

Predicting Transition to Postsecondary Programs of
GED® Earners in a College Setting

by
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Approval Page

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Abstract

Predicting Transition to Postsecondary Programs of General Educational Development Earners in a College Setting. Isabel Medina, 2014: Applied Dissertation, Nova Southeastern University, Abraham S. Fischler School of Education. ERIC Descriptors: High School Equivalency Programs, Dropout Programs, College Preparation, College Bound Students, Predictive Measurement

This applied dissertation was designed to identify the characteristics of students enrolled in a GED® preparation program who transitioned to postsecondary programs at the same institution after passing the GED® test. The characteristics studied included age; gender; ethnicity; prematriculation scores in reading, language, and math in the Test of Adult Basic Education (TABE); and hours spent preparing for the GED® test in an open-entry, open-exit remedial laboratory environment.

Through the use of binary logistic regressions to answer the research questions, a prediction model was constructed. The variables that are able to predict an increased likelihood of transition to postsecondary programs were being between the ages of 16 and 24 at the time of enrollment in the GED® program and having an ethnicity category of Asian, White/Caucasian, Hispanic, or Black/African American as opposed to the category of *No Report*. The variables that significantly predicted a lessened likelihood of transition to postsecondary programs were a grade equivalent of less than 8.9 in the prematriculation TABE reading, language, and math scores. Spending less than 16 hours preparing for the GED® test was also found to lessen the likelihood of transition.

The findings of this study are important to adult education practitioners, tutors, teachers, and administrators who are responsible for GED® programs. Through application of the prediction model in a similar environment, supportive and interventional mechanisms can be created to increase the number of GED® earners who transition to credit, college preparation, and vocational programs.

Table of Contents

	Page
Chapter 1: Introduction.....	1
History of General Educational Development.....	1
Statement of the Problem.....	3
Description of the Setting.....	5
The Research Problem.....	8
Background and Justification.....	8
Deficiencies in the Evidence.....	10
Definition of Terms.....	11
Purpose of the Study.....	14
Conceptual Framework.....	15
Summary.....	17
Chapter 2: Literature Review.....	19
Introduction.....	19
Comparisons of General Educational Development and High School Students...21	
Challenges of General Educational Development Earners.....	24
Transitions to Postsecondary Programs.....	27
Persistence and Hours of Preparation of General Educational Development Earners.....	34
Predictors and Predictive Research.....	40
Frameworks for Prediction of Transition to Postsecondary Programs.....	49
Summary.....	52
Research Questions.....	53
Chapter 3: Methodology.....	54
Introduction.....	54
Participants.....	57
Instruments.....	59
Procedures.....	60
Summary.....	69
Chapter 4: Results.....	70
Introduction.....	70
Descriptive Statistics.....	71
Statistical Analyses to Address Research Questions.....	74
Summary.....	82
Chapter 5: Discussion.....	84
Introduction.....	84
Summary of Findings.....	85
Discussion and Links to Relevant Research.....	90
Implications of the Findings.....	93
Limitations.....	95
Recommendations for Future Research.....	96

References.....	98
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Appendices

A	Logistic Regression Variable Operational Definitions and Coding.....	110
B	Classification Table for Total Sample in Research Question 1	112
C	Classification Table for Total Sample in Research Question 2.....	114
D	Classification Table for Total Sample in Research Questions 3 and 4 and for Separate Logistic Regressions of Question 3.....	116

Tables

1	Demographic Characteristics of Participants ($N = 1,620$).....	71
2	Descriptive Statistics of Participant Characteristics ($N = 1,620$)	72
3	Transitions to Postsecondary Programs Based on Participant Characteristics.....	73
4	Summary of Logistic Regression Analysis for All Variables as Predictors of Transition ($df = 1$).....	75
5	Summary of Logistic Regression Analysis for Age, Gender, and Ethnicity as Predictors of Transition ($df = 1$).....	78
6	Summary of Logistic Regression Analysis for Prematriculation Test of Adult Basic Education Scores as Predictors of Transition ($df = 1$)	80
7	Summary of Individual Logistic Regression Analyses for Prematriculation Test of Adult Basic Education Scores as Predictors of Transition ($df = 1$)....	81
8	Summary of Logistic Regression Analysis for Hours in the ABE/ GED Lab as a Predictor of Transition ($df = 1$)	82

Chapter 1: Introduction

Over 1.3 million high school students drop out of high school each year (GED® Testing Service, 2011a), resulting in almost one in five adults not having a high school credential (GED® Testing Service, 2011b). Furthermore, in the United States, over 59 million people, or 30% of adults, have never attended a postsecondary program and, in 35 states, over 60% of the population do not have associate's or higher college degree (Council for Adult and Experiential Learning [CAEL], 2008). These figures may have resulted in the President's goal of having more college graduates than any other country in the world by the year 2020 (The White House, 2009). Traditionally, the pathway to postsecondary education has been high school completion, but there is a growing reliance upon another pathway, the GED® program (Florida Department of Education [FLDOE], 2009). The GED® provides new opportunities for adult learners who have not completed high school (GED® Testing Service, 2011b).

History of General Educational Development

The GED®, also known as the high school equivalency diploma (American Council on Education [ACE], 2006), was created in 1942 to serve military personnel who needed to complete high school (GED® Testing Service, 2011b; Tyler, 2005). During the early years of the GED, a high school education was enough for many types of jobs; but by the mid-1970s, changes in attitudes about education created a need for an updated version of the GED test, resulting in the 1978 Series (GED Testing Service, 2011c). This series focused on application and evaluation of knowledge rather than on knowledge recall. The GED Testing Service (2011c) reported that the shift to an information society in the late 1980s catalyzed changes to the test, which began to require a writing sample and focused on critical thinking and problem solving. The test was again revised in 2002

(GED Testing Service, 2013a), and a new series was released in early 2014. The 2014 version of the GED test measures career and college-readiness skills in addition to literacy, mathematics, science, and social studies (GED Testing Service, 2013b).

Since its creation in 1942, over 18 million adults have earned the GED (ACE, 2013). Heckman, Humphries, and Mader (2010) pointed out that, in 2008, almost 500,000 high school dropouts passed the GED test, an amount equivalent to 12% of all high school degrees conferred that year. In 2011, nearly 800,000 adults were administered the GED test, which is recognized by virtually all U.S. colleges and employers (ACE, 2013). Based on this data, the GED credential may be an important vehicle in accessing postsecondary educational programs not only for recent high school dropouts, but also for adults who never finished high school and want to enter a postsecondary program. At the institution where the study took place, as well as in most colleges in Florida, these programs include college credit and college preparatory courses, English for Academic Purposes, and vocational programs.

Different reasons for taking the GED have been cited. The GED Testing Service (2012), reported that in 2011 there were more than 723,000 adults worldwide who took at least one of the GED subtests, which include language arts/reading, language arts/writing, mathematics, science, and social studies. Of these, approximately 454,000, or 71.9%, passed the test. Educational reasons were cited most often for taking the GED test. However, Reder (2007), using national data, found that only about 27% of GED earners transitioned to postsecondary programs compared to 63% of individuals who earned a traditional high school diploma, possibly indicating a gap between GED earners' educational goals and actual transitions to postsecondary. More recent studies (Patterson, Zhang, Song, & Guison-Dowdy, 2010; Zhang, Guison-Dowdy, Patterson, & Song, 2011)

found that approximately 43% of GED earners enroll in postsecondary education, yet the graduation rate for students with GED credentials is only 12%. The rate of postsecondary enrollment by GED earners was found to be even lower in a study conducted by a community college in Oregon, where only 4% of nearly 400 GED graduates per year transitioned to postsecondary programs over a 5-year period (Mageehon, 2013).

The need for support systems in order to increase transition rates was discussed by Alamprese (2004), who viewed the GED as a bridge to postsecondary transition. Alamprese pointed out that transition services such as financial aid application assistance and workshops addressing time management and study skills are important to adults involved in GED and other adult basic education programs in order to facilitate actual transitions. Information about postsecondary transitions of GED students has not been fully available, as the GED Testing Service, which publishes annual statistics about GED test takers and passers, has not comprehensively addressed post-GED experiences (Reder, 2007). In addition, research appears to be inconclusive, with transition rates ranging from 4% (Mageehon, 2013) to 43% (Patterson et al., 2010; Zhang et al., 2011). This study not only addressed the lack of information in the field but also presented a prediction model for transition to postsecondary programs by GED earners in a South Florida public college setting.

Statement of the Problem

Transition to postsecondary programs by GED test passers is a topic that has been widely discussed nationally by educational organizations. The ACE conducted a longitudinal study that went beyond attainment of a high school equivalency diploma and included transitions, as the GED credential can help propel students to begin a postsecondary education, but “little is known about how successfully GED Test

candidates make that transition and whether enrollment rates change with time” (Patterson et al., 2010, p. vii).

The FLDOE (2009), reported that transitions to postsecondary by GED completers in a 2004 cohort were 33.5%, compared to a national average of 63% postsecondary transition rate for high school graduates with standard diplomas (Reder, 2007). Additionally, the Florida Education and Training Placement Information Program (2012) tracks students who have earned a standard high school diploma but not GED earners into postsecondary programs. For the 2010-2011 year, 66% of high school graduates with a standard diploma were found to have transitioned to a postsecondary program. The more than 30-point difference in postsecondary transitions of GED completers and high school graduates with a standard diploma has been a matter of concern for Florida educators and the researcher, who has been responsible for the success of students in a GED programs and participated in various forums and state-wide meetings where the concern was discussed.

Although national and state systems track student demographics relating to postsecondary transition, the data are incomplete in terms of predicting the characteristics of students who pass the GED exam and transition to college. Understanding the characteristics of the students who transition, from an academic and demographic perspective, is critical to educators in Florida, which has the fourth highest GED testing volume in the nation (ACE, 2010). In addition, Florida leads the 16 states belonging to the Southern Regional Education Board (SREB, 2010a) in enrolling students in programs resulting in a GED. In 2008, SREB data (2010b) indicated that 17% of 25- to 44-year-olds without a high school diploma, or 106,369 adults, were enrolled in adult education programs leading to a GED.

The broad problem identified by the researcher was that although there were data from many national and state educational organizations (ACE, 2006, 2010, 2011a, and 2011b; CAEL, 2008; FLDOE, 2009; Florida Education and Training Placement Information Program, 2012; GED Testing Service, 2011a, 2011b, 2011c, 2012, 2013a; SREB, 2010a, 2010b), as well as studies conducted by various researchers (Alamprese, 2004; Patterson et al., 2010; Reder, 2007), the literature rarely predicted the characteristics of GED earners who were likely to transition to a postsecondary environment, especially in terms of preenrollment data. If this information were available, systems could be created that would provide services for early interventions for GED students who are likely to have difficulties with transitioning to postsecondary programs. These interventions and intentional support services would serve to increase the percentage of GED earners' transitions to postsecondary so they are more closely aligned with the percentages of students who graduate with a standard high school diploma rather than falling over 30 percentage points below that number.

Description of the Setting

Publicly-funded high school equivalency and GED programs have generally been housed within the adult education departments of public school districts and public community and state colleges (FLDOE, 2009). State and community colleges in Florida have GED programs that are usually offered through classroom or online instruction (Daytona State College, n.d.; Indian River State College, n.d.) rather than through an open laboratory environment. However, this type of program has been offered at a campus of a large, state-funded college in Florida, which served over 350 students each 8-week term in an open-entry, open-exit laboratory. The program's goal was to prepare participants to successfully acquire the State of Florida High School Diploma credential

by passing the GED exam. The students in the laboratory, called the ABE/GED lab, were enrolled in one or more of three academic categories based on entry grade-level scores on the Test of Adult Basic Education (TABE). The programs were Adult Basic Education (ABE) for students testing up to Grade 5.9, Pre-GED for students testing into Grades 6.0-8.9, and GED for students testing above Grade 9.0. With the assistance of academic tutors and trainers and through the use of remediation software, students were able to increase their reading, language, and math skills. They progressed at their own pace through the grade levels until they were ready to pass the GED exam. Students also increased skills in the areas of science and social studies, which were additional content areas of the GED exam.

Upon entry and throughout the program, students were assessed by the TABE, the most frequently used standardized test for adult education assessments (Van Horn & Carman, 2007). Once students were deemed ready to successfully pass the GED exam through the completion of practice tests, they were encouraged, but not required, to complete the exam at a nearby vocational/technical center. This facility belonged to the local public school system, not to the college. Although many students passed all the sections of the GED exam, other students failed some or all of the GED content areas and returned to the college to continue remediation. It was only when students applied for admission to postsecondary programs at the college that information about the passing of the GED exam was confirmed by the admissions office in order to formally admit the student to the postsecondary environment.

Throughout the ABE/GED program, students attended advisement and informational sessions about the college's postsecondary programs. The sessions included discussions about financial aid, testing requirements, and degree and certificate

programs at all of the college's campuses. Preliminary data provided by the college addressing students enrolled during the 2008-2009 academic year indicated that of 2,438 students enrolled in the ABE, pre-GED, and GED programs, 13.2%, or 322, enrolled in a postsecondary program when followed longitudinally through the second semester of the 2009-2010 academic year. Some students progressed quickly from the ABE to the pre-GED and GED levels, whereas others struggled in the ABE environment.

Students also participated in orientations to the GED program prior to entry and were asked to make a 10-hour-per-week commitment to attend the program. Attendance was measured by swiping the student identification card at entry and exit into a card reader with software that tracked student attendance (AccuTrack, n.d.). Students with repeated or long-term absences were terminated from the program.

Once students were enrolled in GED-level courses and tested above the 9.0 grade-equivalent, they were administered the Official GED Practice Test (FLDOE, n.d.a.). At that point, they were encouraged to take the GED exam. In the weeks preceding the exam, students were also encouraged to take advantage of counseling and advisement offered by the student services offices of the institution so that could begin the process of transitioning to postsecondary programs. Students were not able to apply for admission to credit programs or for financial aid until they passed the GED exam. However, they were encouraged to explore opportunities available to them so that, once they passed the GED exam, they could immediately apply for admission to postsecondary programs. These programs included college-credit courses leading to an associate in arts or science, postsecondary adult vocational programs leading to a vocational certificate, college preparatory courses, and English for Academic Purposes programs. These programs and courses were offered by the college-credit side of the institution and, if GED students

wanted to register for these programs, all they had to do was, literally, cross the street to the college-credit registration office. However, not enough of the GED earners crossed the street. This study focuses on the characteristics of the students who do cross the street and transition to the postsecondary environment, as well as those students who do not. This information can help to create mechanisms that will strategically target students in order to provide seamless transitions.

The Research Problem

The research problem addressed by this study was that there was no way to predict whether or not a GED earner was likely to go to college at the subject institution at which the researcher supervised the GED program. Although there is literature addressing the posttransition characteristics of GED students, the predictive characteristics used for interventions of high school and college students were not addressed in the literature for their GED counterparts. Furthermore, predictive profiles of GED earners who are potential college candidates have not been created. A comprehensive review of the literature revealed that very few studies addressed predictors of transition to postsecondary programs for students enrolled in GED programs at colleges, community colleges, or public school systems. Having this information can impact GED programs, as early warning systems resulting in academic interventions can be created to assist students in the acquisition of academic skills and behaviors that are likely to lead to postsecondary transition.

Background and Justification

The characteristics of the students who transition to the postsecondary environment at the educational institution, as well as the number of hours of attendance in the ABE/GED lab, had not been previously analyzed. The college gathers data about

students enrolled in various programs as well as their academic outcomes; however, these data are seldom tied to departmental information, such as time spent in an academic laboratory, unless a special project such as this one is undertaken. Therefore, there was not enough information about the students who did transition versus those who did not in order to create specific intervention programs and to tailor initiatives that would assist with the transition process. One such initiative is the intrusive advising academic model proposed by Kuh (2011). This model addresses college-credit students; however, it could be replicated within a GED program. The lack of information about transitions of GED students was confirmed in the Proceedings Report of the 2007 ABE Transitions Symposium (U.S. Department of Education, 2007), which indicated that research was needed to identify models that facilitated enrollment and success of adult education students moving into the postsecondary environment.

The ability to identify predictors of transition to postsecondary upon entry into the ABE/GED program will be beneficial not only to students but to the college as well, because state funding for adult education programs is tied to outcomes. Predictive information will assist program administrators, tutors, trainers, and advisors in creating early warning systems. These can help provide services including enriched curricula, more intensive advisement, vocational counseling, and focused interventions.

Predictive studies have been conducted in a variety of non-GED educational settings and have focused on predicting performance and success from characteristics including academic level (Goldstein & Perin, 2008); successful college experiences (Noble, Flynn, Lee, & Hilton, 2007); persistence (Herreid & Miller, 2009); high school grades and test scores (Hoffman & Lowitzki, 2005); course-taking patterns (Hagedorn, Cabrera, & Prather, 2010); student ethnicity and first language (Zwick & Sklar, 2005);

participation in clubs and student expectations (Miller & Tyree, 2009); and scores on an entrance exam (Wolkowitz & Kelley, 2010). Predictive studies involving GED earners' transition to postsecondary programs could encourage the development of systems that would help students seamlessly transition to postsecondary education and generally improve services offered to GED and other adult education students. This study differs from the great majority of GED research as it addresses the students' characteristics prior to entry into a GED preparation program, not after they have completed the program and passed the GED exam. Furthermore, the studies of students after they have passed the GED exam have generally been conducted by state or national organizations, such as the FLDOE, or by the American Council of Education's GED Testing Service, which creates and controls the GED exam, rather than by educators and adult education professionals.

