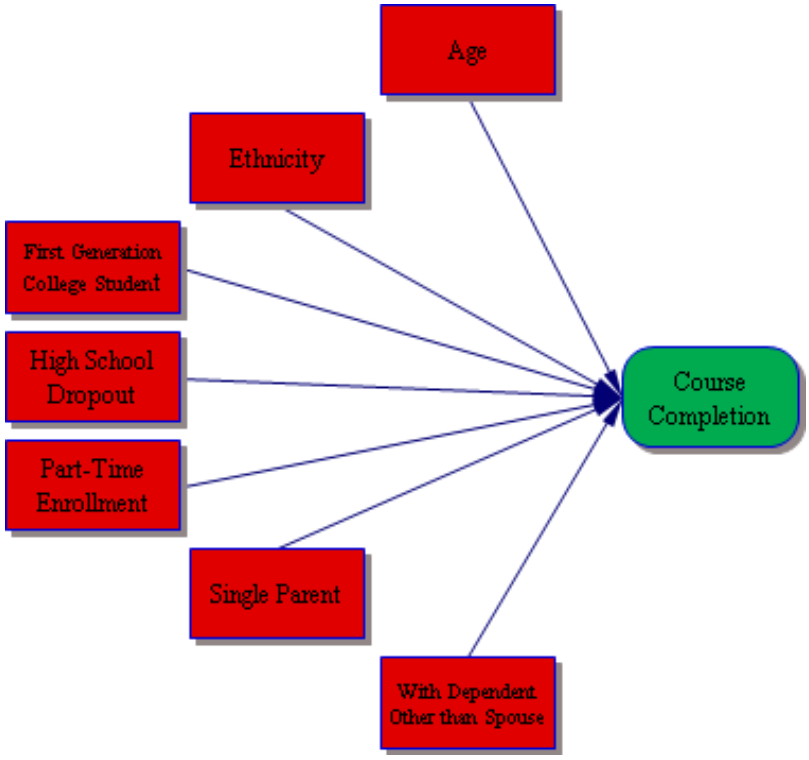
Table 16. Relationships between student characteristics and student cumulative course completion rate

Student Characteristics vs. Course Completion	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.667	.040		16.636	.000*
Age	.004	.001	.170	4.917	.000*
Ethnicity	.015	.007	.061	2.043	.041*
Gender	-.001	.014	-.002	-.050	.960
Financial Aid Need	.003	.014	.007	.229	.819
First Generation College Student	-.041	.017	-.073	-2.394	.017*
Full-Time Work	-.022	.014	-.049	-1.603	.109
High School Dropout	-.045	.019	-.071	-2.346	.019*
Part-Time Enrollment	-.032	.014	-.072	-2.272	.023*
Single Parent	-.068	.022	-.121	-3.122	.002*
Dependent Other than Spouse	.044	.020	.097	2.231	.026*

* Significant impact at below 0.05 level.

Figure 13. Relationships between student characteristics and course completion rate

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and course completion are presented in Figure 13.

Student Characteristics and Student Success

According to the above two regression models, certain student characteristics have significant impact on student success (Table 17). The directions of impact are consistent. Student age, ethnicity, and with dependent other than spouse always have significant positive impact. First generation college student, high school dropout, part-time enrollment, and single parent always have significant negative impact. The seemingly unexpected results about some directions of impact will be further discussed in Chapter Five.

Table 17. Relationships between student characteristics and student success (+: Positive significant impact at below 0.05 level; −: Negative significant impact at below 0.05 level.)

Student Characteristics vs. Student Success	Course completion	Grade Point Average
Age	+	+
Ethnicity	+	+
Gender		
Financial aid need		
First generation college student	−	−
Full-time work		
High school dropout	−	
Part-time enrollment	−	
Single parent	−	−
With dependent other than spouse	+	+

RELATIONSHIPS BETWEEN STUDENT CHARACTERISTICS AND STUDENT ENGAGEMENT

Student Characteristics and Faculty Interactions Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and Community College Student Report (CCSR) faculty interactions factor.

The overall regression model was significant at below 0.05 level (Table 18), indicating that student characteristics can be predictors of faculty interactions factor.

Of the ten student characteristics, two of them contributed significantly (at below 0.05 level, Table 19) to the model. They were student age, and part-time enrollment.

Table 18. Regression model summary of student characteristics vs. faculty interactions factor

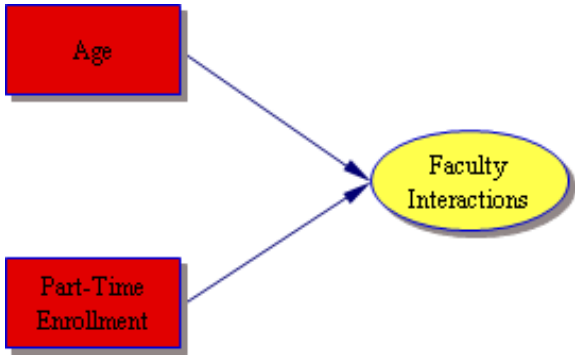
Model	R	R Square	F	Significance
Student Characteristics vs. Faculty Intonations	.165	.027	3.055	.001

Table 19. Relationships between student characteristics and faculty interactions factor

Student Characteristics vs. Faculty Interactions	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.382	.034		11.090	.000*
Age	.002	.001	.082	2.322	.020*
Ethnicity	.002	.006	.010	.315	.753
Gender	.001	.012	.003	.101	.919
Financial Aid Need	.019	.012	.050	1.567	.117
First Generation College Student	-.018	.015	-.038	-1.218	.224
Full-Time Work	-.010	.012	-.027	-.851	.395
High School Dropout	.017	.017	.032	1.033	.302
Part-Time Enrollment	-.035	.012	-.093	-2.877	.004*
Single Parent	.019	.019	.040	1.018	.309
Dependent Other than Spouse	.007	.017	.019	.440	.660

* Significant impact at below 0.05 level.

Figure 14. Relationships between student characteristics and faculty interactions (Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and faculty interactions are presented in Figure 14.

Student Characteristics and Class Assignments Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR class assignments factor.

The overall regression model was significant at below 0.01 level (Table 20), indicating that student characteristics can be predictors of class assignments factor.

Of the ten student characteristics, two of them contributed significantly (at below 0.05 level, Table 21) to the model. They were student financial aid need, and part-time enrollment.

Table 20. Regression model summary of student characteristics vs. class assignments factor

Model	R	R Square	F	Significance
Student Characteristics vs. Class Assignments	.185	.034	3.896	.000

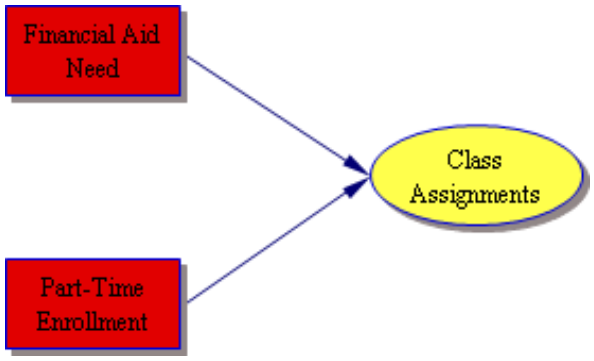
Table 21. Relationships between student characteristics and class assignments factor

Student Characteristics vs. Class Assignments	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.556	.045		12.260	.000*
Age	.000	.001	.013	.371	.711
Ethnicity	-.008	.008	-.030	-.996	.320
Gender	.016	.016	.030	.987	.324
Financial Aid Need	.034	.016	.068	2.156	.031*
First Generation College Student	-.007	.020	-.012	-.381	.704
Full-Time Work	.001	.016	.003	.095	.925
High School Dropout	.018	.022	.025	.809	.419
Part-Time Enrollment	-.069	.016	-.139	-4.337	.000*
Single Parent	.036	.025	.057	1.459	.145
Dependent Other than Spouse	-.009	.022	-.018	-.419	.675

* Significant impact at below 0.05 level.

Figure 15. Relationships between student characteristics and class assignments

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and class assignments are presented in Figure 15.

Student Characteristics and Exposure to Diversity Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR exposure to diversity factor.

The overall regression model was significant at below 0.01 level (Table 22), indicating that student characteristics can be predictors of exposure to diversity factor.

Of the ten student characteristics, two of them contributed significantly (at below 0.05 level, Table 23) to the model. They were student ethnicity, and high school dropout.

Table 22. Regression model summary of student characteristics vs. exposure to diversity factor

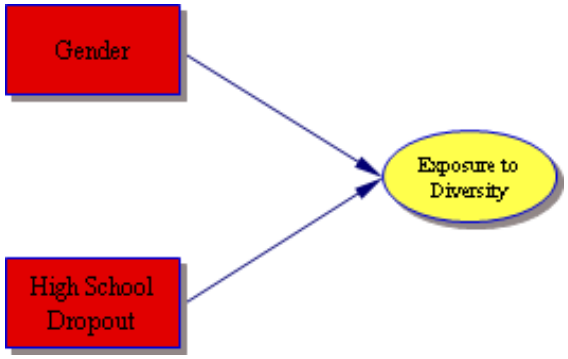
Model	R	R Square	F	Significance
Student Characteristics vs. Exposure to Diversity	.186	.035	3.938	.000

Table 23. Relationships between student characteristics and exposure to diversity factor

Student Characteristics vs. Exposure to Diversity	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.543	.052		10.506	.000*
Age	-.001	.001	-.021	-.607	.544
Ethnicity	-.007	.010	-.022	-.735	.462
Gender	.045	.018	.075	2.443	.015*
Financial Aid Need	.029	.018	.050	1.586	.113
First Generation College Student	-.023	.022	-.032	-1.040	.299
Full-Time Work	-.014	.018	-.025	-.804	.421
High School Dropout	.098	.025	.120	3.924	.000*
Part-Time Enrollment	-.027	.018	-.048	-1.500	.134
Single Parent	.035	.028	.048	1.236	.217
Dependent Other than Spouse	-.001	.026	-.002	-.048	.962

* Significant impact at below 0.05 level.

Figure 16. Relationships between student characteristics and exposure to diversity (Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and exposure to diversity are presented in Figure 16.

Student Characteristics and Collaborative Learning Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR collaborative learning factor.

The overall regression model was significant at below 0.05 level (Table 24), indicating that student characteristics can be predictors of collaborative learning factor.

Of the ten student characteristics, two of them contributed significantly (at below 0.05 level, Table 25) to the model. They were student financial aid need, and part-time enrollment.

Table 24. Regression model summary of student characteristics vs. collaborative learning factor

Model	R	R Square	F	Significance
Student Characteristics vs. Collaborative Learning	.142	.020	2.247	.014

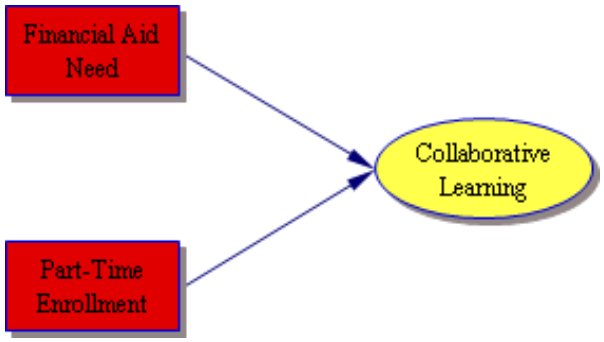
Table 25. Relationships between student characteristics and collaborative learning factor

Student Characteristics vs. Collaborative Learning	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.294	.033		8.783	.000*
Age	.000	.001	-.007	-.185	.854
Ethnicity	-.005	.006	-.022	-.723	.470
Gender	.002	.012	.004	.145	.885
Financial Aid Need	.025	.012	.067	2.101	.036*
First Generation College Student	-.002	.014	-.004	-.130	.896
Full-Time Work	-.012	.012	-.031	-1.000	.317
High School Dropout	.001	.016	.002	.049	.961
Part-Time Enrollment	-.030	.012	-.082	-2.540	.011*
Single Parent	.026	.018	.057	1.452	.147
Dependent Other than Spouse	-.020	.017	-.053	-1.201	.230

* Significant impact at below 0.05 level.

Figure 17. Relationships between student characteristics and collaborative learning

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and collaborative learning are presented in Figure 17.

Student Characteristics and Information Technology Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR information technology factor.

The overall regression model was significant at below 0.01 level (Table 26), indicating that student characteristics can be predictors of information technology factor.

Of the ten student characteristics, three of them contributed significantly (at below 0.05 level, Table 27) to the model. They were student gender, full-time work, and part-time enrollment.

