NONTRADITIONAL STUDENT PERSISTENCE AMID THE TRANSITION TO COREQUISITE REMEDIATION: EXAMINING THE RELATIONSHIP OF DEVELOPMENTAL EDUCATION AND ACADEMIC SUPPORT COURSES

by

Priscilla Renee Burns

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

This quantitative, correlational study was conducted to examine how persistence of nontraditional college students is influenced by participation in developmental education and academic support courses. The persistence rate of students, especially nontraditional students, can have a profound impact on today's workforce and the funding of the postsecondary institution. This predictive correlational study utilized logistic regression to examine the relationship between the predictor variables (developmental mathematics, developmental reading, and academic support courses) and the criterion variable (persistence to the next academic year). The sample for each research question was comprised 100 first-year college freshman who met at least one of the seven indicators of nontraditional college students. These participants, drawn from a convenience sample, were enrolled in a 2-year community college in the southern United States. This study utilized the college's student information system database to obtain archival demographic and enrollment data. The results of this study present many considerations for corequisite remediation transition. While analysis showed no significant relationship for developmental reading courses in combination with academic support course on persistence, a significant correlation existed between developmental math and academic support courses and persistence. This study concludes with recommendations for future research including conducting a comparative analysis study that compares persistence for nontraditional and traditional college students.

Keywords: academic support, attrition, corequisite remediation, developmental education, nontraditional students, persistence

Dedication

This study is dedicated to my parents, Lula Hubbard Burns and JD Burns, who supported me along my educational journey. Thank you, Mother, for the many sacrifices you made for me over the years.

Acknowledgments

I thank God for this experience and journey. When I felt like giving up, the Lord gave me the strength and wisdom to continue. I did it all because of Him.

I would like to express my deepest appreciation to my dissertation committee chair, Dr. Jeffrey Savage, and committee member, Dr. Roger Stiles. I am forever grateful for Dr. Savage's patience, advice, and guidance. His feedback and encouragement was invaluable. I am also grateful for the work of Dr. Shawn Loht and Pamela Kemp for compiling and providing the data for this study.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Academic Literacy Course (ALIT 099)

American College Test (ACT)

College Success Skills (CCSS 107)

General Education Development (GED)

Grade Point Average (GPA)

High School Equivalency Diploma (HSE)

Performance-based Funding (PBF)

Success in College (CCSS 100)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this quantitative, predictive correlational study is to examine if the persistence of nontraditional college students can be predicted by the students' course grades in developmental education courses and academic support courses. Chapter One provides a background for the topics of persistence, nontraditional college students, developmental education, and academic support courses. Included in the background is an overview of the theoretical framework for this study. The problem statement examines the scope of the recent literature on this topic. The purpose of this study is followed by the significance of the current study. Finally, the research questions are introduced, and definitions pertinent to the study are provided.

Background

Nontraditional students enroll in postsecondary education at high rates each academic year (Chen et al., 2020; Ellis, 2019; Remenick, 2019). These adult learners enroll in college for numerous reasons, which include for academic growth, increased economic opportunities, and to further develop workplace skills and knowledge (Chen, 2017; Chen et al., 2020; Goings, 2018). Regardless of the reason or intrinsic motivation, the nontraditional segment of the college population fails to persist to college completion or for some students beyond the first year of enrollment. While numerous efforts have been focused on retention strategies for the traditional student population, the rate of attrition for nontraditional students is alarming and requires a closer examination. The background and historical context of the nontraditional college student expand through decades of theoretical and educational innovation.

Almost half of nontraditional students enter college needing remediation in a core subject area and approximately 67% of these undergraduate students drop out of college before receiving a degree (Macdonald, 2018). These nontraditional students often lack the needed academic skills to successfully complete college-level reading, writing, or math courses and the college readiness skills to navigate the college environment. Approximately 45% of students attending universities fail to persist to degree completion or fail to persist because of academic deficiencies (Savage et al., 2019). According to Ellis (2019), the enrollment rate of nontraditional students is increasing at greater rates than the traditional students. Academic success and positive environmental factors have been considered significant predictors of student success for nontraditional students. Nontraditional adult learners are defined as individuals who are age 25 and older, work full-time, financially independent, a parent, delayed enrollment in college, or did not complete high school (Chen, 2017; Karmelita, 2020). According to Kamer and Ishitani (2019), part-time enrollment has been determined to be a risk factor for the adult learner, yet nontraditional students have higher rates of part-time enrollment. The United States National Postsecondary Student Aid Survey revealed that more than 70% of undergraduate students have one or more nontraditional characteristics (Chen et al., 2020). Forty percent of postsecondary institutions have indicated they do not identify their nontraditional students for outreach, services, or financial aid (Chen, 2017). Many of these schools often categorize adult learners within the realm of lifelong learning, which fails to consider students enrolled in degree programs.

As the workforce transitions to requiring workers to have a postsecondary degree or certificate, adults will increasingly pursue a college education. Labor statistics indicate that adult learners who achieve a degree play a critical role in establishing and maintaining a thriving economy (Bergman et al., 2014). These adult learners often face barriers that center around their

classification of nontraditional. These barriers include not only environmental factors but also academic deficiencies. In a study conducted by Bowers and Bergman (2016), the findings indicated that approximately 65% of jobs in 2020 were predicted to require some postsecondary education. While a high percentage of jobs require postsecondary education, the adult learners who enroll in college fail to persist to the second year and do not receive the required workforce credentials.

Considering the factors that influence persistence, research indicates that students who obtained a high school equivalency (HSE) diploma are less likely to persist in college (Chen et al., 2020). Nontraditional college students who have a high school equivalency diploma must also possess college readiness skills to be prepared for the college classroom. Individuals who successfully obtained their HSE diploma often must take remedial courses in college (Hawkins, 2019). In addition to these developmental education or remedial courses, the undergraduate students are placed in academic support courses to develop their readiness for the college environment.

Historical Overview

According to Jepson and Tobolowsky (2020), college enrollment has increased over the past two decades, but there has not been a substantial increase in graduation rates. The increase in nontraditional student enrollment at 4-year institutions was greatly influenced by the growth of weekend and evening programs taught at central locations (Bean & Metzner, 1985). One of the qualifiers for nontraditional students is that they delayed college enrollment after completing high school. Research studies have revealed that nontraditional students who delay college enrollment are about 64% likely to graduate with a four-year college degree (Jepson &

Tobolowsky, 2020). These adult learners have often participated in developmental education courses that extend their time for completion.

Developmental education, which began at Harvard with remedial reading in 1636, has existed for approximately 400 years (Wolfe, 2012). The growing number of underprepared students enrolling in colleges and universities caused a shift from the developmental tutoring format to a class format for remedial reading, writing, and math (Bohlig et al., 2018). While many postsecondary educational leaders have realized the stigmatism associated with developmental education, many colleges continue to offer these courses. Nontraditional students comprise a substantial number of students enrolled in these often non-credit-bearing courses.

The number of nontraditional students entering college without the skills needed to be academically successful is increasing. Some colleges have required all first-year students to enroll in an academic support course or orientation course to develop the skills they need to be successful in college (Coleman et al., 2018). These courses were designed to address the needs of setting goals, learning organizational skills, and understanding college (Coleman et al., 2018). Academic support courses are not developmental or remedial courses. Students participating in academic support courses receive information to assist in developing academic goals, enhancing their study techniques, and learning about student services. Student engagement in academic support activities has been characterized as a crucial element to student academic success by making them feel connected to their academic goals and more likely to succeed. In the past, student services were able to address the unique needs of nontraditional students, but today many colleges lack the funding for specific resources for nontraditional students (Remenick, 2019). Many colleges offer academic support courses to address the academic needs of both traditional and nontraditional students, but the nontraditional population often has unique needs.

Society-at-Large

The persistence of nontraditional college students is a critical concern for colleges and society. The rate of nontraditional students entering college is increasing, yet nontraditional students have lower degree completion rates than traditional college students (Ellis, 2019; Markle, 2015). Nontraditional student persistence is a concern for postsecondary institutions because the number of nontraditional students enrolling in college is happening at a greater rate than traditional student enrollment (Ellis, 2019). While tremendous efforts and attention have been focused on the persistence of traditional students, nontraditional students often face unique challenges. The persistence of nontraditional students is often compounded by the social environment of the college campus. The environment of the college campus is often geared toward the traditional student population. To meet projected workforce needs, nontraditional student persistence rates must increase. The Bureau of Labor Statistics projected that in 2020 about 65% of the jobs in the workforce will require some postsecondary education (Bowers & Bergman, 2016). A student's decision to enroll and complete college has an impact on the economy, the student, and the students' family (Bowers & Bergman, 2016). The current social environment on campuses may not support the successful integration of nontraditional students into the academic environment. With the increased need for higher levels of education, more must be done to promote persistence and degree completion.

Theoretical Background

Numerous theories have supported the examination of nontraditional student persistence at the postsecondary level. Tinto's theoretical student integration model of persistence states that students who assimilate and integrate into the college setting are more academically successful than those who do not establish integration (Remenick, 2019). Tinto's theoretical model is used

to describe the longitudinal process of student engagement in which the entry characteristics of previous schooling experiences, secondary achievement, socioeconomic status, and psychological characteristics influence their goal of persistence or graduation (Savage et al., 2019). This goal may not only impact students' academic and social integration within the college but also their persistence. This model encompasses the idea that students who persist often have reasons that motivate them to continue compared to those who do not persist.

Bean and Metzner's theoretical perspective model, the nontraditional undergraduate student attrition model, describes the attrition of students as being influenced by background, academic variables, environmental factors, and psychological outcomes (Chen et al., 2020). According to this theory, nontraditional students' participation in college is impacted by such external factors as family obligations, work responsibilities, and personal finances (Chen et al., 2020). These external factors can create insurmountable barriers for nontraditional students that may not be rectified by the college student services. This model is based on nontraditional students interacting more with the external environmental factors than with the academic environment of the institution (Aljohani, 2016). While the Bean and Metzner's nontraditional undergraduate student attrition model focuses on the nontraditional university student, it is applicable to all nontraditional college students.

Tinto's student integration model of persistence and Bean and Metzner's nontraditional undergraduate student attrition model will be utilized as a framework for analysis of this study. Tinto's student integration of persistence considers the students' first-year experiences, whether those experiences were successful or not (Aljohani, 2016). Nontraditional students need to experience integration into the academic college environment to achieve their academic goals. The Bean and Metzner model focuses specifically on nontraditional students and the

environmental factors that influence their academic achievement. Together these models will create a framework for analysis that is focused on the academic integration of nontraditional college students.

Problem Statement

Limited research exists on college persistence of nontraditional students. In assessing nontraditional first-year students' persistence to the next academic year, the current literature does not thoroughly explore the predictors of developmental education and academic support course grades (Kamer & Ishitani, 2019). Persistence is a prominent concern for colleges because approximately 60% of students who begin postsecondary studies do not complete their degree (Savage et al., 2019). Numerous research studies have tackled persistence for nontraditional college students, but these studies have failed to address some key components of the issue. In a study by Cho and Serrano (2020), the authors explored the academic achievement predictors of ethnically diverse nontraditional college students. Cho and Serrano (2020) operationalized academic achievement as semester grade point average (GPA). However, they suggested that future studies consider GPA of at least a year and use retention as an academic outcome. Kamer and Ishitani (2019) conducted a persistence study examining first-year, first-time nontraditional college students. As suggested by Rabourn et al. (2018), future studies should examine whether nontraditional adult learners benefit from such student engagement activities as meaningful learning activities like collaborative learning, interactions with peers and faculty, and leadership activities. In a study that examined the variable of commitment in college student persistence rates, Savage et al. (2019) suggested that future research measures persistence as an actual behavior instead of a categorical variable that examines behavioral intention. By examining persistence as an actual behavior, the study could utilize official college records that document

persistence. Chambers (2020) suggested that since many states are considering remediation methods, like corequisite models to address students' remediation needs, more research is needed to determine the effectiveness of student support services. Many higher education institutions have a student services department that addresses the needs of nontraditional students. Student engagement has the most significant impact during the crucial first year of college, but it has been unclear how to promote diverse student populations (Williams et al., 2018). Few studies have fully addressed the relationship between developmental education and academic support course grades and first-year nontraditional students' persistence to the next academic year.

Purpose Statement

The purpose of this quantitative, predictive correlational study is to examine how persistence of nontraditional college students is influenced by participation in developmental education courses and academic support courses. The predictor variables for this study are the course grades, which will be converted to numbers using the college's grade point scale, for developmental math, developmental reading, and the academic support course. Developmental education courses are remedial courses that are designed to address deficiencies in academic skills that are needed for college-level coursework (Bohlig et al., 2018). Developmental education, which typically does not count for credit in a degree program, ensures students are prepared to complete their postsecondary academic goals by focusing on reading, math, and writing (Bohlig et al., 2018). Academic support courses assist underprepared students in developing their noncognitive abilities in such areas as study skills, organizational skills, or introduction to college resources (Coleman et al., 2018). Persistence, the criterion variable, is defined as staying at an educational institution until completing a degree within a specific time frame (Savage et al., 2019). This correlational study will examine persistence to the next

academic year. The developmental education and academic support courses will be measured by a student successfully completing the course with a grade of C or better. Course letter grades will be converted to numbers based on the college's grading point scale. Persistence will be measured by a student completing the developmental education and academic support courses and enrolling in and attending school for the next academic year. This measurement will be verified through student data obtained from the college's data system.

