

THE RELATIONSHIPS BETWEEN ONLINE ADULT STUDENT CLEP TRANSFER  
CREDIT SUBJECT TYPES AND SIX-YEAR GRADUATION

by

Clifford James Stumme

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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APPROVED BY:

Kurt Y. Michael, Ph.D., Committee Chair

Brian C. Yates, Ed.D., Committee Member

## ABSTRACT

College Level Examination Program exams are accepted at thousands of schools, but the question remains as to whether College Level Examination Program students are prepared to graduate and whether accepting College Level Examination Program students benefits higher education institutions. While research has been done on College Level Examination Program student success, further research is needed to know whether increased College Level Examination Program exams and College Level Examination Program credits in specific disciplines correlate to an increased likelihood in online adult student graduation. College Level Examination Program exams' relation to graduation and online adult learners' use of College Level Examination Program exams are both understudied in the research. To this purpose, in a quantitative study, a sample of 34,927 online adult learners (25 or older) who applied College Level Examination Program exams in four disciplines (English, math, history, and science) to a four-year, private university have been studied using a logistic regression analysis, and there was at least a small effect size but significant correlation between each College Level Examination Program discipline and six-year graduation. Of the four disciplines, English was the strongest predictor, history and math were moderately strong, and science was not significantly predictive. Recommendations for further research concern the skills necessary for graduation and the roles that the College Level Examination Program has in preparing students.

*Keywords:* College Level Examination Program, retention, adult learner, online student, prior learning assessment

## Acknowledgements

“I knew exactly what to do, but in a much more real sense I had no idea what to do”  
(Lieberstein & Blitz, 2009, n.p.).

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### **List of Abbreviations**

College Level Examination Program (CLEP)

Credit-by-Exam (CBE)

Prior Learning Assessment (PLA)

Grade Point Average (GPA)

## CHAPTER ONE: INTRODUCTION

### Overview

The following chapter overviews a study into the place of the College Level Examination Program in online adult education. It discusses a need for further research into the graduation rates and likelihood of online adult students who apply College Level Examination Program exams from specific disciplines (English, math, history, and science) to their degrees. The chapter includes a background of the problem, followed by a problem and purpose statement. It continues with an explanation of the significance of the study. Finally, this chapter concludes with research questions concerning this topic.

### Background

Public, four-year, in-state higher education yearly tuition costs in the United have risen from \$2,390 to \$9,650 (in 2016 dollars) since 1981; in fact, tuition rates have risen almost every single year since 1981 for both private and public higher education (Ma, Baum, Pender, & Welch, 2016). While yearly inflation increase in the Consumer Price Index explains this somewhat, college tuition increase has been higher than inflation consistently by approximately 2-6% during most years since 1981 (Bundick & Pollard, 2019). Thankfully for students, cost increase percentages are not as extreme as they were in the 1980's: 1980 saw an approximate 11% increase in cost, and 2016 saw only an approximate 3% increase (Bundick & Pollard, 2019), but considering the current high price, a 3% increase is formidable. The year-to-year increase is also formidable when considered alongside a much slower inflation in income levels. Baum (2018) compared yearly tuition and fees cost increases and yearly median family income increases to 1967 levels to find that while yearly income increase grew from 1% to 1.5% since 1967, tuition cost increases had grown from 1% in 1967 to 4.4% in 2017; while tuition and

income used to evenly match each other in terms of inflation, higher education tuition is now wildly outpacing income making college less affordable for most students. As a result, American educational entrepreneurs have devised and introduced many new options for earning college credit to students struggling to afford degrees. These have included dual enrollment, a growing community college system, advanced placement credit, and institutional prior learning assessments, but perhaps the most popular and widespread is the College Level Examination Program.

College Level Examination Program exams were introduced in 1965, and since then 7 million students have taken a College Level Examination Program exam (“Celebrating 50 Years,” 2017). College Level Examination Program exams are credit-by-exam tests offered by the College Board and accepted by the sample institution. They usually range from being worth 3-9 credits, and students usually must score at least a 50 on the College Board’s unique 20-80 scale to earn credit (in most cases). These College Level Examination Program exams range from being about history to composition to Spanish to science and other subjects. Four main categories correlate to common general education curriculum: language arts, history, math, and science. If a student receives an institution’s pre-determined acceptable passing score, they can then transfer those test credits to that institution.

