4-22-2010

A Comparison of the Cognitive and Personal Development of College-level Mathematics Students and Developmental Mathematics Students at a Community College

Bridgett Pressley Smith

A COMPARISON OF THE COGNITIVE AND PERSONAL DEVELOPMENT OF COLLEGE-LEVEL MATHEMATICS STUDENTS AND DEVELOPMENTAL MATHEMATICS STUDENTS AT A COMMUNITY COLLEGE

by

Bridgett Pressley Smith

A Dissertation

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education

Major: Higher and Adult Education

The University of Memphis

May 2010

To the University Council:

The Dissertation Committee for Bridgett Pressley Smith certifies that this is the approved version of the following dissertation:

A COMPARISON OF THE COGNITIVE AND PERSONAL DEVELOPMENT OF COLLEGE-LEVEL MATHEMATICS STUDENTS AND DEVELOPMENTAL MATHEMATICS STUDENTS AT A COMMUNITY COLLEGE

_____
James I. Penrod, Ed.D., Major Professor

_____
Katrina A. Meyer, Ph.D.

_____
Barbara Mullins-Nelson, Ph.D.

_____
Patricia H. Murrell, Ed.D.

Accepted for the Graduate Council:

_____
Karen D. Weddle-West, Ph. D.
Vice Provost for Graduate Programs

DEDICATION

I dedicate this dissertation to my brother, Calvin Pressley. Without your patience, support, laughter, and most of all love throughout my educational years, the completion of this work would not have been possible.

ACKNOWLEDGEMENTS

To the casual observer, a doctoral dissertation may appear to be a solitary work. However, to complete a project of this magnitude required a network of support, and I am indebted to many people. I am most especially grateful to my husband, Donald Smith and children, Breland and Shaun for their love, patience, and understanding.

To my parents Vernon and Daisy Pressley, for their guidance and support and for stressing the importance of an education. I will always strive to make you proud.

To my aunt, Ann Price for her unwavering support and encouragement throughout my life. She is truly the wind beneath my wings.

To my family and friends, for keeping me sane and for reminding me of what is truly important.

To all of you, I shall always be thankful. I am extremely blessed to have you in my life.

ABSTRACT

Smith, Bridgett P. Ed.D. The University of Memphis. May 2010. A Comparison of the Cognitive and Personal Development of Developmental Mathematics Students and College Level Mathematics Students at a Community College. Major Professor: James I. Penrod, Ed.D.

Education is a major focal point of individual justice within a free society as well as a central point of human capital for the world. This study compared the cognitive and personal developmental levels of community college students enrolled in developmental-level mathematics courses to students enrolled in college-level mathematics courses. In addition, the effects of age, as well as a variety of demographic differences such as parents' education, financial aid, and gender on the development of community college students were investigated. The levels of development were based on the following scales: competency, autonomy, identity, and intellectual development. The sources of these scales were Arthur Chickering's theory on college students' development and William Perry's theory of cognitive development. In establishing this causal-comparative design, the independent variables were mathematics level (developmental-level mathematics students versus college-level mathematics students), with a further distinction between age groups (traditional-aged versus adult students). Comparisons among means on the instruments and the various subscales were tested using independent sample t-tests and a series of analysis of variance tests. With this design and combination of variables, three basic null hypotheses were tested: a) There were no significant differences between mean scores on the four inventories of developmental mathematics students versus college-level mathematics students; b) There were no significant differences between mean scores on the four inventories of traditional-aged versus adult

community college students; and c) There were no significant differences between additional independent variables tested such as gender, marital status, family background, and method of financing education. Significant differences were found on the following scales and subscales: mobility based on age; identity based on mathematics level; mobility, identity, and intellectual development based on gender; interdependence based on marital status; and competency in mathematics based on employment patterns. The results of this study can be used to recommend appropriate changes in classrooms, instruction, and student services

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

LIST OF FIGURES

Figures Page

Chapter 1

Introduction

Interest in the development of college students is not a new phenomenon. A study of American higher education revealed that development of the whole person is an integral part of our college tradition. Still, over the course of history, there have been gaps in this whole system of beliefs. Faculty and administrators have periodically focused their attention away from the development of the whole student and society as well has changed its expectations of higher education's responsibility toward its students.

As a result of these changes, a new profession emerged to fill the gaps. Student personnel professionals through the years have attempted to respond to changing needs and expectations of school officials, society as a whole, and most especially the students themselves. To this end, student development professionals have sought various means of defining student characteristics and understanding developmental levels and patterns in order to add focus to their programming and educational efforts.

Since the establishment of Harvard University in 1636, there has been continuing debate concerning the value of developmental education (Roberts, 1986). Two-year and four-year colleges, universities, small private colleges, and long established, prestigious institutions of higher education have faced the dilemma of the inadequately prepared student. As early as 1828, the Yale Report called for an end to the admission of students with what they described as defective preparation (Roberts, 1986). In 1894, Wellesley College in Massachusetts offered the first specific developmental education courses for freshmen who were in need of increased general academic college preparation (Kulik, Kulik, & Shwalb, 1983; Roberts, 1986). Thus historically, in the United States, the

concept of developmental education and the under-prepared student has existed since the 1600s.

In recent years, many discussions and debates have been held on the issue of remedial education in American public higher education. In many states, politicians, educators and the public are asking, how many students need remedial education? Who are they? How much does it cost? Does it achieve its purpose? But more importantly, concerned parties are asking, should the burden of remediation fall on community colleges or four-year institutions? Or, should the nation's high schools be held responsible for adequately preparing their graduates?

Cost of Developmental Education

Much of the opposition to remedial education is due to its costs. But, often the cost of remedial education seems large because the figures are provided outside the context of all instructional costs. Breneman and Haarlow (1998), found that remediation accounted for about $1 billion annually in a public higher education budget of $115 billion, or less than one percent of expenditures. A remedial education is often one of the cheapest forms of instruction: a teacher (often adjunct faculty), a blackboard, and little else. Finally, remedial programs are the lesser of several undesirable outcomes for these students. Compared to other options such as dead-end jobs, unemployment, welfare, or criminal activity coupled with social costs of poverty; remediation is a good investment for long-term benefits to society (Breneman & Haarlow, 1998).

In 1996, the U.S. General Accounting Office (GAO) conducted a study to explore the extent to which federal financial aid was being spent to support remedial courses. The report concluded that "our calculations show that no more than 4 percent of the

financial aid granted to underclassmen could have paid for remedial courses. Consequently…it is unclear whether eliminating financial aid associated with remedial education would have presented any meaningful opportunities to reprogram Title IV funds." (p. 10)

These findings effectively put to rest the debate over federal financial aid for remedial education. With such a small amount of federal funds involved, few Congress members felt the situation warranted legislation to eliminate federal aid for remedial courses.

Federal guidelines under Title IV of the Higher Education Act of 1984 permit financial aid to pay for remedial courses provided students who take them are accepted to the institution, enrolled in a recognized program of study, and making reasonable progress toward a degree. Students receiving federal loans may use this money toward remedial courses as long as they are enrolled at least half-time. Students accepted to institutions on the condition that they take remedial courses may receive federal financial aid for up to a year while completing remediation (Boylan, Saxon, & Boylan, 2000). While some policymakers have proposed shifting all remediation to community colleges, limiting the number of courses students can take, or charging differential rates for such work; these reforms should be approached with caution due to diversity issues and discrimination such as socioeconomics (Long, 2005).

Accountability

As "open-door" institutions, community colleges have been educating students who were not prepared for college-level work for a long time. Across the country, states are asking community colleges to take on an even greater share of remedial instruction. At

least 10 states prevent or at least discourage public four-year institutions from offering remedial education. These states are Arizona, Colorado, Georgia, Florida, Indiana, Kansas, New Mexico, South Carolina, Utah, and Virginia. In fact, Colorado, New Mexico, and Utah's four-year institutions receive no state funding for remedial instruction. Louisiana began a master plan in 2005 of not enrolling students who needed remediation into four-year institutions (Boswell & Jenkins, 2002).

The trends of states shifting all or most of their remedial instruction to the community colleges has caused great concern for these two-year institutions. Although they are there to serve the community, two-year institutions do not wish to become known as "remedial schools". The shift now is to hold secondary schools accountable for under-prepared students (Yamasaki, 1997).

Importance of the Study

In reviewing the sample populations used to develop and validate the current theories and models on student development, it seemed clear that some major populations are missing, such as developmental-level students, community college students and nontraditional students. Most of the research subjects had been traditional-aged, university or small private liberal arts students. While these samples have resulted in foundations useful for the development of preliminary theories and models, it is imperative that research efforts designed to expand the samples to nontraditional students enrolled in other types of institutions be supported and carried out.

Developmental-level students represent a segment of society being left behind in a growing service and technology-oriented economy. It is suggested that developmental-level students have experienced financial hardship and are now seeking a better standard

of living (Boylan, et al., 2000). Over 60% of first-time community college students in the National Education Longitudinal Study (NELS: 88) took at least one remedial course, compared to 29% of first-time students in public four-year institutions (Bailey, Jenkins, & Leinbach, 2005).

Based on a survey of beginning postsecondary students in 2003-04, the National Center for Education Statistics (2008) reported about 29% of community college students reported having taken some remedial coursework in their first year. Mathematics was the most common remedial course reported by beginning postsecondary students (15%) and by beginning community college students (22%) in 2004.

The reader should interpret these estimates of remedial coursework as being at the low end of the range because the estimates only account for students' coursework in their first year and not over their entire postsecondary education. Moreover, these estimates were based on student self-reports and may not fully capture all remedial course-taking because some students may not recognize a class as being remedial or they may fail to report it for other reasons. When compared with estimates generated from postsecondary student transcripts, student estimates are often lower (Adelman, 2006).

As a result of this large underserved population, it seemed clear that additional populations need to be further tested before assuming that the current models and theories can be used effectively in diverse settings and situations. In examining where these research efforts need to be directed, it is necessary only to consider current enrollment trends. Due to the changing demographics, economics, and employment patterns in our society, an increasing number of students are appearing at community colleges. Data from the 2005 Community College Survey of Student Engagement (CCSSE) shows that

approximately 46% of all U.S. undergraduate college students attend community colleges (Randall, 2005).

It cannot be assumed that the current student development theories, based on limited student populations and validation efforts, apply equally well to all types of students. Similarly, it has not been shown whether research studies conducted in one type of institution would generate the same results in another type of institution. In order to prepare for the changes occurring in American higher education and its students, there is critical need to expand current research efforts and sample diverse populations and settings.

Such studies could make a significant contribution to the building of appropriate theories and models, as well as the structure of direct effect on professional practice, both in and out of the classroom. Within classroom settings, developmental patterns and levels affect such things as curriculum concerns, teaching methodologies, testing methods, learning styles, and study skills. Further considerations exist for student services, including counseling techniques and strategies, vocational concerns, personal concerns, motivation and or goal-setting strategies employed, and types and schedules of services offered.

Purposes/Outcomes

With the need for such research identified above, the purpose of this study is two-fold: 1) to compare the developmental levels of college-level mathematics students to developmental mathematics students and to further study the effects of age, as well as a variety of demographic differences on the development of college students; and 2) to use the results to recommend appropriate changes to classroom concerns, instruction, and

student services.

The following research questions were tested: 1) Do college-level mathematics students (either traditional-aged or adults) vary widely from developmental mathematics students in their level of development based on a) competency; b) autonomy; c) identity; or d) intellectual development? 2) Do adult students vary significantly from traditional-aged students based on the same constructs? 3) Are there other factors such as gender, age, employment and parent's education that affect the development of community college students?

The following assumptions were constructed: First, there would be significant differences in the levels of development between college-level mathematics students and developmental mathematics students. While there was no previous research to suggest in what specific ways they would differ on these instruments of autonomy, competency, identity, and intellectual development, related research on community college students (Randall, 2005) did provide some insight. Such research suggested that, overall, developmental-level mathematics students may score somewhat lower on measures of competency, identity, autonomy, and intellectual development.

A second assumption concerned the comparison of adults and traditional-aged students. Once again, there was no previous research that directly compared levels of autonomy, competency, identity, or intellectual development. If consistent with previous related research (Deopere, 1987), however, adults would score higher on measures of competency, autonomy, and identity, but not necessarily higher on measures of intellectual development. In fact, prior studies (Deopere, 1987) showed that intellectual development increases as a result of additional schooling (or other forms of challenge and

support) rather than simply an increase in age.

Finally, in exploring additional factors that might affect development, it was hypothesized that there would be differences based on gender, employment, and enrollment patterns. While there were no previous research findings to suggest specific directions of differences in scores of autonomy, competency, identity, and intellectual development, it was hypothesized that development would increase with the number of terms of enrollment and differ based on gender and employment patterns.

Theoretical Frameworks

The measures of competency, autonomy, identity, and intellectual development are rooted in two theoretical frameworks. The development of competency, autonomy, and identity are based on the findings of Chickering (1969), while the construct of intellectual development is based on the work of Perry (1970). Chickering's theory of student development, classified as a psychosocial theory, builds on the work of Erikson (1963). Psychosocial theorists focus on stages of development as well as developmental crises and tasks. Broader than most other theory classifications, psychosocial theories combine thinking, feeling, and behavior.

Perry's theory of intellectual development has its roots in the works of both Piaget (1964) and Kohlberg (1969). With a primary focus on how students think, rather than what they think, cognitive development theories emphasize the developmental principles of organization and adaptation. Chickering's and Perry's theories will be briefly described here, with additional details in Chapter 2.

The development of competency, as suggested by Chickering (1969), is one of the first growth areas to emerge in the college years. His theory breaks competency into

three components: intellectual competence, physical and manual skills, and interpersonal competence. Intellectual competence is skill in using one's mind. It involves mastering content, gaining intellectual and artistic sophistication, and, most important, building a collection of skills to comprehend, analyze, and create. Physical and manual competence can involve athletic and artistic achievement, designing and making tangible products, and gaining strength, fitness, and self-discipline. Interpersonal competence entails not only the skills of listening, cooperating, and communicating effectively, but also the more complex abilities to tune in to another person and respond appropriately, to align personal agendas with the goals of the group, and to choose from a variety of strategies to help a relationship flourish or a group function.

Developing autonomy, Chickering's (1969) third vector of development, is also thought to develop fairly early in the college experience. It also includes three facets: establishing emotional autonomy, attaining instrumental autonomy, and ultimately, recognizing one's interdependence. Emotional autonomy means freedom from continual and pressing needs for reassurance, affection, or approval. It begins with separation from parents and proceeds through reliance on peers, non-parental adults, and occupational or institutional reference groups. It culminates in diminishing need for such supports and increased willingness to risk loss of friends or status in order to pursue strong interests or stand on convictions. Instrumental autonomy has two major components: the ability to organize activities and to solve problems in a self-directed way, and the ability to be transportable. It also involves learning to get from one place to another, without having to be taken by the hand or given detailed directions, and to find the information or resources required to fulfill personal needs and desires. And finally, developing

autonomy culminates in the recognition that one cannot operate in a vacuum and that greater autonomy enables healthier forms of interdependence. Relationships with parents are revised. New relationships based on equality and reciprocity replaces the older, less consciously chosen peer bonds.

Identity is the fourth vector and is the most central and encompassing element in Chickering's (1969) work. While growth in this domain is primarily perceptual and attitudinal, as well as interwoven with the other vectors, Chickering sees growth in identity as a distinct developmental step which develops, in part, after competency, autonomy, and the freeing of emotions and prior to the last three vectors of development; interpersonal relationships, purpose, and integrity (Widick, Parker, & Knefelkamp, 1978). Besides providing a framework of order for the other six vectors, however, the development of identity is defined by Chickering (1984) as a "solid sense of self" (p. 80).

While Chickering's theory is divided into seven vectors, only three of those vectors were used for the purposes of this study; competency, autonomy, identity. Perry's theory focuses on only one component; intellectual and ethical development. Perry (1970) suggested that intellectual development progresses through nine hierarchical positions. These positions are divided into three major components: dualism, relativism, and commitment. The most basic position is duality. The world, knowledge and morality are assumed to have a dualistic structure. Things are right or wrong, true or false, good or bad. Students see teachers as authority figures who impart right answers and the truth. The role of the student is to receive those answers and demonstrate that they have learned them. Detachment is difficult in this position because there is only a single, correct point of view.

The next major position is relativism. The world, knowledge and morality are accepted as relativistic in the sense that truth is seen as relative to a frame of reference rather than absolute. Students recognize that things can only be said to be right or wrong within a specific context. Teachers are seen as expert guides or consultants rather than as authority figures who impart the truth. Peers are accepted as legitimate sources of learning. The position of relativism involves a much more extensive restructuring of the learner's existing knowledge than the previous position.

The final major position is commitment. The commitments that the students have developed together with their recognition that all knowledge is relative leads to the realization that each person partly determines his or her own fate. The students also recognize that commitments and identity are constantly evolving (Rapaport, 2006).

While both theoretical frameworks are central to the study and to the instruments, it is important to point out that only parts of each theory were utilized. As previously indicated, only three of Chickering's developmental vectors were included and furthermore, the instruments selected focus only on certain subscales of each vector. The instrument selected to measure Perry's intellectual development originally included all three major divisions of the hierarchical sequence; however, the validity for the commitment scale was low. Furthermore, if consistent with previous studies (Parker, 1984; Strange, 1978) the scores would fall primarily into dualism and relativism in the first two years of college. Therefore, only the first two divisions were used.