The population of this study is all the first-year, nontraditional students enrolled in 2-year postsecondary institutions. The sample for this study will be from a public community college in the state of Louisiana, which is in the southern United States. The students, who are enrolled in various programs of study, will have participated in developmental education and academic support courses during their first year of college enrollment. The participants will be classified as nontraditional by meeting at least one of the seven descriptors of nontraditional learners. These descriptors include nontraditional students who are 25 years of age or older, work full-time, financially independent, has nonspousal dependents, a single parent, delayed enrollment into postsecondary education, or did not complete high school (Chen, 2017; Remenick, 2019). The nontraditional student status can be based on delayed enrollment in postsecondary education (Jepson & Tobolowsky, 2020). Additionally, nontraditional students can be defined as age 25 or older, financially independent, or enrolled part-time. Students can be classified as nontraditional students using the seven different criteria, which reflect life demands of this student population (Cho & Serrano, 2020). College students with children, student parents, are common characteristics for nontraditional students (Peterson, 2016). As a nontraditional college student, student parents often must balance childcare and academic responsibilities. As described by Choy (2002), nontraditional college students are less likely than traditional students to attain a

degree. Nontraditional students may work full-time, which is characterized as 35 hours or more each week (Choy, 2002).

Additionally, nontraditional students may delay enrollment in postsecondary education. Delayed enrollment is defined as not entering college in the same calendar year as finishing high school (Choy, 2002). In a study on the motivations of traditional and nontraditional college students, Johnson et al. (2016) acknowledged that age has varied throughout the literature and does not accurately account for the other descriptors of nontraditional students.

Significance of the Study

This study will provide a new understanding of college student persistence by examining nontraditional students at the college level. When examining nontraditional college student persistence, many previous studies have focused on defining nontraditional by age without examining the other six characteristics (Cho & Serrano, 2020). Unlike many previous studies, the participants of this study will be comprised of students who identify with all seven characteristics of nontraditional students. This study will contribute to the research on nontraditional students who are parents and students who delayed enrollment in college, which are two major gaps in the literature (Jepson & Tobolowsky, 2020; Peterson, 2016). In addition to addressing the gaps in the literature, this study will add to the research on the impact of developmental education and academic support courses on first-year student persistence to the next academic year.

This study, which will examine student persistence by considering the variables of developmental education and academic support courses, will fulfill an overlooked aspect of student persistence. The various facets that contribute to academic success impact not only the student but also numerous entities beyond the classroom. Nontraditional students face unique

challenges at postsecondary institutions. Nontraditional students are not only academically vulnerable but also have lower graduation rates compared to traditional students (Markle, 2015).

Postsecondary institutions are having to demonstrate measurable student success outcomes. First-year students are often used to measure these outcomes, but when these students leave before achieving the goal of degree completion it can cost colleges thousands of dollars in potential revenue. Funding to address the academic support needs of nontraditional students is limited. Many colleges cannot fully finance the resources nontraditional students need to address specific barriers to persistence and ultimately completion (Remenick, 2019). Since these adult learners now make up a majority population for many campuses, postsecondary educational institutions must support these learners to promote persistence. Higher education data for fiscal year 2018 indicated that 28 states have performance funding policies in place (Li, 2019). The persistence and completion rates of students, especially underserved students, in higher education impact equity metrics. Many postsecondary institutions' funding is based on performance funding in which allocation of state appropriations is based on the student outcomes of retention rates, persistence rates, course completions, graduation rates, and degree completions (Li, 2019). To meet these outcomes, colleges focus on activities to increase persistence of disadvantaged student populations.

By understanding the barriers to persistence, adult education leaders can better establish programs that address the needs of prospective nontraditional learners that transition to postsecondary education. Previous research revealed that adult learners, who did not complete high school but obtained their high school equivalency diploma, are at greater risk of not persisting in postsecondary education (Chen et al., 2020; Hawkins, 2019). Today's adult education programs do much more than focus on developing the basic education skills of reading

and writing (Belzer & Kim, 2018; Hawkins, 2019). Today's adult education programs act as workforce development agencies by providing college and career readiness activities and transitioning students to college (Belzer & Kim, 2018; Hawkins, 2019). Adult education leaders can benefit from this study by having greater insight into the nuances of college persistence.

This research study will contribute to the research on preparing nontraditional students for postsecondary studies. By addressing the key literature gaps of nontraditional student persistence, the findings will help address the problem of low persistence rates of college students. Furthermore, this study will contribute to the nontraditional student persistence understanding by looking beyond the first year of enrollment to what influences the student to persist to the next academic year at community colleges. These features will expand the current theories of student persistence. This study will better inform educational leaders within the admissions, developmental education, and academic support departments of colleges and universities. Additionally, the findings will inform the practices of adult education and workforce development leaders in how to better address the academic needs of adult learners. American College Test (ACT) scores are often used by many colleges to determine if students need developmental education or academic support courses. Academic support courses can have a profound impact not only on the first year of enrollment but also the student's commitment to persist. Student engagement activities outside the classroom, which are determined to be academically purposeful, can help develop relevant skills that promote motivation to succeed (Carr & London, 2019).

Research Questions

RQ1: How accurately can a linear combination of developmental math course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

RQ2: How accurately can a linear combination of developmental reading course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

Definitions

1. *Academic support courses*-Academic support courses are college courses designed to deliver a range of student support services to address the needs of first-year students, which include effective self-regulating learning skills. These courses provide information about college, academic and career planning, and study strategies. Additionally, academic support courses are also called college success courses, learning skills laboratory, student success courses, orientation courses, first-year experience, or success courses (Coleman et al., 2018; Hoops & Artrip, 2016; Kimbark et al., 2017).
2. *ACT score*- The total composite score on the American College Test, which assesses a student's college readiness (Millea et al., 2018).
3. *Corequisite remediation*- An approach to developmental or remedial studies in which students are placed in college-level courses while taking developmental courses and academic support courses concurrently (Chambers, 2020; Childers et al., 2021; Kane et al., 2021; Yadusky et al., 2021).

4. *Developmental education*- These remedial courses ensure that students are prepared to complete their postsecondary academic goals by focusing on the areas of reading, math, and writing (Bohlig et al., 2018).
5. *Nontraditional student* - The nontraditional student has such characteristics as age 25 and over, enrolled in college part-time, financially independent, have dependents, a single parent, did not enroll in postsecondary education immediately after high school, did not complete high school or have a high school diploma, and works 35 hours or more while enrolled (Cho & Serrano, 2020). Nontraditional students can also be under age 25 if they possess some of the aforementioned characteristics (Chen, 2017).
6. *Persistence* – Persistence is staying at an educational institution until completing a degree within a specific time frame (Savage et al., 2019).
7. *Retention*- Retention refers to a freshman student who continuously returns to the same college or university from one academic year to the next academic year (Williams et al., 2018).
8. *Student engagement*- Student engagement is activities, such as collaborative learning, interaction with peers and faculty, and leadership activities, outside the classroom that are academically purposeful in developing relevant skills that promote motivation to succeed through college involvement (Carr & London, 2019; Rabourn et al., 2018).
9. *Success in college*- Success in college is defined by academic performance and student retention, but also may be related to other variables or combination of variables (Sparkman et al., 2012).

CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this literature review is to present essential elements of nontraditional student persistence, describe developmental education and academic support courses, and examine how the characteristics of nontraditional students can impact persistence. The chapter opens with the theoretical framework. This study is grounded in Tinto's student integration model of persistence and Bean and Metzner's student attrition model. Research related to persistence and nontraditional students will be discussed. A thorough review of the literature pertinent to nontraditional student persistence, developmental education, and academic support courses completes the chapter which ends with a summary.

Theoretical Framework

The theoretical framework guiding this persistence study is derived from Tinto's theoretical student integration model of persistence and Bean and Metzner's (1985) nontraditional undergraduate student attrition model. These two theories not only guide but also establish a context for the exploration of college student persistence.

Tinto's Sociological Student Integration Theory

Vincent Tinto, the author of the theoretical student integration model of persistence, is viewed as a prominent authority of postsecondary degree completion (Simmons & Smith, 2020). Tinto's theoretical model examines how student integration can support academic success and persistence (Remenick, 2019). This theoretical model of persistence posits that college students, who assimilate into the college environment and integrate into college life, will be more academically successful (Remenick, 2019). This model considers that students enter postsecondary institutions with a variety of background characteristics, skills, and intentions that

interact with the college environment (Bassett, 2021). These various features play an active role in the integration process. This persistence model examines the important characteristics of the educational institution and the campus environment for students (Wisemath & Newberry, 2019). The role of the institutional environment was not considered in student retention work until the 1970s (Tinto, 2006). Departing from previous views of student dropout, Tinto recognized that colleges and universities play crucial roles in ensuring high rates of student retention (Tight, 2020; Tinto, 1975).

As college resources began to diminish, some institutions placed more emphasis on increasing student persistence rates (Tinto, 2006). According to this environmental theory, students who have positive, productive encounters with the institution and their peers become integrated and potentially successful in achieving their academic goals and persisting to graduation (Bassett, 2021). For this theory, integration is defined by the institution and not the student (Bassett, 2021). Tinto expanded on the work of earlier researchers which led to the development of the student integration model (Dewberry & Jackson, 2018). The theory of student integration was originally conceived in 1973 (Claybrooks & Taylor, 2016; Davidson & Wilson, 2013). In 1973 Tinto and Cullen presented a report on the theoretical synthesis research about student dropout in higher education (Nicoletti, 2019). That theoretical model has been modified from its original version. Initially, this model proposed that students enter college with emotional and intellectual barriers that are the result of personal characteristics and external factors that motivate students to enroll and complete courses (Nicoletti, 2019). These barriers impact students' ability to integrate into the college environment. Tinto recognized that dropout resulted after a series of events. These events include pre-postsecondary factors that influence commitment and the integration into the academic system (Dewberry & Jackson, 2018).

The research on student retention began in the 1930s and led to the development of several theories and models (Dewberry & Jackson, 2018). Student retention models began examining the relational variables of the student and the institution in the late 1960s and early 1970s (Burke, 2019). Tinto and Cullen examined the correlation between the student and the postsecondary institution. In 1975 Tinto published an article that built upon the 1973 publication and became a widely accepted theory of student retention and withdrawal (Claybrooks & Taylor, 2016; Davidson & Wilson, 2013). Tinto expanded on the model in 1975 to include a goal and institutional commitment (Nicolettti, 2019). The 1975 Tinto theoretical model of the persistence and withdrawal process of postsecondary education considers that there is a degree of fit between students and the college environment (Pascarella & Terenzini, 1983). The student integration model is based on Durkheim's theory of suicide (Dewberry & Jackson, 2018). Tinto associated a student's withdrawal from college with the experiences of withdrawal from family and society observed with individuals demonstrating suicidal behavior (Claybrooks & Taylor, 2016). Tinto's framework was grounded in the economics of education, cost-benefit analysis, and alternative educational activities (Davidson & Wilson, 2013; Tinto, 1975). The student integration theory posits that students must experience a certain degree of social and academic integration to commit to the school and persist to graduation (Claybrooks & Taylor, 2016; Davidson & Wilson, 2013). The student services department of colleges and universities support this assimilation (Remenick, 2019). Tinto and Cullen's theoretical model suggested that the greater one's integration into the academic and social environments the greater the student's commitment to the institution, persistence, and course completion (Nicoletti, 2019). By the 1980s, research studies began to address the factors of nontraditional college students, which include academic and social integration (Davidson & Wilson, 2013).

Failure to successfully integrate into the school results in reduced goal commitment and increased attrition (Tinto, 1975,1998). The model contends that students need to achieve social and academic integration (Tinto, 1975; Wisemath & Newberry, 2019). Tinto's model centered on the concept of student integration and the interactions between the students and other members within the postsecondary institution during the student's first year of enrollment (Tinto, 2006). Tinto (2006) stated that student involvement in the institution's environment is most important in the first year of college.

Most studies using Tinto's theory focused on social as opposed to academic integration because Tinto believed social integration was a better predictor of residential students' retention (Davidson & Wilson, 2013). By the 1980s, commuter student populations increased and academic integration had a greater impact on student retention (Davidson & Wilson, 2013). In the late 1990s, Tinto acknowledged that because of the limited amount of time commuter students spent on campus their academic engagement was more important than social integrations (Davidson & Wilson, 2013; Tinto, 1998). This integration model examines how students integrate into the college's social and academic components through various types of cognitive and non-cognitive factors that are shaped by one's enrollment commitment and degree attainment (Williams et al., 2018). The student persistence model focuses on student characteristics, academics, and social integration (Davidson, 2016). Tinto's student integration theory is applied to studies to account for how students academically and socially connect within the college environment (Kamer & Ishitani, 2019).

Williams et al. (2018) used Tinto's student integration model to examine the cognitive and noncognitive factors that influenced freshman retention rates. This integration theory contends that various cognitive and noncognitive factors, such as grade point average, academic

ability, academic attainment, age, and even social status can influence educational expectations (Williams et al., 2018). Tinto's model can be applied to persistence research studies to determine the likelihood of students persisting. Claybrooks and Taylor (2016) used Tinto's theory of student integration to explore how college success courses can be used as a student persistence tool in a for-profit postsecondary institution. This interaction accounts for a successful student acclimation to the school environment, which results in successful academic achievement and ultimately promotes persistence (Claybrooks & Taylor, 2016).