Table 26. Regression model summary of student characteristics vs. information technology factor

Model	R	R Square	F	Significance
Student Characteristics vs. Information Technology	.212	.045	5.133	.000

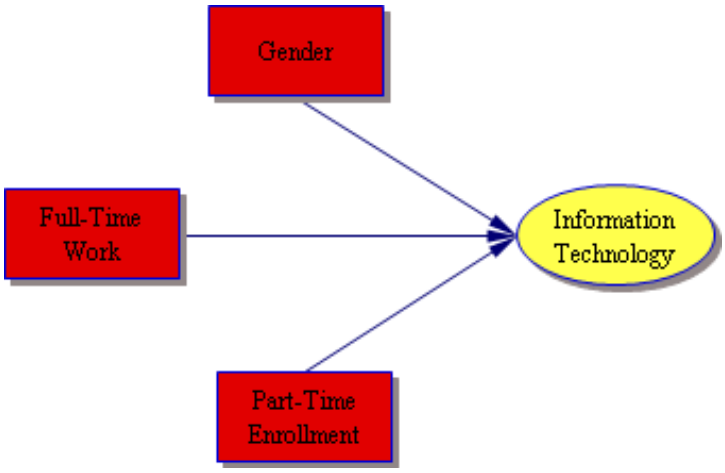
Table 27. Relationships between student characteristics and information technology factor

Student Characteristics vs. Information Technology	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.563	.053		10.699	.000*
Age	-.002	.001	-.065	-1.875	.061
Ethnicity	.006	.010	.018	.610	.542
Gender	.064	.019	.104	3.413	.001*
Financial Aid Need	-.012	.019	-.020	-.640	.522
First Generation College Student	-.007	.023	-.009	-.310	.756
Full-Time Work	-.053	.018	-.090	-2.912	.004*
High School Dropout	.022	.025	.026	.849	.396
Part-Time Enrollment	-.070	.018	-.120	-3.765	.000*
Single Parent	-.040	.029	-.055	-1.403	.161
Dependent Other than Spouse	.046	.026	.077	1.758	.079

* Significant impact at below 0.05 level.

Figure 18. Relationships between student characteristics and information technology

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and information technology are presented in Figure 18.

Student Characteristics and Mental Activities Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR mental activities factor.

The overall regression model was significant at below 0.05 level (Table 28), indicating that student characteristics can be predictors of mental activities factor.

Of the ten student characteristics, one of them contributed significantly (at below 0.05 level, Table 29) to the model. It was high school dropout.

Table 28. Regression model summary of student characteristics vs. mental activities factor

Model	R	R Square	F	Significance
Student Characteristics vs. Mental Activities	.130	.017	1.892	.043

Table 29. Relationships between student characteristics and mental activities factor

Student Characteristics vs. Mental Activities	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.553	.041		13.573	.000*
Age	.001	.001	.033	.945	.345
Ethnicity	-.003	.008	-.011	-.352	.725
Gender	.008	.015	.017	.556	.579
Financial Aid Need	-.018	.014	-.040	-1.239	.216
First Generation College Student	.015	.018	.026	.851	.395
Full-Time Work	-.009	.014	-.020	-.642	.521
High School Dropout	.054	.020	.085	2.751	.006*
Part-Time Enrollment	-.015	.014	-.033	-1.022	.307
Single Parent	-.007	.022	-.012	-.304	.761
Dependent Other than Spouse	.026	.020	.057	1.290	.197

* Significant impact at below 0.05 level.

Figure 19. Relationships between student characteristics and mental activities (Note: Arrow indicates significant impact at below 0.05 level)

Significant relationship between student characteristics and mental activities is presented in Figure 19.

Student Characteristics and School Opinion Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR school opinion factor.

The overall regression model was significant at below 0.01 level (Table 30), indicating that student characteristics can be predictors of school opinion factor.

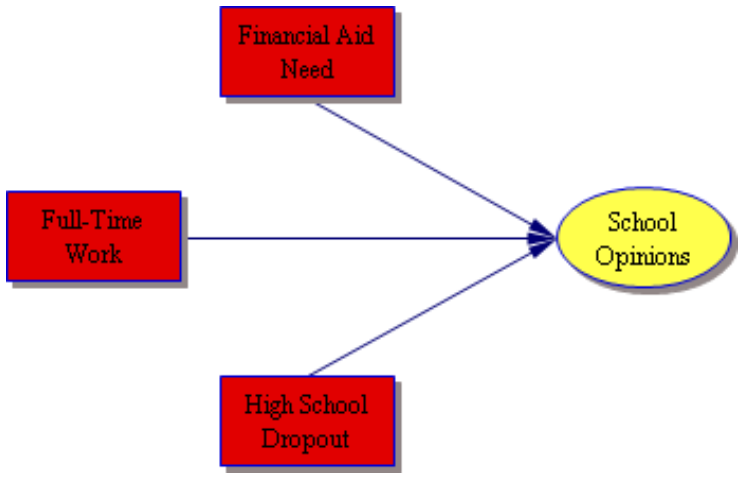
Of the ten student characteristics, three of them contributed significantly (at below 0.05 level, Table 31) to the model. They were student financial aid need, full-time work, and high school dropout.

Table 30. Regression model summary of student characteristics vs. school opinion factor

Model	R	R Square	F	Significance
Student Characteristics vs. School Opinion	.205	.042	4.813	.000

Figure 20. Relationships between student characteristics and school opinion

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and school opinions are presented in Figure 20.

Table 31. Relationships between student characteristics and school opinion factor

Student Characteristics vs. School Opinion	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.552	.042		13.171	.000*
Age	-.001	.001	-.030	-.860	.390
Ethnicity	-.011	.008	-.041	-1.373	.170
Gender	.018	.015	.037	1.220	.223
Financial Aid Need	.045	.015	.096	3.058	.002*
First Generation College Student	.003	.018	.005	.179	.858
Full-Time Work	-.035	.015	-.075	-2.408	.016*
High School Dropout	.041	.020	.061	2.010	.045*
Part-Time Enrollment	-.011	.015	-.024	-.740	.459
Single Parent	.037	.023	.063	1.610	.108
Dependent Other than Spouse	.016	.021	.035	.790	.430

* Significant impact at below 0.05 level.

Student Characteristics and Student Services Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR student services factor.

The overall regression model was significant at below 0.01 level (Table 32), indicating that student characteristics can be predictors of student services factor.

Of the ten student characteristics, one of them contributed significantly (at below 0.05 level, Table 33) to the model. It was full-time work.

Table 32. Regression model summary of student characteristics vs. student services factor

Model	R	R Square	F	Significance
Student Characteristics vs. Student Services	.146	.021	2.338	.010

Table 33. Relationships between student characteristics and student services factor

Student Characteristics vs. Student Services	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.394	.047		8.347	.000*
Age	.001	.001	.050	1.405	.160
Ethnicity	-.006	.009	-.022	-.719	.472
Gender	.012	.017	.023	.738	.461
Financial Aid Need	.019	.017	.038	1.170	.242
First Generation College Student	.036	.020	.055	1.768	.077
Full-Time Work	-.045	.016	-.088	-2.767	.006*
High School Dropout	-.011	.023	-.015	-.477	.633
Part-Time Enrollment	-.017	.016	-.034	-1.043	.297
Single Parent	.042	.026	.066	1.659	.097
Dependent Other than Spouse	-.032	.023	-.062	-1.379	.168

* Significant impact at below 0.05 level.

Figure 21. Relationships between student characteristics and school services

(Note: Arrow indicates significant impact at below 0.05 level)

Significant relationship between student characteristics and student services is presented in Figure 21.

Student Characteristics and Academic Preparation Factor

Regression model was used to examine the relationships between student characteristics including age, ethnicity, gender, financial aid need, first generation college student, full-time work, high school dropout, part-time enrollment, single parent, with dependent other than spouse and CCSR academic preparation factor.

Table 34. Regression model summary of student characteristics vs. academic preparation factor

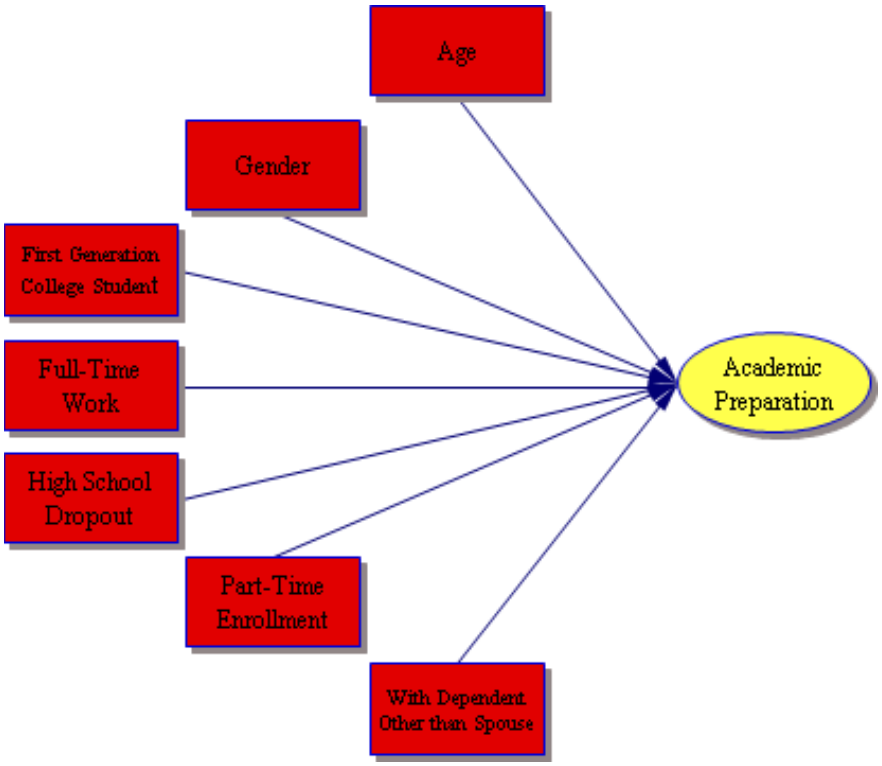
Model	R	R Square	F	Significance
Student Characteristics vs. Academic Preparation	.292	.085	10.205	.000

The overall regression model was significant at below 0.01 level (Table 34), indicating that student characteristics can be predictors of academic preparation factor.

Of the ten student characteristics, seven of them contributed significantly (at below 0.05 level, Table 35) to the model. They were student age, gender, first generation college student, full-time work, high school dropout, part-time enrollment, and with dependent other than spouse with full-time work.

Figure 22. Relationships between student characteristics and academic preparation

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and academic preparation are presented in Figure 22.

Table 35. Relationships between student characteristics and academic preparation factor

Student Characteristics vs. Academic Preparation	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	.523	.029		18.053	.000*
Age	.002	.001	.107	3.136	.002*
Ethnicity	-.003	.005	-.015	-.505	.613
Gender	.028	.010	.081	2.713	.007*
Financial Aid Need	.012	.010	.036	1.162	.245
First Generation College Student	-.037	.012	-.088	-2.932	.003*
Full-Time Work	-.028	.010	-.083	-2.728	.006*
High School Dropout	.030	.014	.064	2.172	.030*
Part-Time Enrollment	-.056	.010	-.172	-5.523	.000*
Single Parent	-.007	.016	-.016	-.416	.678
Dependent Other than Spouse	.030	.014	.089	2.070	.039*

* Significant impact at below 0.05 level.

Student Characteristics and Student Engagement

According to the above nine regression models, certain student characteristics have significant impact on student engagement. The directions of impact are consistent. Student age, gender, financial aid need, high school dropout, and with dependent other than spouse always have significant positive impact. First generation college student, full-time work, and part-time enrollment always have significant negative impact. Table 36 presents these significant impacts with their directions of impact.

Table 36. Relationships between student characteristics and student engagement

(+: Positive significant impact at below 0.05 level; −: Negative significant impact at below 0.05 level.)

Student Characteristics vs. Student Engagement	Faculty interactions	Class assignments	Exposure to diversity	Collaborative learning	Information technology	Mental activities	School opinions	Student services	Academic preparation
Age	+								+
Ethnicity									
Gender			+		+				+
Financial aid need		+		+			+		
First generation college student									−
Full-time work					−		−	−	−
High school dropout			+			+	+		+
Part-time enrollment	−	−		−	−				−
Single parent									
With dependent other than spouse									+

Student Engagement Factors and Student GPA

Regression model was used to examine the relationships between student engagement factors including faculty interactions, class assignments, exposure to diversity, collaborative learning, information technology, mental activities, school opinions, student services, academic preparation and student cumulative GPA between school year 2002 to 2004.

The overall regression model was significant at below 0.01 level (Table 37), indicating that student engagement factors can be predictors of student GPA.

Of the nine student engagement factors, four of them contributed significantly (at below 0.05 level, Table 38) to the model. They were faculty interactions, collaborative learning, mental activities, and academic preparation.