In an attempt to further outline the research problem, several additional variables were investigated. It was assumed that several of these variables would have a significant effect on developmental levels and patterns: full versus part-time attendance,

gender, age, time obligations and barriers (e.g., family responsibilities, employment, lack of funds), family background, triggering events to return to school, and educational aspirations.

Research Questions

Based on the theoretical frameworks used, the purpose of the study, and the specific instruments selected, the following questions were posed:

1. Competence
    a) How do developmental mathematics students in general differ from college-level mathematics students on the two scales of competence?
    b) How do traditional-aged community college students differ from adult community college students on the three scales of competence?
2. Autonomy
    a) How do developmental mathematics students in general differ from college-level mathematics students on the three scales of autonomy?
    b) How do traditional-aged community college students differ from adult community college students on the three scales of autonomy?
3. Identity
    a) How do developmental mathematics students in general differ from college-level mathematics students on the identity subscale?
    b) How do traditional-aged community college students differ from adult community college students on the identity subscale?

4. Intellectual Development
    a) How do developmental mathematics students in general differ from college-level mathematics students on intellectual development?
    b) How do traditional-aged community college students differ from adult community college students on intellectual development?
5. Demographic Information
    a) Are any of the scale scores related to employment patterns?
    b) Are any of the scale scores related to gender?
    c) Are any of the scale scores related to degree aspirations?

Definition of Terms

While the research questions have been identified, it is important to define several terms as they were used for the purpose of this study.

- Adult students were defined as students 21 years of age or older attending a two-year institution.
- Community colleges are commonly described as publicly funded two-year institutions. In the United States, community colleges operate under the policy of "open enrollment" (American Association of Community Colleges, 2005).
- Developmental mathematics courses are designed to remediate students deficient in mathematical skills which are a prerequisite to success in required college-level mathematics courses as well as courses in the sciences, business, or other fields that require basic mathematics and algebra competencies (Southwest Tennessee Community College, 2007).

- Open enrollment allows anyone with a high school diploma or general education diploma (GED) to attend regardless of prior academic status or college entrance exam scores. Although community colleges have an open admission policy, students have to take assessments before enrolling at the college because not all courses are open admission (American Association of Community Colleges, 2005).
- Placement in developmental mathematics courses is designed to match students' mathematical skills with course offerings. Placement into the Developmental Studies Program (DSP) is based on the same guidelines for all Tennessee Board of Regents institutions. Students under 21 years of age are placed according to valid ACT sub-scores in English, Mathematics, and Reading. Students 21 years or older are most often placed according to their scores on an appropriate placement test, COMPASS. COMPASS is a computerized battery of standardized tests covering reading, writing, pre-algebra and algebra skills. If valid ACT sub-scores are available, they can be used for placement (Southwest Tennessee Community College (2007).
- Traditional-aged students were defined as students ranging in age from 17 to 20 years of age.

Limitations of the Study

The sample was taken from students enrolled at Southwest Tennessee Community College primarily in day courses located on the Union Avenue campus. The results may not be generalized to the community college population as a whole. Also, to the extent that each community college is unique, the results of the study may not be generalized to

other community colleges. Furthermore, while recognizing the inherent value in using theories to help make sense out of what we do, as they have the power to describe, explain, predict, and control; there are limitations as to how or why they should be considered at Southwest Tennessee Community College.

- Because Southwest Tennessee Community College student affairs division is so comprehensive, it may be very difficult, if at all appropriate, to focus primarily on the traditional college-aged student.
- The theories themselves are based on the findings of a narrow population (mostly white, upper to upper middle class, traditional-aged men) but have been tested later in other settings.
- The theories focus on individual development to the exclusion of community-oriented values such as humanity and interdependence. Maslow, an American psychologist, viewed humans as exercising a high degree of conscious control over their lives and as having a high resistance to pressures from the environment. (Hoffman, 1988).

Finally, the cutoff score used with the placement test to assign mathematics course placement was determined by the Southern Regional Education Board to be 19 on the ACT. Since the procedure to determine the cutoff score can vary throughout the United States, this could cause inconsistencies in the results from one college to another.

Chapter 2

Review of the Literature

The theoretical frameworks used in this study are the theories of Arthur Chickering (1969) and William Perry (1970). This chapter will review these two theories and related research. Although Chickering's work is based on students at four-year institutions, it is relevant to this study of community college students.

The work of Chickering has consistently been among the most widely applied theories to the study of college student development or to administrative programming intended to promote student development (Pascarella & Terenzini, 1991). Part of its appeal lies in its all-inclusive coverage of psychosocial issues. Widick et al, (1978) suggested "his descriptions of students and college environments are theoretical yet recognizable and realistic; his thinking connects in a very direct way with the experiences of college practitioners" (p. 19). Perry's theory of intellectual and ethical development is strongly rooted in the work of Piaget (1964), who is recognized for studies of cognitive development in children and adolescents.

Classified as a psychosocial theory, Chickering's work builds on the foundation of Erikson (1963). Erikson's theory of psychosocial development emphasizes individual movement through a sequence of stages that define the life cycle. Furthermore, the theory suggests that development cannot be understood outside the socio-cultural context in which it occurs. Thus, each stage of development unfolds as biological growth, cognitive maturation, and societal stimuli come together to form a specific set of issues or developmental tasks to be resolved.

Chickering (1969), selected Erikson's (1963) two developmental stages most associated with late adolescence and early adulthood and narrowed the focus to an examination of the development of identity and intimacy during the college years. With the central point of reference being the development of identity, Chickering refined and expanded the concept of identity to include seven vectors or dimensions of development involved in the task of identity resolution (Widick et al., 1978). These seven vectors will be discussed later in the chapter.

While proponents of Chickering's (1969) theory have admired its comprehensiveness, critics have argued that it lacks specificity and precision. Seemingly, it is difficult to satisfy both requirements. Therefore, research based on the theory might take advantage of the breadth in an attempt to expand its depth. Chickering's theory is considered too broad because it attempts to encompass developmental tasks throughout the life cycle. For example, those aged 23 to 35 must deal with the tasks of deciding on a partner, starting a family, managing a home, starting an occupation, and assuming civic responsibilities. These are clearly tasks nearly everyone undertakes during that age period, but there is no notion of stages. Chickering's theory is considered too narrow because it is concerned primarily with higher education whereas much human development also takes place in infancy and younger years, and in the workplace (Nelson, 1997). Widick et al. (1978) suggested that "it may be useful and necessary to draw on other more specific knowledge bases relevant to each vector" (p. 28). Each of Chickering's seven vectors will now be briefly examined, with specific emphasis and elaboration on the three vectors used for the purpose of this study: competence, autonomy, and identity.

Chickering's Theory of Student Development

The terminology itself may first merit some clarification. Chickering (1984) chose to call his seven areas of college student development "vectors." This term was chosen because "each seems to have direction and magnitude—even though the direction may be expressed more appropriately by a spiral or by steps than by a straight line" (p. 8). Thus, Chickering's seven vectors are his attempt to identify the common major areas in which growth occurs during the college years.

The first vector involves achieving competence. This is seen in three distinct areas: 1) intellectual competence; 2) physical and manual skills; and 3) social and interpersonal competence. Intellectual competence is probably the most studied and easily assessed area of student development in the college years. It can be further divided into increases in general information, general intelligence, and critical thinking ability. Growth in the intellectual competence arena seems critical to further growth in nearly all other areas, as a student must have the ability to adequately symbolize and categorize in order to make sense of life experience and external stimuli.

Physical and manual competence is undeniably important in our competitive world and again, seems interwoven with an overall sense of competence, confidence, achievement, and purpose. The student who acquires proficiency in athletics or artistic endeavors has many opportunities to develop leadership, vocational skills and interests. While intellectual competence is steeped in the abstract, physical and manual competence teaches students about achievement and is more concrete.

The third division of competence is the interpersonal arena. White (1963) stated, "Interpersonal competence develops through effort and its efficacy in human interaction"

(p.91). He also suggested that every interaction with another person entails some aspect of competence, that every act directed at another is intended to have an effect of some kind. The extent to which the student can produce this effect, consciously or unconsciously, can be viewed as a measure of competence (White, 1963).

Together, intellectual, physical/manual, and interpersonal competence provide a means of coping with the world. Students' feelings about their competence and their sense of security and control have a large impact on their levels and patterns of development in other areas. Confidence in their competence allows them to take more risks and pursue other growth opportunities. This leads directly to the second vector—that of managing emotions.

The goal or end result of satisfactory growth in this second vector might be summarized as "developing flexible controls congruent with the self one is and is becoming" (Chickering, 1984, p. 41). This control must be identified as that which comes from self, rather than family, peers, or culture. The greater the linkage to personal purposes, attitudes, and values, as well as to future plans and aspirations, the greater the growth exhibited.

Chickering (1984) divided this second vector, managing emotions, into two areas: 1) increased awareness of personal feelings and emotions; and 2) increased integration of feelings and emotions. Increased integration recognizes the fact that feelings and emotions are legitimate guides and sources of information. As a student becomes better able to respond emotionally from his or her experiential base and to accept these emotions, there is greater depth and breadth of emotional response, "leading to increasingly complex varieties of control and levels of sensitivity" (p. 52). Once again,

growth in this area is viewed as stimulus for growth in the next vector.

The third vector of development is that of developing autonomy. The three components are: 1) the development of emotional independence; 2) the development of instrumental independence; and 3) the recognition of interdependence. Emotional independence is exhibited by reduced dependence upon significant others (family and/or peers), as well as reduced dependence upon institutional forms such as colleges and churches. There is a greater willingness to risk loss of approval and affection. There is also a greater willingness to explore nontraditional alternatives outside the institutional norm.

Instrumental independence is defined as the ability to carry on activities and to cope with problems without seeking help, as well as the freedom and confidence to be mobile in order to pursue opportunity or adventure. Finally, development of autonomy culminates in recognition of interdependencies. Interdependence is an awareness of one's place in and a commitment to the welfare of the larger community.

The fourth vector of development is establishing identity. This vector involves students integrating the first three vectors: competence, managing emotions and increased autonomy. This integration results in a greater sense of self and understanding of one's place in the world, which in turn, stimulates growth in establishing identity. Students exhibiting maturation on this dimension show increased personal stability, a sense of balance and perspective, and an increased comfort with the kind of person they are and are becoming. They have a well-ordered sense of values and a sense of confidence that they can cope effectively with present and future challenges.

According to Chickering's theory, students generally progress through the first four vectors simultaneously during their first and second years in college and through the fourth vector during their second and third years (given a standard four-year program). Students move through these vectors at different rates and may even move back and forth through them, depending on levels of challenge, support and maturity. Although based on traditional-aged students, elements of Chickering's theory can be used with all students. Because this study was conducted at a two-year college, it is important to focus on the first four vectors since they occur during the first two to three years of college. Therefore, only a brief summary of the final three vectors of Chickering's theory seemed appropriate.

The fifth vector, freeing of interpersonal relationships, begins with increased tolerance and acceptance of individual differences. There is a greater capacity for listening and understanding without domination or judgment. This tolerance and acceptance, along with growth of autonomy and identity, open the door for intimate relationships.

The sixth vector is developing purpose, or formulating plans for action and establishing priorities. It involves the integration of three major elements: 1) recreational interests; 2) vocational plans and aspirations; and 3) integration for considerations of lifestyle. Once again, effective development of purpose reflects and is integrated with a sense of identity (Widick et al., 1978).

The seventh and final development of Chickering's vectors is the development of integrity. The following components are identified: 1) the humanizing of values; 2) the personalizing of values; and 3) the seeking of congruence between beliefs and behavior.

Growth along this vector results in an increased capacity to see the relativity of values in individual situations, to develop a personal set of values to serve as a flexible guide to behavior, and to integrate values and actions.

Most, if not all, of Chickering's vectors are life-long tasks that are constantly renewed and reaffirmed with new challenges and life transitions. Thus, the term vector with its connotation of a spiraling path throughout the life span seemed most appropriate. The college years introduce many challenges that a student faces for the first time. These same challenges, in a variety of guises and life experiences, continue to confront an individual and to shape and mold his or her development.

Perry's Theory of Intellectual and Ethical Development

William Perry's (1970) theory of intellectual and ethical development is based on three central cognitive development assumptions. First, cognitive development theories are based on an information processing view of the world which basically means that people interpret and respond to stimuli. Second, development is seen as progressing along a hierarchical continuum divided into separate, increasingly complex stages. Third, development is seen as a product of the interaction between the person and his or her environment (King, 1978). These three assumptions provide a framework for viewing Perry's theory.

Perry's nine position scheme can be used to trace "the evolution of a student's thinking about the nature of knowledge, truth and values, and the meaning of life and responsibilities" (King, 1978, pp. 37-38). Students progress from a simplistic, categorical view of the world to a better understanding of contingencies and relativism. Finally, students progress to a formation of individual commitment within these contingencies

such as an emergency or unexpected expense. The nine positions are as follows:

Level 1: Dualism

From the dualism perspective, there are only two approaches, being right and being wrong. Uncertainty indicates an error of some sort. Level 1 consists of three positions.

Position 1: The student sees the world in polar terms of we-right-good vs. other-wrong-bad. Right answers for everything exist in the absolute, known to authority whose role is to teach them. Knowledge and goodness are perceived as quantitative accretions of discrete rightness to be collected by hard work and obedience. All information is either right or wrong.

Position 2: The student perceives diversity of opinion and uncertainty, and accounts for them as unwarranted confusion in poorly qualified authorities or as mere exercises set by authority "so we can learn to find the answer for ourselves." All information is either right or wrong and where uncertainty seems to exist it is really an error committed by a wrong authority.

Position 3: The student accepts diversity and uncertainty as legitimate but still temporary in areas where authority hasn't found the answer yet. The student supposes authority grades him/her in those areas on good expression but remains puzzled as to standards. All information is either right or wrong, but uncertainty is acceptable in areas where experts don't know the answers yet. Someday, the right answers will be discovered.

Level 2: Relativism

Position 4: (a) The student perceives legitimate uncertainty (and therefore diversity of opinion) to be extensive and raises it to the status of an unstructured epistemological realm of its own in which anyone has a right to his own opinion, a realm which he or she sets over against Authority's realm where right or wrong still prevails, or (b) the student discovers qualitative contextual relativistic reasoning as a special case of what they want within authority's realm. Ideas have equal value and no one has the answer.

Position 5: The student perceives all knowledge and values including authority's as contextual and relativistic and subordinates dualistic right-wrong functions to the status of a special case, in context. Knowledge is contextual.

Position 6: The student apprehends the necessity of orienting oneself in a relativistic world through some form of personal commitment as distinct from unquestioned or unconsidered commitment to simple belief in certainty. A person's life, especially his or her values, emerges as commitments are made.

Level 3: Commitment in Relativism

Position 7: The student makes an initial commitment in some areas. Establishing an identity is in process.

Position 8: The student experiences the implications of commitment, and explores the subjunctive and stylistic issues of responsibility. Personal commitments are made.

Position 9: The student experiences the affirmation of identity among multiple responsibilities and realizes commitment as an ongoing, unfolding activity through

which he expresses his lifestyle. The student establishes his/her own identity and lifestyle consistent with own personal theme (Perry, 1970, pp. 9-10).

One interesting variation of Perry is that, unlike most cognitive theories, Perry's theory allows for something other than straightforward movement along the hierarchical continuum. Based on the belief that a student might experience alienation, she or he could "opt out from the course of the maturation process" (Perry, 1970, p. 8). These conditions of delay, deflection and regression are described by Perry as follows:

> Temporizing: The student delays in some position for a year, exploring its implications or explicitly hesitating to take the next step.
>
> Escape: The student exploits the opportunity for detachment offered by the structures of Positions 4 and 5 to deny responsibility through passive or opportunistic alienation.
>
> Retreat: The student entrenches in the dualistic, absolutistic structures of Positions 2 or 3 (Perry, 1970, p. 10).

Perry's cognitive theory represents a valuable attempt to chart the progress of effort by students. The theory also helps to re-categorize and restructure students' worlds in an ever-changing environment and developmental journey. Perry's theory, in conjunction with Chickering's psychosocial theory, provides the primary theoretical frameworks for this study. The following section applies Chickering's and Perry's theories to adult community college students.

Extension of Theories to Adult Community College Students

Although Chickering's (1969) seven vectors were created to explain the various psychosocial developments that occur during the traditional-age student's college years,

Wimbush, Bumphus, and Helfgot (1995) asserted that the theory is also applicable to adult students and can indeed inform adult student development practice. For example, "adult students may work through Chickering's seven vectors and reexamine their identity in the context of going to college" (Wimbush et al., 1995, p. 24). In addition, for many adult students, exposure to global cultures on campus contributes to their sense of self and their relation to the wider global community. As well, it is crucial for adult students to develop purpose about their vocational goals, especially in community or technical colleges. These goals are often strongly tied to family commitments and financial survival and can and should be worked into curricula at community colleges that serve large numbers of adult students. However, researchers investigating the applicability of Chickering's theory to women have found that "their development differs from men's, particularly regarding the importance of interpersonal relationships in fostering other aspects of development" (Evans et al., 1998, p. 46). As such, theories about women's ways of knowing must be taken into account if the adult students are to be served effectively.