Deficiencies in the Evidence

Although there have been studies relating characteristics of GED test passers' transition to postsecondary programs using various variables, including age, gender, ethnicity, primary language, and time spent preparing for the GED test (Patterson, Song, & Zhang, 2009; Patterson et al., 2010; Zhang, 2010; Zhang et al., 2011), the research did not reveal predictive characteristics that addressed prematriculation test scores. These types of initiatives generally target traditional high school students rather than adult education students, and overall, there has not been much research on the topic (Zafft, Kallenback, & Spohn, 2006). A predictive study by Zhang (2010) did address predictive characteristics of GED earners compared to traditional high school graduates as they related to participation patterns in postsecondary programs. Variables studied by Zhang included age, gender, ethnicity, and workforce status. Zhang's study, however, did not include prematriculation data and hours spent preparing for the GED test. Patterson et al.

(2010) made recommendations for further study regarding the characteristics of GED passers enrolling in postsecondary programs lasting fewer than 2 years. This study acted upon this recommendation.

Transition and success in postsecondary education has been widely studied and tied to academic ethic (Smith & Zhang, 2009), timing and socioeconomic factors (Bozick & DeLuca, 2005), social support interventions (Mattanah et al., 2010), and persistence and program scheduling (Kasiz et al., 2007), among other characteristics. Most studies, however, point to transitions and success for students who obtained a regular high school diploma and not a GED. Alamprese (2004), Guison-Dowdy and Patterson (2011a), Patterson et al. (2010), and Reder (2007) suggested that more studies were needed about the characteristics of individuals who do make the transitions. The literature revealed various doctoral dissertations focusing on GED students (Akins, 2009; Ebert, 2002; Henry, 1999; Kurlaender, 2005; Payne, 2010; Pollard, 2006; Sanders, 2007; White, 1996), but none addressed predictors of transition to postsecondary programs. Furthermore, in a meta-analysis studying models and practices of transitions to postsecondary programs, Valentine et al. (2009) conducted a literature search of more than 8,000 sources and selected 100 studies for the analysis. However, transition practices of GED students were not discussed.

Definition of Terms

For the purpose of this applied dissertation, several terms are defined.

ABE/GED lab is a facility of the college with one main room housing 30 computers, as well as smaller computer classrooms. It was the main facility used by all ABE, pre-GED, and GED students. The smaller rooms were very close to the main laboratory and also contained computers with the same software available in the main

room. At all times, students were assisted by tutors and trainers. As needed, small groups of students attended short workshops to address a challenging topic. These workshops were held inside the laboratory, in a nearby classroom, or in the smaller rooms.

GED test passer, earner or completer are terms that have been used in studies addressing GED students' demographics and academic behaviors (ACE, 2011a; Patterson et al., 2010; Zhang et al., 2011). These terms refer to students who passed all five sections of the GED exam and were able to have this formally confirmed by the college so that they could enter the postsecondary environment. These terms are used interchangeably.

Postsecondary programs are college-credit courses toward Associate in Arts (AA) and Associate in Science (AS) degrees, as well as Postsecondary Adult Vocational (PSAV) courses, English for Academic Purposes (EAP), and college preparatory programs. At the subject college, students could be enrolled in more than one of these programs simultaneously.

Transition to postsecondary programs refers to the admission and registration of a student who was enrolled in ABE, pre-GED and GED programs at the college and subsequently enrolled in any type of postsecondary course at the same institution as evidenced by institutional databases. Zhang et al. (2011) defined transition to postsecondary as students indicating that they entered either a 2-year college or a 4-year college. For the purposes of this study, institutional databases provided the information about whether a student transitioned to postsecondary programs by indicating whether or not the student enrolled in any college-credit, PSAV, EAP, or college preparatory course within the time frame studied. In this study, transition to postsecondary programs was considered a single variable as a student could be enrolled in more than one

postsecondary program at the same time.

The *TABE*, used for determining academic levels in adult education programs (Van Horn & Carman, 2007), was used for placement of all students upon entry, as well as for posttesting and continuing enrollment in the GED program. The *TABE*, which measures reading, language, and math levels, is published by CTB/McGraw-Hill (n.d.) and was required by the FLDOE (2009) for entrance into a GED program. Students wishing to enter the ABE/GED program were administered the *TABE* Survey Version 9 or Version 10 or both. The test scores yielded a grade-level equivalent that was used for academic placement in the ABE/GED lab. However, because two different versions of the *TABE* were used, grade-level equivalents were converted to normed scaled scores. *TABE* scores, in the form of grade-level equivalents, were obtained from the college's official student records in deidentified format.

Age refers to the students' age of at the time of enrollment in the program. It was measured by their birth date and was obtained from official deidentified student records. The age of students was grouped into the three categories utilized by Zhang et al. (2011) for their research: 16-24 years, 25-34 years, and 35 years and older.

Gender refers to students' self-declaration of male or female, as suggested by Guison-Dowdy and Patterson (2011a), Zhang (2010), and Zhang et al. (2011). Students' gender was obtained from the college's official deidentified student records.

Ethnicity refers to students' self-declaration of ethnic background and was obtained from official deidentified student records. For this study, categories of ethnicities identified for the college's students during 2008 and 2009 were Black/African American, White/Caucasian, Hispanic, Asian, Hawaiian or Pacific Islander, American Indian or Alaska Native, and *not reported*.

Hours of attendance refers to the cumulative number of hours spent by each student in the ABE/GED lab as recorded by the tracking system (AccuTrack, n.d.). This system allows students to swipe their identification card upon entering and exiting the facility in order to determine time spent in the lab. This information was supplied by the GED staff to the college's institutional research department. It was then included in a database, along with the other participant data, and provided to the researcher in deidentified format.

Purpose of the Study

The purpose of this study was to identify the characteristics of students enrolled in an ABE/GED program housed in a public state college that, upon passing the GED test, transitioned to postsecondary programs in the same institution. Once the predictors were identified, the predictive characteristics could be used to create tracking systems for all students involved in similar GED programs. Through the use of the tracking systems, staff and tutors in these programs can address the specific needs of students predicted to transition, or not transition to postsecondary programs. Interventions for students predicted not to transition could include curriculum enrichment, closer monitoring of absenteeism, and increased counseling and advisement. In addition, interventions for students who are likely to transition may include additional exposure to the college environment, college expectations discussion groups, financial aid follow-up, and meetings with college credit faculty and staff to discuss potential college enrollment. Although the college had identified the students who have transitioned to postsecondary, predictive characteristics including age, gender, ethnicity, prematriculation scores on the TABE, and hours spent in the ABE/GED lab had not been studied.

Audience. This study will be of interest to GED directors, trainers, teachers,

tutors and administrators, as well as state and federal policy-makers and funders of adult education programs. It may also be of interest to future doctoral students who are interested in studying the characteristics of GED students from a different perspective, as research which would include both quantitative and qualitative information may be valuable in the development of interventions which support transition to postsecondary programs.

Significance. Once the characteristics of GED students who are likely to transition to postsecondary programs as well as those with lessened transition chances are known, interventional mechanisms can be implemented. This is significant because it is important for adult educators to have the data to create customized support systems for students who are likely to transition or not to postsecondary programs. This information may be well received by state and federal funding sources in order to meet national goals of increasing college attendance.

Conceptual Framework

The researcher was not able to identify a specific framework within the literature that addressed the same transition predictors used in this study. However, several studies did address predictors in a higher education setting. For example, Miller (2007) used the results of the College Student Expectation Questionnaire and institutional data of University of South Florida students including age, gender, ethnicity, high school average, and SAT scores to create a model addressing the risk of students' attrition prior to enrollment, allowing for specific early interventions. Miller included student expectations in predicting attrition, as well as age, ethnicity, and prematriculation academic information, including high school grade point average (GPA) and SAT or ACT scores.

Following the Miller (2007) study, a research team at the University of South Florida implemented the prediction model, resulting in various studies using the characteristics and variables identified as predictors. Miller and Herreid (2008), through the use of logistic regression, confirmed that the characteristics identified in Miller's study had predictive value. The characteristics were then used to create attrition interventions by Miller and Tyree (2009), who used the predictors for interventions with students most at risk of attrition. Miller and Herreid (2009) refined the model in order to predict freshman- to sophomore-year transitions. Taking the prediction model a step further, Herreid and Miller (2009) used prematriculation characteristics to craft interventions for students even before they gave any signs of dropping out. Finally, Miller, Tyree, Riegler, and Herreid (2010) demonstrated that the data collected through the prior studies accurately predicted attrition using variables that included high school GPA, race, and selected student expectations.

The cited studies were based on a previous model developed to provide early identification of students at risk of dropping out (Glynn, Sauer, & Miller, 2003). This prediction model combined different studies and surveys to identify independent variables that could be used to predict attrition including attitudes and opinions obtained from the survey, and demographics. In this study, however, prematriculation data were not used.

The only prediction study found in the literature that addressed GED students and contributed to the conceptual framework of this project was conducted by Zhang (2010), who compared GED students to traditional high school graduates in terms of participation patterns in postsecondary programs. Zhang wished to evaluate whether the type of postsecondary program that GED earners selected was related to social and demographic

characteristics. Through the use of logistic regression, Zhang found that age and gender were related to the likelihood of enrolling in postsecondary programs. However, the types of program in which GED earners participated were not statistically significant.

With these studies to ground this study, the researcher used characteristics pertaining to the GED students at the subject college. For the variable of prematriculation data, the researcher utilized entry reading, language, and math TABE grade-equivalents converted to scaled scores. Other independent variables included hours spent in the ABE/GED lab, as well as age, gender and ethnicity. Much like the aforementioned studies, that had a dependent variable of attrition (Glynn et al., 2003; Herreid & Miller, 2009; Miller, 2007; Miller & Herreid, 2008; Miller & Herreid, 2009; Miller & Tyree, 2009; Miller et al., 2010) or of transition to postsecondary programs (Zhang, 2010), this project used postsecondary transition as the dependent variable. Logistic regression was used, as in the studies above, to determine predictive ability of the selected variables.

Summary

As discussed, 30% of adults in the United States have never attended any postsecondary programs, and with a national goal of having more college graduates than any other nation in the world by 2020, the GED is seen as a viable bridge to postsecondary programs for adults who never finished high school. Although many educational systems and organizations track information about GED graduates who go to college, the researcher found that few studies predicted the characteristics of GED earners who transitioned to postsecondary. Other than age, gender, ethnicity, and whether or not they were successful in postsecondary, there is little research focusing on students' prematriculation test scores or their participation during the GED program itself in terms of hours spent in the program.

This study addressed the use of specific characteristics of students enrolled in a GED program to predict transition to postsecondary programs. These characteristics, or independent variables, included preentry data in the form of math, reading, and language scaled scores on the TABE test; number of hours spent in an ABE/GED lab; and age, gender, and ethnicity. The study's conceptual framework was based on prediction models for college students at risk of attrition developed and implemented at the University of South Florida (Herreid & Miller, 2009; Miller, 2007; Miller & Herreid, 2008; Miller & Herreid, 2009; Miller & Tyree, 2009; Miller et al., 2010), and on a study predicting enrollment patterns for both GED students and standard high school graduates (Zhang, 2010).

Chapter 2: Literature Review

Introduction

Although it is a topic of national importance, little research was found that addressed GED® students and GED® completers within the framework of transition to postsecondary education. Although national and state studies have identified the numbers of GED earners transitioning to a postsecondary environment and discuss demographics, GED scores, and achievement once the transition is made, few studies contain information about the characteristics of the students before they transition. For that reason, this review of literature will address many studies that parallel what this researcher feels should be addressed for GED students but was not found in current research. Furthermore, the literature has yielded numerous studies comparing GED earners to high school graduates, and these studies were also reviewed. Although GED completers have been compared to standard high school graduates, similar types of research studies have not taken place solely for GED earners as they have for high school graduates.

Over 280 reference sources were analyzed for the purpose of thoroughly reviewing the literature on topics including characteristics of GED earners who transition to postsecondary, using these characteristics to predict transition, identifying the number of hours spent by GED earners in preparation programs, and using predictors of transition to create intervention programs. However, although there is some research about GED earners and the described factors, no studies specifically were found that focused on predictors of transition to postsecondary programs and included prematriculation data and number of hours of GED test preparation. For that reason, literature addressing high school graduates that paralleled the problem addressed in this study was used to illustrate

some of the concepts.

This review of literature was conducted by researching many online databases including ERIC, ProQuest Education Journals, Education Full Text (H.W. Wilson), and Academic OneFile. Doctoral dissertations were considered, and several studies focusing on the GED were included in this review. Dissertations were found in the ProQuest Dissertations and Theses database, as well as Nova Southeastern University's own MARPs, Practicums, and Dissertations. In addition, searches for information were conducted in multiple U.S. Department of Education websites, as well as websites of the FLDOE, the ACE, the GED Testing Service, the CAEL, the National Center for the Study of Adult Learning and Literacy, the National Council for Workforce Education, the National Commission on Adult Literacy, the SREB, and foundations that funded various studies about GED earners, including the Ford Foundation and the Wallace Foundation.

Key words used for online searches included GED, General Educational Development, high school equivalency, transition to postsecondary, GED and persistence, GED and correctional programs, TABE test, GED preparation and examinations, demographics of GED students, adult education, adult literacy program hours, and disabled students in GED programs, among others. The thorough search for information and research to support the statement of the problem resulted in a review of literature focusing on articles addressing GED students. It also contains articles that support the statement of the problem but do not specifically address GED students, focusing on high school students or non-GED students involved in postsecondary programs. Topics presented include comparisons of GED and standard high school students, challenges of GED earners, transitions to postsecondary programs, persistence of GED earners, predictors and predictive research, and the foundation for a conceptual

framework. The research questions are derived from the results of this review.

Comparisons of General Educational Development and High School Students

The topic of how GED earners perform academically in college compared to students who graduated with a standard high school diploma has been a subject of some interest in the literature. For example, Maralani (2011) focused on the educational paths taken by high school dropouts, GED earners, and high school graduates. Maralani suggested that GED completers and high school graduates tend to take different educational paths and have educational patterns that are different, with GED earners less likely to enter college in their late teens as do high school graduates. Using information from a national database, Maralani studied 8,432 standard high school diploma graduates, GED graduates, and dropouts. Findings indicated that more GED completers enter college than suggested by previous studies and GED earners enter and complete college later than high school graduates. Additionally, Maralani found that 58% of traditional high school graduates entered 4-year colleges compared to 33% of GED completers. This finding is similar to the percentage discussed in a State of Florida report (FLDOE, 2009), indicating that 33.5% of GED completers in a 2004 cohort transitioned to public colleges and universities in the state.

Similarities and differences among GED completers, high school graduates and dropouts were also chronicled by Ou (2008), who longitudinally followed a sample of 1,372 low-income, inner-city Chicago youth. Significant differences among the three groups were found in terms of life satisfaction, optimism about the future, symptoms of depression, and substance abuse. GED completers were found to have lower incidences of substance abuse than dropouts but higher than high school graduates. The GED earners were also in the middle in terms of life satisfaction and depression. Distinct differences

were found among the three groups in terms of educational levels attained and income. One limitation of the study was its correlational, and not causal, nature. However, that study was illustrative of the types of research studies found in the scholarly literature which compared GED and high school graduates. Earning potential, psychological characteristics, life conditions, and educational attainment are examples of the types of characteristics that were found in the research.

One of the largest series of studies about GED earners, high school graduates, and their journeys to and through postsecondary programs was an initiative of the ACE and the GED Testing Service (Guison-Dowdy & Patterson, 2011a, 2011b; Patterson, 2010; Patterson et al., 2009; Patterson et al., 2010; Quigley, Patterson, & Zhang, 2011; Zhang, 2010; Zhang et al., 2011; Zhang & Patterson, 2010). Using national data from the 2004-2009 Beginning Postsecondary Students Longitudinal Study, researchers pulled representative samples and studied GED and high school graduates' characteristics and journeys into the postsecondary environment. The research studies from the project, titled *Crossing the Bridge*, are discussed as follows.

One of the studies based on the *Crossing the Bridge* initiative (Guison-Dowdy & Patterson, 2011a) examined the postsecondary experiences of GED earners. The researchers concluded that GED earners in college were older than high school graduates, worked full time, were at or below the poverty level, and received 25% less financial aid for their 1st year than did high school graduates. The authors posed the question about whether the GED earners were cautious of incurring debt or lacked financial aid information. This is an important point because lack of information about transition services and financial aid has been cited in other studies addressing GED completers and their transition to postsecondary (Reder, 2007; Valentine et al., 2009).

The comparisons of GED and high school graduates also addressed demographics and other personal life situations of the two groups. Zhang (2010) and Guison-Dowdy and Patterson (2011b) conducted research addressing some of these factors. Using the national data from the *Crossing the Bridge* initiative, Zhang compared college participation patterns of GED and high school graduates entering colleges, universities, and vocational/technical centers during the years 2001 and 2005 in order to predict types of participation in postsecondary programs. Through the use of logistic regression, Zhang found that traditional high school graduates had a higher participation rate in postsecondary programs than GED earners, although the gap between them narrowed with increasing age. Additionally, although male and female high school graduates entered postsecondary programs at similar rates, female GED earners participated almost twice as often as male GED earners.

The literature included several doctoral dissertations addressing postsecondary attainment and success differences between GED completers and high school graduates. Ebert (2002) studied the performance of the two groups enrolled in a public university. The study questioned whether selected characteristics would predict the college graduation of GED completers. Ebert found that graduation rates were lower for GED earners than for traditional high school graduates. Additionally, GED completers had a lower GPA than high school graduates during their first and second semesters, but there were no significant differences in later semesters. Ebert concluded that the score on the GED exam was an effective predictor of college performance in terms of graduation and GPA. The finding regarding the GPA was confirmed by Adams (2011), who studied success rates of Kentucky community college and technical college students. Statistically significant differences in postsecondary GPA were found between the two groups, with

the high school graduates having a higher mean GPA.