Table 37. Regression model summary of student engagement factors vs. student cumulative GPA

Model	R	R Square	F	Significance
Student Engagement vs. Student GPA	.199	.040	7.898	.000

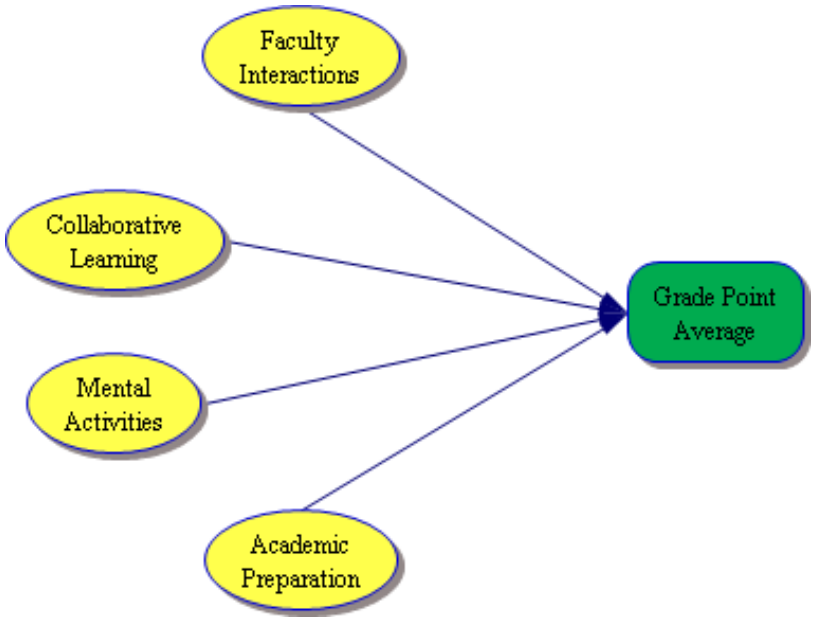
Table 38. Relationships between student engagement factors and student cumulative GPA

Student Engagement vs. Student GPA	Unstandardized Coefficients		Standardized Coefficients	t	Significance
	B	Std. Error	Beta		
(Constant)	2.336	.075		30.972	.000*
Faculty Interactions	.295	.131	.072	2.254	.024*
Class Assignments	.076	.092	.024	.820	.413
Exposure to Diversity	-.096	.076	-.035	-1.272	.204
Collaborative Learning	-.322	.118	-.079	-2.729	.006*
Information Technology	-.129	.072	-.049	-1.797	.072
Mental Activities	.511	.102	.148	4.981	.000*
School Opinions	-.118	.090	-.035	-1.316	.188
Student Services	-.120	.078	-.040	-1.537	.124
Academic Preparation	.499	.127	.105	3.926	.000*

* Significant impact at below 0.05 level.

Figure 23. Relationships between student engagement factors and GPA

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student engagement factors and GPA are presented in Figure 23.

Student Engagement and Student Course Completion Rate

Regression model was used to examine the relationships between student engagement factors including faculty interactions, class assignments, exposure to diversity, collaborative learning, information technology, mental activities, school

opinions, student services, academic preparation and student cumulative course completion rate between school year 2002 to 2004.

The overall regression model was significant at below 0.01 level (Table 39), indicating that student engagement factors can be predictors of student cumulative course completion rate.

Of the nine student engagement factors, five of them contributed significantly (at below 0.05 level, Table 40) to the model. They were class assignments, exposure to diversity, collaborative learning, mental activities, and academic preparation.

Table 39. Regression model summary of student engagement factors vs. student cumulative course completion rate

Model	R	R Square	F	Significance
Student Engagement vs. Course Completion	.182	.033	6.580	.000

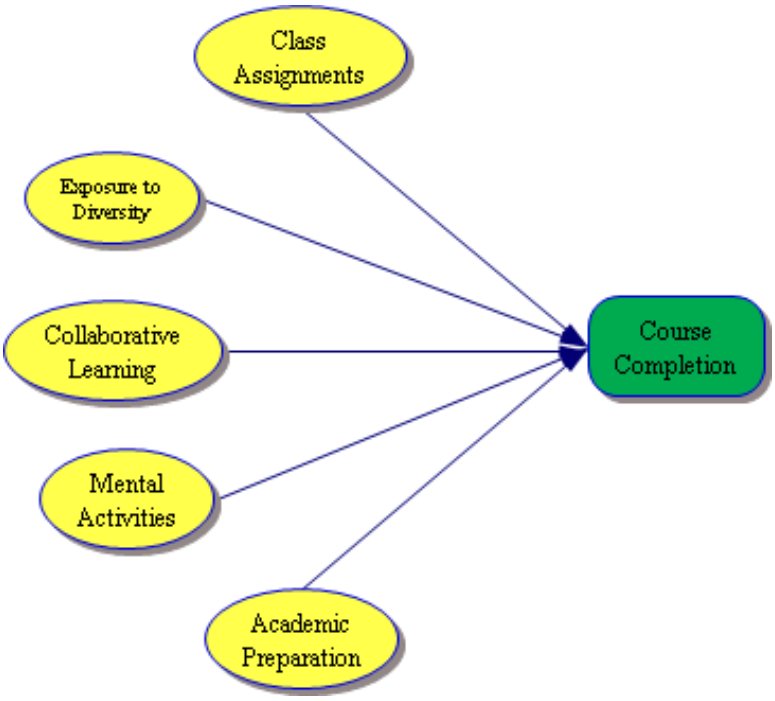
Table 40. Relationships between student engagement factors and student cumulative course completion rate

Student Engagement vs. Course Completion	Unstandardized Coefficients		Standardized Coefficients	t	Signifi-cance
	B	Std. Error	Beta		
(Constant)	.654	.022		29.445	.000*
Faculty Interactions	.035	.039	.029	.915	.360
Class Assignments	.079	.027	.086	2.911	.004*
Exposure to Diversity	-.054	.022	-.067	-2.438	.015*
Collaborative Learning	-.070	.035	-.058	-2.015	.044*
Information Technology	-.027	.021	-.035	-1.268	.205
Mental Activities	.101	.030	.099	3.359	.001*
School Opinions	-.006	.026	-.006	-.230	.818
Student Services	-.015	.023	-.017	-.670	.503
Academic Preparation	.136	.037	.096	3.620	.000*

* Significant impact at below 0.05 level.

Figure 24. Relationships between student engagement factors and course completion rate

(Note: Arrow indicates significant impact at below 0.05 level).



Significant relationships between student engagement factors and course completion are presented in Figure 24.

Student Engagement and Student Success

According to the above two regression models, certain student engagement factors have significant impact on student success. The directions of impact are consistent. Student age, gender, financial aid need, high school

dropout, and with dependent other than spouse always have significant positive impact. First generation college student, full-time work, and part-time enrollment always have significant negative impact. Table 41 presents these significant impacts with their directions of impact.

Table 41. Relationships between student engagement factors and student success (+: Positive significant impact at below 0.05 level; -: Negative significant impact at below 0.05 level.)

Student Engagement vs. Student Success	Course completion	Grade Point Average
Faculty interactions		+
Class assignments	+	
Exposure to diversity	-	
Collaborative learning	-	-
Information technology		
Mental activities	+	+
School opinions		
Student services		
Academic preparation	+	+

RELATIONSHIPS AMONG STUDENT CHARACTERISTICS, STUDENT ENGAGEMENT AND STUDENT SUCCESS

Student Characteristics and Student Engagement vs. Student GPA

Regression model was used to examine the relationships for all ten student characteristics and all nine student engagement factors vs. student cumulative GPA between school year 2002 to 2004.

The overall regression model was significant at below 0.01 level (Table 42), indicating that student characteristics and student engagement factors can be predictors of student GPA.

Of the ten student characteristics and nine student engagement factors, seven of them contributed significantly (at below 0.05 level, Table 43-44) to the model. They were student age, ethnicity, single parent, with dependent other than spouse, mental activities, student services, and academic preparation.

It is important to note that first generation college student no longer had significant impact on student GPA. In addition, student age, ethnicity, single parent, and with dependent other than spouse all had less significant impact on student GPA.

Table 42. Regression model summary of student characteristics and student engagement factors vs. student cumulative GPA

Model	R	R Square	F	Significance
Student Characteristics and Engagement vs. Student GPA	.351	.123	7.843	.000

Table 43. Relationships between student characteristics and student engagement factors AND student cumulative GPA (Part 1)

Student Characteristics and Engagement vs. Student GPA	Unstandardized Coefficients		Standardized Coefficients	t	Signifi-cance
	B	Std. Error	Beta		
(Constant)	1.835	.160		11.450	.000*
Age	.020	.003	.252	7.251	.000*
Ethnicity	.053	.025	.062	2.119	.034*
Gender	.026	.048	.016	.538	.591
Financial Aid Need	-.040	.048	-.026	-.849	.396
First Generation College Student	-.112	.058	-.058	-1.921	.055
Full-Time Work	-.028	.047	-.018	-.595	.552
High School Dropout	.011	.065	.005	.171	.864

Significant impact at below 0.05 level.

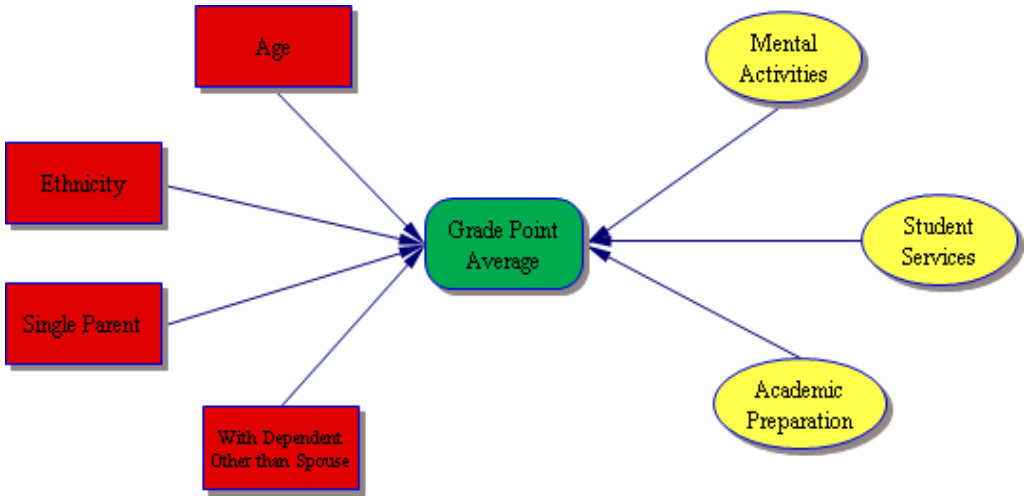
Table 44. Relationships between student characteristics and student engagement factors AND student cumulative GPA (Part 2)

Student Characteristics and Engagement vs. Student GPA	Unstandardized Coefficients		Standardized Coefficients	t	Signifi-cance
	B	Std. Error	Beta		
Part-Time Enrollment	-.074	.048	-.049	-1.551	.121
Single Parent	-.188	.073	-.098	-2.578	.010*
Dependent Other than Spouse	.146	.067	.094	2.182	.029*
Faculty Interaction	.144	.159	.036	.906	.365
Class Assignments	.131	.112	.043	1.174	.241
Exposure to Diversity	-.082	.093	-.030	-.881	.379
Collaborative Learning	-.062	.146	-.015	-.427	.670
Information Technology	-.103	.089	-.039	-1.157	.248
Mental Activities	.372	.127	.109	2.943	.003*
School Opinion	-.018	.109	-.006	-.167	.867
Student Services	-.244	.095	-.082	-2.574	.010*
Academic Preparation	.332	.158	.071	2.098	.036*

* Significant impact at below 0.05 level.

Figure 25. Relationships between student characteristics and student engagement factors AND GPA

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and engagement factors AND GPA are presented in Figure 25.

Student Characteristics and Student Engagement vs. Course Completion Rate

Regression model was used to examine the relationships for all ten student characteristics and all nine student engagement factors vs. student cumulative course completion rate between school year 2002 to 2004.

The overall regression model was significant at below 0.01 level (Table 45), indicating that student characteristics and student engagement factors can be predictors of student course completion rate.

Of the ten student characteristics and nine student engagement factors, seven of them contributed significantly (at below 0.05 level, Table 46-47) to the model. They were student age, ethnicity, first generation college student, high school dropout, single parent, class assignments, exposure to diversity, mental activities, and academic preparation.

It is important to note that part-time enrollment and with dependent other than spouse no longer had significantly impact on student GPA. In addition, first generation college student, and single parent had less significant impact on student GPA.

Table 45. Regression model summary of student characteristics and student engagement factors vs. student cumulative course completion rate

Model	R	R Square	F	Significance
Student Characteristics and Engagement vs. Course Completion	.283	.080	4.871	.000

Table 46. Relationships between student characteristics and student engagement factors AND student cumulative course completion rate (Part 1)

Student Characteristics and Engagement vs. Course Completion	Unstandardized Coefficients		Standardized Coefficients	t	Signifi-cance
	B	Std. Error	Beta		
(Constant)	.569	.048		11.796	.000*
Age	.004	.001	.148	4.183	.000*
Ethnicity	.017	.008	.065	2.183	.029*
Gender	-.002	.015	-.005	-.159	.873
Financial Aid Need	.003	.014	.006	.188	.851
First Generation College Student	-.038	.017	-.067	-2.181	.029*
Full-Time Work	-.023	.014	-.050	-1.593	.111
High School Dropout	-.046	.020	-.072	-2.355	.019*
Part-Time Enrollment	-.024	.014	-.053	-1.647	.100
Single Parent	-.064	.022	-.113	-2.902	.004*
Dependent Other than Spouse	.034	.020	.075	1.701	.089

* Significant impact at below 0.05 level.