Perry's (1968) theory of cognitive development of students examines nine positions that trace the way in which students typically move from a simplistic, categorical view of the world to a realization of the contingent nature of knowledge, relative values, and the formation and affirmation of one's own commitments. These sorts of coping and delaying strategies may be especially relevant as intellectual development of adult students is explored. Faced with new challenges, but no support, adults may retreat to previous stages of intellectual development. Furthermore, some comparison of institutional supports and challenges may be possible in reviewing the differences in levels or patterns

of development between developmental-level mathematics students and college-level mathematics students.

Perry's theory is useful in establishing, implementing and evaluating a curriculum. These "positions" serve as filters through which students see their world by way of their academic and personal experiences. Curriculum challenges for level one include providing relative viewpoints in course content and instructional method; providing experiential learning modes; and requiring analysis of conflicting viewpoints. Students seeing the world from this perspective are best supported by highly structured instruction, a personal atmosphere in the classroom and limited degrees of freedom. Curriculum challenges for the second level include relativistic, diverse content that enables commitment; vicarious experiential learning; and a low degree of instructional structure. Students at the relativism level are best supported by highly diverse content, a personal atmosphere in the classroom and a high degree of freedom.

While there is still much to learn about the ways in which students grow and develop during their post-secondary years, these theories are the foundational ones.

Characteristics of Community Colleges and Their Students

Community colleges are a vital part of the postsecondary education delivery system. They serve over half of the undergraduate students in the United States, providing open access to postsecondary education, preparing students for transfer to four-year institutions, providing workforce development and skills training, and offering noncredit programs ranging from English as a second language, to skills retraining, to community enrichment programs or cultural activities (American Association of Community Colleges, 2008).

Globalization is driving changes in our economy, and the need for an educated workforce has never been greater. The majority of new jobs that will be created by 2014 will require some postsecondary education. In addition, the demographics of the workforce are changing. As a result, employers increasingly rely on the very students who currently are least likely to complete their education (Leath, 2007).

Without community colleges, millions of students and adult learners would not be able to access the education they need to be prepared for further education or the workplace. Community colleges often are the starting point for education in a city and a real means for economic development. According to the American Association of Community Colleges (2008), community colleges serve more than 6.5 million credit-earning students and five million noncredit-earning students in the fall of 2007. The comprehensive mission of community colleges makes them attractive to a broad range of people who seek particular programs or opportunities of special interest. Community colleges are the gateway to postsecondary education for many minority, low income, and first-generation postsecondary education students. Since 1985, more than half of all community college students have been women. As of January 2008, 60% of the 6.5 million students in community colleges are female. In addition, the majority of Black (46%) and Hispanic (55%) undergraduate students in this country study at these colleges. Figure 1 shows a breakdown by gender and race of students enrolled in community colleges for 2003-04. In fact, students of Hispanic origin are the fastest-growing racial/ethnic group at community colleges.

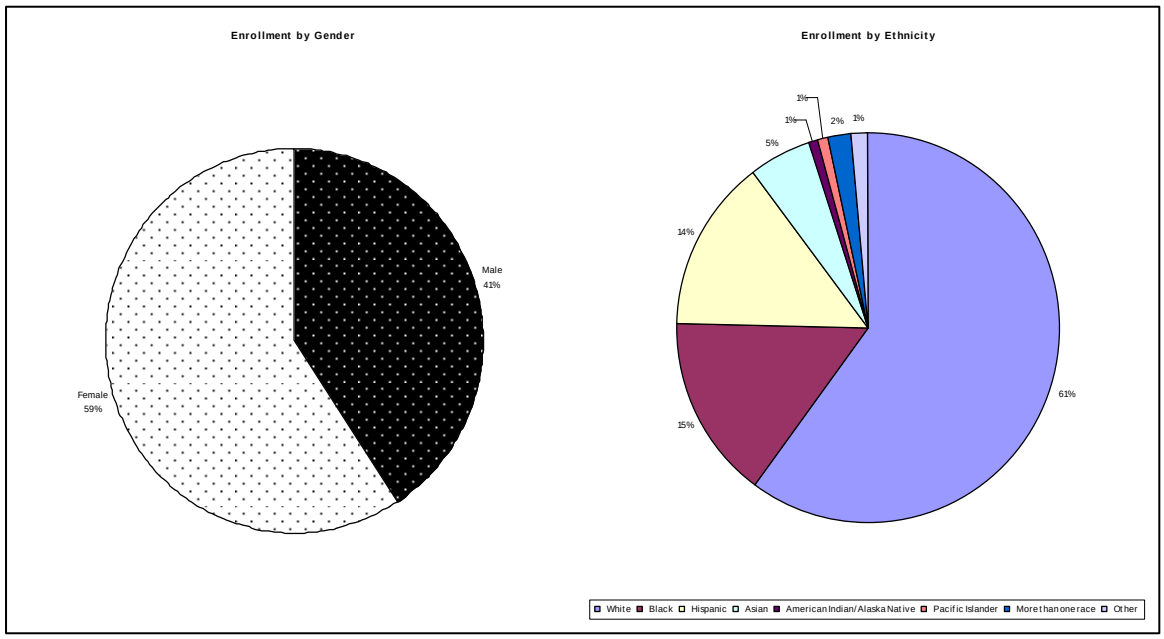

Figure 1. Community College Enrollment

Source: National Center for Education Statistics (2003-04)

Community colleges also provide access to education for many nontraditional students who are adults and working while enrolled. The average age of a community college student is 29 years old, and two-thirds of community college students attend part-time. Figure 2 shows a break down of students according to age enrolled at community colleges. At the same time, community colleges are not only providing access for adult students but also serving an increasing number of traditional age and high school students who take specific courses to get ahead in their studies. In fact, half of the students who received a baccalaureate degree in 1997 attended community college in the course of their undergraduate studies (American Association of Community Colleges, 2008).

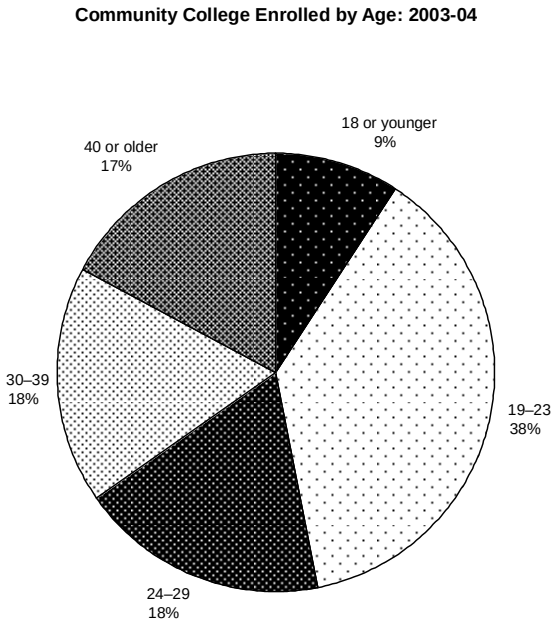

Figure 2. Community College Enrollment by Age: 2003-04

Source: National Center for Education Statistics (2003-04)

The costs to attain a postsecondary degree are on the rise. As a result, increasing numbers of students at community colleges (and four-year institutions) are looking to the federal financial aid programs to help offset or finance the costs of their education. Almost half of the students attending community college receive some form of financial aid to help finance their studies (AACC, 2006). In 2005, more than 2 million of 6.5 million (approximately 30%) community college students received Pell grant dollars. However, in recent years, there has been a shift in government policies away from grants toward student loans. Figure 3 shows the total percent of community college students receiving federal Pell grant by gender and figure 4 shows the ethnicity and average amount per recipient. Because of the lower costs to attend community college, it follows

that the amounts borrowed are lower for community college students than they are for their counterparts at four-year institutions (public and private).

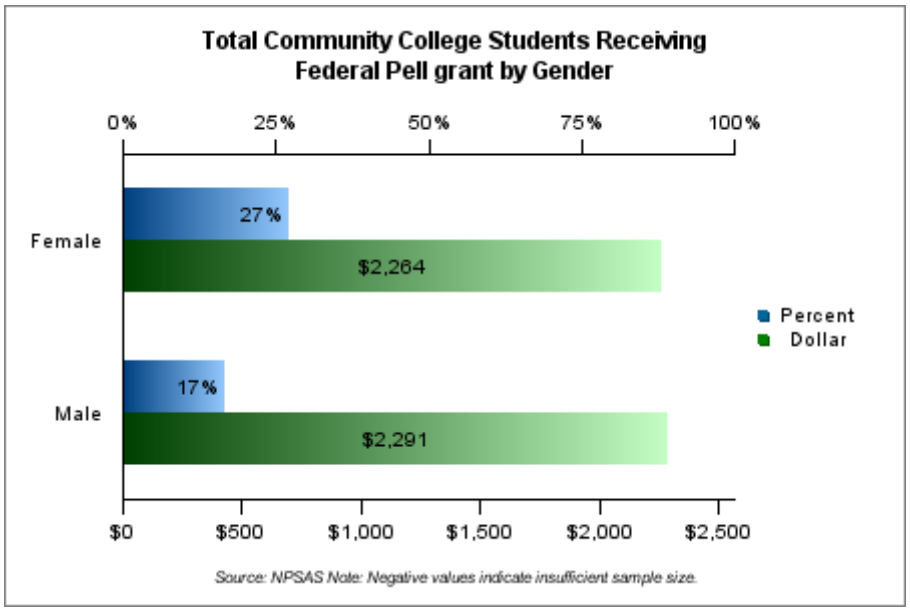

Figure 3. Community College Students Receiving Pell Grant by Gender

Source: National Center for Education Statistics, 2004

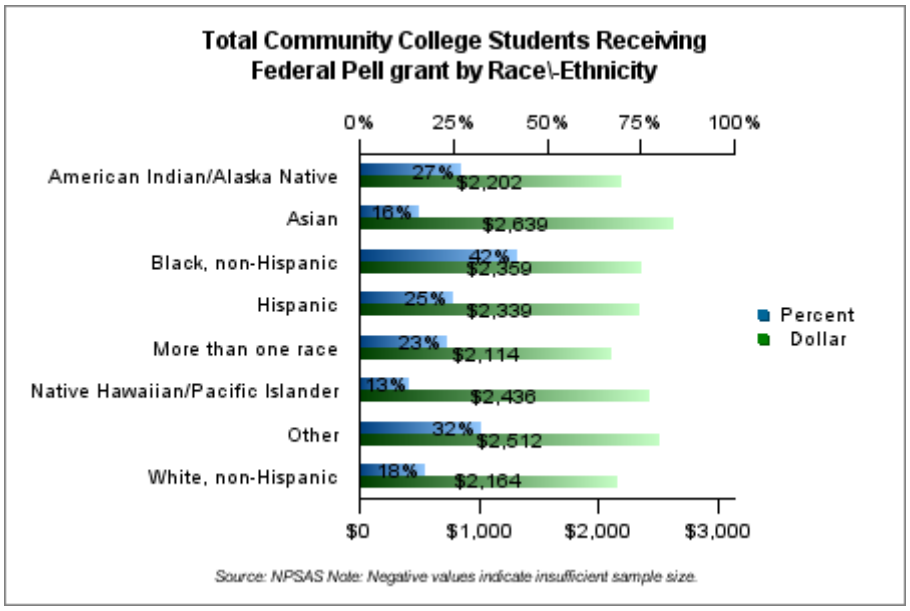

Figure 4. Community college students receiving Pell grant by ethnicity

Source: National Center for Education Statistics (2004)

In addition, 27% of community college students who work full time also attend classes full time. Among students aged 30 to 39, the rate of students attending class full time and working full time climbs to 41% (AACC, 2006). Figure 5 shows the employment status of community college students by enrollment status for 2009.

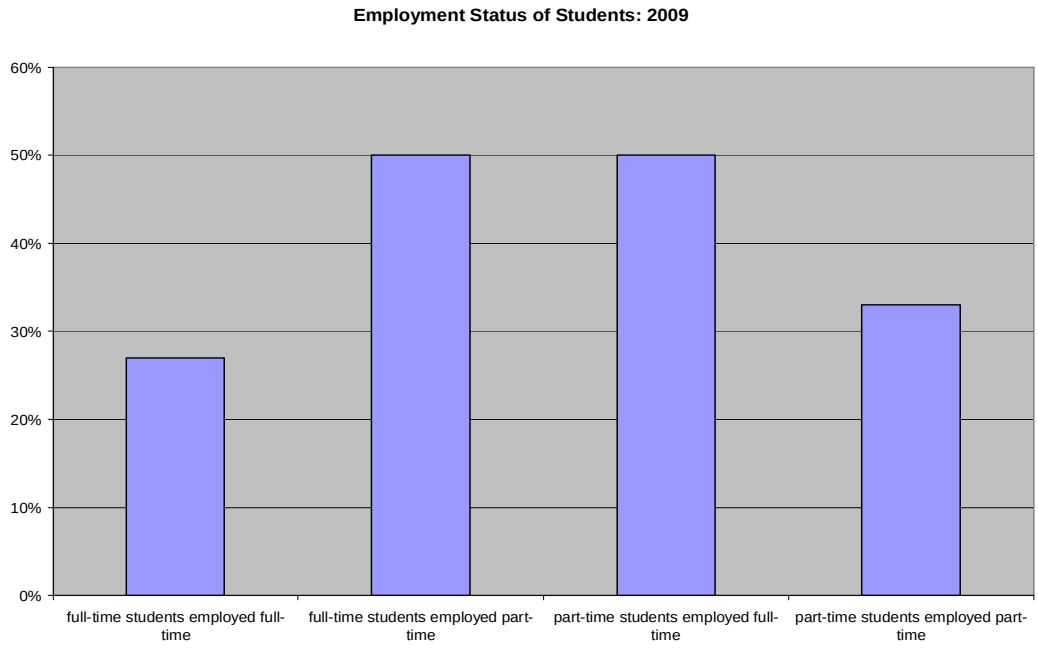

Figure 5. Employment Status of Community College Students by Enrollment: 2007. Source: American Association of Community College, (2008)

Community colleges are diverse institutions that serve a wide variety of needs. These include the students who come to upgrade their skills for a particular job, students who are pursuing an associate degree to transfer to a four-year institution and students who come to pursue a hobby such as learning a language. The educational outcomes of community college students reflect this diversity.

- Community colleges enroll a diverse group of students, with various reasons for going to college, and have larger percentages of nontraditional, low-income, and minority students than 4-year colleges and universities (U.S. Department of Education, 2008).

The defining characteristics of high school seniors who go to a community college immediately after high school include the following:

- Seniors from demographic groups with the lowest rates of immediate enrollment in a postsecondary institution were students from the lowest quarter of SES families. Hispanic and American Indian/Alaska Native students—had the highest rates of immediate enrollment in community colleges in 1992 and 2004.
- Seniors who enrolled immediately in community colleges in 2004 spanned a broad range of academic achievement—including some students who were very well-qualified for college in terms of their performance on standardized tests and coursework completed. They included a greater percentage of well-prepared seniors than did the 1992 senior cohort and included many students with a high school GPA of C+ or above but who lacked mathematics coursework beyond algebra II, foreign language coursework beyond year 2, or both.
- About two-thirds of 2004 high school seniors who enrolled immediately in a community college seem to have done so with the intention of pursuing a bachelor's degree or higher. As high school seniors, 28% had planned to use a community college as a stepping stone to a bachelor's degree and 39% revised their original plans to attend a 4-year college and earn a bachelor's degree by starting their postsecondary education at a community college.
- One-third of 2004 seniors who enrolled immediately in a community college did so with no intention of pursuing any education higher than an associate's degree; however, by 2006, almost 47% of them had raised their educational expectations to start or complete a bachelor's degree (U.S. Department of Education, 2008).

The short-term persistence or attainment rate of first-time community college students in 2003–04 was lower than that of first-time undergraduates in 4-year institutions, even when looking separately at "more committed" community college students.

- Forty-five percent of students beginning at a community college in 2003–04 had left school without completing a degree or certificate program by 2006. Among the community college first-time freshmen who intended to transfer to a 4-year college, 39% had left school by 2006 without completing a degree or certificate program.
- Sixteen percent of students beginning at a community college in 2003–04 had completed a degree or certificate program by 2006, while 40% had not completed a degree or certificate program but were still enrolled (U.S. Department of Education, 2008).

According to the National Center for Education Statistics (2008), while the traditional-age student population has been increasing over the last decade, community colleges still serve primarily independent students. These are students predominantly age 24 or older who are considered financially independent from their parents for financial aid purposes. However, younger students who are married and/or have children are also considered independent. Some 61% of community college students were independent for 2003 through 2004. One-third of community college students were married with children and one-fourth were single parents.

When incomes were examined against established poverty thresholds, just over one-fourth (26%) of community college students fell into the lowest income group. Just under one-half (47%) of community college students received some form of financial aid, primarily grants (40%). Because community college students are likely to work full time

and/or attend college part time, relatively few take out student loans. In 2003-04, for example, twelve percent of community college students had borrowed an average of about $3,600. For those attending full time for a full year, 23 percent had borrowed an average of about $4,100 (NCES, 2006).