A study that contradicted Ebert (2002) and Adams (2011) was undertaken by Akins (2009), who found no significant difference in mean GPA between GED completers and high school graduates after one semester in a rural community college. Using data from 680 participants, Akins did find statistically significant differences for both groups using race, with White students achieving a higher GPA, although gender and age had no influence on GPA. Race was also a factor in a study by Vanderloo (2003). Using a pool composed of 2,220 GED completers and 27,423 high school graduates enrolled in participating community colleges in the state of Mississippi, Vanderloo found that GED completers of White racial origins, as well as those enrolled full-time and those enrolled in vocational programs, had higher levels of academic achievement.

Challenges of General Educational Development Earners

In addition to educational challenges, most GED earners have had to overcome barriers ranging from disabilities, low socioeconomic status, illness, child care, family, and transportation issues, to committing crimes and being placed in juvenile or adult correctional facilities. Styles (2011) conducted a study in which GED students identified the barriers that they perceived prevented them from completing their programs at a community college. Responses on a survey indicated that situational barriers versus institutional or dispositional had the most impact in students' ability to succeed. These included job and home responsibilities, transportation, illness, and child care. Gender and race, as well as job and marital status, were not found to impact program completions. These situational barriers were also discussed by Nix and Michalak (2012), who suggested that holistic programs should be created for GED earners to increase both transitions to and retention within postsecondary environments.

These challenges may also contribute to the length of time that GED earners take to finish postsecondary programs. This was confirmed by Patterson et al. (2010), who longitudinally studied a 2003 national cohort of 148,649 GED test passers and their enrollment and graduation patterns. Patterson et al. (2010) found that 77.8% of test passers had enrolled in 2-year or less-than-2-year institutions awarding associate degrees and certificates. Furthermore, the enrollment of these students took place within 3 years after passing the GED, and their progress took more time than other adult learners. By September 2009, Patterson et al. found that only 11.8% of students in the cohort who enrolled had graduated from a postsecondary program. Patterson (2010), who studied the same cohort during the same period of time, analyzed graduation rates by state and found that Florida test passers had a graduation rate of 14.1% from 2-year institutions. Patterson also analyzed the characteristics of the students including age, gender, ethnicity, primary language, and highest grade completed before leaving high school. Results from Patterson's study indicated that graduates had characteristics including being female, belonging to White or African American ethnic groups, and enrolling full time.

The location, or setting where a GED preparation program is held, such as an adult education center or a detention center, has also been found to impact GED student performance. Whelan (2002) studied the characteristics of GED candidates that led to passing or failing tests, as well as totals of academic scores. Subjects studied were 266 high school dropouts who had taken the GED test in the state of Virginia and had completed an application containing information about themselves. The goal of the study was to determine if the type of preparatory program was related to performance. Other factors, including age, gender, race, highest grade completed, and hours of class attendance, were also included in the research. Students attended programs at adult

education learning centers and juvenile and adult detention centers, and there were alternative programs for 16- to 18-year-olds. Students who attended adult education learning centers scored significantly lower than students in adult and juvenile detention center and alternative programs for 16- to 18-year-olds. Whelan pointed out that this may have been a function of not being able to control participation at the adult education learning centers, whereas the others were special groups with controlled attendance and much in common. Other findings included race and gender as significantly impacting scores, with students classified as *Other* in race passing at a higher rate and Asians passing more often than other races.

Correctional facilities have provided subjects for different studies about the GED, as participating in courses leading up to the exam is often encouraged and supported in these institutions. In fact, in a study that marked the first time that GED data were compiled nationally at correctional centers, 10% of all GED tests in the United States were taken by individuals who were incarcerated (ACE, 2011b). Reasons for preparing and taking the GED test were analyzed, including acquiring further education, getting a better job, being a positive role model for family members, and personal satisfaction. Of these, personal satisfaction ranked highest (63.4%) of all the reasons for taking the GED test.

Another major barrier faced by students, especially GED students, is having a disability that can impact the ability to achieve. Hsu and George-Ezzelle (2008) studied the literacy of adults with disabilities and compared GED recipients, high school graduates, and non-high school graduates. Disabilities were defined as having visual or hearing difficulties or both, having a learning disability, or having any other health problem that impaired the ability to fully participate in work, school, or other activities.

Findings indicated that disabled adults had higher dropout rates and lower literacy than nondisabled students. However, an interesting finding pointed to adults with disabilities and a GED showing similar levels of literacy as adults with a high school diploma. In a complementary study illustrating other needs of disabled students, Milsom and Dietz (2009) conducted a Delphi study of 29 experts in various fields of special and higher education and counseling. Their task was to define college readiness for students with learning disabilities. They found that for learning disabled students, college readiness went beyond academic skills to support systems, personal factors, and knowledge of themselves and of the college environment.

As illustrated by the literature, many barriers and challenges are faced by GED students. However, with appropriate support systems, these can sometimes be overcome. Some of these support systems were identified by Pollard (2006) in a phenomenological study of eight GED recipients attending a 4-year university. Of the eight, four completed the degree. Themes arising from interviews with the successful group of students included career-driven majors, family support, and the ability to attend the programs without interruptions. Academic support systems were also critical in order for students to even attempt the transition to postsecondary, as Alamprese (2004) pointed out. Beyond academic preparation, Alamprese posited that counseling, including information about financial aid, time and stress management activities, mentoring, and other supportive activities are necessary in order for GED earners to transition to and be successful in a postsecondary institution.

Transitions to Postsecondary Programs

Transitions of any type can be demanding, with new environments, expectations, and social groups impacting behavior and performance. Transitioning to postsecondary

programs, whether at a technical school, community college, or university, can be difficult for some students but may be especially so for nontraditional, disadvantaged, learning disabled, and low-socioeconomic-status students, as well as GED earners.

The timing of the transition to postsecondary also plays a role, as suggested by Bozick and DeLuca (2005). Using national data, they found that 16% of high school students postpone the transition by 7 months or more. These individuals have several common factors, including having dropped out of high school and exiting high school with a GED, fewer socioeconomic resources, and transitioning to roles as spouses or parents before entering postsecondary programs. In addition to timing, age has also been found to play a role in the choices regarding postsecondary transitions. Kortesoja (2009) studied postsecondary choices of nontraditional age students. Using the National Household Education Survey of 1999, Kortesoja analyzed the data through logistic regression and found that females were one-half as likely as males to obtain some postsecondary education. Kortesoja also found that the odds of attending postsecondary programs were higher when the program was offered by an educational institution rather than a business or corporation. It was also determined that for nontraditional age students, cost and time were the two primary barriers to entering and completing postsecondary programs.

Although timing and age are factors that have been found to impact postsecondary transitions, having the academic ethic has been found to have an important effect on transition to college. In a study by Smith and Zhang (2009) performed at a medium-sized state university, 775 students were provided with questionnaires to which 657, or 85%, responded. Answers to 39 questions pointing to academic ethic were analyzed. The questions included information about learning and receiving grades, as well as number of

hours studied each week. Students having a higher academic ethic had a higher GPA during the first semester in college. Behaviors associated with an academic ethic and analyzed through the questionnaire included the amount of time respondents dedicated to studying and social activities, not only during their high school years but also during their first semester in college. Other questions addressed whether respondents were interested in learning or in grade achievement. Based on the study, Smith and Zhang suggested that having the learned behaviors that define the academic ethic are as important as intellectual skills in order for students to be successful.

The literature about transitions to postsecondary also addresses programs offering services that can minimize the stress and challenges of transitioning. Valentine et al. (2009) conducted a meta-analysis that addressed programs offering transition interventions and supportive services; they found that many transition support services may not have an impact on transition success. The study, which systematically reviewed 19 transition research studies, had criteria including subjects that were disadvantaged in at least one of several dimensions. Valentine et al. discussed the findings from the perspective that students with certain characteristics may not avail themselves of transition services, as some students may not have the ability to decide whether or not they should receive the intervention. The characteristics identified by Valentine et al. included having a disability, coming from an economically disadvantaged background, low academic performance, and limited English proficiency. These characteristics are important for this researcher because, if this project results in a recommendation for increasing transition services for the subjects to be evaluated, the results obtained by Valentine et al. should be taken into consideration.

As discussed by Valentine et al., another student characteristic that impacts

transition is having a learning disability. Janiga and Costenbender (2002) studied the postsecondary transition challenges faced by students with learning disabilities.

Transition services coordinators at 74 colleges and universities in New York State were interviewed for the project, and participants discussed their perceptions of the impact of postsecondary transition services provided during the high school years to learning disabled students. Themes uncovered by the study included the fact that the self-advocacy skills of the students were inadequate for postsecondary success and that learning disabled students needed a better understanding of their strengths, as well as their weaknesses, and the accommodations needed for success.

Janiga and Costenbender (2002) also found that overall, transition services received during the high school years were inadequate. This study was important to this research, as many of the GED students involved in this project were suspected to have a learning disability, although they had not disclosed that fact. There was little research available on the topic of both GED and college students' reluctance to disclose any type of disability even if they were specifically asked if they required special accommodations, including free tutors. The FLDOE (n.d.b.), in its procedures for working with disabled students, indicated, "Self-disclosing is the first step an individual with a disability must take to receive the wide range of accommodations available to them during classroom instruction" (p. 6).

Payne (2010) found that once GED students do self-disclose, services can be beneficial. In a study of GED students who did self-disclose and had confirmed learning disabilities, Payne found that themes from interviews included needing assistance navigating institutions of higher education, requiring initial as well as ongoing transition services, receiving personal assistance from counselors rather than lists and written

information to decrease trial and error in the transition process, and the need for special bridge programs to facilitate transitions.

Studies focusing on specific factors of GED earners transitioning into postsecondary environment were not plentiful in the literature. There were two main types of studies: dissertations, and research using national data, primarily supplied by the ACE's GED Testing Service. Three dissertations by White (1996), Helton (2005), and Coopersmith (1998), had interesting and relevant findings, although two of them were not current. White studied the factors that impacted GED earners continuing with postsecondary education. Participants in the study were 25 years of age or older, and 327 surveys were sent out with 112 responses received. Findings indicated that age, race, marital, and parental status had no significant impact on postsecondary transitions. Females were found to be twice as likely as males to maintain continuous enrollment once the transition to postsecondary was made. White also found, as did Helton, that lack of self-confidence and lack of preparation were the two barriers most commonly reported by participants of the study. Both White and Helton found that the greatest difficulty experienced by GED earners in postsecondary was the ability to manage time and coordinate college, family, and work duties. Coopersmith, in a study of GED earners transitioning to a community college, had findings similar to White's, especially in that females were more likely to transition to postsecondary. Coopersmith also found that 43% of transitioners were ages 18-24, with 24% aged 25-34. Coopersmith asserted that overall, GED earners at the community college studied transitioned at lower rates than the national GED population.

Although recommendations have been made for further research regarding GED earners' transitions to postsecondary programs (Alamprese, 2004; Guison-Dowdy &

Patterson, 2011a; Patterson et al., 2010; Reder, 2007), many of the studies have been conducted or sponsored by large national organizations rather than individual researchers. The largest study of GED transitions to postsecondary available in the literature was a longitudinal study supported by the ACE using national data from the GED Testing Service. The pilot for the 3-year longitudinal study randomized a sample of 1,000 GED earners and matched 307 of them to postsecondary institutions. The researchers found that 37% of GED earners in the United States transition to postsecondary institutions. The authors, Patterson et al. (2009), suggested that this percentage was close to that estimated by other researchers. The purpose of the study was to understand how earning a GED related to postsecondary transitions, persistence, and completions. Results also indicated that women with a GED enrolled at higher rates than men, which is consistent with other studies mentioned earlier and with student enrollment patterns across gender. Furthermore, when a goal of attending postsecondary programs was indicated, participants were more likely to enroll than those who did not indicate this goal. One of the most important findings of this study was the amount of time that GED earners who transitioned to postsecondary spent preparing for the GED test. With a range of 0 to 3,940 hours, GED test passers who enrolled in postsecondary spent about 23 hours preparing for the GED test. In this study, however, most participants had completed the 11th grade, which may have contributed to the average of 23 hours of preparation. If the participants had entered the GED preparation program at an earlier grade level, more hours might have been necessary.

The 1st-year report of the previously cited study, titled *Crossing the Bridge*, which focused on the same population of GED earners, confirmed that females had higher enrollment than males (Patterson et al., 2010). Another important finding was that

a younger age group of 16-24 years was most likely to enroll in postsecondary, but had the lowest chances of graduating. Older groups, ages 35 and older, had the lowest enrollment but had the highest graduation rates. The 2nd-year report of the *Crossing the Bridge* study (Zhang et al., 2011) discussed the longitudinal findings of the project and confirmed that enrollment decreased as age increased and that most GED earners chose public 2-year colleges rather than other types of postsecondary programs. When compared with high school graduates, the GED earners had similar demographic characteristics as high school graduates but were older when they enrolled in postsecondary programs. In addition, the parents of the GED earners had lower educational attainment than those of high school graduates. The importance of this study is the confirmation of the age of GED earners in the process of transition to postsecondary, as the reviews presented begin to identify and confirm some of the characteristics and factors associated with transition to postsecondary of GED earners.

A follow-up report of the *Crossing the Bridge* initiative (Guison-Dowdy & Patterson, 2011b) expanded on the findings of Zhang et al. (2011) by once again looking at longitudinal data from 2004 to 2009 GED and high school graduates. It was again confirmed that more females transitioned to postsecondary programs. Outcomes also included the finding that there were no large differences in ethnicity between GED earners and high school graduates in relation to transitions. However, 17% of GED earners versus 10% of high school graduates were found to have a disability. Other important findings included GED earners being more financially independent, having a higher rate of full-time employment, and having fewer family members attending college than high school graduates.

The final *Crossing the Bridge* report available at the time of this writing

addressed motivations and experiences contributing to the choice of attending postsecondary programs (Quigley et al., 2011). Through a series of preliminary interviews of 85 adult GED earners, themes identified included a need to have support systems and counseling for GED earners as well as more flexible scheduling in order to accommodate different life styles. The study also asserted that GED students who were English language-learners needed more exposure to certain topics, such as U.S. history and Western literature, in order to succeed in postsecondary endeavors.

The characteristics and factors to be considered when discussing student transitions to postsecondary programs are many. These range from the timing of the transition (Bozick & DeLuca, 2005), age at transition (Zhang et al., 2011) and gender of the students (Kortesoja, 2009), to academic ethic (Smith & Zhang, 2009), disability (Payne, 2010), and whether or not students avail themselves of transition services (Janiga & Costenbender, 2002). However, persistence of GED students, in terms of the number of hours they spend preparing for the GED exam and its relationship to postsecondary transitions, does not appear to be widely studied other than in research conducted by Comings (2007), Patterson et al. (2009), and Patterson et al. (2010).

Persistence and Hours of Preparation of General Educational Development Earners

Tinto (1997) discussed learning communities and persistence, and further defined persistence and retention of traditional undergraduates (Tinto, 2006). However, Tinto did not address GED graduates in their ability to persist not only in their GED preparation programs but also in overcoming challenges in postsecondary programs in order to persist all the way to completion. Although persistence for high school graduates and college students has been researched and discussed, persistence for GED students and GED earners is a topic that did not appear to be fully addressed in the literature.

Various research studies focusing on the predictors of persistence of college students and their ability, or lack of it, to persist until graduation can be found in the literature (Barbatis, 2010; Crisp & Nora, 2010; Kiser & Price, 2007-2008; Kuh, 2007; Tinto, 1997). Kiser and Price (2007-2008), for example, studied the persistence of 2,439 college students in continuing from freshman to sophomore year. Predictors of persistence, through selected characteristics in the Cooperative Institutional Research Program Freshman Survey, were analyzed. The predictive characteristics included high school GPA, 1st year of college GPA, location of their residence, the parents' educational level, and cumulative hours enrolled in college. Through the use of logistic regression, cumulative number of college-credit hours was found to be significant for White and Hispanic students in their impact on persistence. No statistically significant predictors of persistence were found for African American students.

Other factors that impact persistence were explained by Barbatis (2010), who interviewed 22 subjects at Broward College in Florida, which had over 65,000 credit and noncredit enrollments and a high incidence of underprepared, ethnically diverse students. Barbatis identified themes including precollege factors, external influences, social situations, and interactions with academia. The findings supported cultural self-identification and the importance placed on education by the family for persisters and graduates. In addition, Barbatis illustrated that outside influences were important to persistence and that all graduates and persisters viewed a college education as a means to gain success in their lives.

Other characteristics related to persistence were documented by Crisp and Nora (2010), who studied factors that impacted persistence and transfer for Hispanic students. National data from 570 Hispanic students enrolled in developmental community college

courses who planned to transfer to a 4-year university were analyzed, and predictors of persistence were identified from theory. Factors included gender, primary language, parents' education, participation in community service, job status, financial aid, number of college credits, college and high school GPAs, and types of courses taken. Findings pointed to high school math preparation being associated with success, as well as parental educational background. Enrollment in developmental courses exhibited a positive impact on persistence, which was operationally defined as staying enrolled, transferring to another educational institution, or earning a degree. In this study, prematriculation data, as well as gender, were used as predictors of persistence. Although the data to identify these two student characteristics were generally available through student records at colleges and universities, the literature did not appear to address students' gender and prematriculation information as predictors of transition to postsecondary programs for either traditional or GED students.

Kuh (2007) discussed another important factor in persistence: number of hours spent studying. Citing data collected by the High School Survey of Student Engagement, Kuh reported that almost one-half of high school seniors study fewer than 3 hours per week, which, as Kuh noted, was considerably less than the national average of 13 to 14 hours per week of 1st-year students at 4-year colleges and universities. Although Kuh discussed college readiness of high school students and hours of preparation of 1st-year college students, the observations using hours spent studying were important to this project, as it is hours spent on task that translates to persistence in the GED environment.