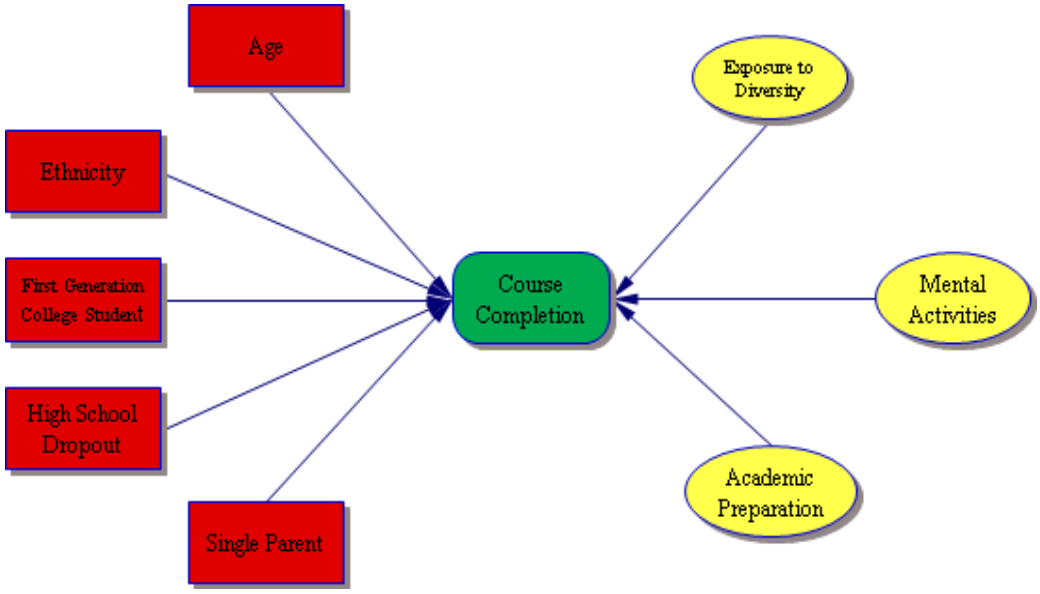
Table 47. Relationships between student characteristics and student engagement factors AND student cumulative course completion rate (Part 2)

Student Characteristics and Engagement vs. Course Completion	Unstandardized Coefficients		Standardized Coefficients	t	Signifi-cance
	B	Std. Error	Beta		
Faculty Interaction	.038	.048	.032	.796	.426
Class Assignments	.066	.034	.073	1.962	.050
Exposure to Diversity	-.064	.028	-.081	-2.298	.022*
Collaborative Learning	-.025	.044	-.021	-.574	.566
Information Technology	-.012	.027	-.015	-.441	.659
Mental Activities	.078	.038	.077	2.034	.042*
School Opinion	.004	.033	.004	.122	.903
Student Services	-.027	.028	-.031	-.960	.337
Academic Preparation	.123	.048	.090	2.581	.010*

* Significant impact at below 0.05 level.

Figure 26. Relationships between student characteristics and student engagement factors AND course completion rate

(Note: Arrow indicates significant impact at below 0.05 level)



Significant relationships between student characteristics and student engagement factors AND course completion rate are presented in Figure 26.

Student Characteristics and Student Engagement vs. Student Success

According to the above two regression models, certain student characteristics and engagement factors have significant impact on student success. The directions of impact are consistent. Student age, gender, with dependent other than spouse, mental activities, and academic preparation always have significant

positive impact on student success. First generation college student, high school dropout, single parent, exposure to diversity, and student services always have significant negative impact on student success. Table 48 and 49 present these significant impacts with their directions of impact.

Table 48. Relationships between student characteristics, engagement factors and success indicators (Part 1) (+: Positive significant impact at below 0.05 level; -: Negative significant impact at below 0.05 level.)

Student Characteristics and Engagement vs. Success	Course completion	Grade Point Average
Age	+	+
Ethnicity	+	+
Gender		
Financial aid need		
First generation college student	-	
Full-time work		
High school dropout	-	
Part-time enrollment		
Single parent	-	-

Table 49. Relationships between student characteristics, engagement factors and success indicators (Part 2) (+: Positive significant impact at below 0.05 level; −: Negative significant impact at below 0.05 level.)

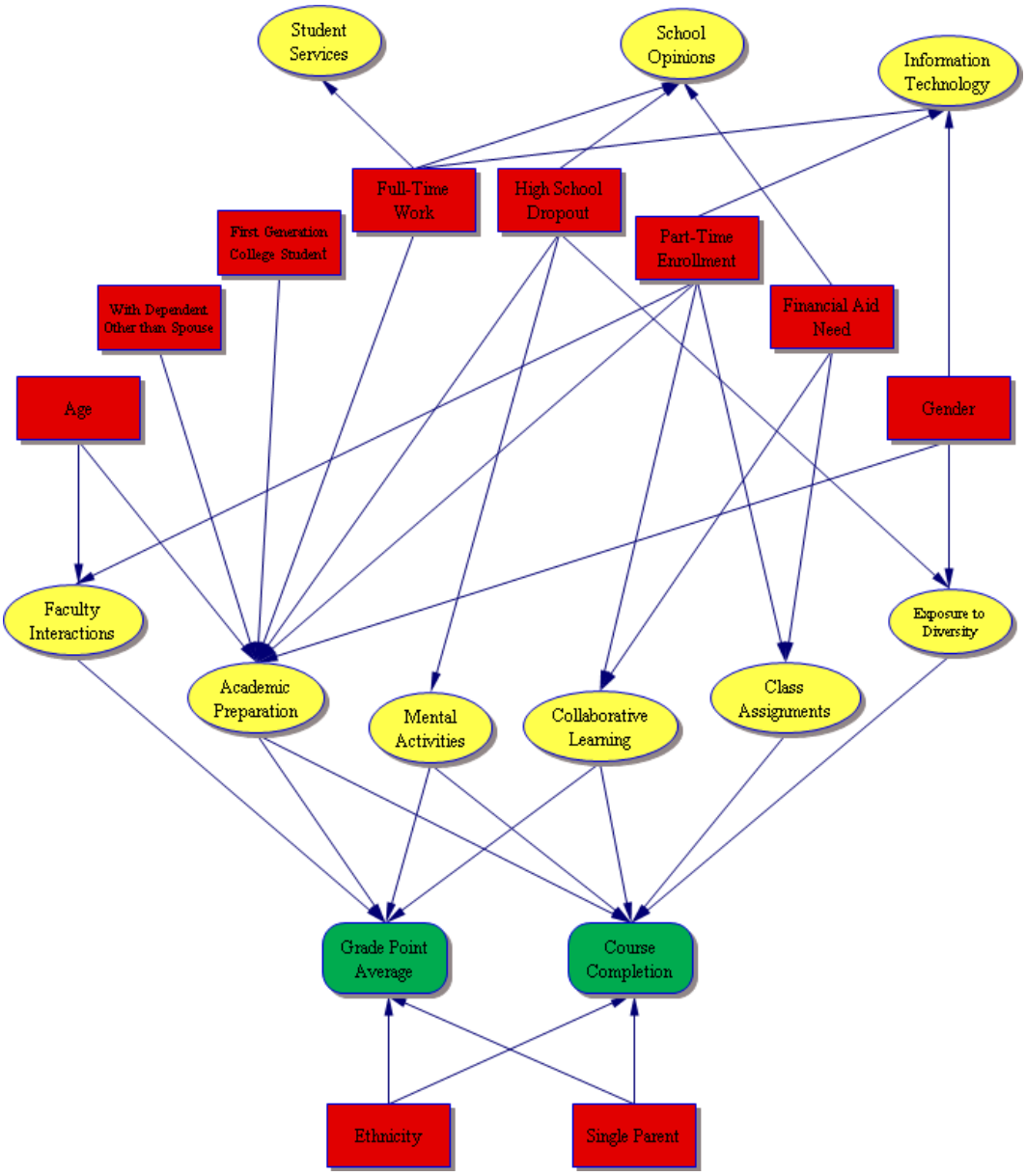
Student Characteristics and Engagement vs. Success	Course completion	Grade Point Average
With dependent other than spouse		+
Faculty interactions		
Class assignments		
Exposure to diversity	−	
Collaborative learning		
Information technology		
Mental activities	+	+
School opinions		
Student services		−
Academic preparation	+	+

DEVELOPMENTAL EDUCATION STUDENT SUCCESS MODEL

A developmental education student success model (Figure 27) is presented by combining all the significant relationships, mentioned in this chapter, together:

Figure 27. Developmental education student success model

(Note: Arrow indicates significant impact at below 0.05 level)



SUMMARY

This chapter presented the findings drawn from data analysis of relationships among development student characteristics, student engagement factors and student success indicators.

Findings of this study indicated that:

- There are significant relationships between student characteristics and student success.
- Student characteristics including student age, ethnicity, first generation college student, single parent, and with dependent other than spouse can be predictors of student GPA; and student characteristics including student age, ethnicity, first generation college student, high school dropout, part-time enrollment, single parent, and with dependent other than spouse can be predictors of student course complete rate.
- There are significant relationships between student characteristics and student engagement.
- There are significant relationships between student engagement factors and student success.

- The impact of student characteristics on student success can be lessened by effective institutional practice influencing student engagement.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

Community college has represented American dream in higher education. It provides access to higher education to students coming at different levels of preparation. A lot of those students have never thought that the college education is within their reach. Because of the quest for a more skilled workforce and the change of the nation's demographics which results in the increase in minority population, community colleges are facing more students underprepared for college-work and/or from underrepresented group. Thus, developmental education was, is, and will be a key to the realization of the American dream in higher education.

Community colleges are committed in taking on the challenge of preparing students with limited academic skills to be successful in college. However, there is a lack of research on theories and guidelines to identify and design effective practices to enhance the success of these students. Most research on student success in higher education focused on four-year institutions. Insights

obtained from those research studies do not necessarily translate to community college students who are more likely to be minority, non-residential, part-time, first-generation college students, and working adults with families. Therefore, there is a great need on models based upon empirical studies of community college developmental education students to generate concrete insights on institutional policies and practices that impact college success of those students.

This study supports the theoretical framework that students come to college with various background and behavioral patterns, some of them have significant impact on student success in college. Meanwhile, students' experiences in college are influenced by institutional policies and practices. Thus, effective institutional policies and practices help students to be successful in college.

RESEARCH QUESTIONS

For the purpose of this study, five research questions were used to examine:

- The relationships between student characteristics and student success.
- Whether certain student characteristics can be used as predictors of student success.

- The relationships between student characteristics and student engagement.
- The relationships between student engagement and student success.
- Whether effective institutional practices influencing student engagement can close the gap between student characteristics and student success.

SUMMARY OF MAJOR FINDINGS

Student Characteristics as Predictors of Student Success

As shown in Table 50, student age, ethnicity, first generation college student, high school dropout, part-time enrollment, single parents, and with dependent other than spouse, were predictors of developmental education student success. Thus, community colleges need to identify and design institutional polices and practices focusing on success of students with those characteristics. As expected, students characterized as first generation college student, high school dropout, part-time enrollment, and single parent were less likely to be successful. However, older students and students with dependent other than spouse were more likely to be successful. Further discussions are provided in later part of this chapter.

Table 50. Relationships between student characteristics and student success (+: Positive significant impact at below 0.05 level; −: Negative significant impact at below 0.05 level.)

Student Characteristics vs. Student Success	Course completion	Grade Point Average
Age	+	+
Ethnicity	+	+
First generation college student	−	−
High school dropout	−	
Part-time enrollment	−	
Single parent	−	−
With dependent other than spouse	+	+

Student Characteristics as Predictors of Student Engagement

As shown in Table 51, student characteristics were also predictors of student engagement. Older students, students with financial need, students who dropped out from high school and students with dependent other than spouse were more engaged. First generation college students, students with full-time work, and

part-time enrollment were less engaged. Thus, an examination between the relationships between student engagement and student success will help explain these phenomena.

Table 51. Relationships between student characteristics and student engagement. (+: Positive significant impact at below 0.05 level; −: Negative significant impact at below 0.05 level.)

Student Characteristics vs. Student Engagement	Faculty interactions	Class assignments	Exposure to diversity	Collaborative learning	Information technology	Mental activities	School opinions	Student services	Academic preparation
Age	+								+
Gender			+		+				+
Financial aid need		+		+			+		
First generation college student									−
Full-time work					−		−	−	−
High school dropout			+			+	+		+
Part-time enrollment	−	−		−	−				−
With dependent other than spouse									+

Student Engagement Influences Student Success

As shown in Table 52, six out of nine student engagement factors had significant impact on student success for this study population. Students who were more engaged on the faculty interaction factor, class assignments factor, mental activities factor, and academic preparation factor were more likely to be successful. Students who were more engaged on the exposure to diversity factor, collaborative learning factor were less likely to be successful.

Table 52. Relationships between student engagement factors and student success (+: Positive significant impact at below 0.05 level; -: Negative significant impact at below 0.05 level.)

Student Engagement vs. Student Success	Course completion	Grade Point Average
Faculty interactions		+
Class assignments	+	
Exposure to diversity	-	
Collaborative learning	-	-
Mental activities	+	+
Academic preparation	+	+

Student Engagement Affects Student Characteristics' Impact on Student Success

As shown in Table 53, student characteristics had less impact on student success in the presence of student engagement factors. First generation college student was no longer a significant predictor of student GPA in the presence of student engagement factors. Ethnicity, single parent, and with dependent other than spouse all had less significant impact on student GPA. Similarly, part-time enrollment and with dependent other than spouse were no longer significant predictors of student GPA in the presence of student engagement factors. First generation college student and single parents had less significant impact on student GPA.