This reminder of greater diversity and the possible limitations of existing classifications such as family responsibilities and finances is important in examining and extending what is known about the community college student population. It may be that our measures and theories are too grounded in a university or private liberal arts framework and may be inappropriate for understanding the behavior and characteristics of a large percentage of community college students. This study is an attempt to recognize the diversity of the community college population and to examine the usefulness and fit of our current theories and instruments.

Characteristics of Adult Students

Adult students fall into the category of nontraditional students, whom the National Center for Education Statistics (2008) defined as meeting at least one of the following seven criteria:

- Delays enrollment (does not enter postsecondary education in the same calendar year that he or she finished high school).
- Attends part time for at least part of the academic year.
- Works full time (35 hours or more per week) while enrolled.
- Is considered financially independent for purposes of determining eligibility for financial aid.
- Has a dependent other than a spouse (usually children, but sometimes others).

- Is a single parent (either not married or married but separated and has dependents).
- Does not have a high school diploma (completed high school with a GED or other high school completion certificate or did not finish high school).

Adult students seem to be overtaking traditional students in the higher education arena. The NCES noted in a 2002 study that nearly three-quarters of American undergraduate students met one of the above characteristics for classification as a nontraditional student. Of those, 46% were so defined because of delayed enrollment.

More than half of nontraditional students enroll in two-year institutions, and the more nontraditional they become, the more likely they are to consider themselves working adults first and students second. Nationally, the average adult student is a 35 year-old, married, middle-class Caucasian mother (NCES, 2008).

Another related factor may be the number of terms an adult student has been enrolled. Phillips (1986) found that adult students anticipate more adjustment problems than they actually experience. Therefore, adult students enrolled in their first term may require special supports and assistance to build confidence. Steltenpohl and Shipton (1986) made several recommendations to overcome entry feelings of inadequacy and marginality. They suggested that colleges need to provide developmental opportunities for appraisal of potential, a sense of belongingness, and a better understanding of higher education. Furthermore, specific attempts should be made to link learning to the student's developmental level and location on the life cycle.

Despite the lack of confidence often associated with first-time entry into college, Steitz (1985) also found that, overall, adult students were more motivated than

traditional-aged students. This is exhibited in better concentration and performance levels. In relationship to these performance levels, adult students focused on accuracy rather than speed. When forced to hurry, their performance levels dropped. Furthermore, Steitz found that adult students demand greater application and relevance in their learning which reiterates the fact that adult students are more committed to their studies then traditional aged students.

Triggering Events, Supports, and Barriers

In addition to studying general characteristics of the adult student population, many researchers have also examined factors that initially draw adults back to the classroom. Furthermore, they have begun to identify and explore conditions that encourage and support retention of adult students, as well as conditions that serve to block or impede adult students. The results of these previous studies, found later in the chapter, will be used to design the demographic items for this study.

In studying the purpose or triggering event for additional schooling, Fujita-Starck (1996) surveyed 1,142 students using Boshier's Education Participation Scale and found communication improvement, social contact, educational preparation, professional advancement, family togetherness, social stimulation, and cognitive interest (Merriam & Caffarella, 1999). This is consistent with Phillips' (1986) findings that 65% of adult students enter college for career purposes while 35% enter for personal reasons. Phillips (1986) also reported that the percentage on personal reasons increased as the primary purpose for seeking further education as age increases. Speer and Dorfman (1986) studied formal education's impact on personal and professional development. For their surveyed population, the strongest correlations of rated levels of personal development of

adult students were support from classmates, desire for intellectual stimulation, desire for a career identity, and desire for a meaningful role. The strongest correlates of rated level of professional development were helpfulness of financial aid, desire for a career identity, desire for job preparation, desire for a meaningful role, and desire for achievement.

While supports and benefits certainly exist for adult students, a number of studies have highlighted barriers as well. Sewall (1984) found that family responsibilities are the major barriers to adult women, and job responsibilities and lack of interest in further education are major barriers for adult men. Aslanian and Brickell (1980) reported barriers of family and job situations, geographic remoteness from the nearest campus, cost of attendance, and lack of financial aid for part-time students.

When adults do overcome the barriers and decide to return to school, 48% of adult students surveyed (Sewall, 1984) stated that a very important goal for education was to achieve independence and a sense of identity while the most frequently mentioned triggering events were job dissatisfaction, encouragement, and the availability of funds. For homemakers, the triggering event of children entering school was also highly significant.

Similarly, Richter-Antion (1986) found that adult students have a clearer purpose for education in mind. They usually pay their own way, so they are more demanding. They want value for their money. They have more time commitments; they must juggle work and family responsibilities in addition to academics. They also are characterized by their increased levels of life experience to apply to their studies, as well as their lack of a strong support group. Their lack of a support group could result from a broad age range of adult students interjected with many different life crises. Unlike the narrow 18 to 22

year old age range when most students experience similar developmental patterns and levels, adult students are much more diverse and have less in common with their adult colleagues.

Partially explaining this diversity and lack of commonality is Even's (1988) discussion of the "baggage" that adult students bring to the learning environment. The baggage represents who they are, what they are, why they are in college, where they have been, and all the life experiences they have gathered until that moment. Even makes the following divisions for the purposes of comparison and variance: 1) age, experiences, and self-concepts; 2) physical nature and aging developments; 3) philosophy and values; 4) emotions and memories; 5) motivation, attitudes, and interests; 6) culture, history, and preferences; and 7) intellectual abilities and perceptions.

Finally, adult students still have to cope with the lack of social acceptability. The common prevailing socio-cultural theme, despite increased adult student enrollment, is that youth is the appropriate time to be a student; adulthood is not. This socio-cultural theme may begin to reverse itself in the current information age, where adults find that they must, more than anything else, be able to locate and use knowledge. Also they find that they must focus more on inter- and intrapersonal development, rather than just on the development of cognitive skills (Nordstrom, 1989).

This study, in addition to comparing developmental differences based on age, will explore several of the characteristic differences such as confidence, triggering events, and barriers.

Characteristics of Community College Developmental Students

One of the key educational tasks that has fallen to community colleges is to offer developmental or remedial education to prepare students who, for one reason or another, are not ready for college-level coursework. Remedial courses, usually in mathematics, English, or writing, provide instruction to shore up the basic fundamentals within a subject and to develop studying and social habits related to academic success. Given the large increases in postsecondary student enrollment and the open admissions policies offered by many institutions, student populations have become increasingly diverse and many new students (especially nontraditional students) are entering college each year. As a result of the growing need for remediation on campuses, some states require students to take remedial coursework at community colleges and have in turn stopped offering these courses at public 4-year institutions (Cohen & Brawer, 2003).

Developmental courses at community colleges keep open the possibility of degree programs and highly technical vocational training for those who need to improve reading, writing and computation skills. In the literature, developmental students are also known as remedial, at-risk, under-prepared, low-achieving, disadvantaged, non-traditional, and skill-deficient. These students represent a segment of society being left behind in a growing service and technology-oriented economy. Tables 1 - 8 show the percentage of first- and second-year undergraduates who reported ever taking remedial courses, the type of courses taken and the student characteristics in 2003-04.

Table 1

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Institution Type: 2003-04

Institutional Type	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
Public 2-yr College	42.9	79.5	29.4	30.4	10.5

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Table 2

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Class Level: 2003-04

Class Level at Public 2-yr	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
First year	34.9	76.3	28.9	35.3	12.0
Second year	37.5	77.8	25.9	33.5	12.5

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Table 3

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Gender: 2003-04

Gender at Public 2-yr	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
Male	33.8	76.6	27.2	34.6	12.6
Female	37.6	77.0	28.3	34.8	11.9

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Table 4

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Race/ Ethnicity: 2003-04

Race / Ethnicity at Public 2-yr	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
White	32.7	77.5	24.2	34.7	12.4
Black	43.1	76.9	32.9	28.8	12.2
Hispanic	41	77.9	31.8	37.5	12

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Table 5

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Dependency Status: 2003-04

Dependency Status at Public 2-yr	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
Dependent	33.6	74.6	29.2	39.5	11.6
Independent	38.6	79.6	26.1	28.4	13
No dependent, unmarried	37.7	79.6	24.4	30.5	14
Married, no dependents	37.4	77	23.4	31.5	13.8
Single parent	40.9	80.2	27.9	27.5	12.4
Married with dependents	37.8	80.1	26.7	26.5	12.5

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Table 6

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Age: 2003-04

Ages as of 12/31/03 at Public 2-yr	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
18 or less	31.1	72.5	30.3	41.3	11.1
19-23 yrs	34.7	76.6	28.8	37.8	12.2
24-29 yrs	38.1	80.3	23.2	27.9	12.5
30-39 yrs	38.6	80.2	28.9	30	11.9
40 yrs or older	41.6	78.1	24.1	22.5	14.3

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Table 7

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Income: 2003-04

Income at Public 2-yr	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
Lowest 25%	38.1	76.3	31.8	35.6	12.8
Middle 50%	36.7	77.3	26.8	34.3	11.7
Highest 25%	31.8	76.3	24.2	34.2	12.9

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Table 8

Percentage of First- and Second-Year Undergraduates Who Reported Ever Taking Remedial Courses, the Type of Courses, and Parent's Education: 2003-04

Parent's Education at Public 2-yr	Any Remedial Courses	Among those who took remedial courses in 2003-04			
		Mathematics	Reading	Writing	Study Skills
High school diploma or less	39.6	78.8	28.7	33	11.5
Some postsecondary education	38.1	78.7	27.1	33.5	11.5
Bachelor's degree or higher	30.9	73	27	37.8	13.3

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04

Careful examination of Table 1 - 8, shows that remedial mathematics was taken over 70 percent of the time for students taking remedial courses. The percentage of students taking remedial mathematics remained the same or higher regardless of institutional or student characteristics. Based on these facts, this study will focus on remedial mathematics students and their comparison to college-level mathematics students.

According to Knopp (1996), the academic profile of community college developmental students was an average high school grade point average (GPA) of 2.40 and a mean cumulative college GPA upon completion or departure of 2.28. This grade

reflected grades received in remedial and college-level classes. Also, 50% of the students scored 800 or lower on the SAT. The maximum score for the SAT is 2400. Thus, 50% of the students scored in the bottom one-third.

While the research does point out some similarities across the remedial student population, it should not be assumed that remedial students can be typified in any particular way. Boylan, Bonham, and Bliss (1994) pointed out that there is really no such thing as the "typical" remedial student. They range in age from 16 to 55. Some are financially disadvantaged and some are quite wealthy. Most are white but a large percentage is African American or Latino. Some are married and some are single. Most have low high school grades and SAT scores and some are well above average in both categories. In fact, it is the very diversity of remedial students that is most interesting.

In essence, students participating in community college remedial courses are very much like most other community college students. There are no demographic, economic, or personal characteristics in which they differ significantly from the typical community college student. The only factor that appears to separate them from non-remedial students is that they have lower scores on institutional assessment tests.

It should be noted that the overall research base on non-cognitive characteristics of community college developmental students was quite limited. However, two studies were found that dealt specifically with developmental students and their non-cognitive skills. For example, Ley and Young (1998) found that developmental students did appear to be properly motivated for college work and their level of motivation was similar to that of regularly admitted students.

Using data from the Learning and Study Strategies Inventory, Ley and Young (1998) also found that the remedial students used fewer self-regulation strategies and used them less frequently than non-remedial students. With self-regulation strategies, learners regulate their own learning by observing what they are able to do, then comparing this to what they have observed to a standard of some kind and making judgments about the quality of this performance, and finally making plans regarding what to do next. In addition, remedial students were typically uncertain about their goals and had low self-efficacy on some academic tasks.

Finally, it was found that a significant number of community college developmental students were the first in their family to attend college. In a study that focused specifically on developmental mathematics students, it was concluded that the older the student, the less likely that their parents had a college education (Umoh & Eddy, 1994).

A few studies addressed issues such as cognitive ability and psychosocial development in remedial students. But these studies examined only small samples of 4-year college students. Some conclusions that were drawn stated that remedial students lacked the academic aptitude, higher order and, particularly, critical thinking skills necessary to survive in college without intensive assessment, counseling, and other learning assistance services (Reed, Makarem, Wadsworth, & Shaughnessy, 1994). The proposed study will examine the cognitive development of remedial mathematics students and college-level mathematics students at a community college to determine if there is a significant difference.

Rationale for the Study

In summary, a review of the related literature provides focused direction for comparisons in this study, as well as reaffirms the need to expand research efforts to adult students and development of community college students. How do developmental-level mathematics students in general differ from their college-level mathematics counterparts in the community college? Do the current theories of student development apply well to them? Are the instruments used to measure these theories of development appropriate to this population?

Similar questions can be posed in examining the development of adult students. How do returning students differ from traditional-aged students on measures of student development? Are the measures of development appropriate to this population? How much of their development can be attributed to formal education activities as opposed to life experiences? Do their differences constitute support for changes in academic curricula, structures, and services?

It is clear that there are many unanswered questions about these two increasingly significant student populations, developmental-level mathematics students and adult students. This study was an attempt to further our understanding of the effects of age on developmental mathematics students versus college-level mathematics students at a community college. Specifically, addressing the comparative developmental levels and patterns of competency, autonomy, identity, and intellectual development; this study served as a beginning step toward a greater understanding of significant differences in the characteristics and development of students of various ages and mathematics levels.

Chapter 3

Methodology

Introduction

This study involved the administration of a developing competence scale, a developing autonomy scale, an establishing identity scale, and a measure of intellectual development to a group of community college students. Competence, autonomy, identity, and cognitive development were studied in relationship to age and two groups of students: developmental mathematics students versus college-level mathematics students in a community college.

The following topics were covered in this chapter: an explanation of the research design; procedures used to obtain the sample population; elaboration of demographic characteristics of the sample population; a review and rationale of the selected instruments, as well as the procedures for data collection and statistical analysis; and finally, a brief examination of methodological assumptions and weaknesses.

Research Design

This study was based on a causal comparative research method designed to look for developmental levels and patterns associated with age and/or mathematics levels at a community college. The characteristic of the causal comparative method is its "ex post facto" design. Crowl (1993) described an ex post facto study as "group comparisons in which the groups being compared already differ with respect to one of the variables of interest. Such studies are often used to identify possible causal relationships." (p. 410) He also acknowledged that the term causal comparative is synonymous with ex post facto. The groups under investigation were already formed according to the guidelines of

Southwest Tennessee Community College at which subjects are students.

In establishing this causal-comparative design, the independent variables were mathematical levels (developmental mathematics students versus college-level mathematics students), with a further distinction between age groups (traditional-aged versus adult students). Additional divisions of age were gathered in order to explore the relationship of life cycles and transitions. The dependent variables were the overall scores and the subscale scores on the instruments measuring competence, autonomy, identity, and intellectual development. Additional independent variables used for exploration included: gender, marital status, employment patterns, family background, and methods of financing education.

With this design and combination of variables, three basic null hypotheses were tested:

1) There are no significant differences between mean scores on the four inventories of developmental mathematics students versus college-level mathematics students;

2) There are no significant differences between mean scores on the four inventories of traditional-aged versus adult community college students; and

3) There are no significant differences between additional independent variables tested such as gender, marital status, family background, and method of financing education.

Subjects

The sample was gathered from two sets of Southwest Tennessee Community College students; developmental-level mathematics students attending day and/or evening classes and college-level mathematics students attending day and/or evening

classes.

To determine how undergraduate students would be placed in developmental mathematics courses or college-level mathematics courses, the Southern Regional Education Board (SREB) recommended in the mid-1980s that states establish statewide or system-wide standards for student performance and for placement of students into college courses. A uniformed set of standards are important for several reasons:

1. Statewide standards establish criteria that determine whether students can begin college-level courses, regardless of whether they enroll at a two-year technical college or a research university. Statewide standards do not mean that colleges and universities in the state must have the same standards for admission. Some colleges and universities may set higher standards.

2. Statewide standards allow educational leaders to assess more accurately the academic preparation, performance and needs of students entering college. Further, students statewide can be measured against the same standard.

3. Statewide standards send a consistent message to students, parents, and high schools about how well students need to be prepared in order to begin college-level work.

States now fall into two categories based on their policies on assessment and placement. States in the first group mandate which assessments are used and how well students must perform on the assessments as an initial step in their placement into college-level courses. SREB states that fall into this category are Arkansas, Florida, Georgia, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, and West Virginia.

States in this first category take various approaches to statewide policies and set different standards. For example, in Arkansas, Oklahoma, Tennessee, and West Virginia

students must score at least 19 on the ACT mathematics test in order to place into college-level mathematics courses. A precise comparison of states' results is difficult at best because each state's policy can be vastly different (Reducing remedial education, 2000).

Two very important factors in statewide placement policies must be noted. First, state policies may allow multiple tests, with different scores on these tests to determine academic placement as shown in Table 9. Second, some states use statewide standards as a wide measure in determining remedial needs, and then allow colleges and universities to administer additional assessments to weigh students' skills and place them in courses more accurately.