The literature yielded few current studies addressing persistence of GED students in terms of time spent on instruction. Comings (2007) defined persistence in adult education as including both intensity, or hours of instruction per month, and duration, or

total months of instruction. In an earlier study, Comings, Parrella, and Soricone (1999) interviewed 150 adult education students in five New England states with reading levels between fifth and eighth grades. The students were interviewed at 2 months and then 4 months after the initial interview. They were considered persisters if they were still in the program 2 and 4 months later. At the end of the 4 months, 33% of the students had dropped out of the program. The average program length was 10.8 months for persisters, with men and women having similar rates of persistence. Barriers identified as factors impacting persistence included managing positive and negative life situations, self-efficacy, goal setting, and ability to make progress toward educational goals.

The average program length found by Comings et al. (1999) was preceded by another project addressing hours of instruction in relation to persistence (Fitzgerald & Young, 1997). In this study, variables impacting reading achievement in adults involved in ABE, English as a second language and adult secondary education were analyzed. Subjects consisted of 614 representative students selected from the records of a population of over 22,000 students in 20 states. Persistence was measured as the number of hours of instruction between pre- and posttests in class only, laboratory plus class, and laboratory only. An important finding was that, for ABE students, entering level of reading achievement had the greatest impact on literacy outcomes. Fitzgerald and Young also found, however, that persistence in terms of hours of instruction did not lead to better literacy outcomes for ABE students. In addition, although the number of hours of instruction was found to be significant for English-as-a-second-language students, they declined after 9 hours of instruction per week. For adult secondary education students, persistence in terms of hours was not found to be significant; however, prematriculation ability was a factor, as was ethnicity, with minority groups having lower achievement.

Another study addressing hours of instruction and their relationship to literacy performance was conducted by Porter, Cuban, and Comings (2005). Funded by the Wallace Foundation, Porter et al. launched the Literacy in Libraries Across America project not only to study adult education literacy programs in public libraries but also to research participation and persistence in adult literacy and language programs. In this case, literacy programs sponsored by selected public libraries in various states yielded 4,255 participants between the ages of 15 and 100 who attended the literacy programs offered by the libraries. Among the issues addressed by Porter et al. were adult students' tendencies to drop out, attend sporadically, and make little progress in the programs. Persistence was defined as hours spent in the program, and it was found that the average number of hours spent by the study's participants was 58, with an average of 8.5 hours spent on literacy activities during the months which participants attended the program.

Porter et al. (2005) suggested that although persistence could not be predicted, pathways to persistence existed that could categorize the types of goals and intent of the students in the programs. The pathways included a short-term pathway, such as one that would be appropriate for a student wishing to pass the GED exam, as well as tryout, intermittent, long-term, and mandatory pathways, such as those that might be required when a student is on public assistance or is mandated by legal reasons to attend. As with the study discussed earlier by Fitzgerald and Young (1997), no relationship was found between the hours spent in a program and the literacy achievement. In this study, the definition of persistence presented by Comings (2007), which looked at persistence in terms of intensity and duration or total time in the program, was utilized.

The persistence of GED earners once they complete the GED and enter postsecondary environments has also been described in the literature. Osei (2001)

analyzed persistence, attrition, and academic performance of GED earners in postsecondary programs. By comparing national data about the performance of undergraduate students for 108 GED earners who applied to Virginia's 4-year postsecondary institutions, Osei concluded that GED earners did not perform as well as national undergraduates. However, GED earners who completed more credits the 1st year of college were more likely to persist to a 2nd year, and female GED earners earned higher grades. Other factors of significance included the finding that older GED graduates were more likely to have higher GPAs and that the majority of GED graduates enrolling directly into 4-year degree programs were likely to drop out the 1st year and were not likely to earn a bachelor's degree.

Osei's (2001) study was complemented by Sanders (2007), who studied characteristics of 4,785 students enrolled in one of 17 community colleges in Oregon. The characteristics of the GED earners were analyzed as they related to persistence, which was defined as enrolling for two consecutive terms after completing the GED. Findings included significance in the number of college credits as they related to persistence, as well as a finding that GED earners who enrolled in remedial courses persisted at a higher rate. This finding concurred with Crisp and Nora (2010), who also found that GED earners enrolled in remedial courses had higher levels of persistence.

Although persistence in higher education has been researched in many studies, including the seminal works of Tinto (1997, 2006) and Kuh (2007), much has been devoted to traditional high school graduates during their high school years as well as their time in college. Underprepared, ethnically diverse students have also been discussed (Barbatis, 2010), as well as Hispanic students (Crisp & Nora, 2010). The number of hours that represented persistence for ABE/GED students was defined and analyzed in projects

conducted by Comings (2007), Comings et al. (1999), Fitzgerald and Young (1997), and Porter et al. (2005), creating a framework for analysis of persistence within the paradigm of hours spent in an adult education program. Finally, GED graduates in postsecondary institutions were chronicled as being more likely to persist if certain factors were present, including enrollment in remedial courses. However, the literature did not combine the characteristics discussed, including age, gender, ethnicity, hours of instruction, prematriculation information, and other factors, into one study that would give educators the profile of GED students who were likely to transition to postsecondary. These factors would be useful in predicting GED students who are most likely to transition so that early intervention programs can be created for those who are less likely to enter postsecondary programs. Therefore, the use of prediction and predictive studies in higher education is discussed in order to address and define methods for the prediction of transition to postsecondary programs.

Predictors and Predictive Research

The reliance on prediction in education cannot be underestimated. “Prediction studies . . . are useful because they help anticipate or forecast future behaviors” (Creswell, 2008, p. 359). Predictive research can help educators forecast success and future behavior. In this type of research design, the predictor variable is measured at one point in time and the outcome, or criterion variable, at a later time (Creswell, 2008).

Prediction in higher education literature appears to be focused on college success and retention. A study of this type was conducted by Fike and Fike (2008), who analyzed predictor variables of first-year retention for 9,200 first-time-in-college community college students over a 4-year period. The quantitative variables utilized in the study included gender; age; ethnicity; completion of remedial math, reading, and writing

courses; financial aid; and semester hours taken during the first semester, among others. The completion of a remedial reading course was found to have the strongest correlation with retention, as well as enrollment in online courses. The analysis of predictor variables that can be identified through student records, such as the Fike and Fike study, is an important starting point for the prediction of student success. Qualitative characteristics, coupled with information on student records, can also result in information that can point to student success.

A study illustrating predictors of retention was conducted by Woosley and Miller (2009), who measured GPA as well as academic and social integration of first-year students to see if the experiences of the first few weeks of college would lead to retention. Of the 2,744 students who completed a survey, 2,222 reenrolled the following semester. The study chronicled that retention and academic performance, as measured by GPA, could be predicted by the early transition experiences of the students, and these could be used to flag at-risk students.

First-year experiences were also documented by Noble et al. (2007), who measured the effects of a program to increase retention and attainment during the freshman year of 2,915 students. The study's main limitation was that students self-selected into the retention program, where they received test-taking and study skills, career advisement, and writing skills, among other enrichment topics. The dependent variables included the first-year GPA and the graduation rate. Students who participated in the voluntary retention program were found to have better chances of successfully graduating from college than those who did not. However, these findings may have been biased because of student self-selection, which might have indicated that they had a higher level of motivation to succeed.

DeBerard, Spielsmans, and Julka (2004), also conducted analyses of predictors of retention among college freshmen in a longitudinal study of 204 undergraduates who completed a survey. In their study, however, in addition to demographics and academic records, predictors included smoking, drinking, and health information, as well as social support and coping ability. Although the predictors were not strongly related to retention, relationships were found among maladaptive behaviors, including drinking and smoking, social support systems and low coping ability, and poor academic performance. In an earlier study of the impact of noncognitive variables in the prediction of college success, Ting (2003) surveyed 215 first-generation college students using a questionnaire that addressed leadership experience, self-concept, goal setting, and support systems. Other factors were also included, such as race and SAT scores, and all predictors were followed for 4 years. Results pointed to noncognitive variables being better indicators of continued enrollment, but they were found to be moderate predictors for students of color. In addition, race was an important factor in predicting academic achievement.

Predictive research has also included expectations as a factor of achievement. Sciarra and Ambrosino (2011) illustrated the relationship between postsecondary achievement and expectations by studying student, teacher, and parental expectations to see if they had predictive impacts on postsecondary attainment. The study chronicled the educational status of 5,353 students 2 years after graduating from high school. Results indicated that student, parent, and teacher expectations were significant predictors of educational attainment with Asian students having the highest expectations and the highest postsecondary enrollment, followed by White, Black, and Latino students.

Prediction studies in the literature also focused on detailed outcomes, such as success in a specific class. Dugan (1999) and Goldstein and Perin (2008) addressed the

prediction of performance in college courses. Using variables including academic skills, demographics, self-efficacy, time management, and other factors, Dugan related the variables to final class grades of 403 students in a community college. Retention was affected by number of hours employed, reading scores, and self-rating of intelligence, with higher extroversion and reading scores predicting final grades. In Goldstein and Perin's study, binary logistic regression using institutional data from a large community college was used to measure predictive ability of various academic and nonacademic factors. The dependent variable was successful or unsuccessful completion of a psychology course that required a high level of literacy. Independent variables included levels of English, gender, ethnicity, primary language, and high school completion, among others. Students who had completed college English were more likely to pass the course than students who had completed developmental English courses. Much like Dugan, Goldstein and Perin found that literacy skills are critical in the prediction of success in college.

Prediction beyond performance in college classes can extend to specific disciplines; Truell and Woosley (2008) discussed predictors of business-student graduation at a large public university. Admission criteria, including math academic scores, verbal scores, and GPAs in various subjects, were analyzed for 284 students in the business program. Successful completion of business statistics courses was the most significant predictor of graduation.

The literature about prediction included studies addressing self-paced and self-regulated learning in an online environment, which is important to this research project, as the participants were involved in a self-regulated computer laboratory. No studies about self-regulation of GED students in a computerized learning environment were

found; however, studies addressing self-regulation in college online courses are included in this review. One of these studies (Bell, 2007) addressed predictors of college attainment in online courses by asking 629 random students enrolled in public university courses to complete a questionnaire about self-efficacy, self-monitoring, time management, and other factors. A total of 201 students completed the questionnaire. Significant predictors of academic achievement included GPA, learning expectations, and a cross product of these two factors. In another study addressing outcomes in a self-paced online course, Gerlich, Mills, and Sollosy (2009) addressed several characteristics that might impact course performance, including demographics, psychosocial factors, and student effort. Using these criteria on 40 students in an online management course, Gerlich et al. found that GPA was the sole predictor of success.

Preenrollment descriptors of 896 developmental education students, including voluntary or forced attendance at an orientation program and preenrollment academic aptitude ratings, in relation to postenrollment GPA were discussed by Moore (2004). The results of the study indicated that compliance with voluntary orientation was a strong predictor of success as measured by GPA and academic aptitude rating was a poor predictor. Similarly, Zwick and Sklar (2005) used preenrollment predictors including high school grades, SAT scores, ethnicity, and first language to predict college grades and completion. Using national data, a probability sample of 14,825 college sophomores was identified. Information about first language, coupled with the other factors, was analyzed. Results indicated that the SAT scores were significant predictors for Hispanic and White students whose first language was English.

Preenrollment data were also used by Kitsantas, Winsler, and Huie (2008), who maintained the importance of both prior ability and self-regulation as predictors of

college success in their study of 243 first-semester students enrolled in introductory college courses. Students completed surveys addressing self-efficacy and ability to manage time. These factors, analyzed with prior ability characteristics including GPAs and SAT scores, illustrated that self-efficacy, verbal SAT scores, time-management skills, and self-regulation were predictors of college achievement. Kitsantas et al. recommended workshops in time management and self-regulation (goal setting and time management) for students in their first semester of college. Gump (2005) measured the attendance of 300 students as related to final grades in a required general- education course. The data indicated a relationship between attendance and final grades. However, high attendance did not guarantee an A grade, as there were other factors involved in the study such as the day of the class, time, and year of college, as seniors were observed to have the most absences.

In addition to the predictive studies presented, predictors of transfer in large populations have also been addressed in the literature. Sheldon (2009) researched factors that determined the transfer of community college students to 4-year, for-profit institutions. With data from the records of 613,595 California community college students who transferred to different types of 4-year institutions between the years 2000 and 2004, Sheldon found that part-time enrollment, age, and GPA were the strongest predictors of transfer to 4-year, for-profit institutions. Students of color were also found more likely to transfer to for-profit institutions.

To predict the transfer of community college students to a bachelor's degree program, Hagedorn et al. (2010) developed a predictive model that identified the course-taking patterns of the students and related these to transfer and success. Using the data from 114,777 students in the Los Angeles Community College district in the fall of 2006,

Hagedorn et al. identified the courses that led to transfer and, through the use of logistic regression, developed a model that predicted transfer. Certain courses were found to lead to transfer, especially science courses, and part-time students were less likely to transfer to 4-year degree programs than students attending full time.

In addition to the prediction of transfer to college, the prediction of academic success in college, especially for minorities, low socioeconomic status students, and students with disabilities, has been addressed in the literature. For example, students faced with challenges from disabilities were discussed by Ponticelli and Russ-Eft (2009), who identified 12 predictors of transfer from community colleges to 4-year institutions for disabled students. Using data from 31,590 students in California community colleges from 1995-2007, these researchers found that 4,741 disabled students transferred to 4-year programs. The strongest predictors of transfer were the amount of transfer courses taken by the students and the total number of courses completed out of total number enrolled. In addition to disabled students, predictive research has also addressed minorities and women. Using archival information from 299 former students of a private women's college, Kirby, White, and Aruguete (2007) identified predictors of college success. These included high school GPA, standardized test scores, high school rank in class, and ethnicity. Using regression statistics, academic factors pointing to prior ability were good predictors of college GPA, and for non-White students, only high school GPA and rank in class significantly predicted college GPA.

Hoffman and Lowitzki (2005) also discussed limitations for minorities using high school grades and test scores. In a study of 522 students attending a Lutheran university, precollege characteristics including race, religion, gender, high school GPA, and hours worked were analyzed in terms of their relationship to college GPA. Hoffman and

Lowitzki maintained that high school GPA is the best predictor of academic achievement for students of color and non-Lutheran students. The high school GPA was found to be a weaker predictor for Lutheran students. An important point of discussion in this study was that prior achievement as measured by high school GPA and validation experiences may help students achieve more success in college than abilities measured by standardized tests.

In another predictive study, Lee, Daniels, Puig, Newgent, and Nam (2008), through the analysis of data from the National Education Longitudinal Survey, studied the educational progress of 2,460 students. Findings pointed to math scores as being the most powerful predictor of postsecondary educational attainment, followed by effects of expectations, locus of control, reading ability, and classroom behaviors. Also observed was that females attained higher degrees than males. Although there appears to be agreement in the literature about the higher achievement of females, the research seems to be divided between math and reading as being the most powerful predictors of educational achievement and success.

The literature had very few studies that specifically discussed GED students within the prediction paradigm. However, three studies discussed GED exam scores and prediction in the adult education environment. Henry (1999) researched the ability of GED scores to predict community college GPA for a group of 131 GED graduates. The findings indicated a significant positive relationship between mean standard scores on the GED and college GPA. In addition, GED graduates performed as well as high school graduates in terms of GPA, suggesting that a GED score might be used as a high school GPA in terms of college placement. No significant effects were found for gender or age.

Although Henry (1999) suggested that the GED score be used for college

placement, Mellard and Anderson (2007) pointed out that “no research to date quantifies the sufficiency of the GED in preparing a student for postsecondary course work” (p. 10). Mellard and Anderson also discussed challenges in assessing postsecondary readiness for students in adult education programs and recommended that assessment measures, including the TABE test, be evaluated for predictive ability.

The literature yielded few studies involving cognitive predictors of academic success for GED earners. However, Leininger and Kalil (2008) examined the impact of cognitive as well as noncognitive skills for explaining the probability of success in adult education programs. The data for this project came from the National Evaluation of Welfare-to-Work Strategies during the late 1990s, and information from a randomized subset of 2,076 participants who had neither a high school diploma nor a GED was studied. The dependent variable was whether or not a participant reported completing high school or receiving a GED credential. Baseline literacy and numeracy skills were among the independent variables, which also included attitudes toward work and locus of control measurements. Leininger and Kalil found that noncognitive skills, especially locus of control, played such a critical role in the educational attainment of adult education students that participants with high cognitive ability but low noncognitive skills were only half as likely to earn a degree as their counterparts with high skills on both.

Although predictive research is plentiful for high school and college students (DeBerard et al., 2004; Dugan, 1999; Fike & Fike, 2008; Goldstein & Perin, 2008; Gump, 2005; Hagedorn et al., 2010; Hoffman & Lowitzki, 2005; Johnson, 2007; Kirby et al., 2007; Kitsantas et al., 2008; Lee et al., 2008; Noble et al., 2007; Ponticelli & Russ-Eft, 2009; Sciarra & Ambrosino, 2011; Sheldon, 2009; Ting, 2003; Truell & Woosley,

2008; Woosley & Miller, 2009; Zwick & Sklar, 2005), it is less so for students involved in GED and other adult basic education programs (Mellard & Anderson, 2007). As described, research has addressed predictors of college success and retention using prematriculation social and academic factors, first-year experiences of college students, maladaptive behaviors, social support systems, expectations, attendance, course-taking patterns, socioeconomic status, cognitive and noncognitive skills, performance in specific courses or programs, SAT scores, high school and college GPAs, age, gender, race, and ethnicity, among others. Prediction studies about the educational behaviors of adult education students, however, are not plentiful in the literature. Although adult education students can be challenging populations to study, many colleges and universities, such as the subject college, house programs with data that may be available for research. Many of the studies that have been conducted to develop prediction models for traditional college programs could be replicated with nontraditional students, including GED earners; some of these studies are discussed.