The student integration model is based on the concept that college students integrate into the college environment. This integration, within the academic and social systems, occurs through normative and structural integration (Nicoletti, 2019). This model can be used to examine the academic integration of nontraditional students at community colleges. This student integration model is commonly applied to academically disadvantaged students (Davidson, 2016). When examining student persistence, Tinto's integration theory is often cited as a part of the theoretical framework. The premise of the Tinto model is that students begin college with different levels of commitment and motivation to achieving their educational goals (Simmons & Smith, 2020). Tinto's model concludes that a student's decision to drop out of school is a result of the student's low level of integration into postsecondary education.

Effective academic support programs connect in meaningful ways to address the student's needs, so they can make meaningful connections to the skills and knowledge they obtain in the course (Tinto, 2004). The student integration theory allows postsecondary institutions to create a plan for student persistence that focuses on academic and social integration (Xu et al., 2018). Researchers have acknowledged that the psychological process of developing a sense of belonging early in college is key for underprepared students (Xu et al.,

2018). Students at residential and commuter postsecondary institutions often have needs and expectations that differ from other institutions, such as community colleges, when those students' needs and expectations are not met the student will leave (Tinto, 1975).

While Tinto's theoretical integration model of persistence has been used as theoretical framework for many persistence research studies, Tinto's model has received criticism from numerous researchers (Simmons & Smith, 2020). The model has had extensive theoretical approach usages, yet the diversity of nontraditional students causes concern. Researchers examining persistence often criticize Tinto's model in reference to nontraditional students who are low-income, low socio-economic, and first-generational students (Simmons & Smith, 2020). While findings from research using Tinto's model may be difficult to apply in practice, the model clearly points out that the relationships students form with others connected to the school result in being more likely to persist (Davidson & Wilson, 2013). After the initial recognition of student retention, the high rate of students who were not successfully completing the higher education courses caused researchers to focus on understanding retention and what can be done to improve retention (Tight, 2020). Tinto concluded that whether or not a student drops out of college is a result of the student's ongoing goal and commitment to the postsecondary institution, which is influenced by the social and academic integration at the college (Dewberry & Jackson, 2018). Tinto held that commitment is a key variable in student persistence (Savage et al., 2019). As student integration deepens, greater degrees of commitment to the college will result (Tinto, 1975).

Bean and Metzner's Nontraditional Student Attrition Theory

Bean and Metzner's nontraditional undergraduate student attrition model examines how attrition can be influenced by students' academic background and environmental variables (Chen

et al., 2020.). Bean and Metzner's student attrition model was initially formulated by Bean to address traditional students but was reformulated to examine the experiences of nontraditional students (Chen & Hossler, 2017). As the enrollment of nontraditional students began to increase, the attrition rate of this group began to gain attention. The increasing number of nontraditional students amplified the higher rate of student attrition by nontraditional students compared to traditional students (Bean & Metzner, 1985). Nontraditional students had been included in attrition studies with traditional students because no theoretical model existed to guide attrition research studies in higher education (Bean & Metzner, 1985). Bean and Metzner (1985) developed this model to explore the process of nontraditional students dropping out of college. The model is a combination of models for traditional student attrition, behavioral theories, and elements from nontraditional student characteristics. Bean's student attrition model is often employed to create a direct path of causality that school administrators can use to identify variables that indicate why students drop out of college (Burke, 2019).

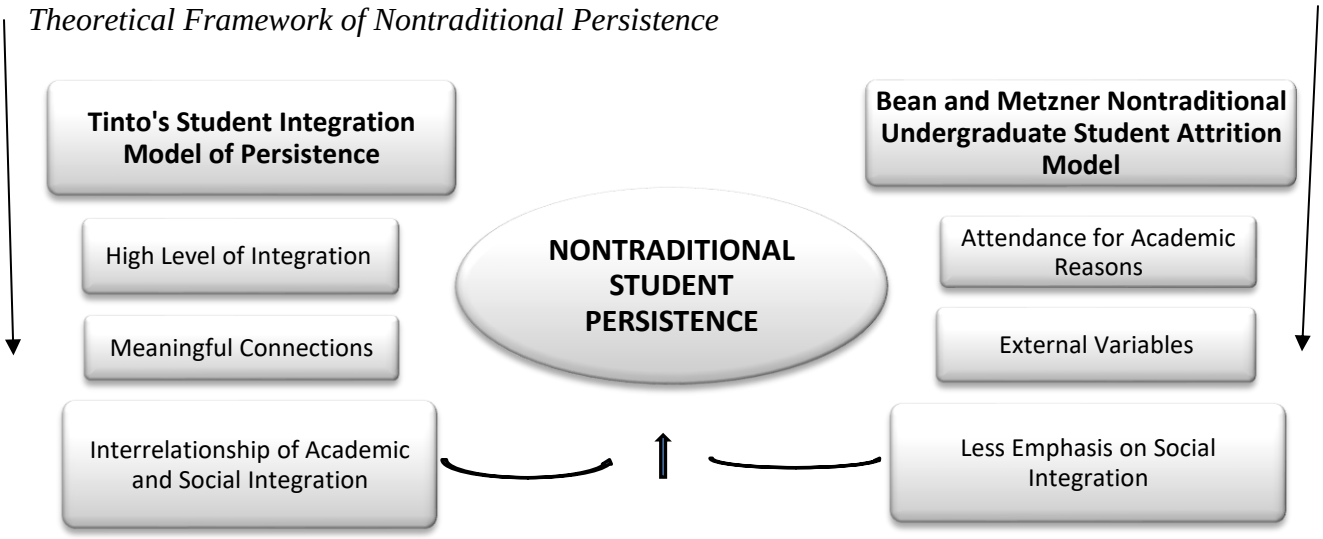
Bean and Metzner published a study differentiating between traditional and nontraditional college students. They noted that nontraditional students attend college for academic reasons (Bean & Metzner, 1985). Bean and Metzner introduced the noncollegiate, external variables of finance, hours of employment, outside encouragement, and family responsibilities (Davidson & Wilson, 2013). Bean and Metzner placed less emphasis on social integration in their model but acknowledged the social components of external and environmental factors related to retention (Davidson & Wilson, 2013). Bean and Metzner derived explanations of student retention by applying concepts of organizational and psychological literature (Dewberry & Jackson, 2018).

Studies that examine retention of first-time students at four-year colleges are often grounded in Tinto's integration theory, which considers the interrelationship of a student's academic and social experiences (Kamer & Ishitani, 2019). Unlike traditional college students, nontraditional students often lack social integration into the campus environment. The study of nontraditional students must account for the lack of social integration into the higher education institution, which is why previous models could not be used to link the variables of nontraditional student research (Bean & Metzner, 1985). The nontraditional student attrition model has been used to study the unique variables of the nontraditional student population. Peterson (2016) used this model by Bean and Metzner as the theoretical framework for research studies focused on the academic success of student-parents and their priorities for persistence. Chen and Hossler (2017) used the model to support research on the economic variables of nontraditional student persistence, such as financial aid.

When the Bean and Metzner student attrition model is applied to nontraditional students, a central assumption is that this student population is likely to be affected by the external environment and more focused on academics than socialization while in college (Chen & Hossler, 2017). The characteristics of age, ethnicity, gender, enrollment status, residence, educational goals, and past experiences are likely to affect students' college experiences and attrition decisions (Chen & Hossler, 2017). These academic variables can influence enrollment decisions such as study habits, academic advising, major decisions, and course availability. Bean stated that student satisfaction leads to persistence (Savage et al., 2019). Figure 1 shows the key components of student integration that influence persistence.

Figure 1

Theoretical Framework of Nontraditional Persistence



Note. This figure displays the key components of Vincent Tinto's Student Integration Model and Bean and Metzner's Nontraditional Undergraduate Student Attribution Model. While these models were initially applied to retention studies, both models support the examination of factors that support nontraditional student persistence.

Related Literature

Nontraditional College Students

Nontraditional students are a rapidly increasing population in higher education, yet they have decreasing persistence (Renirie, 2017). Zarifa et al. (2018) conducted a study where nontraditional students were described as being an important at-risk group for timely degree completion. Zarifa et al. (2018) discussed how the odds were against nontraditional students completing their four-year degree in time or even completing the degree program. When students fail to persist at colleges and universities, the outcomes impact the academic and social environment of the institutions (Burke, 2019). With this evolvement of the student population, educators must understand the unique characteristics of nontraditional students. This understanding must include how these characteristics influence not only enrollment but also persistence. Approximately 70% of today's college students possess the characteristics of being

nontraditional (Chen & Hossler, 2017). While nontraditional students can be defined based on one of the seven descriptors, these students are often simply defined by educational pathways that differ from the usual pathway of society (Crone et al., 2020). Nontraditional student enrollment in college has increased because of various national policies and cultural shifts such as the GI Bill, federal changes to financial aid policies, and online learning (Remenick, 2019). When college officials develop, implement, and facilitate courses, they must consider the support structures nontraditional students need to persist (Ellis, 2019). Remenick (2019) suggested that there needs to be a cultural shift in the inflexible practices and academic expectations of postsecondary institutions to help nontraditional students persist. The nontraditional student population needs resources specific for their unique needs. These needs may be based on multiple characteristics. Chen et al. (2020) proposed the need to understand the dropout risk of nontraditional students enrolled in 4-year colleges and universities.

Multiple Criteria for Defining Nontraditional Students

Using one criterion, such as age, to define nontraditional students does not consider the life demands of this student group (Cho & Serrano, 2020). These life demands can have a profound impact on students' academic integration and achievement. Nontraditional students often enter postsecondary institutions later in life and must maintain the balance of multiple responsibilities and roles, which differ from traditional students (Kamer & Ishitani, 2019). Kamer and Ishitani (2019) concluded that postsecondary administrators must coordinate retention efforts and persistence policies based on the unique characteristics of nontraditional students. Nontraditional students differ from traditional students in motivation and college preparation (Hawley & Chiang, 2017). Studies that define nontraditional students by only one variable exclude a large segment of the population. Chen et al. (2020) conducted a study on the

dropout risks for nontraditional students who were 24 years of age or older, financially independent, enrolled in college part-time, and attended a 4-year institution. A study using all seven nontraditional criteria is a better reflection of those life demands and nontraditional learners (Cho & Serrano, 2020).

Barriers

Nontraditional students may face numerous barriers related to their personal background or classification characteristics. Nontraditional college students who face institutional, structural, and personal barriers are a growing trend in higher education (Remenick, 2019). The trend is prevalent at community colleges and also 4-year institutions. Studies have found that nontraditional students are less likely to complete their degree within four years (Zarifa et al., 2018). Few studies have focused on nontraditional students completing their bachelor's degree in four years (Zarifa et al., 2018). Rural nontraditional college students also face persistence barriers. In a study about rural college students' access to higher education, Goldman (2019) concluded that the common barriers nontraditional students encounter include lacking academic preparation, foregoing full-time employment, and difficulty locating affordable childcare. Changes in rural areas' economic resources and technological development have prompted the necessity for college degrees and has made college enrollment and completion more feasible (Wells et al., 2019).

Little research exists on the persistence of rural nontraditional college students. While there is a demand for a well-educated labor force in the United States, the percentage of individuals age 25 to 64 who have an associate degree or higher-level credential is only 46% (Cummins et al., 2019). Future research on nontraditional college students is needed to examine the need for access to campus resources (Goldman, 2019). To deter students from leaving after

their first year, college administrators and academic advisors must be able to identify potential barriers to academic success and acclimation to the college (Elder, 2021).

Goal Attainment and Persistence

Numerous research studies have examined the goal attainment and persistence of traditional students at the community college level, yet few studies have focused exclusively on the educational attainment of nontraditional college students (Chen & Hossler, 2017). The characteristics of nontraditional students have been shown to be negatively associated with educational attainment (Kimbark et al., 2017). Nontraditional students face more significant barriers to academic achievement than their traditional peers (Remenick, 2019). Nontraditional students also have higher attrition levels than traditional students (Cho & Serrano, 2020; Ellis, 2019). Adult students' first-year dropout rate is greater than the dropout rate of traditional students (Renirie, 2017). Nontraditional student persistence studies have often focused on persistence to a degree rather than on a single course (Ellis, 2019). By focusing on a single course, a developmental education or college success course, educational administrators and curriculum designers can develop more effective courses that promote persistence to the next academic year. Postsecondary attainment for adult learners is important for addressing the needs of the workforce and supporting entry into the middle and upper class for college completers (Kallison, 2017). Additional research is needed to improve the expression of adult learner goals and attachment to those goals (Pearson, 2019).

Delayed Enrollment

A greater understanding of nontraditional students is possible by focusing on all nontraditional characteristics. By moving beyond the age criterion, researchers can gain an understanding of such aspects as delayed enrollment. Some students delay enrollment because of

poor academic preparation, lack of financial resources, changes in employment, or marital status, but little research has been done on how intentional delayed enrollment impacts retention (Jepson & Tobolowsky, 2020). Research findings indicate that delayed enrollment in college can hurt student graduation rates (Jepson & Tobolowsky, 2020). Research has suggested that students who delay enrollment are about 64% less likely to graduate with a four-year degree (Jepson & Tobolowsky, 2020). A multitude of reasons exist for why students delay college enrollment. As individuals prepare for postsecondary education, students from lower socioeconomic backgrounds are more likely to delay enrollment for a year or more (Andrews, 2018). Some nontraditional students intentionally delay postsecondary enrollment. The number of students deciding to delay enrollment in college is increasing (Jepson & Tobolowsky, 2020).