In states with statewide policies on assessment and placement, some similar patterns emerged. Initially, the number of students enrolled in remedial courses rose as standards were established. However, over time, the remedial rates did decline. Holding all entering college students to a single standard resulted in a high percentage of students who need at least one remedial course. This pattern was confirmed by a 1999 Oklahoma study that reported that initiatives to improve student preparation for college initially caused an increase in the need for remedial education but over time this led to a decrease (Mazzeo, 2002). Since the SREB policy took effect in fall 1994, there have been declines in the percentage of students whose ACT scores are lower than 19 and in the percentage of recent high school graduates who take remedial courses (Reducing remedial education, 2000).

Table 9

Policies of States Requiring Assessment and Placement

State	Type of Assessment and Placement Policy			
	Requires Assessment	Requires Placement	Specifies Tests to be Used	Have Developed State Tests
Arkansas	X	X		
California	X			
*Florida	X	X		X
Georgia	X	X		
Illinois	X	X		
Mississippi	X	X		
*New Hampshire	X	X	X	
New Jersey	X	X		X
*North Carolina	X	X	X	
Oklahoma	X	X	X	
Texas	X	X	X	X
Tennessee	X	X		X
Virginia	X	X	X	
West Virginia	X	X	X	
Washington	X	X	X	

*Applies to Community Colleges only.
Source: National Center for Developmental Education survey of SHEEOs (1999) and Russell (1998).

Adult students attending Southwest Tennessee Community College are placed into the appropriate mathematics course based on the results of the COMPASS exam. COMPASS is a computerized battery of standardized tests covering reading, writing, pre-algebra and algebra skills. Placement is based on statewide standards for the various subject areas.

Students who believe their placement is not correct and who have not enrolled in the course at Southwest Tennessee Community College or any other Tennessee Board of Regents (TBR) institution may challenge their placement by contacting the Testing Center at either the Macon Cove campus, (901) 333-4170, or the Union Avenue Campus, (901) 333-5127, to make an appointment for the appropriate challenge test. A nominal fee is charged for the test (Southwest Tennessee Community College, 2007).

According to the Community College Survey of Student Engagement (2009), Southwest Tennessee Community College is the largest two-year college in Tennessee with over 12,000 students enrolled in fall 2009 for associate degrees and career certificates in more than one hundred areas. The open-admissions institution serves both urban and rural populations in Shelby and Fayette counties with two main campuses and four off-campus centers. The student body is predominantly female (66%), black (57%), part-time (53%), and adult (average age of 27 years with only 26% younger than 21 years) (CCSE, 2009).

Instrumentation

The instruments selected for this study included measures for competence, autonomy, identity, and intellectual development. All of the instruments were part of the Iowa Student Development Inventories (Hood, 1986) designed to test the first six of

Chickering's seven vectors and the Perry measure of intellectual and ethical development. These instruments were developed to provide researchers with valid, reliable assessments of student development that are insightful enough to measure change or growth (Hood, 1986). The instruments for this study can be found in appendix A.

Developing Competence

The Developing Competence inventory was developed by Albert B. Hood and Lorraine M. Jackson (1985). The inventory was originally designed to test all three components of Chickering's competency vector (intellectual competence, physical and manual skill, and interpersonal). However, the physical and manual skill component was eliminated because there was the problem on how to measure physical and manual growth in college students. The desire to grow in manual skills and the opportunities for this growth may or may not be present for many students. There was also the problem of accounting for students with various physical disabilities both in the theory and in the assessment of skills. For this reason, the instrument did not attempt to assess that portion of the achieving competency vector.

For this study, the Developing Competency Inventory consisted of two subscales. These subscales were entitled Self Confidence and Competency in Mathematics. The alpha reliabilities for each of the subscales and the total inventory were high, ranging from 0.91 to 0.96.

The Self Confidence subscale was made up of 30 items that focused on three areas: 1) self confidence in interacting with authority figures; 2) self confidence in interacting with peers; and 3) ease of communicating with others. The Self Confidence subscale had a reliability (alpha) coefficient of 0.92.

The second subscale, Competency in Mathematics, was composed of 20 items which dealt with either self confidence in mathematics or the enjoyment of mathematics. The Competency in Mathematics subscale had an alpha reliability of 0.96. Thus, the total Developing Competency Inventory was made up of 50 items. These items are listed in appendix A.

Developing Autonomy

One of Chickering's vectors is that of developing autonomy. Disengagement from parents is the beginning of autonomy development. Reliance is then transferred to peers or to an occupational or institutional reference group. In time there is less need for such support and the individual becomes more emotionally independent and free of continual and pressing needs for reassurance, affection, and approval. Chickering's theory suggested that development of autonomy focuses on three areas: emotional autonomy, instrumental autonomy, and interdependence.

The Developing Autonomy Inventory, created by Hood and Jackson (1985) to cover these areas, was made up of six 15 item subscales: 1) Mobility; 2) Time Management; 3) Money Management; 4) Interdependence; 5) Emotional Independence Regarding Peers; and 6) Emotional Independence Regarding Parents. The first two subscales measured emotional autonomy; the next three subscales measured instrumental autonomy; and the last subscale focused on interdependence.

The subscales measuring emotional autonomy were not used for this study because they seemed to be geared more to a traditional-aged sample with such items as "I really feel uncomfortable when I go to a party without my friends" and "I don't need my parents' approval of the people I date." Hence, only the instrumental autonomy subscale

(time management and mobility) and the interdependence subscale were used. Furthermore, within the instrumental subscale, the money management items were excluded because they too seemed age-biased with such examples as “When I am overdrawn at the bank, I ask my parents for the money I need” and “My parents manage my budget.” Thus the only subscales used in this study were mobility, time management, and interdependence.

The mobility, time management, and interdependence subscales were composed of seven, eleven, and eleven items each with a reliability of 0.87, 0.85, and 0.80 respectively.

Establishing Identity

The establishment of identity is the core development vector in Chickering’s schema. Identity refers to the type of person the individual thinks he or she is. To measure this vector, Erwin (1991) developed a 58-item instrument called The Erwin Identity Scale which contains three subscales measuring confidence, sexual identity, and conceptions about body and appearance. The confidence subscale captures assuredness in one’s self and in one’s capabilities while realizing that there are limits to this process. There would seem to be some overlap with the confidence subscale and the Developing Competence scale, but this subscale is more general and provides a broader picture of how the level of self-assurance is exhibited in expression, decision-making, and behavior patterns.

In an effort to keep the number of items and administrative time reasonable, only the confidence subscale was used rather than include sexual identity and conceptions about body and appearance. The confidence subscale was chosen because it had the broadest

application. Chickering (1984) stated that the search for identity based on sexual identity and conceptions about body and appearance reaches its highest point during late adolescence and earlier adulthood (ages 18 to 25). However, Erwin (1991) suggested a third component of identity; personal confidence. Erwin stated that a self-confident individual feels comfortable about expressing beliefs, making decisions, and behaving competently, even though action may not be taken in these areas. The self-confidence component was not based on age. The confidence subscale contained 18 items. The reliability for the confidence subscale was 0.8.

Intellectual Development

The Parker Cognitive Development Inventory (PCDI), developed by Parker, is based on Perry's theory of intellectual and ethical development. The PCDI was designed to give an objectively scored measure of cognitive development. The instrument attempted to interpret how students think rather than what they do (Hood, 1986). The PCDI contained items in three different content areas: religion, education and career. It also attempted to distinguish between three types of intellectual reasoning: dualism, relativism, and commitment.

Southwest Tennessee Community College is a public, two-year institution that is not affiliated with any religion. Therefore, the religious content area of the PCDI was excluded from the study. The career content area was also excluded in an effort to reduce items and administrative time. The education content area on the PCDI was chosen for this study because it offered a broader range of application. The number of items contained in the PCDI subscale was 32. The reliability was found to be 0.64.

Furthermore, since this study dealt with only community college students, the commitment items were deleted from the inventory. Previous research (Deopere, 1987) has shown that intellectual development increases as a result of further schooling rather than age.

Data Collection

The study was conducted at Southwest Tennessee Community College located on the Union Avenue Campus. Approval for the study was granted by the Institutional Review Board for the Protection of Human Subjects through the University of Memphis. Approval was also granted by the chairperson of developmental studies, Dr. Cheryl Cleaves, through Southwest Tennessee Community College. Approximately, 300 students participated in this study to compare the personal and cognitive development of students enrolled in developmental-level mathematics courses or college-level mathematics courses. The sample consisted of 150 students enrolled in developmental-level mathematics courses and 150 students enrolled in college-level mathematics courses.

During the spring 2010 semester, all participants in the study were given consent forms administered by faculty members and informed that participation in this study was strictly on a voluntary basis. A copy of the consent form along with a copy of the IRB approval may be found appendix B. Participants were also given the instrument packet and asked if there were any questions concerning the survey. Upon completion of the survey, faculty members placed the packets in a large envelope to ensure anonymity of all participants. The estimated time to complete the survey was 30 minutes.

After receiving the completed surveys, the researcher reviewed the surveys to check for missing data. Surveys that were incomplete were discarded. Data from completed surveys were entered into the Statistical Package for the Social Sciences (SPSS) by the researcher.

Statistical Analysis

Comparisons among means on the instruments and the various subscales were tested using a series of analysis of variance and independent sample t-tests. Two primary comparisons on each developmental scale and subscale were paramount: 1) the means of developmental mathematics students versus college-level mathematics students and 2) the means of traditional-aged versus adult community college students. Statistical protocol indicated that the best method of comparison of means between the developmental mathematics students and the college-level students was to report the mean and standard deviation for each developmental scale and subscale.

The comparison of age groups as well as exploration of additional variables offered additional statistical possibilities. All data was analyzed using the Statistical Package for the Social Sciences (SPSS) software.

First, an independent sample t-test was conducted to test the null hypothesis that there was significant difference between the two groups – developmental-level mathematics students and college-level mathematics students - based on the measures for competence, autonomy, identity, and intellectual development.

Secondly, an independent sample t-test was conducted to test the null hypothesis that there was no overall group effect for the independent variable, age. The test was based on two age groups – traditional-aged and adult students - as compared to the seven

developmental scales or subscales. Specifically, this test was used to determine whether age as an independent variable had an effect on any of the dependent measures. This test considered each dependent variable separately to compare mean scores and standard deviations for the independent variable.

A standard alpha level of .05 was used to determine statistical significance. An alpha level of .05 means that there is a five percent chance of making a Type I error, rejecting the null hypothesis when it is true. Rejecting the null hypothesis indicated that the difference between the observed sample mean and the hypothesized population mean was too great to be attributed only to chance fluctuations in sampling (Hinkle, Jurs, & Wiersma, 2003).

An independent t-test was conducted to test the null hypotheses of no significant differences based on age for each of the dependent variables of developmental scales and subscales. The comparisons were run on the basis of age in that traditional-aged students were those students aged 21 years or less and nontraditional students aged 22 years and older. In addition, an ANOVA test was conducted for comparisons on the independent variable, age (less than 22, 22-26, 27-31, and so on in five-year increments). This comparison allowed for more precise investigations of differences and changes in developmental level based on life cycle research.

Finally, additional tests using the ANOVA was conducted to test for significant differences based on gender and work patterns (not working outside the home, 1-15 hours per week, 16-30 hours per week, 31-40 hours per week, and more than 40 hours per week) and family background. If a significant F ratio was achieved, an ANOVA was run for each dependent variable based on the independent variable. The three assumptions

necessary are: 1) The observations within each sample must be independent; 2) The populations from which the samples are selected must be normal; and 3) The populations from which the samples were selected must have equal variances (homogeneity of variance) (Gravetter & Wallnau, 1996).

Methodological Assumptions and Weaknesses

While this research design and statistical plan offered much strength, it is necessary to point out some of the potential limitations and weaknesses. First, by the very nature of the content and design, there was a lack of control over the independent variables. Institutional type, age, and mathematical level were givens. No manipulation of groups could occur. This means that caution must be exhibited in considering all rival hypotheses which may account for results. For example, does the community or environment itself affect development? Southwest Tennessee Community College located at the Union Avenue campus is in an urban area with majority African American students. Does this decrease some of the effects of age or institutional type that might occur in other environments? Demographic information broken down by campus suggests that this may indeed warrant caution in interpreting results.

Another potential problem lies in the very nature of the demographic data collected. Attempts were made to identify relevant factors. Still, it was not possible to assume that all relevant causative, significant factors have been included in the study. Furthermore, it was difficult to fully determine or understand relationships due to combinations and interactions of variables.

Finally, the changes made to the instruments must be considered. Elimination of certain items and subscales may have some effect on the validity of the instrument.

Comparison of overall means with other samples that completed all the items and subscales must be approached with a certain amount of caution.

Summary

Despite the possible limitations identified, it appeared that this research study offered potential benefits that greatly outweigh its weaknesses. The need for such studies has been highlighted and discussed with a great deal of regularity in the literature. This study addressed that need by investigating the impact of age, institutional type, and a variety of demographic variables to the developmental levels and patterns of college students. As an increasing number of students begin their educational experience in the community college system, and a larger number of adult students enter and re-enter the educational system, an understanding of their unique needs and developmental levels and issues becomes essential to the student development educator and practitioner.

Chapter 4

Results of the Study

Two primary comparisons were central to this study: 1) the developmental levels and patterns of developmental-level mathematics students as compared to college-level mathematics students; and 2) the hypothesized differences in the development of traditional-aged students versus adult students within the community college sample. Additional independent variables such as gender and employment patterns were also analyzed to gain a more complete understanding of the interrelationships of developmental growth patterns.

The comparisons of the developmental-level mathematics student sample to the college-level mathematics student sample and the traditional-aged students to the adult students were conducted by performing independent t-tests, listing the means and standard deviations. When using the independent t-test, three assumptions were made: the dependent variable was normally distributed which can be checked with a Q-Q plot; the two groups had approximately equal variances on the dependent variable which was checked by the Levene's test; and the two groups were independent of one another. The final section was devoted to the examination of additional independent variables within the community college sample such as: gender, employment patterns, degree goal, and parents' highest degree earned. These comparisons were made by conducting independent t-tests and ANOVAs.

Very little research has been published that provides a clear picture of how developmental-level mathematics students may differ from college-level mathematics students in their developmental levels and patterns. Based on related literature that

describes the demographics and characteristics of developmental-level mathematics students, it was hypothesized that there would be significant differences in their level of development as measured by the instruments given in this study.

It was hypothesized that age would be a significant factor when comparing the developmental-level mathematics student sample to the college-level mathematics student sample. Since the community college sample (N = 300) was comprised of 43.3% traditional-aged students below the age of 21, control for age differences was an important procedure.

Developing Competency

An independent t-test indicated that developmental-level mathematics students' mean scores were not different from mean scores of college-level mathematics students on both the competency subscales of self-confidence and competency in mathematics. The scores on the subscales self-confidence and competency in mathematics ranged from 30 to 150 and 20 to 100, respectively. Table 10 shows the results of the t-test on competency when comparing the two groups: developmental-level mathematics students and college level mathematics students.

Table 10

Descriptive Statistics by Mathematical Levels: Competency Scales

	Developmental-level mathematics N=150		College-level mathematics N=150		Levene's Test for Equality of Variances		P Values
	M	S.D.	M	S.D.	F	Sig	
Self-confidence	85.23	16.09	84.65	14.66	.963	.327	.744
Competency in Mathematics	55.35	11.17	54.18	9.68	1.352	.246	.332

With p values of .744 for the subscale self-confidence and .332 for the subscale competency in mathematics, there was no significant difference on the competency scale between the two groups.

Additionally, the traditional-aged community college students showed no significant difference in mean scores on the competency subscales of self-confidence and competency in mathematics than the adult community college students (Table 11). Still, the fact that there was no difference in the mean scores for the traditional-aged students and the adult students on the competency in mathematics subscale was somewhat surprising since traditional-aged students were the most recent high school graduates.

Table 11

Descriptive Statistics by Age: Competency Scales

	Traditional-age (age 20 and under) N=130		Adults (age 21 and older) N=170		Levene's Test for Equality of Variances		P Values
	M	S.D.	M	S.D.	F	Sig	
Self-confidence	84.08	12.19	85.59	17.42	6.643	.010	.308
Competency in Mathematics	54.04	9.40	55.32	11.18	1.015	.314	.292

However, the data indicated no significant difference on the competency scale for traditional-aged and adult students with p-values greater than .05 on both subscales: self-confidence (p = .308) and competency in math (p = .292). The Levene's test was significant for the self-confidence subscale, therefore, the results for unequal variances were used.

Developing Autonomy

An independent t-test was performed to compare developmental-level mathematics students in the sample to college-level mathematics students on the three subscales: mobility, time management, and interdependence. The scores on the subscale mobility ranged from 7 to 35. The scores on the subscales, time management and interdependence ranged from 11 to 55. Table 12 shows that the mean scores for the college level mathematics students were higher than the developmental-level mathematics students on all three subscales for autonomy.

Table 12

Descriptive Statistics by Mathematical Levels: Autonomy Scales

	Developmental-level mathematics N=150		College-level mathematics N=150		Levene's Test for Equality of Variances		P Values
	M	S.D.	M	S.D.	F	Sig	
Mobility	22.65	6.69	23.02	6.54	.019	.892	.625
Time Management	40.05	9.09	41.45	8.48	.169	.681	.169
Interdependence	40.19	9.14	41.63	7.87	2.366	.125	.145

However, no significant difference was found between the developmental-level mathematics students and college-level mathematics students on the autonomy scale. All p-values were greater than $p = .05$.