Frameworks for Prediction of Transition to Postsecondary Programs

The literature yielded information comparing GED and high school students' performance in college, challenges of GED earners in their pursuit of higher education, characteristics of students who transition to postsecondary, persistence issues of GED as well as high school graduates in college, and predictive studies which identify factors impacting retention, attrition, success and performance in higher education (Adams, 2011; Ebert, 2002; Guison-Dowdy & Patterson, 2011a, 2011b; Maralani, 2011; Ou, 2008; Patterson, 2010; Patterson et al., 2009; Patterson et al., 2010; Quigley et al., 2011; Styles, 2011; Vanderloo, 2003; Zhang, 2010; Zhang et al., 2011; Zhang & Patterson, 2010). However, few studies specifically addressed the characteristics of GED students who are

likely to transition to postsecondary programs.

Although the literature did not yield many prediction studies for GED students' transitions to postsecondary programs, a series of studies was conducted at the University of South Florida that addressed methods, statistical procedures, and predictive information for college students. The researcher used these studies as the basis for this predictive study's conceptual framework.

The studies at the University of South Florida were catalyzed by Glynn et al. (2003), who used prematriculation information to provide early identification of freshmen at risk of dropping out of college. Using data from 5,221 freshmen attending a medium size private institution in the U.S., Glynn et al. followed the students from freshman matriculation through graduation. Students were identified as persisters (those who graduated) and dropouts (those who left the institution). This dichotomy became a binary dependent variable that could be used in logistic regression, a statistical procedure utilized for prediction. The goal of the study was to identify the characteristics of the students most likely to drop out during the college years. Sixty-two characteristics were identified, ranging from high school GPA, age at matriculation, and gender to academic expectations and study habits. The predictive validity of the study was 83% using data from the students classified as dropouts or persisters.

Glynn et al. (2003) spawned a series of research studies at the University of South Florida. The subsequent research presented frameworks to study the predictive value of various characteristics in order to create and refine a prediction model for persistence and attrition (Herreid & Miller, 2009; Miller, 2007; Miller & Herreid, 2008, 2009; Miller & Tyree, 2009; Miller et al., 2010). Using information from the College Student Expectations Questionnaire and other factors including demographics, academic

performance, standardized test scores, academic majors, athletic status, and honors programs, Miller (2007), Miller and Herreid (2008), and Miller and Tyree (2009) analyzed the differences between 900 dropouts and persisters. With a goal of identifying predictive factors in order to initiate early interventions, high school GPA, expecting to participate in clubs and activities, read texts and assigned books, as well as being a Black student, were positively related to persistence. Factors negatively related to the prediction of persistence in college included expecting to work off campus and expecting to read nonassigned books.

Those studies were followed by further research by Herreid and Miller (2009), who focused on developing the prediction model by updating the 2008 version of the model. Through the use of data from 2,700 participants, a model with better predictive ability was created. In the new cases, prediction factors with positive relationships to persistence included being Asian versus being White, high school GPA, and being Black versus being White. A negative relationship existed for SAT combined scores. Miller and Herreid (2009) followed up on earlier studies using sophomore data, as students in their second year were seen as having experiences different from those of freshmen. Prematriculation information was analyzed, and findings indicated that students with certain types of prematriculation characteristics were more likely to persist to their third year of college. At this point in their college journey, high school GPA was no longer a predictor of retention. Instead, other predictors including the time gap between application and enrollment, as well as SAT scores, were more significant in terms of predicting retention.

Miller et al. (2010) continued the project and injected a new component: a mentoring program used as an intervention for students who might become dropouts.

Using the prediction model of the prior studies, students who were mentored by instructors or individuals with whom they had a relationship exhibited the highest rates of persistence. The study solidified the ability of the prediction model that, through the use of logistic regression, was able to predict academic performance and behavior using variables including prematriculation information.

Summary

This review of literature has illustrated that much of the research pertaining to GED earners has been conducted by state and national organizations (American Council on Education, 2006, 2010, 2011b; Council for Adult and Experiential Learning, 2008; FLDOE, 2009; Florida Education and Training Placement Information Program, 2011; GED Testing Service, 2011a, 2011b; Southern Regional Education Board, 2010a, 2010b). Additional research on characteristics of GED earners was also conducted through Crossing the Bridge, an initiative of the ACE and the GED Testing Service. The Crossing the Bridge project supported research addressing GED earner characteristics (Guison-Dowdy & Patterson, 2011a, 2011b; Patterson, 2010; Patterson et al., 2009; Patterson et al., 2010; Quigley et al., 2011; Zhang, 2010; Zhang et al., 2011; Zhang & Patterson, 2010).

Studies directly related to this project that utilized the same, or very similar, sets of dependent and independent variables were not found. However, by using information and conceptual frameworks found in this review of literature as they related to prematriculation information and demographics, number of hours spent in preparation for the GED test, prediction models, and transition to postsecondary programs, the research questions below were formulated.

Research Questions

Based on the review of the literature, and modeled after studies discussed previously, the research questions for this study were as follows:

1. Are individual characteristics of GED earners in a college setting, including age, gender, ethnicity, TABE reading, language, and math scores, and hours spent in an ABE/GED lab, predictors of transition to postsecondary programs?
2. Are age, gender, and ethnicity of GED earners in a college setting predictors of transition to postsecondary programs?
3. Are prematriculation TABE reading, language, and math scores of GED earners in a college setting predictors of transition to postsecondary programs?
4. Are the hours spent in an ABE/GED lab by GED earners in a college setting predictors of transition to postsecondary programs?

Chapter 3: Methodology

Introduction

This study focused on the transition to postsecondary programs of students enrolled in a GED® program at a public college. The purpose of the research was to identify the predictors associated with the transition of the students to postsecondary programs at the same institution. The ability to identify predictors can give administrators and GED tutors and trainers information that may result in tracking systems so they may be better able to serve students. Once the predictors are known, mechanisms for intrusive advisement and other interventions can be implemented in order to increase the number of students who transition to the institution's postsecondary programs.

Past research, conducted mostly by state and national organizations (American Council on Education, 2006, 2010, 2011a, 2011b; Council for Adult and Experiential Learning, 2008; FLDOE, 2009; Florida Education and Training Placement Information Program, 2011; GED Testing Service, 2011a, 2011b; Southern Regional Education Board, 2010a, 2010b), has addressed the tracking of GED student characteristics. This has included demographic data and GED scores prior to college entrance, academic success and achievement, and transition to 4-year institutions. However, few of the studies conducted by state and national organizations found in the literature addressed the prediction of transition to postsecondary programs of GED students. Other studies that utilized *ex post facto* data also did not provide comprehensive predictive information about GED completers who transition to postsecondary programs (Alamprese, 2004; Guison-Dowdy & Patterson, 2011, 2011b; Patterson, 2010; Patterson et al., 2009; Patterson et al., 2010; Quigley et al., 2011; Reder, 2007; Zhang et al., 2011; Zhang & Patterson, 2010).

Only one study (Zhang, 2010) was identified in the literature that, using logistic regression, analyzed characteristics of GED earners for predictive purposes, in this case, patterns of enrollment when compared to traditional high school graduates. Zhang used national data from 2001 and 2005 cohorts of GED earners and college students that yielded 15,635 participants for the study. The independent variables included age group, gender, ethnicity, income, and workforce status. The two dependent variables for the study were participation or nonparticipation in college programs versus vocational/technical programs. Zhang found that participation in postsecondary programs for both GED and high school graduates decreased as age increased. For the age group 16-24 years, high school graduates had a higher rate (59.82%) of transition to postsecondary programs than did GED earners (20.39%). However, the gap between the two groups narrowed as age increased. Zhang also found that for GED earners, females participated in postsecondary programs twice as frequently as males. Furthermore, Hispanic adults were found to have higher participation than African American or White adults. Explained variance for the results of the study was not presented. Zhang's study approximated what was proposed for this research project; however, rather than two dependent variables, this research proposed one binary dependent variable of transition or no transition to postsecondary programs.

Except for Zhang (2010), no other studies similar to the one discussed were found. This lack of predictive information poses a challenge for educators, including this researcher, who are responsible for providing services that encourage transition to postsecondary programs for students enrolled in ABE/GED programs. This study utilized many of the characteristics discussed in the literature, including age, gender, and ethnicity, as independent variables. In addition prematriculation academic data in the

form of preentry TABE scores in reading, language, and math were used. Furthermore, as discussed by Comings (2007), hours spent in an ABE/GED lab preparing for the GED test were also included as an independent variable.

In the absence of theory to ground the study, the conceptual framework was based on research conducted by Glynn et al. (2003), Herreid and Miller (2009), Miller (2007), Miller and Herreid (2008, 2009), Miller and Tyree (2009), and Miller et al. (2010). These studies resulted in the creation of a prediction model for college retention and persistence that used prematriculation information in order to identify students at risk of dropping out. Similarly, the goal of this project was to identify predictors that could assist in the creation of mechanisms for GED programs that could be used to identify students who are likely to transition or not transition to postsecondary programs. Having this information may result in enhanced services, such as assistance identifying financial aid possibilities, for those students who are likely to transition to postsecondary programs. In addition, supportive interventions for those who are less likely to transition could also be implemented so that these students have a better chance of transitioning to postsecondary programs.

For this project, the criterion, or dependent variable, was transition to a postsecondary program within the subject institution. These programs included credit and PSAV courses, as well as EAP and college preparatory courses. The transition variable was treated as a dichotomous variable in that a subject was considered to have either transitioned or not transitioned regardless of the program for which they had enrolled. The possibility existed that a student may have been simultaneously enrolled in more than one postsecondary category.

The predictor variables for the study were the prematriculation scaled scores on

reading, language, and math on the TABE test. These scores placed the student into one of three levels for each subject: ABE, pre-GED, and GED. Number of hours spent in the ABE/GED lab were also included as a predictor variable, as well as age, gender, and ethnicity.

Participants

Target population and sample. The target population for this study was students who were enrolled in the ABE, pre-GED, and GED programs at the largest campus of a public state college. The sample included all the students beginning and ending their participation in the programs during the 2008 and 2009 calendar years. Those years were chosen because the tracking system used in the ABE/GED lab was fully implemented and reported student hours accurately. In addition, the researcher believed that by selecting those years, the possibility of transitions could be better tracked. The literature suggested that GED earners tend to enter college later than high school graduates and that there can be up to a 3-year period, or even longer, between passing the GED test and entering postsecondary programs (Guison-Dowdy & Patterson, 2011b; Maralani, 2011; Patterson et al., 2010; Quigley et al., 2011; Zhang, 2010; Zhang et al., 2011). For that reason, the researcher wanted to maximize the possibility of transition to postsecondary for subjects attending during 2008 and 2009, who would then be followed through August 2013 to evaluate whether or not transition took place.

Preliminary data provided by the college indicated that 2,438 students participated in the ABE/GED program during the 2010-2011 academic year; of these, 322 participants (13.2%) transitioned that year to postsecondary programs at the same institution. The students who transitioned were all GED test passers, a criterion that had to be met in order to enroll in postsecondary programs at the institution. Postsecondary programs

included AA, AS, PSAV, EAP, and college preparatory courses. Passage of the GED test was confirmed by having the students bring their diploma to the college's registration office. Scores on the GED test, however, were not obtained by the college during the calendar years studied.

Students entering the program were tested by the TABE, as mandated by the FLDOE (2009). The students were first given the TABE Locator, a test used to determine their appropriate level of the TABE on reading, language, and math (TABE, 2004a). Once the level was determined by the TABE Locator, the student was tested in the three subject areas, depending on level achieved on the TABE Locator. TABE scores up to Grade 5.9 were deemed to fall into the ABE level, scores falling between Grades 6 to 8.9 were in the pre-GED level, and scores above Grade 9.0 were GED level. The levels corresponded to the curriculum the students followed in the ABE/GED lab, which was tailored to the specific needs of the students. In order to best track prediction variables, all students beginning and ending their programs during the 2008 and 2009 calendar were studied. Students enrolled in the program received transition services and information, field trips to other campuses to explore and tour credit and vocational programs, as well as workshops and assistance with financial aid. In addition, students attended presentations by many credit departments, including architecture, engineering, business, entertainment technology, and computer science, among others. College advisors and recruitment/retention specialists often met with the students to explain and encourage transition.

Once students achieved a 9.0 grade level in at least one subject and were doing higher level work in the other subjects, they were administered the GED Official Practice Test. The score on this test guided the students and their tutors in identifying strengths

and overcoming challenges before taking the formal GED exam that was administered during the 2008 and 2009 calendar years at a nearby public vocational/technical center and not at the college.

Demographics. The college's institutional reports tracked ethnicity based on the following categories: Black/African American, White/Caucasian, Hispanic, Asian, American Indian or Alaska Native, and Hawaiian or Pacific Islander. Students who did not provide ethnicity information were categorized as *not reported*. Date of birth and gender were also be provided for all students.

Sampling procedures. For this study, nonprobabilistic sampling procedures (Creswell, 2008) were used based on data collected by the college's institutional research department. In addition, data obtained from the tracking software used for attendance at the ABE/GED lab was used to quantify the total number of hours each student spent in the ABE/GED lab. Upon entering and leaving the ABE/GED lab, students swiped their identification card and attendance was tracked through the use of a computer program (AccuTrack, n.d.). Student information regarding entry TABE scores, age, gender, ethnicity, and transition to a postsecondary program at the same college was tracked by the college's research department and was made available in deidentified format to the researcher. A total of 1,620 students constituted the sample. These students represented a sample of convenience (Creswell, 2008), as the data were available for the study. With this type of sample, however, the information obtained may not have been representative of the population, although it could yield useful information for the college's as well as external adult education professionals.

Instruments

The TABE, Forms 9 and 10, which are often used for determining academic

levels in adult education (Alamprese, 2004; Van Horn & Carman, 2007) were used by the ABE/GED staff to determine basic reading, language, and math levels of entering students. The TABE, published by CTB/McGraw-Hill (n.d.), was required by the FLDOE (2009) for entrance into a GED program. The TABE was normed by piloting on thousands of adult students to ensure validity and reliability. The ABE/GED program used the TABE's parallel Forms 9 and 10 to ensure valid results when retesting the same students. TABE scores in grade-equivalent form were converted to scaled scores for purposes of this project (Tests of Adult Basic Education, 2004b).

Number of hours spent in the ABE/GED lab were measured by the results of a computer program used by the college to track student attendance once an identification card was swiped. The hours spent in the lab were transferred to a spreadsheet that included number of hours per day from the first day of attendance (AccuTrack, n.d.). Although many of the students stopped attending the program for various reasons and returned weeks or months later, the software was able to provide a cumulative number of hours spent in the lab from the beginning of the student's enrollment in the program.

Procedures

Research design. The research design for this study was a quantitative correlational study with a prediction research design, as described by Creswell (2008), in which variables were used to predict an outcome. The outcome for this study was transition to a postsecondary program. The conceptual framework was based on literature focusing on predictive studies which illustrated how specific predictors could be used to predict student success and behavior (Brophy & Johnson, 2007; Espin et al., 2008; Fike & Fike, 2008; Goldstein & Perin, 2008; Gump, 2005; Hagedorn et al., 2010; Herreid & Miller, 2009; Hoffman & Lowitzki, 2005; Hurtado et al., 2007; Kiser & Price, 2007;

Kitsantas et al., 2008; Miller, 2007; Miller & Herreid, 2009; Miller & Tyree, 2009; Miller et al., 2010; Noble et al., 2007; Ponticelli & Russ-Eft, 2009; Sheldon, 2009; Steinborn, Flehmig, Westhoff, & Langner, 2008; Wolkowitz & Kelley, 2010; Wurtz, 2008; Zhang, 2010; Zwick & Sklar, 2005). The research design was modeled after the study by Zhang (2010), who used logistic regression to determine the impact of selected characteristics including age, gender, ethnicity, income, and workforce status to predict GED earner transition to postsecondary, as well as type of program chosen.

Data collection. Data were collected by having the college's institutional research department, through the institutional database, match a list of all students who were tracked by the computerized software in the ABE/GED lab to the college's records. Each student was matched in terms of gender, date of birth, ethnicity, and prematriculation TABE scores, in reading, language, and math. Once the students were matched, they were deidentified to protect their identity. The data were then made available to the researcher for the purpose of running the statistical tests. The final spreadsheet of data for each student contained the following information: fictitious student number; date of birth (which was converted to age at time of enrollment); gender; ethnicity; entry TABE grade-equivalent scores in reading, language, and math; and total number of hours spent in the ABE/GED lab. The TABE grade-equivalent scores were then converted to scaled scores. All information containing identifying factors for the participants was kept by the college and not by the researcher, who received student information in a deidentified format with a dummy number assigned to each subject. The subject database was provided to the researcher by the college's director of institutional research.

Operational definitions and coding of variables. The criterion variable and predictors for the study were operationally defined and coded as illustrated in Appendix

A. Transition to postsecondary programs, the criterion variable, was operationally defined as enrolling in a credit program, a postsecondary vocational program, or in English for Academic Purposes.

Age, one of the predictor variables, was defined as the age when the student enrolled in the GED program. The ages of students were grouped into the three categories suggested by Zhang et al. (2011): 16-24 years, 25-34 years, and 35 years and older. Ethnicity was defined through the options for ethnicity that the college gave the students upon registration. Students who did not choose an ethnicity were classified as *not reported*; as discussed later, this classification was used as a variable.