Previous studies have indicated that delayed entry into college is negatively correlated with degree attainment because students transition into other roles like parent, spouse, or employee (Andrews, 2018). High impact practices, including academic support courses, first year seminar, and learning communities, have been beneficial for student persistence and deep learning (Andrews, 2018). Limited research has explored the relationship between delayed college enrollment and the lower likelihood of degree completion (Andrews, 2018).

The research focused on nontraditional student attrition indicates that students are less likely to persist in degree programs than traditional students and nontraditional students have higher rates of attrition (Cho & Serrano, 2020; Ellis, 2019). Research studies indicate that lack of academic preparation, inadequate financial resources, family responsibilities, or employment may cause students to delay enrollment (Jepson & Tobolowsky, 2020). Jepson and Tobolowsky (2020) discussed how previous research has examined how the lack of academic preparation and financial resources have led to delayed enrollment, but that little research has explored how

intentional delays affect retention. Future studies should be conducted to confirm that nontraditional students persist in courses and course assignments and how these learners can be supported in degree program persistence (Ellis, 2019). Future research should also explore nontraditional students' conducive approach to learning (Cho & Serrano, 2020). Cho and Serrano (2020) suggested that future studies should focus on the noncognitive measures of nontraditional students to understand academic achievement.

Students Who Are Parents

Nontraditional students, who are parents, face unique challenges related to time. These challenges often center around the time they devote to childcare and the time they have available for class and study. Student parents make up approximately one-fourth of the total number of undergraduate students enrolled in postsecondary institutions in the United States (Freeman, 2020; Pearson, 2019). Wladis et al. (2018) reported that 52% of student parents dropout of college within six years of enrollment, yet only 32% of nonparents dropout within six years. Additionally, Wladis et al. (2018) concluded that student parents have significantly less time for their studies when compared to peers, which explains the difference in college persistence. Time use patterns have been associated with an undergraduate student's academic and overall well-being (Hensley et al., 2018). The challenge of time highlights the premise of why student parents often persist at lower rates than students without children (Wladis et al., 2018). These student parents cite financial and time constraints and childcare as the major obstacles to higher education (Freeman, 2020; Wladis et al., 2018). College student-parents have often been described as having lower graduation rates than traditional students (Lovell & Scott, 2020). Approximately 55% of student-parents are employed full-time in addition to those students working part-time and balancing caregiving and academics (Sallee & Cox, 2019). Female

student parents may have greater persistence needs. Females comprise the largest group among this population (Lovell & Scott, 2020). Single student mothers may find it difficult to actively participate in activities on campus for reasons such as not being aware of the college services, activities and services are at times that are not convenient, or the lack of a connection to campus (Lindsay & Gillum, 2018).

Even though the number of student-parent college students has increased, the amount of research is limited (Lovell & Scott, 2020). Prediction studies have estimated that approximately 33% of college students with children graduate with an undergraduate degree after six years (Lindsay & Gillum, 2018). The management of the multiple roles of student-parents is often viewed as a hindrance to academic motivation (Lindsay & Gillum, 2018). Educators must understand the unique experiences of students that work and are full-time students to be better able to support them and help them succeed academically (Mills, 2020).

Employment

Nontraditional students who work require support from postsecondary institutions. Student mothers face substantial barriers to postsecondary persistence. The employment status of nontraditional students can have an impact on students' academic outcomes. Student mothers tend to work part or full-time jobs while attending college, which highlights the need for flexible childcare (Freeman, 2020; Pearson, 2019; Wladis et al., 2018). Remenick and Bergman (2021) stated that the number of hours a student spends working has a strong correlation with academic success. Employment might offer numerous benefits for nontraditional students, but these students may need additional support from the school to decrease the drawbacks of employment (Remenick & Bergman, 2021). In discussing competing responsibilities and academic success for working students, Mills (2020) explained that a gap in the literature exists for full-time

college students who work at or near full-time. Choi (2018) conducted a persistence study that examined the effects of student employment on postsecondary dropout. Remenick and Bergman (2021) stated that additional research is needed to understand the complexity and challenges of working students so practitioners and policymakers can reduce these students' burdens or help eliminate barriers.

Did Not Graduate from High School

Numerous benefits are associated with high school graduation. Despite these benefits, high school dropout is still a problem in the educational arena. High school dropout is a problem that affects not only low-income students but also the nation's labor market (Rossi & Bower, 2018). An examination of college enrollment for students with a high school equivalency diploma can be hindered because many colleges group these students with traditional high school graduates (Rossi & Bower, 2018). When assessing college-level coursework readiness, General Education Development (GED) passers are at a more significant disadvantage than traditional high school graduates when preparing for college-level coursework (Rossi & Bower, 2018). The number of GED passers who have attended college is not known because GED passers may start college at any time and data collection for different time intervals and ages can result in conflicting findings (Rossi & Bower, 2018).

First-year College Students

Studies have shown that the first year of college is critical for building a student's educational career, reaching academic achievement goals, and influencing educational decisions (Schaeper, 2020). A study by Hauck et al. (2020) found that students benefit from first-year experience or academic support courses that have a rigorous, academic course format. Tinto (1993) concluded that the initial phase of the transition to college sets the stage for degree

completion or withdrawal from college (Tinto, 1993). First-year college students pose a higher risk of attrition compared to other undergraduate students (Hauck et al., 2020). Several factors can account for this higher attrition and withdrawal risk. Previous studies have concluded that academic self-efficacy is a predictor of college persistence (Hauck et al., 2020). First-year college students can benefit from such courses as academic support courses in which the curriculum includes developing skills for academic self-efficacy beliefs. In examining numerous retention studies on first-year students, Watson and Lenz (2020) stated the consensus that the more positive a student's adjustment to college in the first year the greater the likelihood the student will remain enrolled and persist to degree completion. Hauck et al. (2020) suggested that future studies investigate the short and long-term effects of engagement and self-efficacy after an academic support course. Previous persistence studies have primarily focused on first-time traditional students, but Kamer and Ishitani (2019) suggested that future studies focus on the enrollment patterns of first-time nontraditional students.

College Persistence

Student persistence is a major concern for colleges and universities. Enrollment in 4-year postsecondary educational institutions has doubled since 1965, yet institutions in the United States have seen minor increases in college completion rates since the 1970s (Hawley & Chiang, 2017). Colleges and universities have placed a greater emphasis on student retention, student persistence, and completion rates. The college student completion rate has not kept pace with college student enrollment as the enrollment numbers have increased (Kimbark et al., 2017). Completion and persistence rates have become a primary concern for colleges because state and federal funding have become more strongly associated with student completion rates (Kimbark et al., 2017). College administrators and student support staff have the critically important

responsibilities of identifying students who are having difficulty adjusting to the college environment and assisting these students to succeed and maintain enrollment (Watson & Lenz, 2020). While student retention and student persistence are not the same, students seek to persist and graduate without regard to the institution (Tinto, 2017). Students must want to persist even during challenging times (Tinto, 2017). Students may be committed to completing a degree program but not necessarily at the school they began their college career.

Students' success and persistence have been influenced by integration into the college community and participation in academic support courses (Millea et al., 2018). Tinto (2017) stated that a limited amount of literature exists for student persistence compared to retention. Numerous life events may influence persistence or the desire to persist. To encourage students' desire to persist, colleges offer first-year academic support programs of supplemental instruction and developmental education courses (Tinto, 2017). Savage et al. (2019) suggested that future studies measure persistence as an actual behavior where archival institutional records are used. Nontraditional first-generation students at 4-year institutions have a high risk of dropping out in the first year of college (Kamer & Ishitani, 2019). Further research, as described by Cummins et al. (2019) and Ellis (2019), can help identify strategies to design programs and student services that address the unique needs of nontraditional college students.

Developmental Education

Students who lack the academic skills necessary for college-level courses or score below a pre-determined level on placement exams are placed in developmental education. Sole (2020) defined developmental education as being a span of support services designed to strengthen unprepared students' academic skills and prepare students for credit-bearing college courses. Some colleges no longer rely solely on placement exams to decide whether to place a student in

developmental education or academic support courses. Placement strategies have been implemented which rank students based on their high school grade point average and test scores (Woods et al., 2019).

Developmental education courses are designed to prepare students for college-level coursework and to pursue their postsecondary educational goals (Bohlig et al., 2018). Researchers and educational practitioners have focused on reading developmental education courses because reading is a requisite for most college-level courses and is important for longer-term student success (Woods et al., 2019). Hawley and Chiang (2017) described developmental education as a gatekeeper to long-term academic success in college. Saw (2019) described postsecondary remediation as a prevalent, large-scale intervention to address the academic deficiencies of poorly prepared students. Money spent on developmental education, which prepares students for academic and learning support, is considered a misuse of high-cost educational funding (Saxon, 2017; Wheeler & Bray, 2017; Woods et al., 2019). It is estimated that about one-fifth of first-time college freshmen at public 4-year universities are placed in at least one developmental education course (Cung et al., 2019; Valentine et al., 2017). The rate of developmental education course participation at public universities is about 25% (Valentine et al., 2017). The remediation rates of delayed enrollment students and older students are greater than other members of the college student population (Sanabria et al., 2020). Despite the objectives of developmental education, these courses often do not count for credit hours in a degree program (Bohlig et al., 2018).

Developmental education programs primarily focus on developing courses for remediation in mathematics, reading, and writing. Mathematics has the highest participation rate among developmental education courses and the lowest successful completion rate (Cung et al.,

2019; Davidson, 2016; Valentine et al., 2017). In considering the cost-effectiveness of developmental education, beginning college students placed in remedial education most often are assessed as math being their greatest need in 2 and 4-year institutions (Valentine et al., 2017). In examining developmental math courses, a significant percentage of all postsecondary math courses taught in the United States is developmental math (Maciejewski et al., 2021). Developmental educators acknowledge that some of the challenges that developmental participants encounter do not relate to math, but these challenges prevent them from engaging in their math studies (Maciejewski et al., 2021). Maciejewski et al. (2021) acknowledged that little is known about university-level students taking developmental math. Colleges devote a considerable about of resources to delivering developmental education, yet these courses are often unsuccessful (Davidson, 2016). Sanabria et al. (2020) stated that historical policy changes have demonstrated that there may always be a need for remediation at the college level.

Developmental education is the primary method colleges and universities use to support students who lack the needed academic skills (Woods et al., 2019). Underprepared students do not have the college-level skills required for college-level coursework. Cox and Dougherty (2019) stated that the developmental education placement process is comprised of numerous concerns with how students are assessed as being underprepared. A universal outcome measure used for developmental education is the course-level pass rate, which is the percentage of students who earn a course grade of C or better (Cox & Dougherty, 2019). Students placed in the wrong course level jeopardizes the utility of developmental education course-level pass rates to measure academic success because passing the course may not be representative of advancement of mathematical proficiency (Cox & Dougherty, 2019). Only 20% of the academically unprepared students who participate in developmental education complete the next sequenced

college-level course within two years (Woods et al., 2019). A large number of students that participate in developmental courses fail to matriculate to the gateway courses, which causes many people to consider developmental courses a barrier to gateway courses (Childers et al., 2021). Woods et al. (2019) suggested that there is little correlation between remediation and early college success for students. Despite these arguments, studies have indicated that developmental education course performance can be positively related to a student's performance in gateway courses (Woods et al., 2019). Additionally, results from over twenty developmental education studies reflect that a student's placement in developmental education at 2 and 4-year institutions is related to significant negative effects on course credits, success in college-level courses, and degree completion (Finster & Feldman, 2021; Valentine et al., 2017). A limited number of studies have examined developmental education at 4-year institutions (Davidson, 2016). As the workforce continues to place greater emphasis on a skilled workforce, researchers and educational policy makers need to better understand the effects of developmental education at the postsecondary level (Sanabria et al., 2020).

Previous studies have examined the relationship between developmental course completion and degree completion (Bohlig et al., 2018). The literature on developmental education programs often indicates mixed results for participation in developmental courses. Woods et al. (2019) stated that existing research on the effectiveness of developmental education is not consistent across studies with outcomes often being insignificant or negative. Cox and Dougherty (2019) explained that completion rates provide a limited prospective on the effectiveness of developmental coursework. Acee et al. (2017) stated that students placed in developmental education courses have a higher risk of poor academic performance and dropping out of college. Shields and O'Dwyer (2017) examined the relationship between participation in

developmental education and postsecondary degree completion after controlling for demographic characteristics. A gap in the literature exists on the effectiveness of developmental programs (Wheeler & Bray, 2017). Previous research studies have examined the relationship between developmental math courses and student graduation (Wheeler & Bray, 2017). Shields and O'Dwyer (2017) suggested that future research studies focus on developmental education and degree attainment that takes a longitudinal process by estimating the strength of the relationship between student factors and developmental course enrollment and college outcomes.