Also, Table 13 shows that the adult students scored higher on the three subscales for autonomy than the traditional-aged students. Despite the higher mean scores on the time management and interdependence subscales, no significant difference was found between the mean scores for the two subscales with $p = .098$ and $p = .086$ respectively.

However, the independent t-test for the mobility subscale indicated that the test for homogeneity of variance was not met. A non-parametric test, Kruskal-Wallis was conducted to test for significant difference between the adult students and the traditional-aged students on mobility. With equal variances not assumed, the p value for mobility between the two groups was $p = .012$ ($p < .05$).

Table 13

Descriptive Statistics by Age: Autonomy Scales

	Traditional-age (age 20 and under) N=130		Adults (age 21 and older) N=170		Levene's Test for Equality of Variances		P Values
	M	S.D.	M	S.D.	F	Sig	
Mobility	21.75	6.03	23.66	6.92	4.878	.028	.012 *
Time Management	39.79	8.31	41.49	9.13	.815	.367	.098
Interdependence	39.95	8.44	41.65	8.57	.385	.536	.086

- $p < .05$

Establishing Identity

The mean scores on the identity scales ranged from 18 to 90. An independent t-test was performed to compare the mean scores of the developmental-level mathematics students to the college-level mathematics students on the identity scale. The independent t-test indicated, as shown in Table 14, that the college-level mathematics students (mean score=54.65) scored higher on the identity scale than the developmental-level mathematics students (mean score=52.17). With a p-value of .021, a significant difference was found between the mean scores for developmental-level mathematics students and the college-level mathematics students on the identity scale.

Table 14

Descriptive Statistics by Mathematical Levels: Identity Scale

	Developmental-level mathematics N=150		College-level mathematics N=150		Levene's Test for Equality of Variances		P Values
	Mean	S.D.	Mean	S.D.	F	Sig	
Identity	52.17	9.09	54.65	9.45	.035	.464	.021 *

* $p < .05$

Table 15 shows the descriptive statistics by age for the identity scale. The traditional-age students had a mean score of 54.07 on the identity scale in comparison to the adult students who had a mean score of 52.90. However, no significant difference was found between the traditional-age students and the adult students on the identity scale ($p > .05$).

Table 15

Descriptive Statistics by Age: Identity Scale

	Traditional-age (age 20 and under) N=130		Adults (age 21 and older) N=170		Levene's Test for Equality of Variances		P Values
	M	S.D.	M	S.D.	F	Sig	
Identity	54.07	8.13	52.90	10.16	2.730	.100	.283

Intellectual Development

An independent t-test indicated that the mean scores for developmental-level mathematics students (m.s. = 87.13) and college-level mathematics students (m.s. = 86.21) were not significant when comparing the two groups on the intellectual development scale. The p-value (p = .554) was greater than .05 as shown in Table 16.

Table 16

Descriptive Statistics by Mathematical Levels: Intellectual Development Scale

	Developmental-level mathematics N=150		College-level mathematics N=150		Levene's Test for Equality of Variances		P Values
	Mean	S.D.	Mean	S.D.	F	Sig	
Cognitive	87.13	13.91	86.21	12.94	.740	.390	.554

Furthermore, no significant difference was found in the mean scores between the traditional-age students and the adult students on the intellectual development scale as shown in Table 17.

Table 17

Descriptive Statistics by Intellectual Development Scale Age:

	Traditional-age (age 20 and under) N=130		Adults (age 21 and older) N=170		Levene's Test for Equality of Variances		P Values
	M	S.D.	M	S.D.	F	Sig	
Cognitive	86.81	12.35	86.57	14.21	2.147	.144	.880

Demographic Information

Mathematical levels and age were the two primary comparisons for this study. However, several additional variables such as gender, various age groups, marital status, degree aspirations, parental education, and financial aid were tested in order to better understand the growth levels and patterns of the community college sample.

Table 18 shows the descriptive statistics for gender based on the seven scales or subscales. Male students had a higher mean score on each of the scales or subscales in comparison to the female mean scores. The mean scores were statistically significant for the mobility subscale ($p = .000$), identity ($p = .009$) and cognitive ($p = .001$) measures.

Table 18

Descriptive Statistics by Gender

	Males N=87		Females N=213		Levene's Test for Equality of Variances		P Values
	M	S.D.	M	S.D.	F	Sig	
Self-confidence	87.36	14.95	83.95	15.46	.027	.870	.081
Competency in Math	56.18	9.38	54.19	10.82	1.346	.247	.134
Mobility	24.90	7.00	21.99	6.26	3.039	.082	.000 *
Time Management	41.24	8.87	40.55	8.80	.033	.855	.540
Interdependence	41.53	8.22	40.66	8.68	.103	.748	.426
Identity	55.60	10.16	52.51	8.85	1.338	.248	.009 *
Cognitive	90.67	13.26	85.04	13.17	.003	.956	.001 *

- $p < .05$

An ANOVA test indicated no significant differences in the different age groups for the seven scales or subscales as demonstrated in table 19. All p-values were greater than .05 for each measure.

Table 19

ANOVA Summary Table: Age

	df	*SS*	*MS*	*F*	*P*
Self-confidence	8	1578.368	44.254	.832	.575
	291	69035.429	110.975		
Competency in Math	8	354.035	44.254	.399	.921
	291	32293.632	110.975		
Mobility	8	456.913	57.114	1.320	.233
	291	12588.753	43.260		
Time Management	8	512.037	64.005	.821	.584
	291	22677.710	77.930		
Interdependence	8	393.042	49.130	.667	.721
	291	21438.704	73.673		
Identity	8	702.688	87.836	1.007	.430
	291	25373.699	87.195		
Cognitive	8	1394.552	174.319	.967	.462
	291	52437.434	180.197		

As shown in table 20, the independent variable, marital status, had a significant difference for the interdependence subscale ($p = .038$). An additional test was performed to determine which subset within the marital status showed a significant difference. After

conducting a Tukey test, a statistically significant difference was found between the single group and the married group ($p = .027$).

Table 20

ANOVA Summary Table: Marital Status

	df	*SS*	*MS*	*F*	*P*
Self-confidence	3	144.485	48.162	.202	.895
	296	70469.311	238.072		
Competency in Math	3	597.093	199.031	1.838	.140
	296	32050.574	108.279		
Mobility	3	81.174	27.058	.618	.604
	296	12964.492	43.799		
Time Management	3	317.588	105.863	1.370	.252
	296	22872.158	77.271		
Interdependence	3	611.116	203.705	2.841	.038 *
	296	21220.630	71.691		
Identity	3	248.372	82.791	.949	.417
	296	25828.015	87.257		
Cognitive	3	634.672	211.557	1.177	.319
	296	53831.987	179.721		

Table 21 shows that there is a statistically significant difference in the competency in math subscale for the independent variable, employment patterns (p = .049). An additional test was performed to find the differences within the employment patterns. The results of Tukey test showed that there was a significant difference between the group that "do not work outside the home" and the group that worked "31-40 hours per week" (p = .043).

Table 21

ANOVA Summary Table: Employment Patterns

	df	*SS*	*MS*	*F*	*P*
Self-confidence	4	179.267	44.817	.188	.945
	295	70434.530	238.761		
Competency in Math	4	1033.089	258.272	2.410	.049 *
	295	31614.578	107.168		
Mobility	4	269.084	67.271	1.553	.187
	295	12776.583	43.310		
Time Management	4	303.292	75.823	.977	.420
	295	22886.455	77.581		
Interdependence	4	193.329	48.332	.659	.621
	295	21638.417	73.351		
Identity	4	272.913	68.228	.780	.539
	295	25803.474	87.469		

Table 21 Continued

ANOVA Summary Table: Employment Patterns

	df	*SS*	*MS*	*F*	*P*
Cognitive	4	546.948	136.737	.757	.554
	295	53285.039	180.627		

As demonstrated in Table 22, there were no significant differences on the scales or subscales for the independent variable, enrollment status. All p-values were greater than .05.

Table 22

ANOVA Summary Table: Enrollment Status

	df	*SS*	*MS*	*F*	*P*
Self-confidence	1	42.173	42.173	.178	.673
	298	70571.623	236.818		
Competency in Math	1	10.289	10.289	.094	.759
	298	32637.377	109.521		
Mobility	1	136.443	136.443	3.150	.077
	298	12909.223	43.320		
Time Management	1	7.818	7.818	.101	.751
	298	23181.928	77.792		

Table 22 Continued

ANOVA Summary Table: Enrollment Status

	df	*SS*	*MS*	*F*	*P*
Interdependence	1	56.504	56.504	.773	.380
	298	21775.242	73.071		
Identity	1	37.663	37.663	.431	.734
	298	26038.724	87.378		
Cognitive	1	20.825	20.825	.115	.734
	298	53811.162	180.574		

Finally, as for the demographic variables, degree aspiration, parental education, and financial aid, no statistically significant differences were found on the scales or subscales. The results of the ANOVA tests are shown for degree aspiration (Table 23), parental education (Table 24), and financial aid (Table 25).

Table 23

ANOVA Summary Table: Degree Aspiration

	df	*SS*	*MS*	*F*	*P*
Self-confidence	6	455.046	75.841	.317	.928
	293	70158.750	239.450		
Competency in Math	6	444.306	74.051	.674	.671
	293	32203.360	109.909		
Mobility	6	331.367	55.228	1.273	.270
	290	12714.300	43.394		
Time Management	6	224.651	37.442	.478	.825
	293	22965.096	78.379		
Interdependence	6	458.490	76.415	1.048	.395
	293	21373.256	72.946		
Identity	6	161.400	26.900	.304	.935
	293	25914.987	88.447		
Cognitive	6	1134.979	189.163	1.052	.392
	293	52697.007	179.853		

Table 24

ANOVA Summary Table: Parental Education

	df	*SS*	*MS*	*F*	*P*
Self-confidence	6	1181.633	196.939	.831	.547
	293	69432.163	236.970		
Competency in Math	6	786.153	131.026	1.205	.304
	293	31861.513	108.742		
Mobility	6	378.122	63.020	1.458	.193
	293	12667.545	43.234		
Time Management	6	170.142	28.357	.361	.903
	293	23019.605	78.565		
Interdependence	6	658.203	109.700	1.518	.172
	293	21173.544	72.265		
Identity	6	358.727	59.788	.681	.665
	293	25717.660	87.774		
Cognitive	6	2038.441	339.740	1.922	.077
	293	51793.546	176.770		

Table 25

ANOVA Summary Table: Financial Aid

	df	*SS*	*MS*	*F*	*P*
Self-confidence	4	341.278	85.320	.358	.838
	295	70272.518	238.212		
Competency in Math	4	128.024	32.006	.290	.884
	295	32519.642	110.236		
Mobility	4	136.180	34.045	.778	.540
	295	12909.487	43.761		
Time Management	4	272.679	68.170	.878	.478
	295	22917.067	77.685		
Interdependence	4	96.123	24.031	.326	.860
	295	21735.624	73.680		
Identity	4	58.159	14.540	.165	.956
	295	26018.227	88.197		
Cognitive	4	535.862	133.965	.742	.564
	295	53296.125	180.665		

Summary of Results

In conclusion, the three null hypotheses tested were:

1. There were no significant differences between mean scores on the four inventories of developmental mathematics students versus college-level mathematics students. This null hypothesis was rejected for the identity scale. There was a significant difference ($p < .05$) with the college-level mathematics students scoring higher on the identity scale.

2. There were no significant differences between mean scores on the four inventories of traditional-aged versus adult community college students. This null hypothesis was rejected for the mobility subscale, a component of the autonomy scale. There was a significant difference ($p < .05$) with the adult students scoring higher on the mobility subscale than traditional-aged students.

3. There were no significant differences between additional independent variables tested such as gender, marital status, family background, and method of financing education. This null hypothesis was rejected for the following independent variables: gender in the areas of mobility, identity, and intellectual development; marital status in the area of interdependence; and employment patterns in the area of competency in math. Each had p-values less than .05.

Chapter 5

Summary and Conclusion

Researchers have made great strides in providing the student development profession with essential data based on systematic research with a theoretical basis. These data have allowed educators and practitioners to develop and evaluate their curricula and student service programs in the context of developmental growth opportunities. Specifically, professionals have been able to consider the potential impact of their programs with respect to current levels of student development and interventions designed to encourage growth.

Theories of student development have provided researchers and practitioners with a framework for study and practice. Research studies to develop and assess the value of these theories, however, have focused on narrow student populations. The need for comparing developmental levels and patterns of different student populations for our current theories and models has been identified. The primary purpose of this study was to provide initial developmental comparisons for two often overlooked populations: community college and adult students.

The methodology involved the administration of several inventories to a sample of community college students. The total of 300 students surveyed allowed for a variety of statistical analyses and comparisons of traditional-aged students to returning adult students of various age ranges. In addition, independent variables such as gender and employment patterns were examined. Furthermore, the means and standard deviations of developmental-level mathematics students for each of the seven developmental measures were compared to college-level mathematics students who were given the same

inventories. While additional statistical procedures were limited in comparing the two populations, the initial comparisons for differences in means provide preliminary data that may be useful for further studies. The remainder of this chapter will be divided into the following sections: discussion of major findings, limitations of the study, implications of the study, and conclusions.

Discussion of Major Findings

Developmental-level versus College-level Mathematics Students

The developmental-level mathematics students had a higher mean score on the competency scale than the college-level mathematics students. However, no statistically significant difference was found. It is surprising that the college-level mathematics students did not show a significant difference in competency in math than the developmental-level mathematics students because the students taking college-level mathematics either scored higher on the ACT in the area of mathematics or completed the required developmental-level mathematics courses.

In the three areas of autonomy: mobility, time-management, and interdependence, the developmental-level mathematics students scored lower in each area than the college-level mathematic students. None of these differences were statistically significant. This was expected because all the students were community college students and exhibited the same characteristics such as working at least part-time and being nontraditional students.

The self-confidence subscale of identity was scored higher for the college-level mathematics students than the developmental-level mathematic students. This difference was found to be statistically significant. Thus, placement in a higher level mathematics course seems to have a positive impact on self-esteem.

Finally, the comparison of developmental-level mathematic students to college-level mathematics students on the intellectual development scale showed that the developmental-level mathematic students had a higher mean score than the college-level mathematic students. This difference was found to be not statistically significant. Previous research studies have found that intellectual development is more a result of increased education than age (Deopere, 1987). Further research is needed to determine if the type of education or the courses taken is a factor in increased education.

In summation, the only statistical significant difference between developmental-level mathematics students and college-level mathematics students was on the identity scale with the college-level mathematic students having a higher mean score. While the differences between developmental-level mathematic students and college-level mathematic students were not significant on the other scales and subscales, they are worth noting in discussing the large diversity of the community college population and the need to examine critical variables.

Traditional-aged versus Adult Students

As a result of the independent t-tests, there was a significant difference on the mobility subscale between the traditional-aged students and the adult students. The adult students had a higher mean score than the traditional-aged students. It might have been hypothesized that adult students are much more settled due to family responsibilities and employment than their traditional-aged community college counterparts. However, results of this study did not show this to be the case. The adult students scoring considerably higher on the mobility subscale than traditional-aged students may be a perceived awareness of today's economy and a perceived level of family responsibilities.

Adult students, through life experiences, may have a better understanding of that a person does what it takes to survive. Further research should be done to investigate possible explanations for differences on the mobility subscale between adult and traditional-aged community college students.

No other significant differences were found between the adult students and the traditional-aged community college students on the remaining scales or subscales. These results for adult students may be consistent with Perry's (1970) concept of retreat, representing a regression to absolutistic thinking as a means of coping with a major life change.

Demographic Information

The independent variables found to have a significant difference on the scales or subscales were gender, marital status and employment patterns.

Gender Differences The scales or subscales found to have a significant difference between males and females were: mobility, identity, and intellectual development. The mobility subscales was defined with such items as "I would like living in a variety of places" and "I have taken trips alone." The males scored higher in each of these three areas than the females.

Traditionally, men have always been the ones to leave home for various reasons to provide for the family while the women stayed home to tend to the family. Therefore, it is not surprising that there would be a significant difference between the males and females on the mobility subscale. Related factors such as child care and other responsibilities, as well as predominating socio-cultural views support the gender differences found on mobility.

Additionally, a statistically significant difference was found on the identity scale for males and females. One possible explanation for this difference may be the use of only the self-confidence subscale and the elimination of the subscales measuring sexual identity and conceptions about body and appearance. Self-confidence requires high self-esteem which, in turn, grows with the help of professional success. Women spend much of their strength on family, children, and household chores, while men are more career-oriented and, therefore more successful in this aspect (Women and Men, 2010).

Finally, gender difference based on intellectual development scale was found to be statistically significant with males having a higher mean score than females. This difference between male and female students would support the notion that variables such as cognitive skills do impact developmental levels. Further research in this area should be conducted to observe if similar results are found.

Marital Status A significant difference was found on the interdependence subscale with the married students having a higher mean score than the single students. This would seem consistent based on items in the survey such as "I realize that my behavior toward others will dictate how they will treat me"; "I like people to depend on me"; and "I endorse paying taxes since they support necessary services." Thus, an individual's marital status did have some impact on their developmental levels.