The variables for prematriculation TABE scores were converted to scaled scores based on the version and form of the TABE that was administered. The ranges for the scaled scores were determined by the college's director of testing based on midpoints and approximations, as there were few one-to-one relationships for grade equivalents and corresponding scaled scores. The TABE scores were further divided into the three levels available to students during the years analyzed, which categorized reading, language, and math into ABE, pre-GED, and GED.

The number of hours spent in the program were operationally defined through the use of the attendance tracking system used in the ABE/GED lab. The hours were coded based on the quartiles of the distribution, which were used to assess variability (Huck, 2008). Outliers were treated as data points, a methodology that may be used for treating outliers (Ghosh & Vogt, 2012). The researcher felt that this was the best way to treat outliers as it had been observed that some GED students spent a fraction of a minute in the GED lab at the beginning of the program. These students entered the lab, decided that it was not the right environment for them, and left. This created what appeared to be

outliers, but the researcher believed that there was merit in leaving these as data points rather than winsorizing or eliminating them.

Criterion variable. The criterion variable was student transition or nontransition, defined as enrolling or not in a postsecondary program at the college. These programs included AA, AS, PSAV, EAP, and college preparatory courses. The criterion variable was a dichotomous variable, which was necessary for the use of binary logistic regression for data analysis. The college provided information as to whether or not a student transitioned into a postsecondary program but not the type of program. Some students may have been simultaneously enrolled in one or more of the postsecondary programs mentioned.

Predictors. Scaled scores on the TABE in the categories of reading, language, and math, as well as total number of hours spent in the ABE/GED lab, were the predictors for this study. In addition, age at enrollment, gender, and ethnicity were also used as independent variables in the study. The age variable was measured at enrollment rather than at transition, because it was considered, much like TABE scores, a prematriculation variable. No literature guided this decision, but the researcher believed that treating age as a prematriculation variable rather than a postmatriculation characteristic when the transition took place would give GED staff members at the college better information for the possible creation of intervention strategies for the students.

Data analysis. In order to answer the research questions, the data were analyzed using descriptive statistics, including frequencies, percentages, and measures of central tendency. Inferential statistics, specifically, binary logistic regressions, were also used to analyze the data. This type of regression uses relationships among variables, with one

dichotomous dependent variable. In this case, transition to postsecondary programs was the outcome, with other variables functioning as predictor or explanatory variables (Huck, 2008). According to Huck (2008), logistic regression has become a commonly used regression statistic used for numerous studies using predictors in education (Brophy & Johnson, 2007; Crisp & Nora, 2010; Fike & Fike, 2008; Goldstein & Perrin, 2008; Hagedorn et al., 2010; Herreid & Miller, 2009; Johnson, 2007; Kiser & Price, 2007; Kortesoja, 2009; Miller & Herreid, 2009; Miller & Tyree, 2009; Miller et al., 2010; Noble et al., 2007; Ponticelli & Russ-Eft, 2009; Sanders, 2007; Sheldon, 2009; Wurtz, 2008; Zhang, 2010).

The data analyzed in this study were quantified through a statistical procedure that could take into consideration the types of variables used. For that reason, the binary logistic regression was selected, as it could be used to predict the outcome of a binary dependent variable with either categorical or continuous variables, or a mixture of both (Field, 2009; Garson, 2012; Gray & Kinnear, 2012; Huck, 2008; Menard, 2002; Pampel, 2000; Tabachnick & Fidell, 2013). The logistic regression determines the impact of the predictors, or independent variables, using odds ratios. This type of regression does not assume linearity, homoscedasticity, or a normal distribution. The logistic regression permits the violation of the assumptions required for other types of statistical procedures such as discriminant analysis and multiple regression analysis, which require that the assumption of normality be met (Field, 2009; Garson, 2012; George & Mallery, 2011; Gray & Kinnear, 2012; Hardy, 1993; IBM, 2011; Jaccard, 2001; Menard, 2002; Pampel, 2000; Tabachnick & Fidell, 2013). In terms of predicting category membership, the logistic regression is preferred over discriminant analysis (Gray & Kinnear, 2012), because questions about differential membership are usually not part of the analysis

(Tabachnick & Fidell, 2013). Stepwise logistic regression was also considered for the data analysis; however, Tabachnick and Fidell (2013) suggested that stepwise regression is best for generating hypotheses and, furthermore, shares some of the shortcomings of discriminant analysis. In addition, they indicated that a predictor that may have a high correlation with the dependent variable may not be included in the equation because of being pushed out by another predictor or combination of predictors.

The binary logistic regression is used to illustrate the extent, if any, of the role a variable has in explaining why participants have the status they do on the dichotomous dependent variable, which in this case was transition to postsecondary programs (Huck, 2008). According to Huck (2008), the logistic regression is used not only to study the effects of subjects' characteristics on an outcome; it can also be used for predictive purposes using odds ratios. This means that an odds ratio can be cited for each independent variable. The odds ratio is used to measure the strength of the association between outcomes and predictors (Huck, 2008). Huck and Tabachnick and Fidell (2013) further explained that in logistic regressions, the odds ratio is generally followed up by the use of the Wald chi square to see if the relationship is statistically significant. The odds ratios, Wald statistics, and other analyses were constructed through the use of IBM SPSS Version 20.0 software (IBM, 2012).

Logistic regressions can be sensitive to correlations among predictor variables, and the possibility of multicollinearity should be explored (Tabachnick & Fidell, 2013). In order to examine the possible effects of multicollinearity, a multiway frequency analysis was considered. This statistic can study relationships among several variables. However, Tabachnick and Fidell (2013) pointed out that with a discrete dependent variable, as was the case with this study, the best method was to examine the results of

the logistic regression's standard errors. If these were found to be extremely large, correlations among variables might exist. In addition to examining standard errors, the SPSS collinearity diagnostics were conducted. These diagnostics, based on linear regression, yield an index that will point to collinearity problems (Field, 2009).

A concern in the use of logistic regression was the issue of missing data. Tabachnick and Fidell (2013) suggested that values that are missing for nonrandom reasons are important, as this may affect the results of the study. In some studies, it is not known if data are missing completely at random (MCAR) and whether or not the study meets the MCAR criteria. In this study, there was an obvious case of missing data with the variable of ethnicity. In the database supplied by the college, there was a category of no report for the variable of ethnicity. Upon visual examination of the database, there appeared to be a large number of subjects with no report in the ethnicity column. Although it was not known whether these data were subject to the MCAR criteria (Osborne, 2013), the possibility existed that the data could be missing not at random. Osborne (2013) suggested that "missingness can be an interesting variable in and of itself" (p. 128). Allison (2002) further indicated that a dummy variable adjustment could be made to missing data to ensure that other information from those subjects whose data was missing could be used. Therefore, based on the suggestions by Osborne and Allison, the researcher included and coded the data labeled as no report as a variable in the logistic regression.

Another concern discussed by Tabachnick and Fidell (2013) included the ratio of cases to variables. Based on the literature addressing the ratio of cases to variables, which suggested a minimum of 10 subjects per variable, the researcher believed that the ratio was appropriate for this study (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996).

Logistic regressions test models as well as individual predictors, and these include intercept-only, an incomplete model, a full model, and a perfect model, which is hypothetical and illustrates exact fit of expected to observed outcomes (Tabachnick & Fidell, 2013). To test the fit of the models, Field (2009) suggested the examination of the Wald statistic, which has a chi-square distribution. Field pointed out that SPSS would provide a Wald statistic for each variable in the model. Once the Wald statistic results were known, it would be possible to see whether a predictor significantly contributed to the dependent variable of transition.

SPSS also provided the Hosmer and Lemeshow goodness-of-fit statistic. This statistic was used to analyze how well a model fit the data. In addition, SPSS presented the Cox and Snell *R* Square, which was used to explain the proportion of variance associated with the predictors. The odds ratio for transition to postsecondary programs based on the predictors was also analyzed from the SPSS output. The odds ratio for the predictors helped determine the contribution of predictors to the model. (Field, 2009; Tabachnick & Fidell, 2013).

In order to enter the data into the procedure, data were dummy coded. Hardy (1993) described dummy coding as an indicator of whether or not a subject has a specific characteristic. Generally, a code of 0 is used for not having the characteristic and a code of 1 is used for those subjects who have the characteristic. An example of this is gender. Both gender categories will have the 0 and 1 options; if the subject is a male, he will be coded as a 1 in the male category and as a 0 in the female category. The SPSS software refers to dummy coding as indicator coding, and it is said to indicate whether or not there is category membership (IBM, 2011). Although the categorical variables have a number assigned to each one as illustrated in Appendix A, SPSS converted these numbers to

binary coding in order to determine the presence or absence of each variable before entering it into the equation. This binary coding was produced by SPSS for all the predictors analyzed in this study.

Although different types of variables were part of this study, including prematriculation categories on scaled TABE test scores for reading, language, and math, age, gender, ethnicity, and hours of attendance, SPSS treated all variables as covariates (Garson, 2012; Tabachnick & Fidell, 2013). When the variables were entered into the logistic regression procedure, each predictor was treated as if it entered the equation last. This type of data entry is called a direct logistic regression. Tabachnick and Fidell (2013) suggested that this was the best method for analyses in which there was no specific hypothesis about the contribution made by the predictors. SPSS used the forced entry method in which the predictors were forced into the model with no specific decisions made about the order in which they entered the model. This was considered more accurate than other methods, such as stepwise methods, as Field (2009) suggested that the random variance in the data is difficult to replicate. Field also indicated that another advantage of the direct logistic regression was that the contribution of each predictor to the model could be assessed through the significance of the Wald statistic.

In addition to the direct logistic regression, which analyzed all the independent variables of the study and addressed the first research question, separate logistic regressions were run for each of the other three research questions. This separation of variables was suggested by Menard (2002) and Garson (2012) to avoid Type II errors, or false negatives, when examining the results of the Wald statistic, which contains tests of significance. Therefore, for the reasons stated and in the interest of parsimony, four separate logistic regressions were initially conducted: a direct logistic regression that

included all the independent variables; a second that analyzed age, gender, and ethnicity; a third that addressed prematriculation scaled TABE scores in language, reading, and math; and a fourth that addressed hours spent in the ABE/GED lab. Additional logistic regressions were conducted for the prematriculation TABE scores in order to further analyze predictive significance.

Summary

The research questions for this study were answered by using a conceptual framework based on research catalyzed by Glynn et al. (2003) that resulted in several studies conducted at the University of South Florida. Those studies created prediction models for college retention that used, much like this research, prematriculation information and other characteristics to predict student behavior. In the case of this study, transition to postsecondary programs was the outcome variable. This research was also modeled after a study by Zhang (2010) of a similar population using a logistic regression to analyze the data.

Data were provided to the researcher in a deidentified format and included, for 1,620 subjects, their age; gender; ethnicity; and prematriculation TABE grade equivalents in math, reading, and language. In addition, data were provided that addressed hours spent in an ABE/GED lab and whether or not transition to postsecondary programs took place at the subject institution. Descriptive statistics and a binary logistic regression were used to analyze the data. The software used for data analysis was IBM SPSS Version 20.0. Once the study was completed, predictive information became available that could be used to create mechanisms for additional assistance, as well as academic interventions, for students who are likely or not likely to transition to postsecondary programs.

Chapter 4: Results

Introduction

The purpose of this study was to determine which characteristics or combination of characteristics, if any, could predict transition to postsecondary programs of GED® students in a college setting. The students were participants in GED preparation programs in a laboratory environment at the subject college. All the students in the program received exposure to the postsecondary environment, as well as advisement and encouragement to apply for financial aid and admission to postsecondary programs. The programs included AA, AS, EAP, PSAV, and college preparatory courses, and students were eligible to register upon successful passing of the GED test. The college provided the researcher with deidentified data regarding students who had attended the GED preparation program during 2008 and 2009 and subsequently enrolled in postsecondary programs at the institution. These years were chosen because the tracking system used in the ABE/GED lab was fully implemented. Students were followed from those years until 2013, giving them several years to enroll in postsecondary courses. Data from 1,620 students were analyzed.

Transition to a postsecondary program at the subject institution served as the dependent variable. The independent variables included age; gender; ethnicity; prematriculation language, math, and reading TABE scores; and number of hours spent in the ABE/GED lab. These data were given to the researcher in the form of grade equivalents that were converted to scale scores. All the variables were categorized and coded (see Appendix A) for entry into the logistic regression analyses.

Descriptive statistics were obtained for all the variables, and the possibility of multicollinearity was explored. Binary logistic regression analyses were performed to assess the strength of the variables within the prediction model for each research

question. The results are presented in this chapter.

Descriptive Statistics

Table 1 presents the demographic characteristics of the participants. The largest percentage of students (68.2%) fell into the 16-24 years of age category. The rest of the students were almost evenly divided between 25-34 years (16.1%) and 35 and older (15.7%). Males represented a higher percentage of students (54.2%) than females. The largest ethnicity represented was Hispanic (52.3%), and the smallest was Asian (1.6%). Black/African American students had an ethnic representation of 8.1%, and the percentage for White/Caucasian students was 5.1%. The percentage of students in the category of *not reported* was 32.9%, representing almost one third of all the subjects.

Table 1

Demographic Characteristics of Participants (N = 1,620)

Characteristic	<i>n</i>	%
Age		
16 to 24	1,105	68.2
25 to 34	261	16.1
35 and above	254	15.7
Gender		
Male	877	54.2
Female	743	45.8
Ethnicity		
Black/African American	131	8.1
White/Caucasian	83	5.1
Hispanic	847	52.3
Asian	26	1.6
Hawaiian/Pacific Islander	0	0.0
American Indian/Alaska Native	0	0.0
Not reported	533	32.9

Measures of central tendency for subjects are presented in Table 2. Students' ages

ranged from 16 to 81 with an average age of 24.8 years. Hours spent in the ABE/GED lab ranged from a minimum of .002 to a maximum of over 466 hours. The average number of hours was 32.6, with a standard deviation of 49.4. Reading and language grade-equivalents ranged from Grade 1.0 to Grade 12.9, and the lower range of math was Grade 2.0. The mean prematriculation grade-equivalent for reading was 8.2. Language and math had similar means.

Table 2

Descriptive Statistics of Participant Characteristics (N = 1,620)

Variable	M	SD	Min.	Max.
Age	24.8	9.0	16.000	81.0
Hours in ABE/GED lab	32.6	49.4	0.002	466.5
TABE reading grade equivalent	8.2	3.1	1.000	12.9
TABE language grade equivalent	7.0	3.2	1.000	12.9
TABE math grade equivalent	7.2	2.8	2.000	12.9

Note. ABE = Adult Basic Education; TABE = Test of Adult Basic Education.

Table 3 presents the frequencies and percentages of transition to postsecondary for all the variables in the study. Out of the sample of 1,620 students, 473, or 29.2%, transitioned to postsecondary programs. The group in the 16 to 24 years of age category had the highest percentage of transitions, and the group of ages 25 -to 34 had the lowest percentage. Females had a higher percentage of transitions (31.8%) than males (27%). In terms of ethnicity, Asians had the highest rate of transitions (50%), followed by White/Caucasian (45.5%), Hispanic (41.3%), and Black/African American students (22.1%). Subjects failing to indicate ethnicity on their application, listed as *not reported*,

had the lowest percentage of transitions.

Table 3

Transitions to Postsecondary Programs Based on Participant Characteristics

Characteristic	<i>n</i>	No. of transitions	%
Age			
16 to 24	1,105	377	34.1
25 to 34	261	45	17.2
35 and older	254	51	20.0
Gender			
Male	877	237	27.0
Female	743	236	31.8
Ethnicity			
Black/African American	131	29	22.1
White/Caucasian	83	38	45.8
Hispanic	847	350	41.3
Asian	26	13	50.0
Hawaiian/Pacific Islander	0	0	0.0
American Indian/Alaska Native	0	0	0.0
Not reported	533	43	8.1
Prematriculation TABE scores*			
Reading			
ABE (Grades 0-5.9)	496	98	19.8
Pre-GED (Grades 6.0-8.9)	423	120	28.4
GED (Grade 9.0 and above)	701	255	36.4
Language			
ABE (Grades 0-5.9)	686	139	20.3
Pre-GED (Grades 6.0-8.9)	458	144	31.4
GED (Grade 9.0 and above)	476	190	40.0
Math			
ABE (Grades 0-5.9)	665	127	19.1
Pre-GED (Grades 6.0-8.9)	541	157	29.0
GED (Grade 9.0 and above)	414	189	45.7
Hours spent in ABE/GED lab			
0 - 15 hours	849	209	24.6
16 - 40 hours	378	118	31.2
41 - 467 hours	393	146	37.1

Note. *N* = 1,620. *Prematriculation TABE scores presented in grade equivalents.

The prematriculation TABE scores indicated that students with a math score falling in grade equivalent of 9.0 or above had the highest percentage of transitions (45.7%). Students with the lowest rate of transitions based on test scores were those who fell into the math 0-5.9 grade-equivalent category. In terms of hours spent in the ABE/GED lab, the students with the highest rate of transitions were those who spent the most hours in the laboratory (41 to 467 hours).

Statistical Analyses to Address Research Questions

Prior to addressing the research questions through the use of binary logistic regressions, the possibility of multicollinearity was explored. This was done by examining the standard errors (*SE*) in Table 4 and observing that none of them appeared to be exceedingly high, which might have indicated the possibility of collinearity. In addition, the SPSS Collinearity Diagnostics were performed on the variables. Based on the tolerance and *VIF* values of the diagnostics, there did not appear to be collinearity among variables. The condition indexes and eigenvalues for the variables, in terms of the variance proportions, supported this.