Soon after CLEP exams’ introduction, higher education institutions began encouraging students to earn credit using College Level Examination Program, and some even required students to take several College Level Examination Program exams before matriculating, creating many immediate sophomores who were able to pass several exams (Stecher, 1977). Now, online adult students (those older than 25) who need college to be more affordable may turn to prior learning assessment or credit by exam, but it is unclear whether this is the best

option for students or for institutions (Stecher, 1977). Three new developments in higher education precipitate this situation: the introduction of College Level Examination Program exams, an increase in online learning programs, and a heightened emphasis on retention rates in higher education (Tinto, 1975). All three have developed since the 1960's and have helped to make important changes in higher education. College Level Examination Program exams are a credit-by-exam form of Prior Learning Assessment that allow students to earn college credit by passing a test (usually on a general education subject). The premise is that students who pass will have the knowledge to earn a grade of "C" in an equivalent college course ("CLEP b-level score recommendations," n.d.). Students can take College Level Examination Program exams on history, math, composition, foreign language, and more. Credit-by-exam is popular among many online adult learners who are already non-traditional students (Bean & Metzner, 1985). Students are then able to save money and time on their college degrees; interestingly, Beaver and Paul (2007) found that saving time was the most valuable benefit of College Level Examination Program for students. Educators sometimes doubt whether the experience is equivalent, and several studies have been done to validate College Level Examination Program exams (Godfrey & Jagesic, 2016; Moulder, Abdulla, & Morgan, 2005) or to study whether College Level Examination Program students are as successful as their counterparts (Beaver & Paul, 2007; Barry, 2013; Boatman, Hurwitz, Lee, & Smith, 2019; Scammacca & Dodd, 2005). But studies of the College Level Examination Program are rare, and many studies are sponsored by the College Board itself (Barry, 2013; Scammacca & Dodd, 2005), which could represent a conflict of interest. In any case, no such studies look specifically at online adult learners—one of the primary populations of College Level Examination Program usage—and questions still remain

about whether College Level Examination Program exam usage impacts student graduation (Barry, 2013).

Simultaneously, higher education has had to shift a significant amount of resources to study the burgeoning online and adult student populations. According to Kasworm (2018), adult learners are older than twenty-four years. As adult learners make up a majority of online student populations (Clinefelt & Aslanian, 2016), understanding how these students interact with Prior Learning Assessment and graduation is vital to success for many institutions. These students are non-traditional students, and while many have defined “non-traditional” (Chung, Turnbull, & Chur-Hansen, 2014; Trowler, 2015; Meuleman, Garrett, Wrench & King, 2015), the status of being “not something else” exemplifies the lack of research regarding retention for them: researchers know who non-traditional students are not, but they need more affirmative study to know who they *are* (Chen, 2017). Considering that these adult learners often have very practical needs for education, Prior Learning Assessment opportunities are of special interest, and the results on adult learner educational efforts should be of special interest to researchers and administrators in higher education.

Immediately after College Level Examination Program exams were introduced in the 1970’s, many studies were conducted to determine whether College Level Examination Program exams were valid or led to higher student grades and graduation rates (Beaver & Paul, 2007; Losak & Lin, 1973; Enger & Whitney, 1974; Stetson, 1971). The general consensus was that while researchers did not know whether College Level Examination Program exams caused student success, the exams at least correlated to students operating at an average level or above average level compared to their classmates. Since then, studies continue to find that College Level Examination Program exams do not hurt students and sometimes correlate to advanced

student performance (Barry, 2013; Scammacca & Dodd, 2005). Some still wonder whether this is because exceptional students are more likely to take College Level Examination Program exams anyway (Beaver & Paul, 2007).

Simultaneously, higher education populations continue to evolve. As more students are getting bachelor's degrees, more student populations are joining the classroom, and as online education becomes a more popular alternative (thanks to convenience and cost), that classroom is becoming increasingly digital. And while College Level Examination Program exams provide a low-cost way for students with knowledge but little money to earn parts of their degrees, discussions of retention need to be had because universities need to know how to serve burgeoning, unique populations of students who do not fit traditional molds.

Non-traditional populations are underserved in research. Trowler (2015) holds that the terms itself is even unfair and creates a sense of "other" in conversations about student populations. Simultaneously, these populations are not always understood or even defined the same way (Chung, Turnbull, & Chur-Hansen, 2014). Considering that higher education is already usually much more difficult for these students because of the important roles they have outside of the classroom (Kasworm, 2018), further research is vital in understanding how to best support these students who are underprivileged in the educational system already. Prior Learning Assessment credit is a central opportunity for them to be able to graduate more quickly, so understanding how this affects their likelihood of success may open more opportunities for these students to succeed.