Table 53. Relationships between student characteristics and student success in the absence and presence of student engagement factors

(+: Positive impact with significance indicated in parentheses; −: Negative impact with significance indicated in parentheses.)

Student Characteristics vs. Success	Course completion		Grade Point Average	
	Without Engage-ment Factors	With Engage-ment Factors	Without Engage-ment Factors	With Engage-ment Factors
Age	+ (.000)	+ (.000)	+ (.000)	+ (.000)
Ethnicity	+ (.041)	+ (.029)	+ (.028)	+ (.034)
First generation college student	− (.017)	− (.029)	− (.024)	
High school dropout	− (.019)	− (.019)		
Part-time enrollment	− (.023)			
Single parent	− (.002)	− (.004)	− (.005)	− (.010)
With dependent other than spouse	+ (.026)		+ (.007)	+ (.029)

Conclusion

This study supports the theoretical framework that student characteristics are predictors of student success. The negative impact of student characteristics on student success can be lessened by student engagement, which can be influenced by institutional practices. Therefore, community colleges may develop effective institutional policies and practices focusing on student engagement to increase developmental education student success.

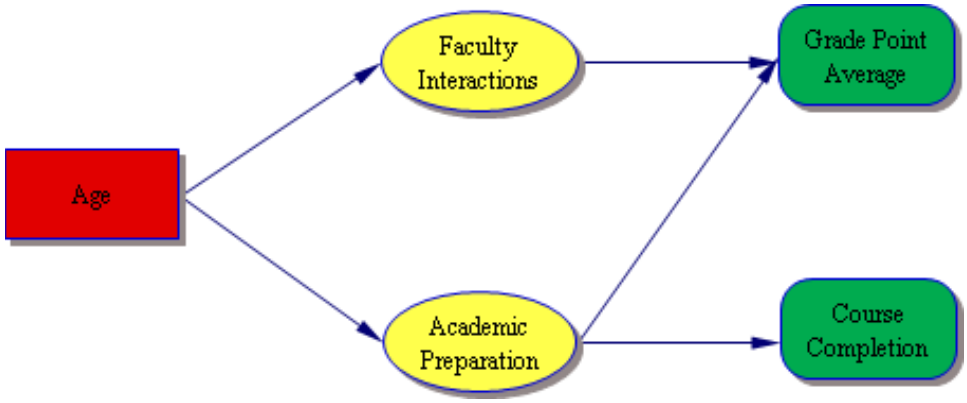
DIRECTIONS OF IMPACT: A CLOSER LOOK AT THE DEVELOPMENTAL EDUCATION STUDENT SUCCESS MODEL

As demonstrated in Chapter Four, there were some seemingly unexpected results. Age, and with dependent other than spouse had significant positive impact on student success. In addition, the significant impacts of ethnicity and single parent on student success were not affected by any student engagement factor. This section of the chapter presents a closer look at the directions of impact of student characteristics and student engagement factors on student success to explain the above discrepancies.

Age

Figure 28. Developmental education student success model --- Age

(Note: Arrow indicates significant impact at below 0.05 level)



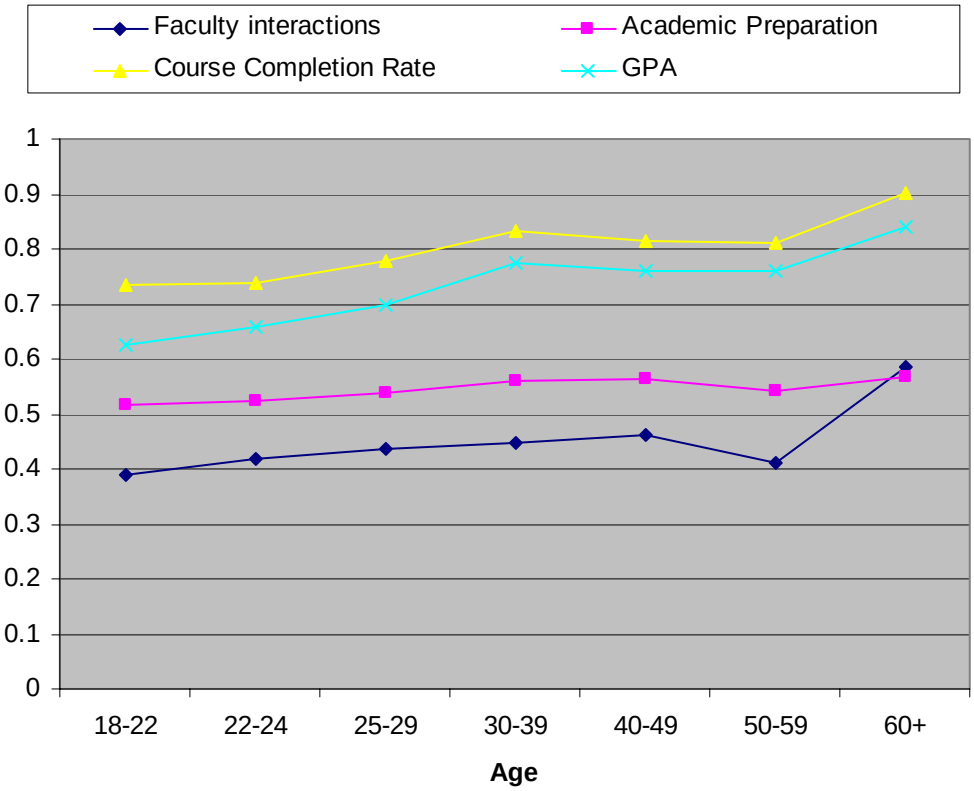
According to the developmental education student success model, age is a predictor for both student GPA and course completion (Figure 28). It is also a predictor of two student engagement factors, faculty interactions and academic preparation. Faculty interactions factor affects student GPA. Academic preparation factor affects both student GPA and course completion rate.

Thus, age, faculty interactions, and academic preparation should have the same direction of impact on student GPA, and/or course completion rate, if older students are more successful than younger ones.

Table 54. Age, student engagement and student success

Age	Faculty Interactions	Academic Preparation	Course Completion Rate	GPA
18-22	.3907	.5148	.7331	2.5003
22-24	.4185	.5228	.7400	2.6322
25-29	.4381	.5385	.7797	2.7898
30-39	.4473	.5606	.8324	3.0994
40-49	.4621	.5651	.8155	3.0457
50-59	.4107	.5431	.8110	3.0432
60+	.5861	.5688	.9030	3.3590

Figure 29. Directions of impact for age, student engagement and student success (Note: GPA is rescaled to be in the range of 0 to 1).



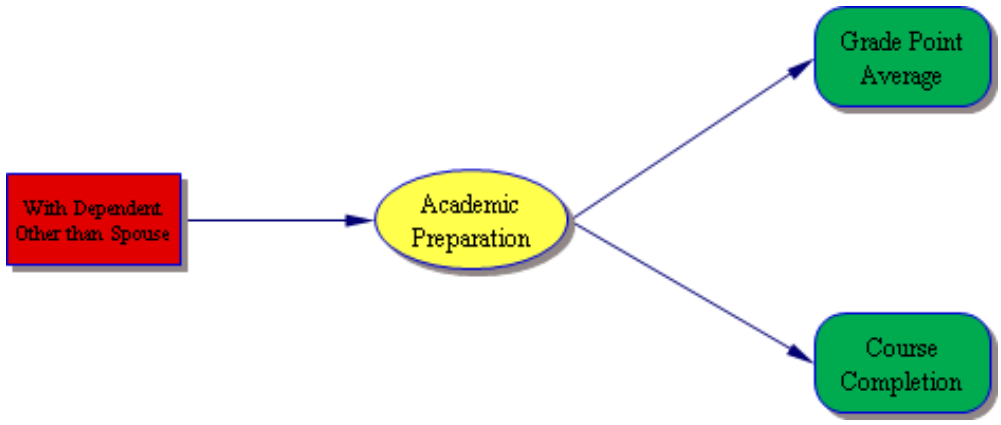
According to Table 54 and Figure 29, there is a same trend for 1) age, 2) faculty interactions, 3) academic preparation, 4) GPA, 5) course completion rate. Older students were more engaged with regard to faculty interactions and academic preparation and thus were more successful in college work. This supports the notion that the more engaged the students, the more successful they are. Therefore, community colleges should design institutional policies and

practices to enhance student engagement to increase developmental education student success.

With Dependent Other than Spouse

Figure 30. Developmental education student success model --- With dependent other than spouse

(Note: Arrow indicates significant impact at below 0.05 level)



According to the developmental education student success model, with dependent other than spouse is a predictor for both student GPA and course completion (Figure 30). It is also a predictor of one student engagement factor, academic preparation. Academic preparation factor also affects both student GPA and course completion rate.

Thus, with dependent other than spouse, and academic preparation should have the same direction of impact on student GPA and course completion rate, if students with dependent other than spouse are more successful than those without dependent other than spouse.

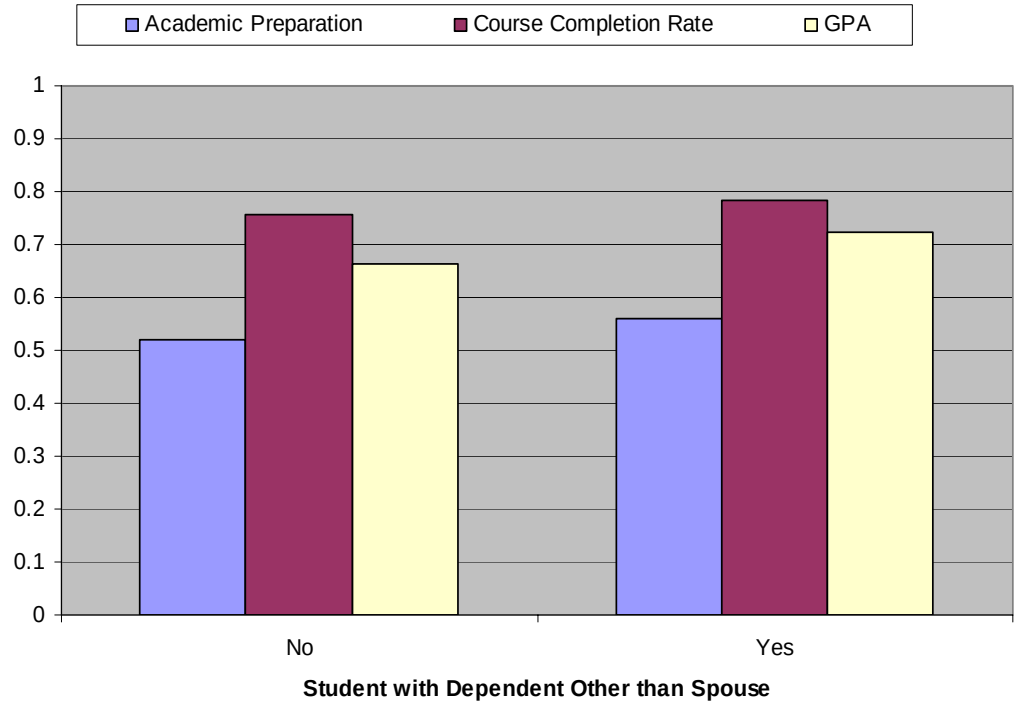
Table 55. With dependent other than spouse, student engagement and student success

Student with dependent other than spouse	Academic Preparation	Course Completion Rate	GPA
No	.5201	.7565	2.6512
Yes	.5590	.7837	2.8893

Similar to student age, there is a same trend for 1) with dependent other than spouse, 2) academic preparation, 3) GPA, 4) course completion rate (Table 55 and Figure 31). Students with dependent other than spouse were more engaged with regard to academic preparation and thus were more successful in college work. This also supports the notion that the more engaged the students, the more successful they are.

Figure 31. Directions of impact for with dependent other than spouse, student engagement and student success

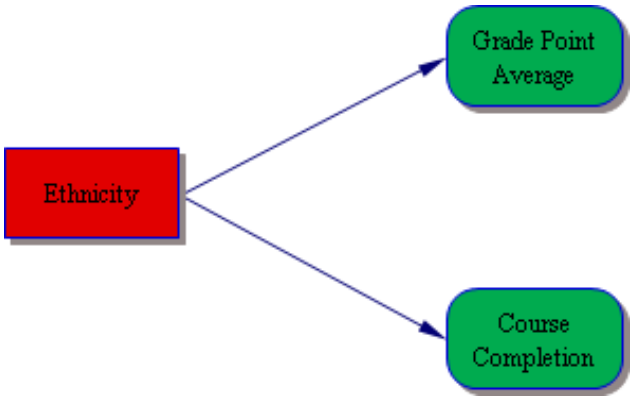
(Note: GPA is rescaled to be in the range of 0 to 1)



Ethnicity

Figure 32. Developmental education student success model --- Ethnicity

(Note: Arrow indicates significant impact at below 0.05 level)



According to the developmental education student success model, ethnicity is a predictor for both student GPA and course completion (Figure 32). However, none of the nice student engagement factors affects ethnicity's significant impact on student success.