Research Question 1. This question addressed all the variables in the study, including age, gender, ethnicity, prematriculation TABE scores, and hours spent in the ABE/GED lab, in terms of their ability to predict transition to postsecondary programs. These variables were categorized into ranges, each representing levels or types of that variable (see Appendix B). SPSS identified the 15 variables listed in Table 4 as possible predictors. This table also illustrates the odds ratios and results of the Wald Statistic, used to assess the significance of the contribution to the model of the predictors in the equation. The Wald statistic was significant at $p < .001$ for Age 1 (16 to 24 years), as well as for the ethnicity categories of Black/African American, White/Caucasian, Hispanic,

and Asian.

Table 4

Summary of Logistic Regression Analysis for All Variables as Predictors of Transition (df = 1)

Variable	Standard error	Odds ratio	Wald statistic	Sig.
Age 1 (16 to 24)	.190	2.74	28.090	.000
Age 2 (25 to 34)	.244	.85	.461	.497
Gender 1 (Female)	.130	.74	5.358	.021
Ethnicity 1 (Black/African American)	.278	4.32	27.793	.000
Ethnicity 2 (White/Caucasian)	.288	9.33	60.349	.000
Ethnicity 3 (Hispanic)	.181	8.76	143.419	.000
Ethnicity 4 (Asian)	.468	10.71	25.639	.000
Reading 1 (Grades 0-5.9)	.182	.81	1.325	.250
Reading 2 (Grades 6.0-8.9)	.163	1.03	.026	.871
Language 1 (Grades 0-5.9)	.182	.74	2.764	.096
Language 2 (Grades 6.0-8.9)	.167	1.01	.006	.939
Math 1 (Grades 0-5.9)	.179	.37	31.179	.000
Math 2 (Grades 6.0-8.9)	.161	.58	11.531	.001
Hours 1 (0 to 15 hours)	.151	.55	15.423	.000
Hours 2 (16 to 40 hours)	.174	.64	6.383	.012

Membership in the Age 1 category (16 to 24 years) resulted in an odds ratio of 2.74, indicating that the chances of being a member of the group that transitioned was 2.74 times higher for students in the Age 1 group than for other groups. Ethnicity was also a significant predictor in the model, with Black/African American students having odds ratios of 4.32, Hispanics of 8.76, and Whites/Caucasians of 9.33. Asian students had the highest odds ratio ($B = 10.71$), indicating that they were the most likely of all the ethnicities in the equation to transition to postsecondary programs. The ethnicity category of *not reported* was not entered into the equation by SPSS and is, therefore, not included

in the table. No participants were in the Hawaiian/Pacific Islander or American Indian/Alaska Native categories.

Being female yielded a significant Wald statistic ($p < .05$) and was, therefore, a contributor to the prediction model. However, because the odds ratio was less than 1, this indicated a lesser likelihood of transitioning than other predictors. This was also the case for Math 1 (Grades 0-5.9), Math 2 (Grades 6.0 - 8.9), Hours 1 (0 to 15 hours), and Hours 2 (16 to 40 hours). These predictors had a significant Wald statistic; however, the odds ratios were below 1, indicating that participants in these categories also had a significant likelihood of not transitioning to postsecondary programs.

Appendix B presents the classification results for the logistic regression in Research Question 1. As shown, when all the variables were entered into the logistic regression analysis, the cases were classified correctly 74.9% of the time for the variables entered into the equation by SPSS.

SPSS generated the Cox & Snell R Square, which is a pseudo- R statistic. Results indicated that 20.8% of the variance for the dependent variable of transition was explained by the predictors entered into the model. The Hosmer and Lemeshow Test, a goodness-of-fit statistic also generated by SPSS, resulted in a significance value of .184 with 8 degrees of freedom derived from the chi-square distribution. This indicated that the model has an acceptable fit, as the predicted values of the model were not significantly different from those observed.

In summary, the results for Research Question 1 indicated that membership in the age group of 16 to 24 years increased the odds of transitioning to postsecondary programs, as did ethnicity in the categories of Black/African American, Hispanic, White/Caucasian, and Asian. The Asian students had the highest odds of transitioning to

college. Being female, having a math prematriculation score in Grades 0-8.9, and spending fewer than 40 hours in the ABE/GED lab were also significant predictors that lessened the likelihood of transition to postsecondary programs.

Research Question 2. This question focused on the predictive ability of age, gender, and ethnicity separate from the other variables. The three categories of age, gender, and the seven ethnicity types were entered into SPSS, and a binary logistic regression was conducted to evaluate predictive strength. Table 5 presents results which are similar to those for the same variables in Question 1.

As shown in Table 5, the odds ratio of the category Age 1 (16 to 24 years), confirmed by the $p < .001$ level of significance of the Wald statistic, indicated that having membership in this category increased the odds of transition 2.78 times. Other predictors with significant contributions to the model included participants in the ethnicity categories of Black/African American, White/Caucasian, Hispanic, and Asian. As with the results for Research Question 1, Asian participants had the highest odds ratio and were 16.42 times more likely to transition to postsecondary programs than other ethnicities.

Black/African American students had the lowest likelihood of significant ethnicity predictors with an odds ratio of 3.50. This odds ratio for Black/African American students was almost 1.0 lower for this logistic regression than for the one with all the variables entered into the regression as illustrated in Table 5. Conversely, the odds ratio for Asian students was 5.71 points higher, as shown in Table 5, when the logistic regression considered the variables of age, gender, and ethnicity separately from the other variables in the study.

Table 5

Summary of Logistic Regression Analysis for Age, Gender, and Ethnicity as Predictors of Transition (df = 1)

Variable	Odds ratio	Wald statistic	Sig.
Age 1 (16 to 24)	2.78	31.970	.000
Age 2 (25 to 34)	.81	.821	.365
Gender 1 (Female)	.85	1.717	.190
Ethnicity 1 (Black/African American)	3.50	21.669	.000
Ethnicity 2 (White/Caucasian)	10.62	71.809	.000
Ethnicity 3 (Hispanic)	9.24	156.960	.000
Ethnicity 4 (Asian)	16.42	39.917	.000

The classification results for the logistic regression in Research Question 2 are presented in Appendix C. As shown, when the variables of age, gender, and ethnicity were entered into the logistic regression, the cases were correctly classified 72.3% of the time for the variables entered into the equation by SPSS. The Cox & Snell *R* Square for Research Question 2 indicated that 16.5% of the explanation for a student's transition to postsecondary programs could be attributed to the predictor variables that were significant. The Hosmer and Lemeshow Test resulted in a significance of .873 with 6 degrees of freedom, indicating that for the significant predictors of age and ethnicity, the model was a good fit.

The logistic regression for Research Question 2 excluded all variables except age, gender, and ethnicity. For this question, the Gender 1 (female) variable, which was significant in Research Question 1, was not significant for Research Question 2. The other predictors remained significant.

In summary, the results for Research Question 2 indicated that by generating a logistic regression separating the variables of age, gender, and ethnicity from the other independent variables in the study, the predictors that significantly contributed to the model remained the same except for Gender 1 (female). There was an increase in the odds ratios of participants with membership in the Asian, White/Caucasian, and Hispanic ethnicities with a decrease in the odds ratios of Black/African American students.

Research Question 3. In this question, the predictive value of prematriculation scores on the TABE test was explored. The categories of reading, language, and math scores were analyzed using a logistic regression that excluded all other variables. Table 6 presents the results of the logistic regression. Results indicated that the prematriculation TABE scores were significant contributors to the prediction model in several of the categories of language and math. For Language 1 (Grades 0-5.9), the Wald statistic was significant at $p < .01$ with an odds ratio of .644. This indicated that students with prematriculation language scores falling between Grades 0 and 5.9 had a lessened likelihood of transitioning to college than students with higher prematriculation TABE scores in the language category. The Math 1 (Grades 0-5.9) and Math 2 (Grades 6.0-8.9) categories both had significant Wald statistics at $p < .001$ with odds ratios less than 1. This indicated that students with prematriculation TABE math scores under Grade 8.9 had a lower likelihood of transitioning than did students who scored in higher grades. Prematriculation reading scores were not found to be significant predictors.

The classification results for the logistic regression in Research Question 3 are displayed in Appendix D. As shown, when the variables of prematriculation TABE scores for reading, language, and math were entered into the logistic regression, the cases were classified correctly 70.8% of the time. The Cox & Snell R Square for Research

Question 3 indicated that 6.2% of the explanation, or variance, could be attributed to the predictor variables. The Hosmer and Lemeshow Test resulted in a significance of .470 with 7 degrees of freedom, indicating that the model had a good fit. In summary, the results for Research Question 3 indicated that the Language 1 and Math 1 and 2 predictors made significant contributions to the model.

Table 6

Summary of Logistic Regression Analysis for Prematriculation Test of Adult Basic Education Scores as Predictors of Transition (df = 1)

Variable	Odds ratio	Wald statistic	Sig.
Reading 1 (Grades 0-5.9)	.755	3.001	.083
Reading 2 (Grades 6.0-8.9)	.983	.014	.906
Language 1 (Grades 0-5.9)	.644	7.218	.007
Language 2 (Grades 6.0-8.9)	.903	.479	.489
Math 1 (Grades 0-5.9)	.375	38.959	.000
Math 2 (Grades 6.0-8.9)	.550	17.655	.000

Once these results were analyzed and noted, additional logistic regressions were conducted individually on reading, language and math in order to explore the possibility of higher levels of predictive significance and in the interest of parsimony. Table 7 presents the impact of the prematriculation TABE scores on transition when analyzed through individual logistic regression analyses. As shown, the prematriculation TABE scores for reading, language, and math were significant contributors to the model at $p < .001$ and $p < .01$. This indicated that students who had prematriculation scores under Grade 8.9 in reading, language, and math had significantly lessened chances of transitioning to postsecondary programs.

The results of the classification tables for the three separate logistic regressions were the same as for the logistic regression with all the prematriculation variables (see Appendix D). The Hosmer and Lemeshow Tests for all three logistic regressions indicated that, for each logistic regression, the model had a good fit. The Cox & Snell *R* Square for reading indicated that 2.4% of the variance for the dependent variable of transition could be explained by the reading predictor. The language predictor alone predicted 3.3% of the variance, and the math predictor was responsible for 5.1% of the variance.

Table 7

Summary of Individual Logistic Regression Analyses for Prematriculation Test of Adult Basic Education Scores as Predictors of Transition (df = 1)

Variable	Odds ratio	Wald statistic	Sig.
Reading 1 (Grades 0-5.9)	.431	37.589	.000
Reading 2 (Grades 6.0-8.9)	.693	7.576	.006
Language 1 (Grades 0-5.9)	.383	51.936	.000
Language 2 (Grades 6.0-8.9)	.690	7.272	.007
Math 1 (Grades 0-5.9)	.281	82.759	.000
Math 2 (Grades 6.0-8.9)	.487	27.712	.000

Research Question 4. This question addressed the predictive value of the hours spent preparing for the GED test in the ABE/GED lab. In order to answer this question, the only independent variable used was hours spent preparing for the GED test. Table 8 presents the results of the logistic regression. The hours spent in the ABE/GED lab for Hours 1 (0 to 15 hours) had a significant Wald statistic ($p < .001$) with an odds ratio of .552. This indicated that participants who spent fewer than 16 hours in the ABE/GED lab

were less likely to transition to postsecondary programs than those who spent a higher number of hours. These results were different from those obtained from the logistic regression used to answer Research Question 1, as Hours 2 (16 to 40) had significant predictive ability for the first question.

The classification results for the logistic regression in Research Question 4 are displayed in Appendix D, and it should be noted that they are the same as those for Research Question 3, where the cases were correctly classified 70.8% of the time. The Cox and Snell *R* Square for Research Question 4 indicated that 1.3% of the variance could be explained by the predictors. The Hosmer and Lemeshow Test resulted in a significance of 1.0 with 1 degree of freedom, indicating that the model for the predictor of hours had a good fit.

Table 8

Summary of Logistic Regression Analysis for Hours in the ABE/GED Lab as a Predictor of Transition (df = 1)

Variable	Odds ratio	Wald statistic	Sig.
Hours 1 (0 to 15 hours)	.552	20.415	.000
Hours 2 (16 to- 40 hours)	.768	3.007	.083

Note. ABE = Adult Basic Education.

Summary

In order to answer the four research questions in this study, four separate logistic regressions were conducted. The first one addressed the predictive ability all the variables in the study, including age; gender; ethnicity; prematriculation TABE scores in reading,

language, and math; and number of hours spent preparing for the GED test in the ABE/GED lab. Research Question 2 addressed the predictive contribution of age, gender, and ethnicity as they related to transition. The third research question focused on prematriculation TABE scores as predictors of transition. After conducting the first logistic regression for this question, further exploration of the predictive contribution of the prematriculation TABE scores was carried out by conducting three separate logistic regressions on reading, language, and math. The fourth research question addressed hours spent preparing for the GED test in the ABE/GED lab.

Results indicated that the variables that had predictive significance for the model included age, which increased the subjects' likelihoods of transition if they were age 16 to 24 years. Ethnicity was also found to have predictive significance for Asian, White/Caucasian, Hispanic, and Black/African American ethnic categories, with Asians having the highest likelihood of transition and Black/African Americans the lowest. Significant predictors that contributed to a lessened likelihood of transitioning included being female; having a prematriculation TABE score under Grade 8.9 in reading, language, or math; and spending less than 40 hours preparing for the GED exam in the ABE/GED lab.

The Cox & Snell *R* Square, as well as the Hosmer and Lemeshow goodness-of-fit test, were conducted for each logistic regression. In addition to obtaining the explained variance for each of the predictors, the conclusion was that the models for all four research questions were shown to have acceptable to good fits.

Chapter 5: Discussion

Introduction

This study addressed the transition to postsecondary programs of students participating in a GED® program at a public college. The ABE/GED program was held in a laboratory where students were able to increase their ability to pass the GED exam through computerized skill-building programs and tutoring. The purpose of the research was to identify the predictors associated with the students' transitions at the same institution. Transition, the dependent variable, was defined as registering for AA, AS, PSAV, EAP, and college preparation programs.

Data from a sample of 1,620 students who began and ended their ABE/GED programs during the 2008 and 2009 calendar years were tracked through August 2013. Data provided by the institution in a deidentified format included age; gender; ethnicity; TABE prematriculation scores in reading, language, and math; total number of hours spent in the ABE/GED lab; and whether or not transition to postsecondary took place. IBM SPSS 20.0 was used for the statistical analyses.

The ability to have predictive information is important for educators who work with GED students. With this information, they can create supportive services and interventions for students who are not likely to transition and also motivate those who are most likely to transition so that they successfully enroll for postsecondary programs.

The study was guided by four research questions addressing the predictive ability of the variables. Demographic and descriptive statistics were conducted, as well as binary logistic regressions, for analyzing the predictive strength and model fit of the variables. Additional statistical analyses were also documented, including the Cox & Snell *R* Square and the Hosmer and Lemeshow Test.

Summary of Findings

Research Question 1 addressed the predictive ability of all the variables in the study, including age; gender; ethnicity; prematriculation TABE scores in reading, language, and math; and hours spent in the ABE/GED lab. The variables were categorized as presented in Appendix A, and SPSS selected and analyzed the variables with possible predictive ability. These included the two lower grade-equivalent categories of the variables for age; reading, language, and math; and hours spent in the ABE/GED lab. Being female was also selected by SPSS, as were the ethnicity categories of Black/African American, White/Caucasian, Hispanic, and Asian. For Research Question 1, the predictor variables correctly classified 88.4% of students who did not transition.

Results of the logistic regression for the first question included odds ratios, which indicated the impact each predictor had on transition to postsecondary, taking into consideration the other variables in the equation. Odds ratios also reflect what happens to a predictor if the value of $\text{Exp}(B)$ is increased or decreased by one unit. If the value of the odds ratio is greater than 1, the odds increase. If it is below 1, the odds decrease. Both of these functions were seen in the results of the logistic regression for Research Question 1.

The odds ratios for students in the age group of 16 to 24 years indicated that these students were 2.74 times more likely to transition to postsecondary programs than students in the other age groups. Students with ethnicity categories of Black/African American, White/Caucasian, Hispanic, and Asian were also likely to transition to postsecondary. The results of this logistic regression indicated that Asians had a 10.71 times greater likelihood of transitioning than other ethnicities. The descriptive statistics indicated that 533 students of the sample of 1,620, or almost 33%, did not report ethnicity. Of these, 8.1% transitioned to college, the lowest percentage of transition of all

categories. However, SPSS did not classify students who did not report ethnicity as a reliable predictor of the model.

Some of the predictors for Research Question 1 also resulted in odds ratios of less than 1 with significance supported by the Wald statistic. These included being female, having prematriculation math TABE scores under Grade 8.9, and spending fewer than 40 hours preparing for the GED test in the ABE/GED lab. This indicated that students falling into these categories had lessened chances of transitioning than did students in other significantly predictive categories. The Hosmer and Lemeshow Test indicated that the model including these variables had an acceptable fit. The value of the Hosmer and Lemeshow Test for goodness of fit was the lowest for Research Question 1 compared to the other research questions. This indicated that when compared with the models of the other research questions, the one constructed for Research Question 1 had the poorest fit.

Research Question 2 addressed the demographic variables of age, gender, and ethnicity separately from the other independent variables in the study. This was done not only in the interest of parsimony but also to avoid Type II errors or false negatives in the results of the significance of the Wald statistic (Menard, 2002; Garson, 2012). This separation of variables also took place with the logistic regressions of Research Questions 3 and 4.