Employment Patterns A significant difference was found on the competency in math subscale for the students who reported not working outside the home and the students who reported working 31-40 hours per week. The students not working outside the home scored higher in this area. This could be explained by students not working outside the home have more time to review material and may have a better connection with the

concepts and theories.

Limitations of the Study

As indicated, the results of this study can only be viewed as a starting point for discovering valid developmental differences for the community college and adult populations. Results from this study may not be generalized to other community colleges or student populations. For example, given the great diversity that exists within the community college population, a variety of additional variables could be relevant. Levels of previous academic achievements, intelligence, identified learning disabilities, and socioeconomic status could certainly impact differences in development. Greater insight may be gained through qualitative studies to identify a variety of personal experiences that may affect the development of community college students such as domestic violence, substance abuse, or a dysfunctional family background. While these problems are found at all levels of society and within all types of educational institutions, it might be hypothesized that a greater predominance exists within the community college system.

Comparisons based on age could also have limited applications due to the diversity that exists within the returning adult population. With the distinction of "non-traditional" based solely on chronological age, several diverse populations were grouped together. For instance, the 42 year old displaced homemaker, the 43 year old male seeking job re-training, and the 45 year old retiree taking classes for personal enjoyment have little in common except their closeness in age. Additional studies to control for purpose in enrolling and personal background differences need to be conducted to differentiate developmental levels and patterns impacted by age versus other factors.

The assessment instruments themselves must also be seen as a potential limitation. The surveys were primarily aimed at traditional students, with particular questions being simply inappropriate for adults or students from nontraditional backgrounds. While an attempt was made to select the inventories and items most relevant to a broader population, certain items or scales may have had limited application to this sample. In addition, the selection of particular demographic items and/or the elimination of certain subscales of the instrument administered to the sample group hold the potential for altered response patterns. It is not known whether students might respond differently to certain items based on the addition or substitution of other individual items.

Finally, the sheer scarcity of related research on developmental levels and patterns of these student populations indicates that broad conclusions must be delayed until an appropriate body of knowledge is gathered to adequately support such abstractions. However, these findings can serve as a beginning step.

Implications of the Study

While broad generalizations and implications can not be made to community colleges, the results of this study do merit some tentative support for possible curricular and programmatic changes, as related to what is already known and can be surmised about the development of students. One factor that can clearly be identified as a major change in the student populations in the last 20 years is the increased diversity. Students are enrolled in community colleges for various reasons which include the students who come to upgrade their skills for a particular job, students who are pursuing an associate degree to transfer to a four-year institution and students who come to pursue a hobby such as learning a language. In addition to the various reasons for attending community

colleges, community colleges also have larger percentages of nontraditional, low-income, and minority students than 4-year colleges and universities (US Department of Education, 2008).

These increasingly diverse populations are encouraging educators to examine their current practices to assess levels of effectiveness, both in and out of the classroom. No longer can faculty and staff maintain the narrow vision of developmental needs of the previously defined "college student." Instead, they must confront the realities of all the potential barriers to development for this increasingly diverse student population such as age, sex, race, and socioeconomics.

To accomplish this task, educators (faculty and practitioners) will need to reflect upon all the aspects of their curricula and programs: the content, methodologies, policies, level of service, flexibility and convenience of service, and so on. Further studies of the developmental levels and patterns of the diverse student population will provide the appropriate framework for such examination to take place.

While these developmental differences are not representative of Southwest Tennessee Community College population, there are several ramifications for the classroom and student services. Faculty would be advised to note the adult Southwest college students' lower levels of confidence and develop their courses in such a way as to provide early class "successes" and bridge points to encourage retention. Furthermore, additional research and class assessments would be appropriate to examine the relationships between confidence and competence in the classroom.

Southwest Community College advisors and counselors would also want to keep these developmental differences in mind. Academic advising would be particularly

critical to the students' retention, with an emphasis placed on class load and perceived abilities. Advisors would perhaps want to work with faculty to establish more "early warning" systems than found in college settings. In addition, counselors could create individual and group experiences designed to create confidence levels and to provide social and cultural opportunities needed to make them more compatible with all college students.

Differences found for the measures; mobility and interdependence would also need to be addressed both in and out of the classroom. Lower perceived mobility among traditional-aged students (perhaps due primarily to socio-economic status and perceived family responsibilities) would impact initial college choice as well as opportunities for transfer to four-year institutions. Thus, admissions staff and financial aid staff would want recruiting strategies, target populations, transfer policies, and financial aid options. Specifically, recruiting strategies would first need to identify perceived barriers of transfer for Southwest Community College students and develop institutional programs and policies to address them. Perhaps, for instance, additional scholarship and work programs could reduce financial barriers. Geographic barriers could perhaps be addressed with more branch campuses, more evening and weekend classes, and more online courses.

Future research on the differences between traditional-aged students and adult students in community colleges could possibly minimized by staff interventions and guided mentor programs pairing a traditional-aged student with a returning adult student. A mentor program with guided intervention strategies could potentially increase both groups' developmental levels and demonstrate appreciation for the diversity of the

community college population.

On the measure of intellectual development, no significant difference was found between the traditional-aged and adult community college students but strategies and intervention would be beneficial to faculty and student services practitioners. For example, community college faculty would want to consider the content and methodologies of courses with regard to the students' ability to tolerate ambiguity, accept multiple theories, and to benefit from environmental challenges and supports. Therefore, faculty could make particular efforts to include a great deal of structure in their syllabi and class assignments, and to progress from highly structured lectures to more interactive class sessions as the students' levels of thinking progressed.

Community college student services practitioners would also want to consider levels of intellectual development, particularly in academic advising and facilitating group experiences. Early advising appointments need to contain more structures with emphasis on handouts and advising guides to clarify and define levels of progression. Finally, faculty and staff would want to be aware of these variations in levels of intellectual development due to the impact on the transfer student. Support services designed to aid in the transition would need to focus on assessment and growth opportunities. Specific developmental skills needed for various program areas would need to be identified, along with assessment instruments and strategies for increasing critical skills.

Thus, developmental differences based on age merit considerable attention by faculty and practitioners. There are additional implications for student development and adult development theory and assessment.

If further studies on community colleges and adult students discover similar findings, theories and the instruments used to measure these differences will need to be refined and expanded to include noted variations in developmental levels and patterns of particular student populations.

Conclusions

The educator who subscribes to a developmental approach views education both as a means of meeting the needs that brought the student to college in the first place and as a means of directly providing challenges and supports that increases development. In short, students come to college with the belief that it can help them make the transition that is desired. While the higher education system is assisting the students in this capacity, the student development expert, armed with a wealth of information on developmental levels and patterns of diverse student populations, can stimulate further growth and progression for these individuals in a wider arena: competency, autonomy, identity, and intellectual development.

Thus, the developmental approach is a philosophy of interaction. The educator seeks to meet the needs that the student presents at the door and to create an environment that will stimulate further growth in the process. It is only through continued comparative research that educators can begin to understand developmental differences of various student populations in order to provide these effective growth opportunities. This study, in exploring developmental differences based on age and mathematical levels, is a beginning step toward that goal.

REFERENCES

Adelman, C. (1998). The kiss of death? An alternative view of college remediation. National Crosstalk. San Jose, CA: National Center for Public Policy and Higher Education.

American Association of Community Colleges. (2008). Research and statistics. Retrieved April 15, 2008 from http://www2.aacc.nche.edu/research/index.htm

Aslanian, C. B., & Brickell, H. M. (1980). Americans in transition: Life changes as reasons for adult learning. New York: College Entrance Examination Board.

Bailey, T., Jenkins, D., & Leinbach, T. (2005). Community college low-income and minority student completion study: Descriptive statistics from the 1992 high school cohort. New York: Columbia University, Teachers College, Community College Research Center. Retrieved January 10, 2010 from http://www.citruscollege.edu/admin/research/documents/literature/remediation.

Boswell, K., & Jenkins, D. (2002, September). State policies on community college remedial education: Findings from a national survey. Education commission of the states. Retrieved November 28, 2006 from http://www.ncde.appstate.edu/reserve_reading/State_Policies.htm

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

Boylan, H.R., Saxon, D.P., & Boylan, H.M. (2000). State policies on remediation at public colleges and universities. The League for Innovation in the Community College. Retrieved November 28, 2006 from http://www.citruscollege.edu/admin/research/documents/literature/remediation.

Breneman, D.W., & Haarlow, W.N. (1998, July). Remedial education: Costs and consequences [Electronic Version]. The Thomas B. Fordham Institute.Bushnell, D. S. (1973). Organizing for change: New priorities for the community colleges. New York: McGraw Hill Book Company.

Chickering, A. W. (1984, 1969). Education and identity. San Francisco: Jossey-Bass.

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

Community College Survey of Student Engagement. (2009). Profile of Southwest Tennessee Community College. Retrieved January 12, 2010 from http://www.ccsse.org/survey/public-profile.cfm?ipeds=221485&source=2007

Cross, K. P. (1990). The junior college student: A research description. Princeton NJ: Educational Testing Service.

Crowl, T. K. (1993). Fundamentals of Educational Research. Dubuque, IA: Wm. C. Brown Communications.

Deopere, D. L. (1987). The relationship of cognitive development to age, education and intelligence. Unpublished doctoral dissertation, University of Iowa.

Erikson, E. H. (1963). Childhood and society, (2nd ed.). New York: Norton.

Evans, N. J., Forney, D. S., & Guido-DiBrito, F. (1998). Student development in college: theory, research, and practice. San Francisco: Jossey-Bass.

Even, M. J. (1988). Baggage Barriers Techniques. (ERIC Document Reproduction Service No. ED 291 952)

Gravetter, F. J., & Wallnau, L.B. (1996). Statistics for the Behavioral Sciences (4th ed.). St. Paul: West Publishing Company.

Hinkle, D.E., Jurs, S.G., & Wiersma, W. (2003). Applied Statistics for the Behavioral Sciences (5th ed). New York: Houghton Mifflin Company.

Hood, A. B. (1986). The Iowa student development inventories. Iowa City, IA: Hitech Press.

Hoffman, E. (1988). The right to be human: a biography of Abraham Maslow. New York: St. Martin's Press.

King, P. M. (1978). William Perry's theory of intellectual and ethical development. In L. Knefelkamp, C. Widick, & C. A. Parker (Ed.). Applying new developmental findings. San Francisco: Jossey-Bass

Knopp, L. (1996). Remedial education: An undergraduate student profile. *American Council on Education, Research Briefs, 6*(8), 1-11.

Kulik, C. C., Kulik, J. A., & Shwalb, B. J. (1983, Fall). College programs for high-risk and disadvantaged students: A meta-analysis of findings. *Review of Educational Research, 53*, 397-414.

Leath, A. (2007, July). Globilization and the U.S. high-tech workforce. The AIP Bulletin of Science Policy News. Retrieved January 05, 2010 from http://www.aip.org/fyi/2007

Ley, K., & Young, D. B. (1998). Self-regulation behaviors in underprepared (developmental) and regular admission college students. Contemporary Educational Psychology, 23, 42-64.

Long, B. (2005, Fall). The remediation debate: Are we serving the needs of underprepared college students? National CrossTalk, 13. Retrieved November 28, 2006 from http://www.highereducation.org/crosstalk/ct0405-long.shtml

Mazzeo, C. (2002). Stakes for students: Agenda-setting and remedial education. *The Review of Higher Education, 26*(1), 19-39. Retrieved November 24, 2006 from http://muse.jhu.edu.ezproxy.memphis.edu/journals/review_of_higher_education

McCabe, V. (2000). Remediation (postsec.): Helping state leaders shape education policy. Education Commission of the States. Retrieved November 28, 2006 from http://www.ecs.org/html/issue.asp?print=true&issueID=216&subIssueID=0

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

Mirriam, S., & Caffarella, R. (1999). Learning in adulthood: a comprehensive guide. San Francisco: Jossey-Bass

Muench, K. E. (1987). A comparative study of the psychosocial needs of adult men and women students in an adult degree program. (ERIC Document Reproduction Service No. ED 287020)

National Center for Developmental Education survey of SHEEOs (1999) and Russell (1998). (IPEDS) [Data file]. Washington, DC: U.S. Department of Education

National Center for Education Statistics. (2003-2004). Integrated postsecondary education data System (IPEDS) fall enrollment survey [Data file]. Washington, DC: U.S. Department of Education.

National Center for Education Statistics. (2008). Integrated postsecondary education data System (IPEDS) [Data file]. Washington, DC: U.S. Department of Education
Nelson, C. (1997). Human development stages in spirituality, management and education. Retrieved April 4, 2008 from http://www.developmentstrategies.org/commentary/1997HumDevStages.htm

Nordstrom, B. H. (1989). Non-traditional students: Adults in transition. (ERIC Document Reproduction Service No. ED 310 686).

Parker, J. C. (1984). The preliminary investigation of the validity and reliability of the Parker cognitive development inventory. Unpublished doctoral dissertation, University of Iowa.

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

Phillips, C. J. (1986). Full-time mature students in higher education: A survey of their characteristics, experiences and expectations. *British Educational Research Journal, 12*(3), 289-308.

Piaget, J. (1954). The construction of reality in the child. New York: Basic Books.

Perry, W., Jr. (1970). Forms of intellectual and ethical development in the college years: A scheme. New York: Holt, Rinehart & Winston.

Randall, K. (2005). No average student: Community college students not your 'typical' undergrads, says college of education survey. Retrieved October 15, 2008 from http://www.utexas.edu/features/2005/college/index.html.

Rapaport, W. J. (2006). William Perry's scheme of intellectual and ethical development. Retrieved November 12, 2008 from http://www.cse.buffalo.edu/~rapaport/perry.positions.html

Reducing remedial education: What progress are states making? (2000). Southern Regional Education Board. Retrieved November 28, 2006 from http://www.sreb.org/main/benchmarks2000/remedial.pdf

Reed, T., Makarem, K., Wadsworth, T., & Shaughnessy, M. F. (1994). Intellectual and psychosocial status of remedial students. *Perceptual and Motor Skills, 78*, 249-250.

Richter-Antion, D. (1986). Qualitative differences between adult and younger students. *NASPA Journal, 23*(3), 58-62.

Roberts, G. H. (1986). Developmental education: An historical study (ERIC Document Reproduction No. ED276396).

Sewell, T. J. (1984). A study of adult undergraduates: What causes them to seek a degree? *Journal of College Student Personnel*,*25*(4), 309-314.

Speer, L. J. & Dorfman, L. T. (1986). The outcomes of reentry education: Personal and professional development in middle-aged and older women graduates. *Educational Gerontology, 12*, 253-265.

Southwest Tennessee Community College (2007). Developmental studies department. Retrieved October 12, 2007 from http://beta.southwest.tn.edu/dev/Default.htm

Steitz, J. A. (1985). Issues of adult development within the academic environment. *Lifelong Learning, 8*, 15-18

Steltenpohl, E. & Shipton, J. (1986). Facilitating a successful transition to college for adults. *Journal of Higher Education, 57*(6), 637-658.

Strange, C. C. (1978). Intellectual development, motive for education and learning styles during the college years: A comparison of adult and traditional-aged students. Unpublished doctoral dissertation, University of Iowa.

Umoh, U. J., & Eddy, J. (1994). Factors related to student retention in community college developmental education mathematics. *Community College Review, 22*(2), 37-47.

University of Calgary. (2008). Student development-the basics. Retrieved April 14, 2008 from http://www.ucalgary.ca/ose/studentdevelopmenttheory

U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2008). Community colleges: special supplement to the condition of education 2008. Retrieved December 15, 2009 from http://www.nces.ed.gov.

White, R.W. (1963). Sense of interpersonal competence: Two case studies and some reflections on origins. In R.W. White (Ed.), The study of lives. New York: Atherton Press.

Widick, C., Parker, C.A., & Knefelkamp, L. (1978). Arthur Chickering's vectors of development. In L. Knefelkamp, C. Widick, & C. A. Parker (Eds.). Applying new developmental findings. San Francisco: Jossey-Bass.

Wimbish, J., Bumphus, W. G., & Helfgot, S. R. (1995). Evolving theory, informing practice. In S. R. Helfgot & M. M. Culps (Eds.), Promoting student success in the community college (New Directions for Student Services, No.69. pp. 17 – 30). (ERIC Document Reproduction Service No. ED451860)

Women and men: differences in self-confidence. Retrieved February 28, 2010 from http://womanknows.com/dating/news/173/

Yamasaki, E. (1997, Winter). Effective policies for remedial education. ERIC Clearinghouse for Community Colleges. Retrieved November 29, 2006 from http://www.gseis.ucla.edu/ccs/digests/dig9806.html

Zwerling, L. S. (1976). Second best. New York: McGraw-Hill Book Company.

Appendix A

Southwest Tennessee Community College Students:

This study involves research on students enrolled in a math course at Southwest Tennessee Community College. The purpose of the research is to determine if there is a significant difference in cognitive and personal development between students enrolled in developmental math courses and students enrolled in college-level math courses. The estimated completion time for the survey is approximately 45 minutes.

Participation in this study is strictly voluntary and all efforts will be made to keep your responses confidential. Refusal to participate will involve no penalty and subjects may discontinue participation at any time during the process without penalty.