Academic Support Courses

A student's well-being is crucial during their college education and student-centered first-year seminars or academic support courses can help create a nurturing, supportive environment for students to build thriving relationships with fellow students, faculty, and college staff (Vuckovic et al., 2019). Many colleges and universities remediate student attrition by offering or even requiring students to take an academic support or first-year seminar course (Jairam, 2020). First-year seminar courses have been offered with different themes that include academic, orientation, and transition themed seminar (Boettler et al., 2020). Boettler et al. (2020) conducted a retention and academic performance study of first-year university students that took four different versions of the required first-year seminar course. This retention study revealed that the version of the course did not make a significant difference in retention and academic success (Boettler et al., 2020). Parsh et al. (2021) noted that first-year seminars have had a positive impact on student experience and have promoted retention. Nontraditional students often spend little time on campus other than attending classes and their strongest contact with the institution may be through the faculty (Zerquera et al., 2018). Jairam (2020) acknowledged that study skills can be used to predict retention. College readiness initiatives have evolved to include linked

courses. An emerging format for students' remediation is the creation of learning communities established through paired developmental education and academic support courses (Hatch-Tocaimaza et al., 2019; Woods et al., 2019). Corequisite support allows colleges to address students' needs while not hindering time to completion. These paired or corequisite courses combine college-level courses with supports such as developmental courses or academic support (Boatman, 2021; Woods et al., 2019). The innovative design of paired courses maintains the goal of student success through college skills, knowledge, and support (Hatch-Tocaimaza et al., 2019). In discussing corequisite academic support courses and developmental course design, Boatman (2021) acknowledged that rigorous research is needed to understand the impact of corequisite instruction, how it works, and who benefits.

Academic support courses began to evolve in the early 1970s to address retention and graduation rates at the university level (Kimbark et al., 2017). Academic support courses originated as courses focused on improving study skills, but recent studies indicate a need to transform the curriculum into more of a focus on motivational skills and time management (Hoops & Artrip, 2016). When colleges began to reform developmental education courses in the 2000s, student success or academic support courses were focused on improving students' progress and success in college-level courses. Colleges implement academic support courses to increase persistence, prepare students to be adult learners, and to introduce them to the college campus (Claybrooks & Taylor, 2016).

Academic support courses address a student's nonacademic deficiencies such as study habits and organizational skills (Coleman et al., 2018). Many colleges are requiring all freshman to enroll in an academic support or orientation course (Coleman et al., 2018). Some colleges exempt certain students from taking this course because of their educational background,

employment history, or life experiences (Claybrooks & Taylor, 2016). These academic support courses are not remedial courses, but students that are enrolled in developmental education are often required to take an academic support course (Coleman et al., 2018). Students who have academic deficiencies often also have nonacademic deficiencies that require intervention or could otherwise negatively impact academic achievement (Coleman et al., 2018).

A statistically significant relationship exists between a student that has taken an academic support course and enrollment to the next semester (Kimbark et al., 2017). While academic support courses have been proven to have a statistically significant relationship on influencing persistence at the community college level, studies have indicated that academic support courses at 4-year institutions have no impact on persistence (Kimbark et al., 2017). Since many colleges require students to take academic support courses, these students cannot withdraw from the course (Coleman et al., 2018). Students who are not successful in the courses are not able to withdraw before receiving a failing grade. Older students who take an academic support course have a better understanding of their educational goals, better time management, and better college navigation skills (Cho & Serrano, 2020; Coleman et al., 2018).

Previous studies have provided data that indicates noncognitive measures can be a strong predictor of academic success (Cho & Serrano, 2020). Previous studies have examined if there is a difference in persistence between students enrolled in an academic support course and students not enrolled in an academic support course (Claybrooks & Taylor, 2016). Previous research has also suggested that studies focus on exploring whether some students have greater benefits in taking academic support courses (Permzadian & Crede, 2016). Research has indicated that self-regulated learning is a crucial aspect of the student's success (Hoops & Artrip, 2016). Success in an academic support course is often measured by semester grade point average, persistence,

graduation, or even reports of self-regulated learning engagement (Hoops & Artrip, 2016). Future research is needed to evaluate the effectiveness of academic support courses in combination with developmental math and reading courses (Coleman et al., 2018).

One barrier to persistence is the institutional factor of program or course design. Some educational programs are not designed to address adult education principles, which accounts for the needs of adult or nontraditional students (Gopalan et al., 2019). Many schools may approach the academic needs of nontraditional students from a lifelong learning perspective.

Corequisite Remediation

Corequisite remediation courses were designed to address the concerns of traditional developmental education courses. The concerns of the traditional developmental method include costs to students, costs to taxpayers, increased time in college, and limited financial aid (Kane et al., 2021). One method of remediation many states are implementing is corequisite remediation in which students enroll in remedial courses concurrently with college-level or gateway courses (Kane et al., 2021). Traditional developmental education courses are defined as prerequisite courses that are taken in advance of the gateway course. The revised methods of college remediation are accelerated/compressed, modular courses, contextualized experiences, and corequisite learning (Brower et al., 2017). Many community colleges have begun to enroll underprepared students in co-curriculum courses for math and reading as a more effective approach to providing remediation (Yadusky et al., 2021). Precurriculum courses have historically resulted in students of certain demographic groups not completing the developmental coursework and also increased inequity (Yadusky et al., 2021). Several states have implemented developmental education reform through the implementation of corequisite remediation (Park et al., 2018). Florida was the first state to pass legislation concerning developmental education as

an option for students (Park et al., 2018). While many states have implemented corequisite remediation, the corequisite model can face some challenges. The challenges associated with corequisite remediation are centered around such logistical challenges as the scope of corequisite remediation, faculty workload adjustments, and financial challenges (Emblom-Callahan et al., 2019).

College Readiness

Students who are not prepared for postsecondary education can have a profound impact on the completion rates of postsecondary institutions. An underprepared student can have financial ramifications for the student and the postsecondary institution (Leeds & Mokher, 2020). College readiness is focused primarily on factors that students or colleges can change, which are related to high school experiences, transcript data, coursework, and performance (Woods et al., 2019). GPA, as a measure of high school grades, is often considered an indication of college readiness (Woods et al., 2019). High school GPA has had a strong correlation to first- and second-year GPA and second and third-year student retention (Woods et al., 2019). High school course rigor can also have a strong relationship with college outcomes for a student (Woods et al., 2019). College and career readiness is included in national and state educational policies, but an equity gap still exists for minoritized and economically disadvantaged students (Morgan et al., 2018). Underprepared first-year students contribute to low graduation rates and the need for developmental courses and other support services to develop the academic skills of vulnerable students (Baier et al., 2019). Developmental or remedial educational programs are central to preparing underprepared students for the rigor of college-level courses (Lundberg et al., 2018). Postsecondary institutions seek to retain students and students stive to persist. Self-efficacy is defined as a demonstration of how students perceive their experiences and interactions with

others and maintain control within their environment (Tinto, 2017). Self-efficacy is learned. A students' academic performance during their first year can prevent them from being successful at the college and result in non-retention (Elder, 2021).

Student Motivation and Interaction

Adult learners are aware of the different blended roles they possess and enroll in higher education knowing how the course or program will benefit them professionally (Bengo, 2020). These nontraditional students are motivated to pursue postsecondary education because of professional as well as personal goals. Adult students often have a readiness to learn that is connected to goals and view college as a means of achieving those proximal goals (Bengo, 2020).

The stress of returning to school while working full-time and maintaining the responsibilities of family contribute to increasing mental health or stress issues for nontraditional students (Moore et al., 2020). Nontraditional students may experience greater isolation than traditional students because of differences in demographics and lifestyle factors (Moore et al., 2020). Nontraditional students have cited the lack of institutional support, laxed student services for advising, and scheduling targeted for their nontraditional needs. (Moore et al., 2020). Persistence requires more than just completing a course, but it requires having a sense of belonging to a community (Tinto, 2017). Vuckovic et al. (2019) stated that there are strong correlations between students' college experiences and their success and overall well-being later in life. A student's self-efficacy is a key variable to student success and persistence (Stephen et al., 2020). In a study exploring the predictors of university students' academic self-efficacy in the first year of enrollment, Wilcox and Nordstokke (2019) discussed how high levels of self-efficacy promote academic motivation. Self-directedness and motivation are also a key

component of academic achievement and persistence (Stephen et al., 2020). Some researchers have declared that successful persistence is supported by academic and social integration (Chen et al., 2020; Tinto, 1975). Many postsecondary institutions have modified their services to address the needs of the nontraditional population.

Teacher and student interactions foster not only learning but also student engagement and motivation (Munoz et al., 2020). This interaction promotes student motivation by influencing the student's competence and relatedness to instructional activities (Munoz et al., 2020). Positive teacher-student interactions have been linked to a student's sense of belonging to the institution, which can result in persistence (Munoz et al., 2020; Tinto, 1993, 2017). Academic support or success courses may increase a student's college motivation and skills through direct instruction about how to engage in academic work (Culver & Bowman, 2020). Limited interactions can result in students having a difficult time transitioning to the college environment. Pearson (2019) noted that additional research is needed to further explore how institutions can increase self-efficacy, help develop a support system, and manage stressors among nontraditional students. In a study about classroom environment and student course attrition, Cooper and Fry (2020) discussed the role of social interaction among students and instructors and how further studies could be beneficial.

Costs of Developmental Education and Academic Support

Each year postsecondary institutions invest a substantial amount of money in recruiting students to their school, but many of the students fail to persist to degree completion or even the second year (Vuckovic et al., 2019). Colleges are having to navigate the challenge of the increasing number of incoming students being required to take developmental education courses, the policies related to completion rates, and the prospect of financial cutbacks (Caruth, 2018). In

addressing this persistence issue, many colleges utilize developmental education and academic support courses. The costs associated with these courses are a significant investment for the postsecondary institutions. Developmental education has been under scrutiny because of its high costs and the large number of students who participate in developmental education (Woods et al., 2019). Woods et al. (2019) claimed that the high cost of developmental education does not increase a student's chances of academic achievement (Woods et al., 2019). Performance-based funding (PBF) for colleges is based on improving the college-completion rates (Gandara & Rutherford, 2020). Larocca and Carr (2020) defined performance-based funding as an incentive program for publicly supported higher-education appropriations that are linked to performance indicators. The high costs associated with developmental education and academic support courses warrant the examination of their impact on nontraditional student persistence. The student attrition problem can result in lost revenue for the college (Jairam, 2020). The cost of academic support courses can be offset by the increased revenue of retaining students and the effectiveness of the course (Kimbark et al., 2017). When considering the effects of PBF on public higher education, in 2017 a total of thirty-five states instituted PBF models to determine funding for at least some of their schools (Li, 2019). Student persistence has an impact on the postsecondary institution's financial planning since student tuition and fees drive the institution's income (Burke, 2019). With the PBF policies adopted in the late 2000s, public college funding may potentially decline in state support when the institutions' performance does not meet specified goals and states tie a larger portion of funding on student outcome measures (Ortagus et al., 2020).

Governments around the world have utilized performance-based funding to hold publicly funded institutions more accountable to improve performance and be more responsible with

public funds (Ortagus et al., 2020). These accountability measures are often in response to inquiries about the value of credentials, increased costs of education, and rising student loan debt (Ortagus et al., 2020). Previous funding of public colleges did not provide direct incentives for higher education institutions to improve student outcomes (Ortagus et al., 2020). Performance-based funding metrics vary among the states participating (Ortagus et al., 2020). Some states participating in performance-based funding include equity metrics or bonuses for graduation of adult or nontraditional students (Ortagus et al., 2020).

Students can also pay substantial costs for having to participate in developmental education and academic support courses. One of the greatest consequences of not completing college or taking longer to complete is the financial costs students or their families incur (Vuckovic et al., 2019). When students enroll in developmental education courses, they can experience added costs and time to their educational journey (Valentine et al., 2017). Developmental or remedial courses seldom count toward course credit and can lengthen the time and financial expenses to complete a degree program (Mills & Mills, 2018). These financial costs can impact the student in numerous ways. If a student must take multiple developmental courses or needs to repeat a course, the student's financial aid may be affected (Boatman, 2021; Mills & Mills, 2018). Supporters of developmental education argue that it is an effective measure for addressing the needs of students, while others point to the enormous costs for the college, society, and the student (Mills & Mills, 2018). Students invest a considerable amount of money in their college career for each developmental course. In examining the cost-effectiveness of developmental mathematics education, Finster and Feldman (2021) suggested that because of the unsuccessfulness of developmental education and because of the high personal and institutional costs, public policymakers need to formulate lower-cost alternatives. Larocca and Carr (2020)

explained that despite the support for PBF there is very little evidence that it actually increases educational or academic performance in the publicly supported postsecondary institutions. Additionally, Larocca and Carr (2020) stated that there is no statistically significant evidence that performance-based funding affects graduation rates of 4-year institutions, but they acknowledge that more research is needed. Additional research is needed on college remediation to examine the barriers created by having to finance non-credit bearing courses (Morgan et al., 2018).

Summary

In summary, chapter two included a discussion of the theoretical foundation for this persistence study. This theoretical foundation was comprised of the student integration model and the nontraditional undergraduate student attrition model. These theoretical frameworks informed the literature on nontraditional college student persistence. Research findings indicated that persistence is a critical issue for nontraditional college students. Additionally, the literature concluded that developmental education and academic support courses have a profound impact on addressing the needed cognitive and noncognitive skills that promote student persistence. This study will address the gaps in the literature related to the relationship between developmental education and academic support courses and the persistence of nontraditional students at 2-year community colleges.