Table 56. Ethnicity, faculty interactions, class assignment, exposure to diversity, and student success

Ethnicity	Faculty Interactions	Class Assign-ments	Exposure to Diversity	Course Comple-tion Rate	GPA
American Indian or other Native American	.3927	.5111	.5238	.7806	2.7164
Asian, Asian American or Pacific Islander	.3893	.5577	.4509	.7742	2.7994
Black or African American, Non-Hispanic	.4365	.5494	.5458	.6999	2.4630
White, Non-Hispanic	.4207	.5194	.5459	.7917	2.8403
Hispanic, Latino, Spanish	.4137	.5399	.4942	.7658	2.7389
Other	.4335	.5429	.5522	.7693	2.7178

Table 57. Ethnicity, collaborative learning, information technology, mental activities, and student success

Ethnicity	Collaborative Learning	Information Technology	Mental Activities	Course Completion Rate	GPA
American Indian or other Native American	.2381	.5714	.5457	.7806	2.7164
Asian, Asian American or Pacific Islander	.2858	.5288	.5721	.7742	2.7994
Black or African American, Non-Hispanic	.2839	.5296	.5960	.6999	2.4630
White, Non-Hispanic	.2537	.5317	.5672	.7917	2.8403
Hispanic, Latino, Spanish	.2691	.5442	.6092	.7658	2.7389
Other	.3039	.5227	.5806	.7693	2.7178

Table 58. Ethnicity, school opinions, student services, academic preparation, and student success

Ethnicity	School Opinions	Student Services	Academic Preparation	Course Completion Rate	GPA
American Indian or other Native American	.4492	.4551	.5218	.7806	2.7164
Asian, Asian American or Pacific Islander	.4989	.4526	.5537	.7742	2.7994
Black or African American, Non-Hispanic	.5991	.5027	.5448	.6999	2.4630
White, Non-Hispanic	.5054	.3903	.5295	.7917	2.8403
Hispanic, Latino, Spanish	.5344	.4656	.5334	.7658	2.7389
Other	.5081	.4516	.5195	.7693	2.7178

Tables 56 through 58 present ethnicity group comparisons with regard to student engagement and student success. A clearer look was presented by focusing on the three biggest ethnic groups (White, African American, and Hispanic), and by ranking the values of nine engagement factors and two success indicators among the three groups (Table 59).

Table 59. A clearer look at ethnicity, student engagement, and student success

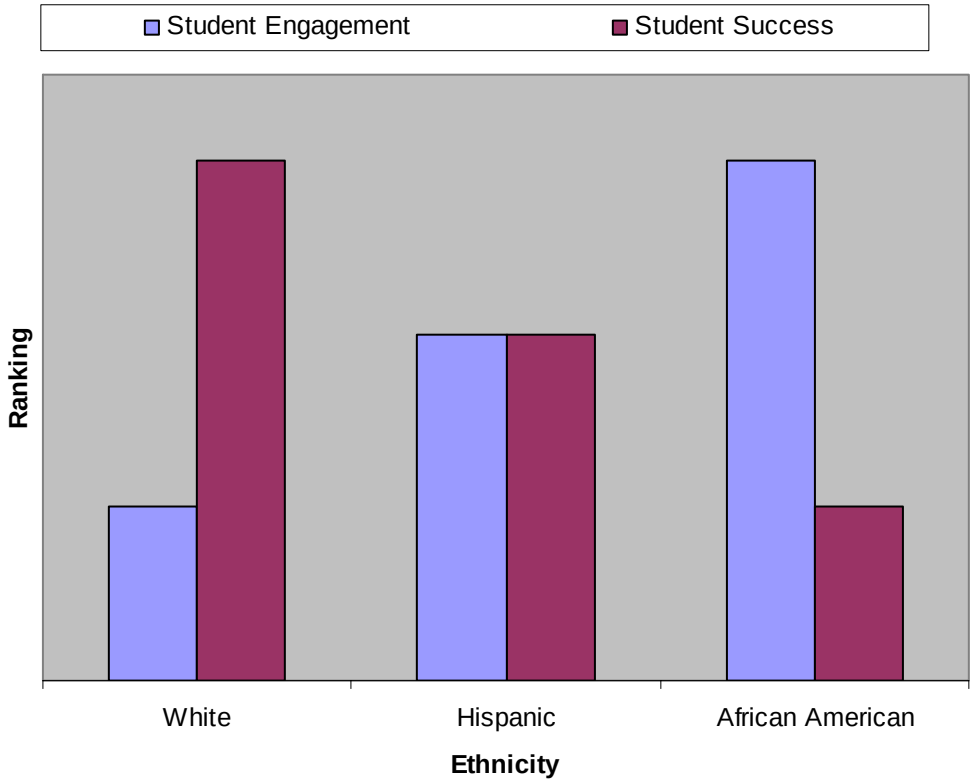
Student Engagement and Success vs. Ethnicity	White	Hispanic	African American
Faculty Interactions	2	3	1
Class Assignments	3	2	1
Exposure to Diversity	1	3	2
Collaborative Learning	2	2	1
Information Technology	2	1	3
Mental Activities	3	1	2
School Opinions	3	2	1
Student Services	3	2	1
Academic Preparation	3	2	1
Course Completion Rate	1	2	3
GPA	1	2	3

Table 60 presents the average ranking of the nine student engagement factors, and the average ranking of the two student success indicators among the three ethnic groups. This table and Figure 33 present another key conclusion from this study: the general notion that the more engaged the students, the more successful they are does not apply to students of different ethnic groups. African American students were most engaged but had the lowest success. White students were least engaged but had the highest success. Hispanic students were ranked in the middle for both engagement and success.

Table 60. Rankings of student engagement, and student success based on ethnicity

Student Engagement and Success vs. Ethnicity	White	Hispanic	African American
Student Engagement	3	2	1
Student Success	1	2	3

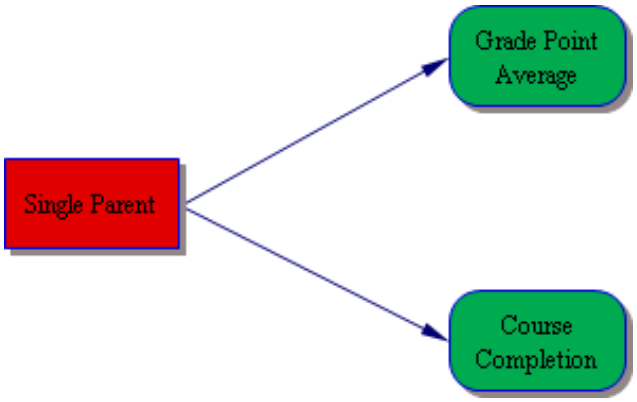
Figure 33. Directions of impact for ethnicity, student engagement and student success



This conclusion suggests that there are some factors other than the student engagement factors investigated that affect college success of students from different ethnic groups.

Single Parent

Figure 34. Developmental education student success model --- Single parent (Note: Arrow indicates significant impact at below 0.05 level).



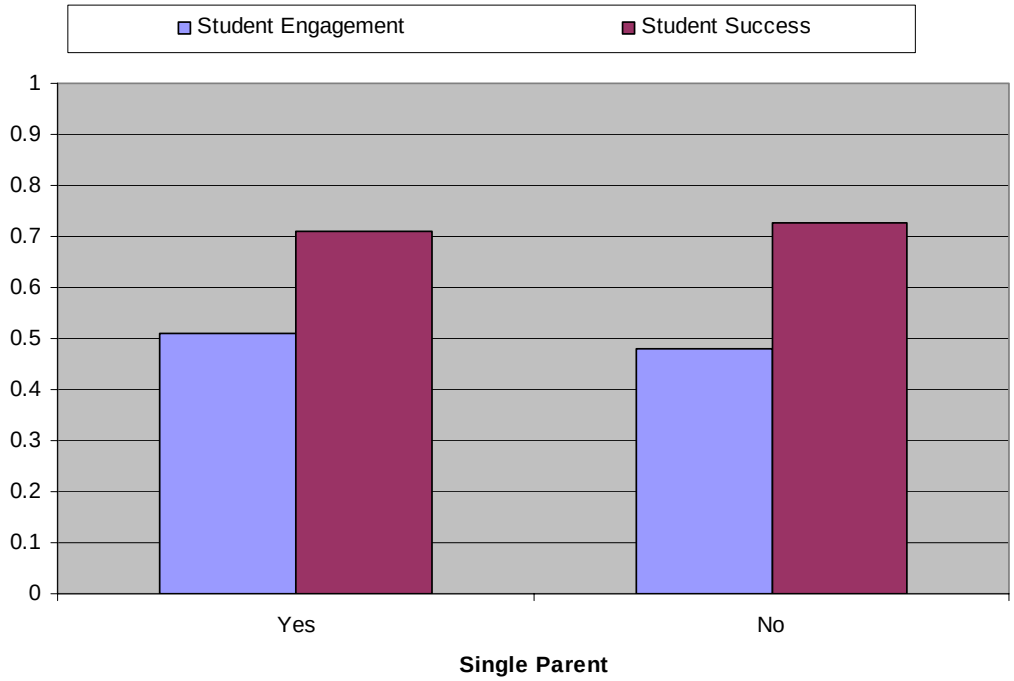
Similar to ethnicity, single parent is a predictor for both student GPA and course completion, according to the developmental education student success model (Figure 34). However, none of the nice student engagement factors affects its significant impact on student success.

Table 61. Single parent, faculty interactions, class assignment, exposure to diversity, and student success

Student Engagement and Success vs. Single Parent	Single Parent	Not Single Parent
Faculty Interactions	.4451	.4168
Class Assignments	.5594	.5255
Exposure to Diversity	.5720	.5268
Collaborative Learning	.2770	.2631
Information Technology	.5393	.5328
Mental Activities	.6052	.5762
School Opinions	.5813	.5173
Student Services	.4499	.4259
Academic Preparation	.5562	.5290
Course Completion Rate	.7423	.7709
GPA	2.7228	2.7360

Figure 35. Directions of impact for single parent, student engagement and student success

(Note: Student engagement value is the average of the nine factor values, rescaled to be in the range of 0 to 1; student success value is the average of course completion value and value of GPA, rescaled to be in the range of 0 to 1).

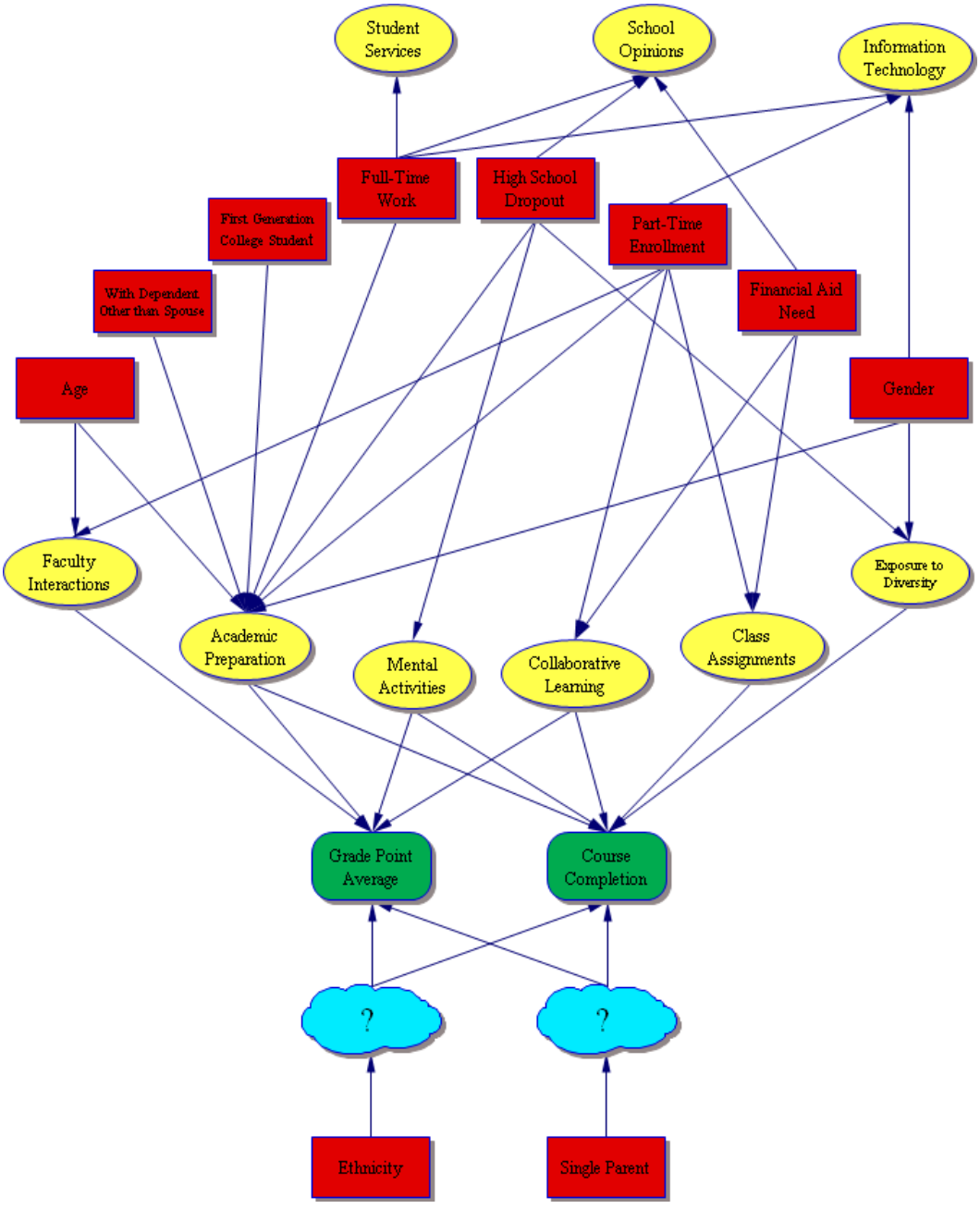


Again similar to ethnicity, Table 61 and Figure 35 demonstrate that single parent factor also provides an exception to the general notion that the more engaged the students, the more successful they are. Single parent students were more engaged but less successful. None single parent students were less engaged but more successful.