If you have questions about the research, you may contact me at 737 Union Avenue, Building F308, Memphis, TN 38103, phone: (901) 333-5965, email: Bpsmith1@memphis.edu. For answers to questions regarding the research subjects' rights, the Chair of the Institutional Review Board for the Protection of Human Subjects should be contacted at (901) 678-2533.

If you agree to participate in this survey, please indicate by signing below and returning the form with the completed survey.

Thank you,

_____

Signature Date

____I decline to participate

Demographic Survey
Please answer each statement. Do not skip any.

1. My gender is
    a) Female
    b) Male

2. My marital status is
    a) Single (never married)
    b) Married
    c) Divorced / Separated
    d) Widowed

3. My age is
    a) 17-20
    b) 21-25
    c) 26-30
    d) 31-35
    e) 36-40
    f) 41-45
    g) 46-50
    h) 51-55
    i) 56 and over

4. I currently work
    a) I do not work outside the home
    b) 1-15 hours per week
    c) 16-30 hours per week
    d) 31-40 hours per week
    e) More than 40 hours per week

5. I am currently enrolled
    a) Full-time (12 semester hours or more)
    b) Part-time (less than 12 semester hours)

6. The highest degree I plan to earn is
    a) I do not plan to pursue a degree
    b) A year or less vocational-technical certificate/diploma
    c) A two-year degree
    d) A four-year degree
    e) A masters degree
    f) A Ph.D.
    g) A professional degree (e.g. medical, law)

7. The highest degree earned by my parents is /was
    a) Less than a high school diploma
    b) A high school diploma
    c) A two-year degree
    d) A four-year degree
    e) A masters degree
    f) A Ph.D.
    g) A professional degree (e.g. medical, law)

8. My primary method of financing my education is/will be
    a) Personal earnings and savings
    b) Federal / state financial aid
    c) Employee reimbursement
    d) Support from spouse
    e) Support from parents

For items 9-19, mark **YES** for all reasons that apply to your decision to attend classes at *Southwest Tennessee Community College* and **NO** for all items that did <u>not</u> affect your decision to take classes here:

9. Simply to learn
    a) Yes
    b) No

10. To achieve independence
    a) Yes
    b) No

11. To achieve a sense of identity
    a) Yes
    b) No

12. To advance in my present career
    a) Yes
    b) No

13. To develop a new career
    a) Yes
    b) No

14. To make contact with other people
    a) Yes
    b) No

15. To obtain an Associate Degree
    a) Yes

b) No

16. Convenient location—I wanted to live at home while attending college
    a) Yes
    b) No

17. Relatively low cost of classes here
    a) Yes
    b) No

18. To increase my G.P.A. enough to go to the University
    a) Yes
    b) No

19. I'm a university student just taking some general education requirements
    a) Yes
    b) No

For items 20-28, mark **YES** for all reasons that you feel triggered or influenced your decision to seek additional schooling and mark **NO** for those which you feel did <u>not</u> impact your decision.

20. Dissatisfied with job
    a) Yes
    b) No

21. Received encouragement from family or friends
    a) Yes
    b) No

22. Funds became available
    a) Yes
    b) No

23. Obtained specific information about Southwest
    a) Yes
    b) No

24. Children entered school
    a) Yes
    b) No

25. Moved to this community
    a) Yes
    b) No

26. Family or marital problems
    a) Yes
    b) No

27. Lost job
    a) Yes
    b) No

28. Serious illness or accident
    a) Yes
    b) No

For items 29-38, mark YES for all the reasons that affected your decision to delay your education at Southwest Tennessee Community College until now and NO for all the items that did not impact your delay.

29. No delays—I came straight here from high school
    a) Yes
    b) No

30. Wanted to / had to work
    a) Yes
    b) No

31. Family responsibilities
    a) Yes
    b) No

32. Funds not available
    a) Yes
    b) No

33. Lack of interest
    a) Yes
    b) No

34. Lack of encouragement
    a) Yes
    b) No

35. Military service
    a) Yes
    b) No

36. Lack of information
    a) Yes
    b) No

37. Illness
    a) Yes
    b) No

38. Attended other college
    a) Yes
    b) No

Developing Competency Inventory

Instructions: This inventory is designed to study attitudes and behavior of college students. You are asked to judge a number of statements in terms of how characteristic the behavior or attitude is of you. Please respond to each statement according to the following scale:

1 = Never characteristic of me
2 = Seldom characteristic of me
3 = Sometimes characteristic of me
4 = Often characteristic of me
5 = Almost always characteristic of me

Please answer each statement. Do not skip any.

1. I am not intimidated by administrative officials.
   1 2 3 4 5
2. I find it difficult to ask for help from my teachers or professors.
   1 2 3 4 5
3. When I don't understand something, I'm not afraid to ask fellow students for clarification.
   1 2 3 4 5
4. My communication skills need improvement.
   1 2 3 4 5
5. I can readily introduce people at club functions.
   1 2 3 4 5
6. I think of ways to get out of giving oral presentations.
   1 2 3 4 5
7. I find it difficult to participate in classroom discussions.
   1 2 3 4 5
8. I am more self-confident than most of my classmates.
   1 2 3 4 5
9. I'm not confident talking to my peers.
   1 2 3 4 5

10. I am firm in speaking with disrespectful people, even those in firm positions of authority.
    1 2 3 4 5
11. Even when friends are present, I still lack the confidence to speak in strange surroundings.
    1 2 3 4 5
12. If necessary, it's easier for me to confront teachers or supervisors on important issue.
    1 2 3 4 5
13. I handle difficult questions in a smooth manner.
    1 2 3 4 5
14. I find it especially difficult to talk with students of the opposite sex.
    1 2 3 4 5
15. I can converse easily with people in positions of authority.
    1 2 3 4 5
16. I lack the self-confidence necessary to seek leadership positions in representing fellow classmates.
    1 2 3 4 5
17. I feel comfortable thanking teachers or supervisors who publicly recognize my accomplishments.
    1 2 3 4 5
18. I would like to participate in a speech shyness class in order to overcome my own shyness.
    1 2 3 4 5
19. I prefer to sit quietly in class than answer a teacher's or professor's complicated question.
    1 2 3 4 5
20. I speak in a clear, even manner.
    1 2 3 4 5
21. I basically lack self-confidence even when speaking in a group of friends.
    1 2 3 4 5
22. I am not intimidated by disagreements with persons in positions of authority.
    1 2 3 4 5
23. I am not a soothing speaker.
    1 2 3 4 5
24. I am able to disagree gracefully with my teachers or professors.
    1 2 3 4 5
25. I talk effectively with important people.
    1 2 3 4 5
26. I would not seek a job where public speaking was important.
    1 2 3 4 5
27. I am self-confident that I communicate well with fellow classmates.
    1 2 3 4 5
28. I do not have a smooth persuasive speaking style.
    1 2 3 4 5

29. I communicate in a comfortable way with new acquaintances.
    1 2 3 4 5
30. I can manage to get rid of difficulties through smooth talking.
    1 2 3 4 5
31. I enjoy working with numbers.
    1 2 3 4 5
32. I plan to take more courses in mathematics.
    1 2 3 4 5
33. I could tutor other students in mathematics.
    1 2 3 4 5
34. I feel self-confident in mathematics.
    1 2 3 4 5
35. I could not finish my math assignments without help.
    1 2 3 4 5
36. I dislike working with mathematical problems.
    1 2 3 4 5
37. I have trouble solving most involved problems in math.
    1 2 3 4 5
38. I hurry through my math assignments without caring if they are right or wrong.
    1 2 3 4 5
39. I understand the mathematical concepts behind formulas.
    1 2 3 4 5
40. I like doing mathematical assignments.
    1 2 3 4 5
41. I like learning anything in mathematics.
    1 2 3 4 5
42. In almost all areas of mathematics, I am very comfortable.
    1 2 3 4 5
43. I don’t think mathematics should be required in college.
    1 2 3 4 5
44. When I can’t sole a math problem I give up easily.
    1 2 3 4 5
45. When working with fractions, I sometimes get confused.
    1 2 3 4 5
46. I only take enough math courses to fulfill school requirements.
    1 2 3 4 5
47. I am able to go just as deeply into the reasoning of mathematical problems as my teacher.
    1 2 3 4 5
48. I enjoy the challenge of mathematical abstractions.
    1 2 3 4 5
49. Working with abstract concepts comes easily to me.
    1 2 3 4 5
50. I dread math exams.
    1 2 3 4 5

Developing Autonomy Inventory

Instructions: This inventory is designed to study attitudes and behavior of college students. You are asked to judge a number of statements in terms of how characteristic the behavior or attitude is of you. Please respond to each statement according to the following scale:

1 = Never characteristic of me
2 = Seldom characteristic of me
3 = Sometimes characteristic of me
4 = Often characteristic of me
5 = Almost always characteristic of me

Please answer each statement. Do not skip any.

Interdependence

51. I realize that my behavior toward others will dictate how they will treat me.
    1 2 3 4 5
52. I feel I have a lot to contribute to my school or community.
    1 2 3 4 5
53. I like people to depend on me.
    1 2 3 4 5
54. I think that we should share our wealth and expertise with poor countries.
    1 2 3 4 5
55. Since I gain from group activities, I feel an obligation to contribute in return.
    1 2 3 4 5
56. I endorse paying taxes since they support necessary services.
    1 2 3 4 5
57. I recognize the need for voting in national elections.
    1 2 3 4 5
58. I feel confident that I can be a contributing member of my country.
    1 2 3 4 5
59. I contribute to group activities.
    1 2 3 4 5
60. As a citizen, I feel I have an obligation to report any serious crimes I witness.
    1 2 3 4 5
61. I think the best family relationships are based on a mutual give and take.
    1 2 3 4 5

Management of Time

62. I can deal with many different responsibilities and still maintain my grades.
    1 2 3 4 5
63. Good management of my time is causing me to get good grades.
    1 2 3 4 5
64. When academic pressures are great, I'm still able to get my outside work done.
    1 2 3 4 5
65. I can cope with my present school and outside work load.
    1 2 3 4 5
66. I do not need to be reminded of deadlines in order to get things finished.

1 2 3 4 5

67. I can get things done when I have two or more projects going on at once.
    1 2 3 4 5
68. There aren't many obstacles in or outside my education that I couldn't handle by myself.
    1 2 3 4 5
69. I learned how to manage effectively both school and other outside activities.
    1 2 3 4 5
70. Because my background training was sufficient, I'm easily able to handle my school and other assignments.
    1 2 3 4 5
71. I have often held an outside job in addition to being a student.
    1 2 3 4 5
72. I know how to schedule my priorities as far as time management goes.

    1 2 3 4 5

Mobility

73. I would like living in a variety of places.
    1 2 3 4 5
74. I have taken trips alone.
    1 2 3 4 5
75. The thought of re-establishing myself in a new community does not bother me.
    1 2 3 4 5
76. After I graduate from college, I would like to be highly mobile for a while.
    1 2 3 4 5
77. If a good job required me to move to another country, I would accept it.
    1 2 3 4 5
78. I could change my residence by myself with little trouble.
    1 2 3 4 5
79. Obstacles do not prevent me from moving from one place to another.
    1 2 3 4 5

Developing Identity Inventory

Instructions: This inventory is designed to study attitudes and behavior of college students. You are asked to judge a number of statements in terms of how characteristic the behavior or attitude is of you. Please respond to each statement according to the following scale:

1 = Never characteristic of me
2 = Seldom characteristic of me
3 = Sometimes characteristic of me
4 = Often characteristic of me
5 = Almost always characteristic of me

Please answer each statement. Do not skip any.

80. I am as sure of myself as most other people seem to be sure of themselves.
    1 2 3 4 5

81. I have found one of the easiest ways to make friends with others is to be the kind of person they would like me to be.
    1 2 3 4 5
82. I usually do not have the assurance that what I am doing is the best thing.
    1 2 3 4 5
83. It usually takes so much effort to make decisions; I wish somebody else would make decisions for me.
    1 2 3 4 5
84. I have many doubts about what I am going to do with my life.
    1 2 3 4 5
85. In most situations, I would not hesitate to express my beliefs to those with opposite beliefs.
    1 2 3 4 5
86. I envy those people who know where they are going in life.
    1 2 3 4 5
87. No matter how sad I feel, I usually think things will get better.
    1 2 3 4 5
88. Each day presents new challenges that I cannot wait to confront.
    1 2 3 4 5
89. I feel confident that I have chosen or will choose the best occupational field for me.
    1 2 3 4 5
90. I am capable of understanding most ideas I read about.
    1 2 3 4 5
91. I often feel inferior when I compare myself to other people.
    1 2 3 4 5
92. No matter how hard I try, I do not feel prepared to enter the working world.
    1 2 3 4 5
93. My confidence is really shaken when I see so many people with abilities as good as or better than mine.
    1 2 3 4 5
94. When I am a stranger in a group, I often introduce myself to others.
    1 2 3 4 5
95. It is uncomfortable for me to speak out in groups for fear my statement may be incorrect.
    1 2 3 4 5
96. If a boss or teacher criticizes my work, it is usually because they do not understand me.
    1 2 3 4 5
97. I still have difficulty making decisions for myself.
    1 2 3 4 5

Parker Cognitive Development Inventory

Instructions: Listed on the following pages are a series of statements regarding education. You are to read each statement and decide whether you agree or disagree with what it says. Please respond to each statement according to the following scale:

4 = Strongly Agree
3 = Agree
2 = Disagree
1 = Strongly Disagree

Please answer each statement. Do not skip any.

98. Development of a personal position on an essay question is possible even though there may be several acceptable answers.
    1 2 3 4
99. The development of educational goals involves both the ability to think things through, and the acceptance of some "unknowns".
    1 2 3 4
100. I have at sometime seriously doubted my current educational commitment.
    1 2 3 4
101. Support for a particular position on an essay question should be offered as a personal perspective and not as the only truth available.
    1 2 3 4
102. So much of the knowledge for a given area is complex and relative that it is not appropriate to expect a teacher to present straight facts only.
    1 2 3 4
103. Educational goals are important, but you should avoid letting them "box" you in.
    1 2 3 4
104. Supporting one of several positions on an essay question does not mean the other positions are of a lesser value.
    1 2 3 4
105. Some of my best essay answers have involved accepting a perspective that I had first argued against.
    1 2 3 4
106. I settle on a position for an essay question only after thinking about the other possibilities.
    1 2 3 4
107. Essay questions that allow for individual interpretation are not as good as those requiring the identification of specific facts.
    1 2 3 4
108. Essay questions may appear to have more than one answer, but there is only one right answer for any question.
    1 2 3 4
109. Choosing a position during an academic debate is both a process of reasoning things through and of "sticking your neck out".
    1 2 3 4

110. Most of the time you can count on teachers for the right answers, but when they can't help, you have to depend on your own ideas.
1 2 3 4

111. When I support a particular position on an essay question, I assume full responsibility for my position.
1 2 3 4

112. When a teacher takes a particular position on a controversial issue, you can be almost certain they are on the right side.
1 2 3 4

113. The primary purpose of an academic debate is to change the minds of those who disagree with your position.
1 2 3 4

114. Teachers who dwell on theories instead of sticking to the facts are wasting the time of their students.
1 2 3 4

115. It is appropriate to argue both sides of an educational issue, but at some point you need to develop a personal commitment of your own.
1 2 3 4

116. I could never work on a research project with someone who did not share my views regarding the research questions.
1 2 3 4

117. The key to understanding a course is learning to think the way the teacher wants you to think.
1 2 3 4

118. Teachers should give you the right answers when you can't find them on your own.
1 2 3 4

119. When it comes right down to it, you are better off siding with the teacher on a controversial issue than getting involved in some endless debate.
1 2 3 4

120. Part of giving a good answer to an essay question, is being able to "step back" and look at your answer.
1 2 3 4

121. Teachers should spend their time presenting the facts instead of making students dig them out.
1 2 3 4

122. Teachers should make sure that students come up with the right answers to their questions.
1 2 3 4

123. I don't really question my educational values, but I don't always know what I value either.
1 2 3 4

124. Even though I have a set position on many questions that come up in classes, I avoid becoming too rigid in my thinking.
1 2 3 4

125. I view my personal positions on discussion topics more as starting points than I do as final verdicts.

1 2 3 4

126. It is important that my personal position on a classroom issue be developed from a personal evaluation of the various alternatives.

1 2 3 4

127. Essay questions can be divided into two groups; those that have definite answers and those based only on personal opinions.

1 2 3 4

128. Teachers who spend too much time on theories end up confusing the real issues of the course.

1 2 3 4

129. I try to be sure of the positions I take on essay questions, but at the same time I try to be open to other possible explanations.

1 2 3 4

Appendix B

Permission Letter From Southwest Tennessee Community College

For her dissertation research, Ms. Bridgett Smith had permission from her chair to use Southwest students as long as they were not identifiable in any way. She is allowed to use the college's name to identify the source of the students in her written dissertation

Joanne Bassett, Ed.D.
Provost/Executive Vice President
Southwest Tennessee Community College
737 Union Avenue
Memphis, TN 38103
901.333.5020

Permission from albert b. Hood

Bridgett,
you have our permission to use the iowa developing competency inventory for your research. Good luck with your study
Albert B. Hood