CHAPTER THREE: METHODS

Overview

The purpose of this quantitative, correlational study is to examine if students' grades in their academic support, developmental math, and developmental reading courses predict persistence to the next academic year for nontraditional students. The predictor variables of academic support, developmental math, and developmental reading courses are often required courses for many first-year college students, but participation in these courses by nontraditional students can have a profound impact on their academic success. Logistic regression will be used to examine the relationship between the predictor variables (academic support course grade, developmental math course grade, and developmental reading course grade) and the criterion variable of persistence to the next academic year. This chapter discusses the study's design, research questions, research hypotheses, participants and setting, and procedures. Additionally, this chapter explains the instrumentation and data analysis methods used in the study.

Design

A quantitative nonexperimental predictive correlational research design was used for this persistence study. A correlational research design seeks to discover if a relationship exists between variables in a study (Gall et al., 2007). The correlational research design allows for the examination of relationships between developmental education courses, academic support courses, and college student persistence. Prediction research is utilized to help anticipate or forecast future behavior (Creswell & Guetterman, 2019). As a predictive study, this study was conducted to predict future occurrences of persistence based on the predictor variables of course grades, which were measured at an earlier time (Gall et al., 2007).

The goal of this study was to determine the extent to which developmental education and academic support courses during a student's first year of college can predict persistence to the next academic year. In a study exploring student perceptions of interferences to college and math success, Acee et al. (2017) utilized a predictive correlational research design to examine the quantitative relationships between demographic variables, perceived interferences, and academic outcomes. Markle (2015) examined factors that can influence persistence for nontraditional university students by analyzing whether the relationship between the variables were positive or negative and the obstacles students encounter. Bohlig et al. (2018) examined the relationship between developmental gateway course completion and credential completion in developmental education.

A correlational research design was used to explore the relationship between the study's variables. The predictor variables for this study were academic support course grade, developmental math course grade, and developmental reading course grade. The letter course grades were converted to numbers using the college's grading point scale. The final grades were coded F=0, D=1, C=2, B=3, and A=4. The criterion variable is persistence to the next academic year, which was considered as enrollment in the fall of the students' second year of enrollment. By selecting a predictive correlational approach, the researcher obtained variable measurements that were recorded before the participants began their second year of enrollment. According to Gall et al. (2007), the correlational research design is used to discover if a relationship exists between variables by employing correlational statistics. The predictive correlational design was appropriate for this study because the predictor variables were measured before the criterion variable (Gall et al., 2007). This design was also appropriate because the variable assumptions were met. The predictor variables, course grades, are quantitative and continuous. Each course

grade is independent of other predictor variables. The criterion variable, persistence to the next academic year, is dichotomous and categorical. The criterion variable was coded “0” for enrolled and “1” for not enrolled.

Research Questions

The following research questions guided this persistence study:

RQ1: How accurately can a linear combination of developmental math course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

RQ2: How accurately can a linear combination of developmental reading course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

Hypotheses

The null hypotheses for this study are:

$H_0$1: There will be no significant predictive relationship between the dependent variable persistence to the next academic year and the linear combination of independent variables (developmental math course grade and academic support course grade) for nontraditional college students enrolled at 2-year community colleges.

$H_0$2: There will be no significant predictive relationship between the dependent variable persistence to the next academic year and the linear combination of independent variables (developmental reading course grade and academic support course grade) for nontraditional college students enrolled at 2-year community colleges.

Participants and Setting

Nontraditional Population

The participants for this study were drawn from a convenience sample of first-year college students located in the southern United States during the 2020-2021 school year. The college was a community college in the state of Louisiana. The population for this study was comprised of first-year nontraditional students who participated in academic support courses and developmental math and reading courses at 2-year community colleges in Louisiana. Transfer students were not included in this study. As nontraditional students, the students were at least 25 years of age, classified as part-time, a parent, delayed enrollment in college, or did not obtain a high school diploma.

Sampling Procedure

Convenience sampling was used for this study. The participants for this study were drawn from a convenience sample of nontraditional students located in the southern United States. A convenience sample was used for this study because it consisted of participants who were readily available to the researcher (Warner, 2013). Convenience sampling is a nonprobability sampling method that addresses a quantitative research study (Gall et al., 2007). The sample was identified based on the location in proximity to the researcher and the researcher's familiarity with the site. The researcher identified the sample after obtaining archival enrollment and demographic data from the college's database system. Woods and Frogge (2017) used the convenience sampling procedure in a study that explored the similarities and differences between traditional and nontraditional students' methods of instruction, number of hours spent working, and grade point average to improve students' persistence efforts. A prospective sample was identified by examining the archival data of first-year nontraditional students enrolled in an academic support

course, developmental reading course, and developmental math course.

Sample Size and Demographics

For this study, the number of participants sampled was 100 students which, according to Gall et al. (2007), exceeds the required minimum of 66 for a medium effect size with a statistical power of .7 at the .05 alpha level. When considering the sample size for logistic regression, a few observations or cases for the predictor variables lowers the reliability of estimates (Warner, 2013). Suggestions for sample size include having a minimum number of independent A variables (Warner, 2013; Peduzzi et al., 1996). This study is comprised of three independent or predictor variables: academic support courses grade, developmental math course grade, and developmental reading course grade. Since the statistical power of multivariate analyses depends on such factors the strength of association between each of the three predictor variables, the degree of assumption violation, and size and sign of predictor correlations, it is difficult to recommend a sample size for adequate statistical power (Warner, 2013). A minimal requirement for sample size is at least 10 times as many cases as the independent or predictor variables (Warner, 2013). A reasonable balance should be maintained between a study's sample size and number of predictor variables (Gall et al., 2007). When considering sample size, multiple logistic regression allows for the sample size to increase by 15 participants for each variable (Gall et al., 2007). The sample size was 100 participants, which exceeds the required minimum of 66 for correlation analysis when assuming a medium effect size with statistical power of .7 and alpha level, α =0.05 (Gall et al., 2007).

The participants were selected from students who participated in developmental education and academic support courses during their first year of college enrollment. These courses address the academic and noncognitive skills needed for academic success. This research

study's sample consisted of males and females enrolled in their first year of college in various programs of study. The participants were classified as nontraditional by meeting at least one of the descriptors of nontraditional learners. These descriptors include nontraditional students who are 25 years of age or older, enrolled part-time, a single parent, delayed enrollment into postsecondary education, or did not complete high school (Chen, 2017; Remenick, 2019). The students were first-year freshmen. The participants of this study varied in age with the youngest being 18 years of age. These students had diverse ethnic backgrounds. The participants in this study were comprised of students who participated in an academic support course during their first year of college enrollment. The academic support courses focus on developing students' learning strategies and study skills, while providing academic and career counseling (Mississippi Institutions of Higher Learning, 2019). In addition to academic support courses, these nontraditional students took a mathematics or reading developmental education course during their first year of enrollment.

College Setting

The sample was drawn from a community college in the southern United States. The community college is a public community college with a total enrollment of approximately 13000 students. This college is located in a metropolitan area with multiple campuses. This study was composed of students enrolled in courses for developmental math, developmental reading, and academic support courses. The school is located in a state that is implementing co-requisite remediation. This community college had streamlined their developmental reading course for the 2020-2021 school year. The data for this study includes ALIT 099, which is an intensive reading, writing, and critical thinking course that prepares students for college-level courses and the workforce. The reading course is not credit bearing. The college offers two developmental math

courses. The participants in this study took MATH 0097 an intensive intermediate algebra. The students took either Success in College (CCSS 100) or College Success Skills (CCSS 107). The Success in College course introduces institutional resources and procedures to students. The course covers academic skills, time management, and goal setting. The College Success Skills course provides instruction in academic skills, critical thinking, educational planning, and the use of academic resources and digital literacy. The participants were enrolled in semester-long course terms. As an archival data only study, the researcher did not have any interaction with the participants. All participant data was obtained from college officials. Only one group was employed for this correlational study. The group was comprised of individuals who met at least one of the nontraditional college student descriptors.

Instrumentation

This correlational study utilized one instrument to gather the needed data. This archival data was a demographic and enrollment report from the college's student information system database. Before utilizing this instrument for data collection, the researcher obtained approval from the Institutional Review Board and college officials.

Student Information System Database

Student demographic and enrollment data was obtained from the college's student information system database. The researcher requested that the data be stripped of all personal information and identifiers. The researcher requested that the data include students' enrolled courses (developmental math, developmental reading, and academic support courses), course grades, if the student delayed enrollment, age, whether the student had a high school diploma or high school equivalency diploma, enrollment status of part-time or full-time, if the student is a single parent, and if the student enrolled and attended school during fall 2021. The purpose of

using this demographic and enrollment data was to determine which first-year freshmen, who participated in developmental education and academic support courses during the 2020-2021 academic year, are considered nontraditional students. These courses are the predictor variables. Another purpose of this data was to measure the successful completion of the developmental math, developmental reading, and academic support courses. Archival demographic and enrollment records have been used in numerous developmental education and persistence studies for nontraditional students (Bohlig et al., 2018; Cho & Serrano, 2020; Davidson & Petrosko, 2015; Hawley & Chiang, 2017). The data report included the enrollment information for the next academic year. This report also served the purpose of determining which students enrolled in college the next academic year after participation in the courses. The predictor variables of academic support and developmental math and reading course grades were included in the demographic and enrollment report obtained from the institution. The successful completion of a course was described as a student obtaining a grade of "C" or above (Mississippi Institutions of Higher Learning, 2019). The course grades were converted to numbers using the college's grading point scale. The final grades were coded F=0, D=1, C=2, B=3, and A=4. Participation in academic support and developmental education courses was recorded by the researcher as continuous data based on course grades. The enrollment data was converted to numbers with enrolled coded "0" and "1" for not enrolled. Course grade conversions have been employed in numerous studies (Cung et al., 2019; Davidson, 2016). While persistence is usually defined as students remaining in college until they complete a degree within a certain period of time, this study focused on persistence of students with enrollment and attendance to the next academic year (Savage et al., 2019).

The purpose of using this instrument was to determine which of the first-year freshmen,

who were enrolled in the academic support and developmental education courses, are also nontraditional students. Some of the data obtained with this instrument are based on a 2002 report by Choy (2002) that analyzed nontraditional undergraduate students' demographic characteristics, enrollment patterns, ways of combining school and work, and persistence patterns. This report was federally funded through the National Center for Education Statistics (Choy, 2002). This 2002 study defined nontraditional students on the following characteristics: delays enrollment, attends part time for at least part of the school year, works full time (35 hours or more per week), financially independent for purposes of determining financial aid eligibility, has dependents other than spouse, a single parent, and does not have a high school diploma (Choy, 2002). These descriptors were also included in the demographic report.

Procedures

After receiving approval from the Institutional Review Board of Liberty University and from the Institutional Review Board of the research site to conduct this study, the researcher began collecting data for this study in the spring of 2022. See Appendix A for IRB approval letter. The researcher gave college officials a letter of permission request to conduct research, which explained the purpose of the study and data collection methods. The researcher submitted this written request to the college to obtain access to school year 2020-2021 course registration and demographic data for the first-year freshmen students who were enrolled in developmental mathematics and reading courses, as well as academic support courses and enrolled and attended classes during the fall of 2021. See Appendix B for letter of permission. This archival data is maintained by the college, so this data is valid and reliable. After submitting this request to the college and obtaining the demographic and enrollment data, the researcher recorded the information in an Excel file. The researcher recorded data for the students enrolled in the three

courses during the 2020- 2021 academic year. Additionally, the researcher recorded the nontraditional characteristics into the Excel file. The course enrollment data and enrollment data for the fall 2021 semester was recorded in a Microsoft Excel file. Students enrolled in the fall 2021 semester was coded with a "0", while students not enrolled for the fall 2021 semester was coded with a "1". This data was then be analyzed.

The researcher used a password protected computer and locking file cabinet to ensure the participants' privacy and security of any written, printed, or electronic data. This data includes a copy of all correspondence with the university. The correspondence includes the study's description, request for demographic and enrollment data, and the demographic and enrollment data report.

Data Analysis

The logistic regression correlational statistic was used to analyze the data of this nonexperimental correlational study. Logistic regression was selected as the most appropriate statistical analysis for this study because of the dichotomous outcome variable and because logistic regression can control for multiple confounding variables if the sample size is large enough (Warner, 2013). Binomial logistic regression analysis was used to address the two research questions of this study (Warner, 2013). Binomial logistic regression allows for the measurement of probability that an observation falls into one of two categories, which is the odds ratio. Binomial logistic regression analysis is a nonparametric statistic with categorical or continuous predictor variables and a categorial outcome variable (Warner, 2013). Each score of the predictor variable is independent of other predictor variable scores. Research studies that were conducted to examine persistence for nontraditional college students and developmental education have utilized logistic regression statistics (Bohlig et al., 2018; Markle, 2015).

Data was screened by using the Statistical Package for the Social Sciences (SPSS) to examine the statistical significance of the correlation and screen for inconsistences. The data screening feature included creating scatterplots to test for extreme outliners. A scatterplot was created as an initial analysis activity. If any extreme outliners existed, the researcher had to determine if the extreme outliners revealed any concerns about the sample and if the outliners should be removed.

Assumptions Testing

Logistic regression analysis has several assumptions that must be met: (a) the outcome variable is dichotomous; (b) the scores of the outcome variable are statistically independent of each other; (c) the model includes all relevant predictors and does not include irrelevant predictors; (d) the categories of the outcome variable are exhaustive and mutually exclusive; (e) the predictor variables are continuous or nominal; (f) independent observations in that there are no relationship between observations; (g) adequate sample size of at least fifteen participants per predictor variable; (h) extreme outliners on a quantitative predictor variable should be identified (Laerd, n.d.; Warner, 2013).