This conclusion again suggests that there are some factors other than the student engagement factors investigated that affect college success of single parent students.

According to these two conclusions, the developmental education student success model may be presented as in the following page (Figure 36). One or more factors may be between ethnicity and GPA/course completion, and between single parent and GPA/course completion. The identification of these factors will complete this model.

Figure 36. Developmental education student success model --- Missing factors

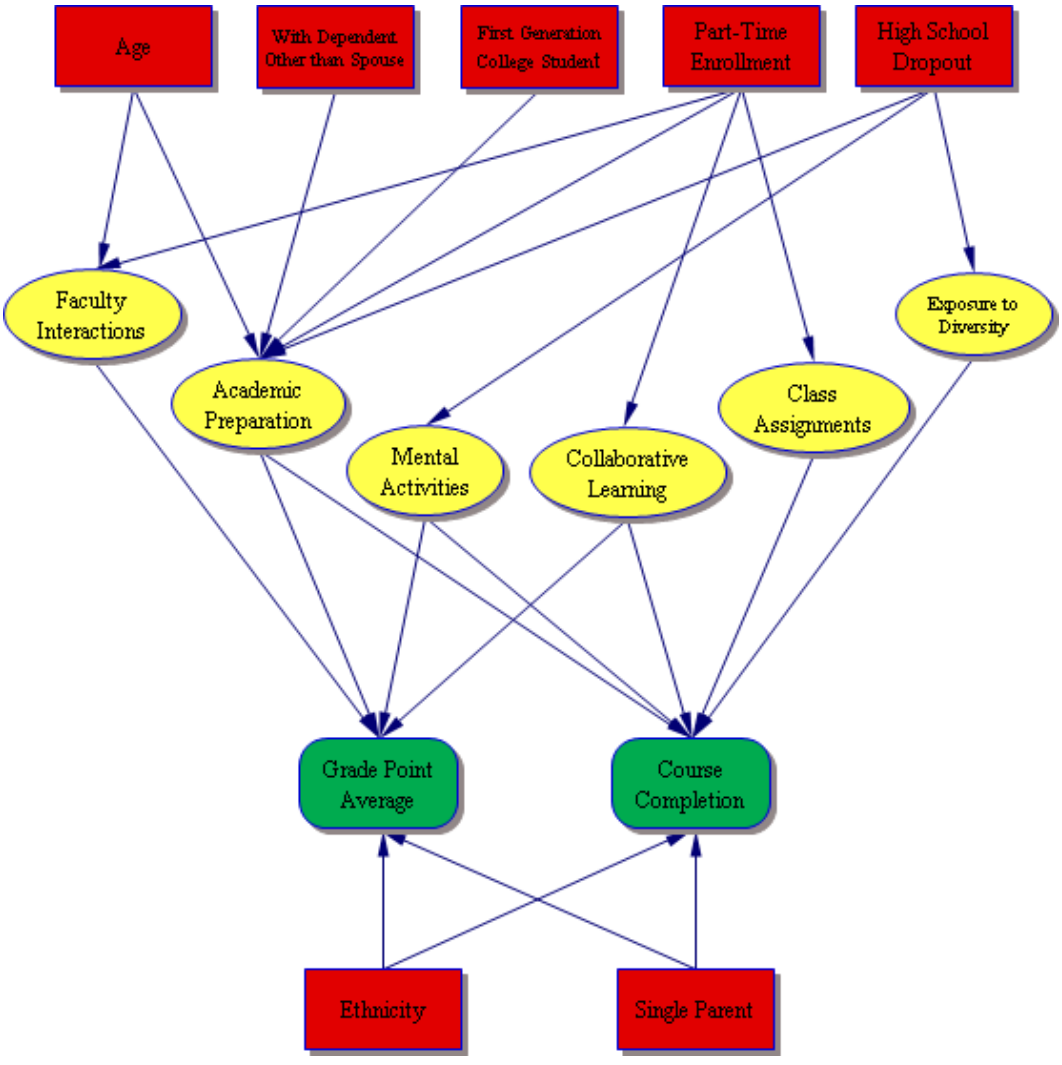


Conclusion

A closer look at the directions of impact of student characteristics and student engagement factors on student success demonstrates that there is no surprise that older students and students with dependent other than spouse were more successful than their counterparts. The reason is because those students were more engaged in their college work.

In addition, a closer look at the developmental education student success model suggests that there are some exceptions to the general rules that the more engaged the students, the more successful they are. It is in agreement with the theoretical framework among student characteristics, engagement and success. The explanation is that the model may not be complete and there may be unidentified factors that influence the significant impacts of ethnicity and single parent on student success. Community colleges need to conduct some further qualitative and quantitative studies specially designed for students from different ethnic groups and single parent students to identify those factors.

Figure 37. Developmental education student success model --- Implications for institutional practices



The developmental education student success model (Figure 37) provides a guideline for identifying and designing institutional policies and practices to enhance developmental education student success.

According to this model, community colleges can focus on developing policies and practices to affect certain engagement factors on students with certain characteristics. For example, to increase the college success of younger students, institutions can focus on two aspects of student engagement. The first is for faculty and advisors to spend more time discussing course grades and homework assignment, providing prompt feedback, encouraging student questions in class and outside-of-class readings and activities, and talking about students' career plans. The second is to encourage students to spend more time reading textbooks, manuals, course packages, and other books and preparing more papers and reports, and more importantly, to challenge students to do their best work in college.

To ensure that students coming from various backgrounds are successful in college work, community colleges can follow this guideline in identifying and designing effective institutional policies and practices:

- Identify student characteristics that have significant impact on student success from the incoming students or current students;
- Identify effective policies and practices from existing literature or other "best practice" schools or through experimenting homegrown

ideas (Kuh et al., 2005) to enhance student engagement factors addressing those student characteristics;

- Design policies and practices pertinent to affect the engagement of the incoming or current students with characteristics that have negative impact on college success;
- Conduct Community College Surveys of Student Engagement before and after these policies and practices are implemented;
- Continuously collect student progress data in college;
- Continuously adjust and/or implement policies and practices to improve student engagement and college experience, and thus student success in college;
- Always make decisions based on data.

However, it is critical to notice that community colleges should always maintain a holistic approach to influence students' college experiences. Focusing on certain areas does not mean less effort on other areas. It is because student learning is shaped by multiple forces operating in multiple settings (Pascarella & Terenzini, 2005).

A GUIDELINE FOR INSTITUTIONAL RESEARCHERS

This study itself provides a guideline for institutional researchers to monitor the progresses of institutional polices and practices and keep moving forward in a changing environment.

This study provides the operational definitions of all variables, including students characteristics, student engagement, and students success. This study also provides the statistical analysis methods, the methods of data collection, and identification of needed instrument.

To examine whether certain institutional practices are effective in enhancing student success, especially for developmental education students, institutional researchers can perform study following this guideline:

- Identify student cohorts;
- Collect student characteristics;
- Conduct Community College Surveys of Student Engagement at different time points during students' enrollment (ideally, at the beginning and end of students' enrollment in college and/or before and after the implementation of institutional policies and practices);
- Continuously collect student success data in college;

- Conduct statistical analysis as demonstrated in this study.

It is well recognized that no two students come in with exactly the same situation and institutions need to continuously identify best ways to help incoming students with various characteristics. This guideline promotes a "culture of evidence" in college decision making with regard to polices and practices (Bailey & Alfonso, 2005; Community College Survey of Student Engagement, 2004). Following this guideline, institutional researchers will be able to inform institutions of incoming students with certain characteristics that need special areas of focus to help them be successful in college. Continuous study will allow them to demonstrate whether institutional polices and practices that are identified to help those students are effective or not. Thus, institutions will be able to continuously make adjustment and reach perfection.

RECOMMENDATIONS FOR FUTURE RESEARCH

Although quantitative approach is powerful at analyzing large scale student data and surveys, it does not provide the reason underlying what happened. Naturalistic and ethnographic inquiries are called to explore student experience to further understand direct and indirect factors that impact student success in college (Pascarella & Terenzini, 2005). Qualitative analysis will also

help identify potential factors associated with student engagement or other student behavioral patterns that can be influenced by institutional policies and practices. The factors identified can be used for further quantitative studies. Alternative applications of qualitative and quantitative approaches will be able to combine the strengths of both methods (Patton, 2002). As a result, these studies will help identify missing factors and thus complete the developmental education student success model presented in this study.

It is also important to conduct a similar study on the newly developed Community College Faculty Survey of Student Engagement (CCFSSE) to compare the views of faculty and student on the same college experience. Students and faculty represent individual and collective views of the same experience (Community College Survey of Student Engagement, 2005). It is already recognized that faculty and students were having different perceptions of student engagement (Manzo, 2006). This comparison will help institutions better understand what leads to this difference and what matters most with regard to developmental education student success.

Developmental education is a vital component of community college mission. Community colleges need to employ different methodological approaches to continuously seeking ways to enhance the performance of students coming without proper preparation for college level work.

SUMMARY

Student characteristics are predictors of student success. The impact of student characteristics on student success can be affected by student engagement, which can be influenced by institutional practices. Some student characteristics, such as older students and students with dependent other than spouse, have seemingly surprising positive impacts on student success. Some student characteristics, such as ethnicity and single parent, have significant impacts on student success. But the impacts are not influenced by student engagement. These discrepancies, however, can all be explained by the above theoretical framework.

Therefore, community colleges may develop effective institutional policies and practices focusing on student engagement to increase developmental education student success. This study provides guidelines for institutions to identify and design effective polices and practices, and for institutional researchers to measure and monitor the effectiveness of theses policies and practices.

REFERENCES

Abernathy, L.J. (1985-86). Institutionally based student assessment for college placement. *The College Board Review*, 138, 8-11, 29-30.

Abraham, A.A., & Creech, J.D. (2000). *Reducing remedial education: What progress are states making?* Atlanta, GA: Southern Regional Educational Board.

Alfred, R.L., & Lum, G.D. (1988). Remedial program policies, student demographic characteristics, and academic achievement in community colleges. *Community/Junior College Quarterly of Research and Practice*, 12(2), 107-120.

Almeida, D.A. (1991). Do underprepared students and those with lower academic skills belong in the community college? A question of policy in light of the "mission". *Community College Review*, 18(4), 28-32.

American Association of Community Colleges. (2006). *Community College Fact Sheet*. Retrieved June 15, 2006 from http://www.aacc.nche.edu/Content/NavigationMenu/AboutCommunityColleges/Fast_Facts1/Fast_Facts.htm.

Arendale, D.R. (2002). Then and now: The early years of developmental education. *Research and Teaching in Developmental Education*, 18(2), 3-26.

Astin, A.W. (1993). What matters in college? *Liberal Education*, 79(4), 4-15.

Bailey, T.R, & Alfonso, M. (2005). *Paths to persistence: An analysis of research on program effectiveness at community colleges*. Indianapolis, IN: Lumina Foundation for Education.

Baker, G.A. (1998). Keeping all generations happy: The Xers, boomers and beyond… *Community College Journal*, 68(5), 10-16.

Bean, J.P., & Eaton, S.B. (2000). A psychological model of college student retention. In J.M. Braxton (Eds.). *Reworking the Student Departure Puzzle* (pp.48-61). Nashville, TN: Vanderbilt University Press.

Bean, J.P., & Metzner, B.S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research*, 55(4), 485-540.

Boylan, H.R, Bliss, L.B., & Bonham, B.S. (1997). Program components and their relationship to student performance. *Journal of Developmental Education*, 20(3), 2-8.

Boylan, H.R., Bonham, B.S., & Bliss, L.B. (1994). Characteristic components of developmental programs. *Research in Developmental Education*, 11(1), 1-4.

Boylan, H.R., & Saxon, D. P. (1999). *What Works in Remediation: Lessons from 30 Years of Research*. Retrieved June 30, 2005 from http://www.ncde.appstate.edu/reserve_reading/what_works.htm.