Results confirmed that for students in the age category of 16 to 24 years, there was an increase in the likelihood of transition. Being female was no longer significant when the gender variable was tested with age and ethnicity and, therefore, was not a predictor for the model in this research question. The ethnicities of Research Question 1 remained significant predictors of the model. However, Asian students had a higher likelihood of transition for this logistic regression, as they were 16.4 times more likely to

transition. Black/African American students who, for Research Question 1, were already predicted to be the least likely to transition for the four ethnicities shown to be significant, dropped one point in their odds ratio, making them 3.5 times more likely to transition than other ethnicity categories with lower predictive significance. No students were in the categories of Hawaiian/Pacific Islander or American Indian/Alaska Native in the entire sample. For this question, there was a better fit for the model than for Research Question 1, indicating that the variables were more likely to predict transition. The overall percentage of correct predictions for this logistic regression was 72.3% with a correct prediction of 87.3% for the students who did not transition. The results of the Cox & Snell *R* Square indicated that the predictors explained 16.5% of a student's transition to postsecondary programs. Finally, the results of the Hosmer and Lemeshow Test indicated that the model was a good fit for this logistic regression. Therefore, the age group of 16 to 24 years and the noted four ethnicities can be said to be significant variables of the prediction model.

In Research Question 3, the prematriculation TABE scores in reading, language, and math as predictors of transition to postsecondary were analyzed. These scores were given to the researcher in grade equivalents that were converted to scaled scores. The scaled scores were then grouped into categories pertaining to ABE, pre-GED, and GED. Students could be in one or more of the categories if, for example, they scored at the ABE level in reading and the pre-GED level in math. In order to answer this question, a logistic regression that included reading and language was conducted. However, the researcher believed that there was merit in separating the three academic variables in order to reduce Type II errors, so separate logistic regressions were then run for further exploration.

For the first logistic regression, which included all three variables, results indicated that the Language 1 (Grades 0-5.9) category had predictive significance. In addition Math 1 (Grades 0-5.9) and Math 2 (Grades 6.0-8.9) were shown to make a predictive contribution to the model. As the odds ratios for all these variables were below 1, this indicated that students with prematriculation scores in these categories had a significantly lessened likelihood of transitioning to postsecondary programs than students who scored in the higher levels of the TABE. The overall percentage of correct classifications for the model was 70.8%, with 100% of students who did not transition classified correctly. The Hosmer and Lemeshow Test for goodness of fit indicated that the model had a good fit.

After the first logistic regression with the three TABE variables was examined, three separate logistic regressions for reading, language, and math were conducted. The results differed in that all the prematriculation TABE scores became significant predictor variables of the model. The Wald statistic for Reading 1 (Grades 0-5.9) was significant at $p < .001$, and Reading 2 (Grades 6.0-8.9) at $p < .01$. Language 1 (Grades 0-5.9) was significant at $p < .001$ and Language 2 (Grades 6.0-8.9) at $p < .01$. Both math categories were significant at $p < .001$. The odds ratios for the three separate logistic regressions for reading, language, and math were less than 1, indicating that students with prematriculation scores under grade-equivalent 8.9 in any of the three subjects had reduced likelihoods of transitioning to postsecondary programs. The classification percentages for correctly classified predictors did not change with the separate logistic regressions, and the Hosmer and Lemeshow Test indicated that the model had a good fit.

Research Question 4 addressed the number of hours that participants spent in the ABE/GED lab separate from all other variables. The results differed from those in

Research Question 1, which included all the variables. For this Question, the Hours 1 (0-15 hours) category remained a significant predictor at $p < .001$. However, the Hours 2 (16-40 hours) category, which had been significant at $p < .05$ for the first question, did not show significant predictive ability. The goodness of fit for the model in Research Question 4 was more robust; therefore, the researcher considered the results of this question to have more predictive ability than the results of Research Question 1. Based on the odds ratio and the Wald statistic, results indicated that students spending 15 hours or fewer in the ABE/GED lab have significantly lessened chances of transitioning to postsecondary programs.

Findings for the four Research Questions indicated that students who are most likely to transition are those in the age category of 16 to 24 years. In order of predictive strength, ethnicities of Asian, White/Caucasian, Hispanic, and Black/African American also made significant predictive contributions to the increased likelihood of transition. Conversely, students whose prematriculation TABE test scores in reading, language, and math were below Grade 8.9 had significantly lessened chances of transition. In addition, students who spent fewer than 16 hours in the ABE/GED lab preparing for the GED test also had significantly lessened chances of transition. As indicated by the Hosmer and Lemeshow Tests for the four questions, all the models had acceptable to good fits.

In summary, the variables to be included in the model that are able to significantly predict increased likelihood of transition to postsecondary programs are being between ages 16 and 24 years at the time of enrollment into the ABE/GED program and an ethnicity of Asian, White/Caucasian, Hispanic, or Black/African American, as opposed to the ethnicity category of *no report*. The variables that can significantly predict a lessened likelihood of transition are having a grade equivalent of less than 8.9 in the

prematriculation TABE reading, language, and math tests and spending fewer than 16 hours in the ABE/GED lab preparing for the GED exam.

Discussion and Links to Relevant Research

The conceptual framework for this study was based on research by Miller (2007), who proposed a prediction model focusing on college students' attrition. The predictors in Miller's study were confirmed as having significant predictive ability by follow-up research (Herreid & Miller, 2009; Miller, 2007; Miller & Herreid, 2008; Miller & Herreid, 2009; Miller & Tyree, 2009; Miller et al., 2010). Miller's study, as well as subsequent research, used age, gender, ethnicity, and prematriculation test scores as predictors. The researcher based this study on Miller's framework.

Another study that guided this study was predictive research conducted by Zhang (2010), who proposed a prediction model to determine the impact of specific predictive variables on the types of postsecondary programs attended by GED test passers. Many of the techniques and statistical analyses utilized by Zhang to identify predictive significance were also used in this. Using Zhang's study as well as Miller's (2007) research provided a conceptual and statistical foundation upon which to build predictive models for this project.

Of the sample of 1,620 students, 473, or 29.2%, transitioned to postsecondary programs at the subject institution. This represents a lower rate of transition than those discussed in the literature. The FLDOE (2009) followed a 2004 cohort and found a transition rate of 33.5%. Patterson et al. (2010) and Zhang et al. (2011) found national transition rates for GED passers of approximately 43%. This indicated that for the institution studied, transition rates appeared to be lower than both state and national figures. However, it must be noted that that for this study, transition information was

available only for transitions within the subject institution and not for other colleges, universities, and vocational schools in Florida. Therefore, the transition rate cannot be compared to the state and national rates in the literature, as students may have transitioned to other institutions for which there was no information.

Several of the descriptive statistical results for this study were supported by the literature. For the sample studied, GED test passers in the age category of 16 to 24 years had the highest percentage (34.1%) of transitions to postsecondary programs. This age group was also found to have significant predictive ability and was, therefore, included in the prediction model. This finding was supported by Patterson et al. (2010) and Zhang et al. (2011), who found that the same age group was more likely to transition to postsecondary programs than older age groups.

Another variable of this study reflected in the literature was gender. Being female was related to transitions by Zhang (2010), Patterson et al. (2010), and Guison-Dowdy and Patterson (2011b). Although in this study females had a higher transition rate (31.8%) than males, results indicated that being female was not a significant predictor of the model. Zhang (2010), however, did find that being female had predictive ability, with females transitioning twice as often as males.

In this study, there was possible membership in seven ethnicity categories: Asian, White/Caucasian, Hispanic, Black/African American, Hawaiian/Pacific Islander, American Indian/Alaska Native, and *not reported*. The researcher included the *not reported* category as a variable because, in the sample of 1,620 participants, 533 cases were in the *not reported* category. Students in the *not reported* category did not select an ethnicity in the institutional admission and registration applications; only the categories of Asian, White/Caucasian, Hispanic, and Black/African American had predictive

significance, and these were included in the model. The transition rate for White/Caucasian GED passers was 45.8%, 41.3% for Hispanics, and 22.1% for Blacks/African Americans. Asians had a transition rate of 50%, the highest of all ethnicities. GED passers in the *not reported* ethnicity category had the lowest rate of transition at 8.1%. The literature, however, had different results with similar studies addressing transitions and ethnicity.

Zhang (2010), for example, found that Hispanics were more likely to transition than Black or White adults. Patterson (2010) also had differing results, with the White GED passers having the highest rate of transition (63.8%). Asians were found to have a lower rate of transitions (2.6%) in Patterson's study. However, Patterson et al. (2010) found that Asians had the highest rate of transition, followed by Blacks, Hispanics, and Whites. Patterson et al.'s (2010) findings supported the results of this research in that Asians had the highest transition rate.

The number of hours spent in the ABE/GED lab had predictive significance in this study and links to relevant research were available. Students who spent fewer than 16 hours in the lab had a reduced chance of transitioning to postsecondary programs. This was corroborated by Patterson et al. (2009), who found that GED test passers who transitioned spent about 23 hours preparing for the GED test. Patterson et al. (2010) found that students who transitioned had a median of 20 hours preparing for the GED. Descriptive statistics for this study indicated that students who spent 0-15 hours preparing for the GED test had a transition rate of 24.6%, whereas students who spent over 40 hours had a transition rate of 37.1%. These transition rates had predictive significance, with students spending fewer than 16 hours in the ABE/GED lab having a lessened likelihood of transition.

Overall, many of the findings in the study were supported by the literature with the exception of ethnicity, which had various results for the studies presented. The researcher was able to use the literature as a foundation for the selection of the predictor variables and for comparisons of results.

Implications of the Findings

The results of this study have significant implications for Adult Education professionals as well as for the staff and administration of the institution studied. First, the transition rate for all the students in the study was lower (29.2%) than the state (33.5%) and national (43%) averages. Although this finding may not be reliable, as transition was defined as having taken place within the same institution, this rate appears to be low for the GED population, as there were many advantages to transitioning at the same institution. These included familiarity with faculty, staff, and facilities, being a part of the institution while preparing for the GED, and the possibility of a scholarship for the first semester of college. Another implication was that transition was predicted for the younger GED students, ages 16-24 and not for the older students. This finding points to the importance of understanding the needs of older students and providing support so that they may also be successful in transitioning to postsecondary programs.

The ability to use the prediction model derived from the research in this study is important for practitioners. This model indicates an increased likelihood of transition for students who are younger at the time of enrollment and are Asian, White/Caucasian, Hispanic, or Black/African American, with the latter having the lowest likelihood of transition. By having an understanding of the impact of ethnicity, practitioners can provide support and interventions for students with lesser likelihoods of transitioning. Students who do not indicate ethnicity in the application and registration documents

should also be monitored, as this group had the lowest transition rate (8.1%) of all groups.

Students who were found to have lessened likelihoods of transition were those who spent fewer than 16 hours in the ABE/GED lab. This is important to practitioners and institutional staff, as it is a variable that can be controlled and improved through counseling, motivational techniques, and challenging educational programming.

Prematriculation TABE scores, which are variables that cannot be controlled in the ABE/GED program, have significant predictive ability for the model. This information is important because students who have prematriculation scores in reading, language, and math below the 8.9 grade equivalent have a significantly lessened likelihood of transitioning. Transition rates for prematriculation reading scores were 19.8% for scoring under Grade 5.9 but 36.4% if the prematriculation score was above Grade 9.0. Similar transition rates were found for language and math, with math having the largest difference between scoring under Grade 5.9 (transition rate of 19.1%) and scoring above Grade 9.0 (transition rate of 45.7%). Although practitioners and staff cannot impact prematriculation scores on the TABE, careful monitoring of students scoring in the lower ranges should take place, as they may have a longer journey for reaching the point of being able to take the GED test. Special programs for these students should be developed, with supportive interventions and celebrations of benchmarks in order to increase motivation.

The literature addressed the need for support systems for GED students so that they can successfully transition to postsecondary programs. Quigley et al. (2011) suggested that supportive counseling and flexible schedules be included in the programs. They also proposed that students who were nonnative English speakers be given more

exposure to United States systems. Alamprese (2004) also recommended that time management and study-skills workshops should be included as part of the programs to help students with transitions to postsecondary programs. Finally, Styles (2011) described barriers that GED passers need to overcome in order to be successful in academic settings. These included situational barriers such as child care and transportation, institutional barriers such as bureaucracy and cost, and dispositional barriers such as perceptions of the value of an education. The researcher suggests that potential barriers be evaluated, and support systems created for students who are predicted to have lessened likelihoods of transition to postsecondary based on the prediction model proposed.

The results of this study can be used by Adult Education practitioners, tutors, teachers, and staff in the planning and development of programs to increase the likelihood of transitioning to postsecondary programs. Although the ABE/GED Program was held in a laboratory rather than a classroom setting, some of the predictive variables, including age, ethnicity, and prematriculation TABE scores, can be extrapolated to the classroom or blended environments.

Limitations

This study was undertaken at a public college in Florida that housed a GED preparation program. The study was limited to predicting transition to postsecondary programs for subjects participating in an open-entry, open-exit laboratory where students could participate in remediation and test preparation through the use of technology and tutoring. In addition, limited English proficiency was considered a limitation and possibly a confounding variable because of the large number of students attending the institution who were nonnative English speakers. It was not known whether English was the native language of the population studied.

Another limitation of the study was that transition to postsecondary programs was confirmed only for those subjects who enrolled in postsecondary programs at the institution studied and not to other colleges, universities, and vocational/technical institutions. In addition, transition to postsecondary was deemed to have taken place even if students did not enroll for college credit courses. Programs included in the definition of transition to postsecondary for this study included not only AA and AS courses but also EAP, PSAV, and college preparatory courses

Recommendations for Future Research

Future research that should be undertaken in the subject institution includes projects that may increase transition rates within the institution. A variety of methods should be explored for delivering the skills needed to increase academic skills in order to pass the GED test. This includes the possibility of offering GED preparation in a blended (laboratory and classroom) format in order to give the students more structure as well as specific attendance expectations. A pilot research project could be conducted and followed longitudinally to evaluate transition rates.

Another suggestion for future research involves nonnative English speakers. As a large segment of nonnative English speakers are at the subject institution, in addition to taking the TABE prematriculation tests in reading, language, and math, nonnative speakers should be assessed for English-language challenges. This information may help increase academic skills in all three content areas, and it could result in curriculum changes for students who are nonnative English speakers.

In addition to language barriers, students may have other types of barriers. Therefore, a recommendation for future research involves having students identify barriers to their success as soon as they enter the program. This would include the

potential barrier of the perception of the value of education suggested by Styles (2011), in addition to situational and institutional barriers. By providing awareness of obstacles as well as assistance in overcoming them, the probability of successful GED completions and transitions may be increased.

A final recommendation for future research addresses giving students the ability to register and participate in a college credit class while still enrolled in the GED program prior to passing the GED test. The researcher acknowledges that this may not be appropriate for all students, but for GED students who are in the higher range of academic scores in the ABE/GED laboratory, the ability to begin a postsecondary program may give them the motivation they need to continue and succeed.

In summary, although research involving GED students can be somewhat challenging, it is extremely valuable to propose and conduct this research as it involves a very large segment of the United States population. The importance of this research cannot be underestimated, as one in five adults in the United States does not have a high school credential (GED Testing Service, 2011b).

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Appendix A

Logistic Regression Variable Operational Definitions and Coding

Logistic Regression Variable Operational Definitions and Coding

Variable	Operational Definition and Coding
Criterion Variable	
Transition to postsecondary program(s)	No transition = 0 Transition = 1
Independent Variables	
Age at enrollment of GED program	Ages 16-24 = 1 Ages 25-34 = 2 Ages 35 and above = 3
Gender	Male = 0 Female = 1
Ethnicity	Black/African American = 1 White/Caucasian = 2 Hispanic = 3 Asian = 4 Hawaiian/Pacific Islander = 5 American Indian/Alaska Native = 6 Not Reported = 7
Prematriculation TABE scores	
Reading	
ABE (Grades 0-5.9)	Scaled scores = 175-516 = 1
Pre-GED (Grades 6.0-8.9)	Scaled scores = 517-566 = 2
GED (Grade 9.0 and above)	Scaled scores = 567-812 = 3
Language	
ABE (Grades 0-5.9)	Scaled scores = 235-524 = 1
Pre-GED (Grades 6.0-8.9)	Scaled scores = 525-560 = 2
GED (Grade 9.0 and above)	Scaled scores = 561-826 = 3
Math	
ABE (Grades 0-5.9)	Scaled scores = 200-504 = 1
Pre-GED (Grades 6.0-8.9)	Scaled scores = 505-564 = 2
GED (Grade 9.0 and above)	Scaled scores = 565-795 = 3
Hours spent in the ABE/GED Lab preparing for the GED test	
0 - 15 hours	= 1
16 - 40 hours	= 2
41 - 467 hours	= 3

Appendix B

Classification Table for Total Sample in Research Question 1

Classification Table for Total Sample in Research Question 1

Observed	Predicted		
	TRANSITION		Percentage Correct
	No transition	Transition	
No transition	1014	133	88.4
Transition	273	200	42.3
Overall Percentage			74.9

Note. The cutoff value is .50.

Appendix C

Classification Table for Total Sample in Research Question 2

Classification Table for Total Sample in Research Question 2

Observed	Predicted		
	TRANSITION		Percentage Correct
	No transition	Transition	
No transition	1001	146	87.3
Transition	303	170	35.9
Overall Percentage			72.3

Note. The cutoff value is .50.

Appendix D

Classification Table for Total Sample in Research Questions 3 and 4 and for
Separate Logistic Regressions of Question 3

Classification Table for Total Sample in Research Questions 3 and 4 and for Separate Logistic Regressions of Question 3

Observed	Predicted		
	TRANSITION		Percentage Correct
	No transition	Transition	
No transition	1147	0	100.0
Transition	473	0	0
Overall Percentage			70.8

Note. The cutoff value is .50.