In this study, the outcome variable was dichotomous, exhaustive, and mutually exclusive, meaning that only one outcome was possible: enrolled the next academic year or not enrolled the next academic year after successful completion of a developmental math and academic support course (RQ1); enrolled the next academic year or not enrolled the next academic year after successful completion of a developmental reading and academic support course (RQ2). The predictor variables met the assumption of being interval or ratio (course grade). The independence of observation and adequate sample size assumptions were met as all participants were enrolled in one developmental education course in conjunction with an academic support

course. The college's database of archival data provided an adequate, large sample size of at least 45 participants who were enrolled in a developmental math and academic support courses and at least 45 participants who were enrolled in developmental reading and academic support courses.

The linear relationship between the predictor variables and the logit transformation of the outcome variable (persistence to the next academic year or not persistent to the next academic year) were measured using the Box-Tidwell approach. The Box-Tidwell test was utilized to determine if each predictor variable is related linearly to the odds ratio (Laerd, n.d.). If one or more of the interactions between each predictor variable is statistically significant, the assumption is considered violated (Laerd, n.d.). Since this study included more than one predictor, multicollinearity was checked. Multicollinearity was determined based on the correlation coefficients. A Variance Inflation Factor (VIF) test was conducted to ensure the absence of multicollinearity for this study.

The alpha level was $\alpha = 0.05$ for 95% confidence. If a statistical significance of 0.05 was not present in the regression analysis, the null hypothesis (H_0) for each research question would fail to be rejected. The effect size was determined by employing odds ratio in the correlation, which can explain the odds of the event happening or not likely to happen (Warner, 2013). An odds ratio less than one indicates that the predictor variables reduce the odds of the criterion variable occurring, yet the odds ratio greater than one indicates that the predictor variable increases the odds of the dependent variable occurring (Markle, 2015). Additionally, the degrees of freedom and critical value was calculated.

Logistic Regression Analysis

In this study, the predictor variables were measured as continuous, and the outcome variable was a dichotomous, dependent variable. The predictor variables, final course grades, were converted to numbers using the university's grade and quality points scale. The final grades for the academic support course and the developmental mathematics and reading courses were coded F=0, D=1, C=2, B=3, and A=4. The outcome variable was a dichotomous, categorical variable with two values. Students enrolled in the fall 2021 semester were coded with a "0", while students not enrolled in the fall 2021 semester were coded with a "1". This study examined the strength of the relationship between developmental education math and reading courses, academic support courses, and persistence to the next academic year.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this study was to determine if persistence of nontraditional college students could be predicted from a combination of developmental education and academic support course final numerical grades in developmental math, developmental reading, and academic support courses. The independent variables were final numerical grades in developmental math, developmental reading, and academic support courses. The dependent variable, which was dichotomous, was persistence to the next academic year. A binary logistic regression was used test the null hypothesis. This chapter includes the research questions, null hypotheses, data screening, descriptive statistics, assumption testing, and results.

Research Questions

RQ1: How accurately can a linear combination of developmental math course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

RQ2: How accurately can a linear combination of developmental reading course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

Null Hypotheses

$H_0$1: There will be no significant predictive relationship between the dependent variable persistence to the next academic year and the linear combination of independent variables (developmental math course grade and academic support course grade) for nontraditional college students enrolled at 2-year community colleges.

$H_0$2: There will be no significant predictive relationship between the dependent variable persistence to the next academic year and the linear combination of independent variables (developmental reading course grade and academic support course grade) for nontraditional college students enrolled at 2-year community colleges.

Data Screening

The researcher sorted the data and scanned for errors and inconsistencies on each variable. No data errors or inconsistencies were identified. Extreme outliers are points that do not fit the regression model well. Casewise diagnostics were used to examine for extreme outliers, which are cases with standardized residuals greater than 2.5. Research question one contained seven extreme outliers that exceeded the standard deviation of 2.5. Those outliers were removed before conducting the analysis. The dataset for research question two contained two outliers, but they did not exceed the stated deviation.

Descriptive Statistics

Descriptive statistics were obtained on each of the continuous independent variables. The sample for research question one consisted of 93 participants. The independent variables of developmental course grade and academic support course grades were converted from a letter grade to numerical values of 4 for an A, 3 for a grade of B, and 2 for a grade of C. Descriptive statistics, which includes demographic frequencies and variable coding, are found in Table 1. The data analyzed for the math developmental course consisted of 93 participants enrolled at a community college during the 2020-2021 academic year. Of the 100 participants sampled, 19 students were classified as nontraditional based only on age, 31 students only on delayed enrollment, 12 only being enrolled part-time, 5 were parents, and 33 were classified based on two or more nontraditional characteristics. The average developmental math course grade (mean)

was 3.06, the median was 3.0, and the standard deviation was 0.80. The average academic support course grade (mean) was 3.60, the median was 4.0, and the standard deviation was 0.63. Data for the 93 students were analyzed to answer research question one.

Table 1

Demographic Frequencies and Variable Coding: Predictor Variable RQ 1 (N=100)

Demographic	Mean	Median	Range	Frequency Math	Coding
Age			18- 51	19	1
Delayed Enrollment				31	2
Parent				5	3
Part-time				12	4
Age & Delayed				14	5
Age & Parent				2	6
Delayed & Parent				1	8
Delayed & Part				2	9
Parent & Delayed				0	10
Parent & Part				0	11
Age, Delayed, & Parent				3	12
Age, Parent, & Part-time				0	13
Age, Delayed, & Part-time				6	14
Delayed, Parent, & Part				0	15
All				0	16
GED, Delayed, & Parent				0	17
Age, GED, & Parent				1	18
Developmental Math	3.0	4.0	2.0		
Standard Deviation 0.80					
A				33	4
B				38	3
C				29	2
Academic Support					
Standard Deviation 0.63					
A				69	4
B				24	3
C				7	2
Enrolled 2nd Year					
No				19	0
Yes				81	1

Descriptive statistics were obtained on each of the continuous independent variables for research question two. The independent variables of developmental reading course grade and academic support course grades were converted from a letter grade to numerical values of 4 for an A, 3 for a B, and 2 for a grade of C. The sample consisted of 100 participants who enrolled at a community college during the 2020-2021 academic year. Of the 100 participants, 13 students were classified as nontraditional based on age, 22 students had delayed enrollment, 8 were enrolled part-time, 2 were parents, and 55 were classified based on two or more nontraditional characteristics. The average developmental reading course grade (mean) was 3.23, the median was 3.0, and the standard deviation was 0.83. The average academic support course grade (mean) was 3.46, the median was 4.0, and the standard deviation was 0.70. Data for the 100 students were analyzed to answer research question two. The variables, their coding, demographic frequencies, and descriptive statistics for the variables analyzed are contained in Table 2.

Table 2

Demographic Frequencies and Variable Coding: Predictor Variable RQ 2 (N=100)

Demographic	Mean	Median	Range	Frequency Reading	Coding
Age			18- 59	13	1
Delayed Enrollment				22	2
Parent				2	3
Part-time				8	4
Age & Delayed				29	5
Age & Parent				3	6
Delayed & Parent				0	8
Delayed & Part				2	9
Parent & Delayed				0	10
Parent & Part				0	11
Age, Delayed, & Parent				10	12
Age, Parent, & Part-time				3	13
Age, Delayed, & Part-time				4	14
Delayed, Parent, & Part				1	15
All				0	16
GED, Delayed, & Parent				1	17
Age, GED, & Parent				0	18
Developmental Reading	3.23	3.0	2.0		
Standard Deviation 0.83					
A				48	4
B				27	3
C				25	2
Academic Support Course	3.46	4.0	2.0		
Standard Deviation 0.70					
A				58	4
B				30	3
C				12	2
Enrolled 2nd Year					
No				23	0
Yes				77	1

Assumptions Testing

Assumption of Linearity

Binary logistic regression requires a linear relationship between the continuous independent variables and the logit transformation of the dependent variable. The Box-Tidwell approach was used to test this. The continuous variables, numerical grades in developmental math, developmental reading, and academic support courses, were all found to be linearly related with $p > .05$ for all. Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable. The assumption of linearity was tenable.

Binary logistic regression analysis is comprised of several assumptions that must be met, including having a dichotomous criterion variable (Warner, 2013). This regression study focused on whether nontraditional first-year college students did or did not persist to the next academic year after participating in developing education and academic support courses. Binary logistic regression analyses were utilized for both research questions and assumptions. The first assumption is that the dependent variable, persistence to the next academic year, is dichotomous. This persistence, the dichotomous criterion variable, upheld the first assumption of binary logistic regression. The predictor variables, course grades, were continuous. The course grades were converted to numerical grades, so this assumption was met. The variables were observed independently, and the participants were independent within the variable (Warner, 2013). In this study, there was no relationship between the observation for each category of the variables and the variables were mutually exclusive and exhaustive. The assumption of linearity for the two research questions was examined using the Box-Tidwell procedure. The statistical significance of level used was set at $p < .05$. In examining research question one, which included the

independent variables of developmental math and academic support course grades, the independent variables assessed was linearly related to the dependent variable logit (p = .043 for math and p = .001 for academic support course). The assumption was met. An adequate sample size was used for both research questions. A case wise diagnostic was conducted to ensure there were no significant outliers. Research question one contained seven outliers that exceeded the standard deviation of 2.5. Those outliers were removed before conducing the analysis. As a result of the cases being removed, 93 cases were analyzed for the math developmental and academic support courses. The dataset for research question two contained two outliers that did not exceed the stated deviation. In examining research question two, which included the independent variables of developmental reading and academic support course grades, the independent variables assessed were linearly related to the dependent variable logit (p = .000 for the developmental reading course). The assumption was met. One hundred cases were analyzed for the developmental reading and academic support courses. The next assumption was fulfilled in that all relevant predictors were included. The Box-Tidwell approach was used to measure the linear relationship of the predictor variables to the logit transformation of the outcome variable.

Assumption of the Absence of Multicollinearity

A Variance Inflation Factor (VIF) test was conducted to ensure the absence of multicollinearity. This test was run because if an independent variable is highly correlated with another independent variable, then the independent variables provide the same information about the dependent variable. If the Variance Inflation Factor (VIF) is too high (greater than 10), then multicollinearity is present. Acceptable values are between 1 and 5. The absence of multicollinearity was met between the variables in this study. The Variance Inflation Factor (VIF) was conducted for research question one and revealed the absence of multicollinearity.

Multicollinearity was not present for question one because there is no relationship between observations. The Variance Inflation Factor (VIF) also revealed the absence of multicollinearity for research question two. Tables 3 and 4 provide the collinearity statistics.

Table 3

Collinearity Statistics Developmental Math

Model		Tolerance	VIF
1	Developmental Math Course	.860	1.163
	Academic Support Course	.860	1.163

Dependent Variable: Enrolled Fall 2nd Year

Table 4

Collinearity Statistics Developmental Reading

Model		Tolerance	VIF
1	Developmental Reading Course	.908	1.101
	Academic Support Course	.908	1.101

Dependent Variable: Enrolled Fall 2nd Year

Results

A binary logistic regression was conducted to determine if persistence to the next academic year could be predicted from a combination of developmental math, developmental reading, and academic support course numerical grades for nontraditional college students enrolled at 2-year colleges. The model explained 28% (Nagelkerke R^2) of the variance in persistence to the next academic year and correctly classified 89.2% of cases in the dataset.

Sensitivity was 97.6% while specificity was 27.3%. Positive predictive value was 90.9% and negative predictive value was 60%. None of the independent variables were statistically significant. The effect size was 0.13. Table 5 provides the results of binary logistic regression for research question one.

The logistic regression model for research question one was statistically significant, $x^2(2) = 14.71$, $p < .001$ indicating that the combination of these variables predicts whether or not a nontraditional community college student persisted to the next academic year. The predictor variables included participation in developmental math (MATH 0097) and academic support (CCSS 107) courses with students earning a course grade of A, B, or C. The Wald chi-squared test was used to evaluate the statistical significance of the two predictor variables. This analysis determined the degree of impact the predictor variables have on the criterion variable of persistence was met. The developmental math course was $x^2 = 4.09$, $p = .04$ and the academic support course was $x^2 = 10.38$, $p = .001$. The null hypothesis was rejected for research question one. The odds ratio indicated that the academic support course more likely increased the odds of students persisting to the next academic year after taking the developmental math course.

Table *5*

Classification Table: Developmental Math Enrolled Fall 2nd Year

Observed	No	Yes	Percentage Correct
Did Not Persist to Next Academic Year (Did Not Enroll)	3	8	27.3
Persisted to Next Academic Year (Enrolled)	2	80	97.6
Overall Percentage			89.2

Developmental math course grades showed lower odds of impacting persistence to the next academic year. Based on the logistic regression analysis and an alpha level of 0.05, a significant difference was detected between developmental math and academic support courses on persistence. Therefore, $H_0 1$ was rejected, stating no significant predictive relationship between persistence to the next academic year of first-year nontraditional community college students with successful participation in developmental math and academic support courses.