Boylan, H.R., & White, W.G. (1987). The historical roots of developmental education: Educating all the nation's people. *Research in Developmental Education*, 4(4), 1-4.

Boylan, H.R., & White, W.G. (1994). Educating all the nation's people: The historical roots of developmental education. In M. Maxwell (Eds.), *From Access to Success: A Book of Readings on College Developmental Education and Learning Assistance Programs* (pp.3-7). Clearwater, FL: H&H.

Braxton, J.M. (2000). Reinvigorating theory and research on the departure puzzle. In J.M. Braxton (Eds.), *Reworking the Student Departure Puzzle* (pp.257-274). Nashville, TN: Vanderbilt University Press.

Braxton, J.M., & Hirschy, A.S. (2005). Theoretical developments in the study of college student departure. In A. Seidman (Eds.), *College Student Retention: Formula for Student Success* (pp.61-87). Westport, CT: Praeger.

Brier, E. (1984). Bridging the academic preparation gap: An historical view. *Journal of Developmental Education*, 8(1), 2-5.

Brint, S., & Karabel, J. (1989). *The diverted dream: Community colleges and the promise of educational opportunity in America, 1900-1985*. New York, NY: Oxford University Press.

Brubacher, J.S., & Rudy, W. (1997). *Higher education in transition: A history of American colleges and universities*. New Brunswick, NJ: Transaction.

Cartwright, G.P. (1996). Technology and underprepared students: Part one. *Change*, 28(1), 45-47.

Casazza, M.E., & Silverman, S.L. (1996). *Learning assistance and developmental education: A guide for effective practice*. San Francisco, CA: Jossey-Bass.

Chickering, A.W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 39(7), 3-7.

Clowes, D.A. (1982-83). More than a definition problem. *Current Issues in Higher Education*, 1, 4-6.

Cohen, A.M., & Brawer. F.B. (2003). *The American community college* (4th ed.). San Francisco, CA: Jossey-Bass.

Commander, N.E., & Smith, B.D. (1995). Developing adjunct reading and learning courses that work. *Journal of Reading*, 38(5), 352-360.

Community College Survey of Student Engagement. (2004). *Engagement by design*. Austin, TX: The University of Texas at Austin.

Community College Survey of Student Engagement. (2005). *Engaging students, challenging the odds*. Austin, TX: The University of Texas at Austin.

Cramer, D. (2003). *Advanced quantitative data analysis*. Maidenhead, UK: Open University Press.

Crotty, M. (2003). *The foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: SAGE.

Cutright, M., & Swing, R.L. (2005). The Community College of Denver: A second family for the first-year student. In B.O. Barefoot & J.N. Gardner

(Eds.). *Achieving and Sustaining Institutional Excellence for the First Year of College* (pp.35-58). San Francisco, CA: Jossey-Bass.

Dotzler, J.J. (2003). A note on the nature and history of post-secondary developmental education in America. *Mathematics and Computer Education*, 37(1), 121-5.

Drucker, P.F. (1999). *Management challenges for the 21st century*. New York, NY: HarperBusiness.

Durkheim, E. (1951). *Suicide* (J. A. Spaulding and G. Simpson, Trans.). Glencoe: The Free Press.

Florida Community College System. (2004). *Student data base*. Tallahassee, FL: Division of Community Colleges and Workforce Education, Florida Department of Education.

Florida Department of Education. (2005). *Developmental education in Florida community colleges*. Tallahassee, FL: Florida Community Colleges and Workforce Education.

Garson, G.D. (2006). *Multiple Regression*. Retrieved June 15, 2006 from http://www2.chass.ncsu.edu/garson/PA765/regress.htm.

Greene, T.G. (2004). *Bridging the Great Divide: Exploring the relationship between student engagement and educational outcomes for Black and Hispanic community college students in the state of Florida*. Austin, TX: The University of Texas at Austin.

Green, S.B., & Salkind, N.J. (2005). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (4th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Grubb, W.N. (2001). *From black box to Pandora's box: Evaluating remedial/developmental education*. New York, NY: Community College Research Center , Teachers College, Columbia University.

Hu, S., & Kuh, G. D. (2002). Being (dis)engaged in educationally purposeful activities: The influences of student and institutional characteristics. *Research in Higher Education*, 43(5), 555-575.

Ignash, J.M. (1997a). Editor's notes. *New Directions for Community Colleges*, 1997(100), 1-4.

Ignash, J.M. (1997b). Who should provide postsecondary remedial/developmental education? *New Directions for Community Colleges*, 1997(100), 5-20.

Information Technology Services. (2001). *SPSS for Windows: Getting started*. Austin, TX: The University of Texas at Austin.

Kazis, R., Vargas, J., & Hoffman, N. (2004). *Double the numbers: Increasing postsecondary credentials for underrepresented youth*. Cambridge, MA: Harvard Education Press.

Kezar, A. (2001). Early intervention: Beyond getting kids into college. *The Education Digest*, 66(8), 54-59.

Kuh, G.D. (2001). *The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties*. Bloomington, IN: Indiana University Center for Postsecondary Research.

Kuh, G.D., Hayek, J.C., Carini, R.M., Ouimet, J.A., Gonyea, R.M., & Kennedy, J. (2001). *NSSE technical and norms report*. Bloomington, IN: Indiana University Center for Postsecondary Research and Planning.

Kuh, G.D., Kinzie, J., Schuh, J.H., Whitt, E.J., & Associates. (2005). *Student success in college: Creating conditions that matter*. San Francisco: Jossey-Bass.

Kulik, C-L., & Kulik, J. (1991). *Developmental instruction: An analysis of the research*. Boone, NC: National Center for Developmental Education, Appalachian State University.

Losak, J., & Miles, C. (1991). *Foundations and context of developmental education in higher education*. Boone, NC: National Center for Developmental Education, Appalachian State University.

Manzo, K.K. (2006). Survey offers options for at-risk students. *Community College Week*, 18 (11/12), 4.

Marti, N. (2003). *Overview of the CCSSE Instrument and Psychometric Properties*. Retrieved June 30, 2004 from http://www.ccsse.org/aboutsurvey/psychometrics.pdf.

Maxwell, M. (1997). *Improving student learning skills*. Clearwater, FL: H&H.

McCabe, R.H. (2003). *Yes we can! A community college guide for developing America's underprepared*. Phoenix, AZ: League for Innovation in the Community College.

McCabe, R.H., & Day, P.R., Jr. (1998). *Developmental education: A twenty-first century social and economic imperative*. Mission Viejo, CA: League for Innovation in the Community College.

McClenney, K.M. (2004). Redefining quality in community colleges: Focusing on good educational practice. *Change*, 36(6), 16-21.

McCusker, M. (1999). Effective elements of developmental reading and writing programs. *Community College Review*, 27(2), 93-105.

McMillan, V.K., Parke, S.J., & Lanning, C.A. (1997). Remedial/developmental education approaches for the current community college environment. *New Directions for Community Colleges*, 1997(100), 21-32.

Merisotis, J.P., & Phipps, R.A. (2000). Remedial education in colleges and universities: What's really going on? *The Review of Higher Education*, 24(1), 67-85.

Miller, K.J. (1996). *Developmental education at the college level. Fastback 404*. Bloomington, IN: Phi Delta Kappa.

Moore, W. (1970). *Against the odds*. San Francisco, CA: Jossey-Bass.

Mortenson, T.G. (2000). *Opportunity for higher education in Florida in the Human capitol economy*. Tallahassee, FL: Florida Postsecondary Educational Planning Commission.

Moss, R.L., & Young, R.B. (1995). Perceptions about the academic and social integration of underprepared students in an urban community college. *Community College Review*, 22(4), 47-61.

National Association for Developmental Education (NADE). (2001). *Definition of Developmental Education*. Retrieved June 30, 2005 from http://www.nade.net/A1.%20de_definition.htm.

National Center for Education Statistics. (2003). *Remedial Education at Degree-Granting Postsecondary Institutions in fall 2000*. Washington, DC: U.S. Department of Education.

O'Banion, T. (1994). Teaching and learning: A mandate for the nineties. *Community College Journal*, 64(4), 21-25.

Pace, C.R. (1980) Measuring the quality of student effort. *Current Issues in Higher Education*, 1, 10-16.

Pascarella, E.T. (1980). Student-faculty informal contact and college outcomes. *Review of Educational Research*, 50(4), 545-595.

Pascarella, E.T., & Terenzini, P.T. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco, CA: Jossey-Bass.

Pascarella, E.T., & Terenzini, P.T. (2005). *How college affects students: A third decade of research*. San Francisco, CA: Jossey-Bass.

Patton, M.Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: SAGE.

Perin, D. (2002). The location of developmental education in community colleges: a discussion of the merits of mainstreaming vs. centralization. *Community College Review*, 30(1), 27-44.

Phipps, R. (1998). *College remediation: What it is, what it costs, what's at stake*? Washington, DC: The Institute for Higher Education Policy.

Roueche J.E., & Baker G.A. (1987). *Access and excellence: The open-door college*. Washington, DC: Community College Press.

Roueche, J.E., Ely, E.E., & Roueche, S.D. (2001). *In pursuit of excellence: The Community College of Denver*. Washington, DC: Community College Press.

Roueche, J.E., Johnson, L.F., & Roueche, S.D. (1997). *Embracing the tiger: The effectiveness debate and the community college.* Washington, DC: Community College Press.

Roueche, J.E., & Kirk, R.W. (1973). *Catching up: Remedial education*. San Francisco, CA: Jossey-Bass.

Roueche, J.E., Milliron, M.D., & Roueche, S.D. (2003). *Practical magic: On the front lines of teaching excellence.* Washington, DC: Community College Press.

Roueche J.E., & Roueche S.D. (1993). *Between a rock and a hard place: The at-risk student in the open-door college*. Washington, DC: Community College Press.

Roueche, J.E., & Roueche, S.D. (1999). *High stakes, high performance: Making remedial education work*. Washington, DC: Community College Press.

Roueche, J.E., & Snow, J.J. (1977). *Overcoming learning problems: A guide to developmental education in college*. San Francisco, CA: Jossey-Bass.

Schrag, G. (1999). End of the second chance? The crusade against remedial education. *American Prospect*, 10(44), 68-74.

Selingo, J. (2000). Cal State puts remediation on an "or else" basis. *The Chronicle of Higher Education*, 46(48), A27.

Smittle, P. (1995). Academic performance predictors for community college assessment. *Community College Review*, 23(2), 37-46.

Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1(1), 64-85.

Starks, G. (1989). Retention and developmental education: What the research has to say. *Research and Teaching in Developmental Education*, 6(1), 21-32.

Taylor, K., Moore, W.S., MacGregor, J., & Limblad, J. (2003). *Learning community research and assessment: What we know now*. Olympia, WA: The Evergreen State College, Washington Center for Improving the Quality of Undergraduate Education.

The National Center for Public Policy and Higher Education. (2000). *Measuring Up 2000: The state-by-state report card for higher education*. San Jose, CA: The National Center for Public Policy and Higher Education.

The National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: U.S. Department of Education.

Tierney, W.G. (1992). An anthropological analysis of student participation in college. *Journal of Higher Education*, 63(6), 603-618.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago, IL: University of Chicago Press.

Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, 68(6), 599-623.

United States Census Bureau. (2001). *Census 2000 PHC-T-2. Ranking Tables for States: 1990 and 2000. Table 1. States Ranked by Population: 2000.* Retrieved June 30, 2004 from http://www.census.gov/population/cen2000/phc-t2/tab01.pdf.

Van Gennep, A. (1960). *The Rites of Passage* (M. Visedon and G. Caffee, Trans.). Chicago, IL: The University of Chicago Press.

Webb, M. (1989). A theoretical model of community college student degree persistence. *Community College Review*, 16(4), 42-49.

Witt, A.A., Watternbarger, J.L., Gollattscheck, J.F., & Suppiger, J.E. (1994). *America's community colleges: The first century*. Washington, DC: Community College Press.

Wyatt, M. (1992). The past, present, and future need for college reading courses in the U.S. *Journal of Reading*, 36(1), 10-20.

Yorke, M., & Longden, B. (2004). *Retention and student success in higher education*. Maidenhead, UK: Society for Research into Higher Education & Open University Press.

Vita

Wei Zhou was born in Shanghai, China in 1972, to parents, Yi Zhou and Rongfen Wang. Wei received his Bachelor of Science in Genetics and Genetic Engineering and Master of Science in Molecular Genetics from Fudan University, one of China's most prestigious universities.

After a long time involvement in the college and university environment, with successful teaching and researching in biosciences, Wei discovered the beauty of the American community college model. He decided to pursue a career as a college leader, and advocate this model to other countries in the world. He is currently a member of the Community College Leadership Program (CCLP), the nation's oldest and top ranked program of its kind, at The University of Texas.

Wei has authored and co-authored over ten articles in science education and biosciences. His doctoral study was supported by several prestigious scholarships, including Colvert Scholarship, Donald T. and Gwen Rippey Scholarship, Jesse Jones Scholarship, and Great American Reserve Scholarship.

Wei enjoys his life with his happily married wife Zhun and his lovely daughter Alice.

Permanent address: 1624 West Sixth Street, Apt. J, Austin TX 78703

This dissertation was typed by the author.