Table 6

Variables in the Equation: Developmental Math

Predictor Variables	*p*	Odds Ratio	95% CI for Odds Ratio	
			Lower	Upper
Developmental Math Course	.043	0.24	0.06	0.96
Academic Support Course	.001	9.43	2.41	36.93

A binary logistic regression was conducted to determine if persistence to the next academic year could be predicted from a combination of developmental reading and academic support course numerical grades for nontraditional college students enrolled at 2-year colleges. The logistic regression model for research question two was statistically significant, $x^2(2) = 22.98$, $p < .000$ indicating that the combination of these variables predicts whether or not a nontraditional community college student persisted to the next academic year. The predictor variables included participation in developmental reading (ALIT 099) and the academic support (CCSS107) courses with students earning a course grade of A, B, or C. The model explained 31.1% (Nagelkerke R^2) of the variance in persistence to the next academic year and correctly

classified 78% of the cases in the data set. Sensitivity for this data set was 84.4%, specificity was 56.5%. Positive predictive value was 86.6%, and negative predictive value 52.0% (Table 7). The effect size was 0.28. The Wald chi-squared test was used to evaluate the statistical significance of the two predictor variables. This analysis determined the degree of impact the predictor variables have on the criterion variable of persistence was met. The developmental reading course was x^2= 15.98, p = .000 and the academic support course was x^2= .48, p = .49.

Table 7

Classification Table: Developmental Reading Enrolled Fall 2nd Year

Observed	No	Yes	Percentage Correct
Did Not Persist to Next Academic Year (Did Not Enroll)	13	10	56.5
Persisted to Next Academic Year (Enrolled)	12	65	84.4
Overall Percentage			78.0

One predictor variable was statistically significant, reading course grade, for predicting persistence to the next academic year. The academic support course grade was not significant in predicting persistence to the next academic year. The developmental reading course had 4.19 times higher odds of impacting persistence. Based on the logistic regression analysis and an alpha level of 0.05, no significant difference was detected between successful completion of developmental reading and academic support courses. There was not enough evidence to suggest an association between the successful completion of courses, the criterion variable of persistence to the next academic year, and the linear combination of the predictor variables of developmental reading course grade and academic support course grade for nontraditional college students

enrolled at 2-year community colleges. Therefore, $H_0 2$, failed to be rejected. Table 8 provides the results of binary logistic regression for research question two.

Table 8

Variables in the Equation: Developmental Reading

Predictor Variables	*p*	Odds Ratio	95% CI for Odds Ratio	
			Lower	Upper
Developmental Reading Course	.000	4.19	2.08	8.47
Academic Support Course	.489	1.30	0.62	2.71

CHAPTER FIVE: CONCLUSIONS

Overview

Nontraditional students make up a large percentage of students enrolled in community colleges, yet the persistence rate of these adult learners warrant concern. One commonality of many nontraditional students is their placement in developmental or remedial courses. Many of these students fail to persist to the second year of study. Many colleges have begun to examine their developmental education offerings and have begun transitioning to a corequisite format for remedial instruction. This study utilized a binomial logistic regression analysis to examine the relationship between developmental math, developmental reading, and academic support courses and enrollment to the next academic year for first-year nontraditional college students attending a community college in the southern United States. Two research questions were investigated to conclude the statistical significance of the relationship of each predictor variable to the criterion variable. Results, implications, limitations of analysis, and recommendations for future research are discussed in this chapter.

Discussion

The purpose of this quantitative, correlational study was to determine whether successful completion of a developmental course can be a statistically significant predictor of nontraditional student persistence when the developmental course is taken in conjunction with an academic support course. Some previous research has been conducted to examine if developmental education influences student persistence. Of the students who enroll in one remedial course, about 39% persist to degree completion (Sanabria et al., 2020; Shields & O'Dwyer, 2017). Additionally, numerous studies are available that look at how academic support courses impact student persistence. Little research exists that focus on how developmental education and

academic support courses influence persistence for nontraditional students beyond the characteristics of age. Nontraditional student persistence is an eminent concern for postsecondary and adult education programs as well as workforce development agencies, so an understanding of the factors that promote persistence is crucial.

This study was intended to examine nontraditional student persistence at a 2-year community college after successfully completing a developmental math or developmental reading course and an academic support course. The participants took the course combination during their first year of college and met at least one of the seven descriptors of being a nontraditional learner. The purpose of this quantitative, correlational study was to determine the relationship between developmental courses, academic support courses, and persistence to the next academic year for first-year nontraditional community college students. Theoretical models of student integration model of persistence and nontraditional undergraduate student attrition model guided this study. Tinto's sociological student integration theory is used to examine how students assimilate into the college environment will support academic success (Remenick, 2019). The nontraditional student attrition model emphasizes the social external and environmental factors that influence student retention while placing less emphasis on the role of social integration (Davidson & Wilson, 2013). This study's findings demonstrated the impact of academic support, which can include activities about the college environment, in conjunction with the developmental math or reading course. The small effect size for the analysis demonstrated that while colleges examine the impact of developmental education in converting to corequisite remediation, these findings may have limited practical applications.

Research Question One

RQ1: How accurately can a linear combination of developmental math course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

The focus of research question one was to determine if developmental math course grade and academic course support grade could predict the likelihood of nontraditional students persisting to the next academic year. Research indicates that approximately 59% of 2-year college students enroll in at least one developmental math course, but only 50% complete the required developmental math sequence (Zientek et al., 2020). Prior research indicates that community college students who begin in developmental education at least at the middle level are more likely to complete their first credit-bearing math course than students who did not take a developmental math course (Bohlig et al., 2018). Based on the number of nontraditional students participating in developmental education math courses, colleges need to address the needs of nontraditional students. One solution many colleges have incorporated is the utilization of academic support courses to address the unique needs of nontraditional students. Many developmental math students are placed in the lowest level remedial math course, which often results in low success rates (Davidson, 2016).

The results of the binomial logistic regression analysis indicate that the combination of developmental math and academic support course grades are statistically significant as it relates to nontraditional student persistence. This study was designed to examine the relationship between developmental math and academic support courses for nontraditional students who are classified as nontraditional by age, being a single parent, enrollment status of part-time, did not complete high school, or delayed enrollment. The most significant difference between most

previous research and this study is that this research broadens the focus of nontraditional to include students beyond the characteristic of age. Out of the 100 students included in the sample, 97.6% (N= 80) of the students persisted to the next academic year.

There has been debate about the effectiveness and costs of developmental education. Many of the studies that have been conducted on developmental education have mixed results (Hawley & Chiang, 2017). This debate includes whether academic support courses support the needs of nontraditional students. Developmental education reform has resulted in improved enrollment and success rates in college gateway courses (Lane et al., 2020). The review of the literature in combination with this study's results suggests that successful developmental math and academic support courses can increase nontraditional students' likelihood to persist to the next academic year.

Research Question Two

RQ2: How accurately can a linear combination of developmental reading course grade and academic support course grade predict persistence to the next academic year for nontraditional college students enrolled at 2-year community colleges?

Research question two explored whether developmental reading course and academic support course grades could predict the likelihood of nontraditional students persisting to the next academic year. Developmental reading courses have been a central focus of many studies because reading is considered a requisite for college-level courses that can determine student success (Woods et al., 2019). Successful course completion was determined by students earning a course letter grade of A, B, or C. These grades were then converted to numerical grades based on the college's grading scale. The results of the binomial logistic regression analysis indicate that the combination of developmental reading course grade and academic support course grade

did not result in a significant relationship. Prior research has concluded that students' persistence has been influence not only by successful integration into the college community but also enrollment in academic support course (Millea et al., 2018). Academic success courses, in previous studies, have had a statistically significant relationship on persistence at 2-year colleges (Kimbark et al., 2017). Earlier research revealed little correlation between remediation and students' success early in their college journey (Finster & Feldman, 2021; Valentine et al., 2017; Woods et al., 2019). For this study, the addition of the academic support course did not significantly impact the persistence to the next academic year. When students complete a developmental reading course, they often are not assessed on the knowledge gained from participation in the course (Lavonier, 2016). As a result of the lack of an assessment, some researchers question whether or not remedial courses help students for content-area courses (Levonier, 2016).

Implications

This study explored details around the growing concern of developmental education and persistence for nontraditional students. Developmental education has played a significant role in postsecondary education. As nontraditional student enrollment continues to increase, college readiness will be a prominent concern for postsecondary institutions, adult education programs, high schools, and even segments of the workforce. Nontraditional students enroll in postsecondary education for such reasons as to continue their education or to gain the skills and knowledge needed for the workplace. When the rate of college completion is impacted by required courses such as remedial courses, a thorough examination is warranted to examine how these courses impact student success and persistence to completion and even persistence to the next year of enrollment. Current literature fails to focus on specific features of nontraditional

students and the transition to corequisite remediation. This study, unlike many other nontraditional persistence studies, examines the persistence of nontraditional students beyond the characteristic of age and during a college's transition to corequisite remediation. This study used persistence as an academic outcome, which is a gap in literature.

The results of this study indicate that there is statistical correlation between persistence to the next academic year and developmental and academic support course grades, as the model was able to correctly predict 89.2% for developmental math and 78.0% for developmental reading. The four predictor variables were shown to be statistically significant, meaning that variables can be leveraged to significantly predict student persistence to the next academic year.

Limitations

One key limitation of this study is the design. Since this study has a correlational design and is non-experimental, the researcher cannot say with certainty that the correlation means causation. A second limitation of this study was the lack of demographics. The demographic data of the participants was obtained through the college's Office of Research and Planning. The Office of Research and Planning obtained the demographic information from the college's student database system, so some nontraditional characteristics might not have been included in the student database for the participants. In order to address this data discrepancy, the researcher modified the sample demographics to waive the nontraditional characteristics related to employment, financial aid, and nonspousal dependents.

Another limitation of this study is that the participant data received did not indicate the parameters by which the students were placed in developmental education courses. Placement in developmental education is often based on student performance on college entrance exams or the results of a college placement assessment. This study did not gather information on placement

requirements. Since the goal of this study was focused on nontraditional learner persistence, placement requirements were outside the scope of the current project.

The external validity of this study is expected to be high for both research questions. The sample population for this study was taken from the nontraditional student population who possessed one or more characteristics of nontraditional learners and enrolled in developmental education courses during their first year of enrollment. As long as the student population is similar to this study, one would expect the results and conclusions of this study to be applicable to other community colleges. It would be expected that demographic data will differ at the 4-year university level.

Recommendations for Future Research

The results of this study offered greater insight into whether the combination of developmental math and academic support courses and developmental reading and academic support courses have a practical significance for persistence to the next academic year for nontraditional students. The research continues to expand on developmental education, corequisite remediation, and nontraditional student persistence. The following recommendations are suggested based on the results and limitations of this study.

1. Future studies should explore nontraditional student persistence beyond the characteristic of age at the university level for students enrolled in developmental education or corequisite remediation.
2. Additional studies should be conducted that include all seven characteristics of nontraditional students. Many colleges do not collect this information, but it could prove useful to understanding the academic and social needs of all students on the college campus.

3. A qualitative study should be conducted to identify how nontraditional students feel the developmental education courses or corequisite remediation courses influence their decision to persist.
4. A comparative analysis should be conducted to compare persistence after successfully completing corequisite remediation for nontraditional and traditional students.

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APPENDIX

Appendix A: IRB Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

February 14, 2022

Priscilla Burns
Jeffrey Savage

Re: IRB Exemption - IRB-FY21-22-595 Nontraditional Student Persistence: Examining the Relationship of Developmental Education and Academic Support Courses

Dear Priscilla Burns, Jeffrey Savage,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if the following criteria is met:
(ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects.

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

Appendix B: Letter of Permission

March 18, 2022

Research Manager
Office of Research and Planning

Dear Research Manager,

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a Doctorate of Educational Leadership degree. The title of my research project is *Nontraditional Student Persistence: Examining the Relationship of Developmental Education and Academic Support Courses* and the purpose of my research is to examine how the persistence rate of nontraditional college students is influenced by participation in developmental education and academic support courses. For this study, a student is classified as nontraditional by meeting at least one of the following descriptors: age 25 or older, enrolled part-time, a single parent, delayed enrollment into college after finishing high school, or did not complete high school (earned a high school equivalency diploma).

I am writing to request your permission to conduct my research at Community College and access and utilize student data. The archival data requested, which will be stripped of all identifying information, include:

- first-year students who were at least 18 years of age and enrolled in a developmental math course and an academic support course (College and Career Success Skills courses) during the 2020-2021 academic year
- first-year students who were at least 18 years of age and enrolled in a developmental reading course and an academic support course (College and Career Success Skills courses) during the 2020-2021 academic year
- course grades for developmental math and academic support courses (College and Career Success Skills courses)
- course grades for developmental reading and academic support courses (College and Career Success Skills courses)
- age (18 years of age or older)
- whether the student has a high school diploma or high school equivalency diploma
- did the student enroll in college within 12 months of finishing high school
- enrollment status (full-time or part-time)
- if the student is a single parent (if this data is available)
- whether the student enrolled and attended school during fall 2021

The data will be used to help determine which first-year students, who participated in developmental education and academic support courses during the 2020-2021 academic year, are considered nontraditional students. Additionally, this data will be used to examine how

persistence of nontraditional students is influenced by participation in developmental education courses and academic support courses.

Thank you for considering my request. If you choose to grant permission, please provide a signed statement on official letterhead indicating your approval. A permission letter document is attached for your convenience.

Sincerely,

Priscilla Burns
Doctoral Student
Liberty University