Despite extensive research and theory surrounding student retention and non-traditional student populations, several other theories come together to provide a theoretical framework for why students fall to attrition; these models of attrition also serve as models of persistence in

retention research. Tinto (1975) developed a theoretical model of contributing factors to dropout behavior for studying attrition, which also serves as a means to explain student persistence. Tinto's model held that students left school because of a lack of integration socially or academically; they did not feel socially connected, did not feel academically challenged, or were forced to drop out due to poor academics. These factors led to a dropout decision and thus lessened retention. Bean and Metzner (1985) integrated Tinto's (1975) model and Deci and Ryan's (1980) Self-Determination Theory into their model of attrition for non-traditional students, which is relevant to a study of adult learners. They held that non-traditional students were less concerned about social integration and that roles outside of the educational experience were more critical to their decision-making process. Finally, Rovai (2003) created a model of attrition for online students. Incorporating all of the above, Rovai altered past models to include considerations of student digital skills and student needs specifically associated with online learning, which begins to provide a context for studying online learners; these included things like computer literacy, service accessibility, and identification with school. Rovai's composite persistence model is the most applicable to a study of online adult learners, but it only briefly mentions "opportunity to transfer" (p. 9) and gives no strong consideration to students earning credit through Prior Learning Assessment. Though strong, Rovai's (2003) model provides the closest approximate model for a study of online adult learners. In summary, College Level Examination Program exams, though a recent innovation, have the potential to help students save money and time, but institutions are not always prepared to make decisions about whether accepting College Level Examination Program exams will serve students or the institutions themselves.

## **Problem Statement**

The millions of College Level Examination Program exams taken since the 1960's ("Celebrating 50 Years," 2017) represent enormous amounts of resources and effort on the parts of colleges, students, faculty, and the College Board, and yet little is known about how diverse student populations interact with these tests or whether different categories of exams more significantly affect graduation. Studies have tested the validity and worthwhileness of College Level Examination Program exams (Scammacca & Dodd, 2005; Beaver & Paul, 2007; Godfrey & Jagesic, 2016), and the parent category of the College Level Examination Program, prior learning assessment, is also a growing concern for researchers (Boatman, Hurwitz, Lee, & Smith, 2019; Evans, 2019; McMullan et al., 2003; Stevens, Gerber, & Hendra, 2010) as well as an important feature of the 21st century university (Harrop, Casey, & Shelton, 2018).

But despite increased importance and studies reporting College Level Examination Program students to be competitive with their peers (Barry, 2013; Scammacca & Dodd, 2005; Godfrey & Jagesic, 2016), further research into prior learning assessment revolving around the College Level Examination Program is needed (Beaver & Paul, 2007) since only three studies on College Level Examination Program exams have been published in the last ten years (Barry, 2013; Boatman, Hurwitz, Lee, & Smith, 2019; Godfrey & Jagesic, 2016). However, these studies utilized a participant population of traditional students, and little is known about non-traditional, online, adult learners who use College Level Examination Program exams, which underscores Kasworm's (2018) calls for more effort and work to be put into integrating adult learners into the higher education system. The absence of empirical research on the topic raises questions of whether online adult students who use College Level Examination Program exams are as successful as their classmates and likely to graduate. Scholars have studied higher education

success of College Level Examination Program students (Barry, 2013; Scammacca & Dodd, 2005; Beaver & Paul, 2007), and adult learner success is an important, current topic (Chung, Turnbull, & Chur-Hansen, 2014; Kasworm, 2018), but reliable, third-party studies are lacking research concerning graduation rates of online, adult populations that use prior learning assessment credit in specific, traditional general education disciplines.

### **Purpose Statement**

The purpose of this study is to determine whether different types of general education College Level Examination Programs exams (sorted by disciplinary categories) are more or less predictive of six-year graduation for online, adult undergraduate students. Six-year graduation was chosen for the criterion variable because it is a common measurement for graduation rates (Chen, Chen, & Oztekin, 2017; Hester & Ishitani, 2018; Johnson & Stage, 2018), and is especially helpful in understanding adult learners who may not be able to graduate within a traditional timeframe. This study was conducted within a quantitative research design using a logistic regression analysis that accounted for a hypothesized correlational relationship between the predictor and criterion variables. The predictor variable is the number of College Level Examination Program exams in four different disciplinary categories (English, math, history, and science) online adult students apply to their degrees; number of College Level Examination Program tests is a variable that has been used in other studies (Barry, 2013; Scammacca & Dodd, 2005; Boatman, Hurwitz, Lee, & Smith, 2019; Godfrey & Jagesic, 2016). To study the long-term success of these students, graduation within six years of enrollment was used. Graduation within six years is a common measure of student retention or persistence (Chen, Chen, & Oztekin, 2017; Johnson & Stage, 2018). Persistence is generally a measure of student success in graduating, and retention is more often a measure of an institution's effectiveness in helping a

student to graduate (Hagedorn, 2006). The population studied was online adult learners at a large private university in the southeastern United States. This student population featured a strong presence of military and minority students who are often non-traditional, adult students with families, full time jobs, or both. Study of the relationships between the above-mentioned variables fills an important empirical gap in understanding of the relationship between non-traditional students, Prior Learning Assessment credit, and higher education institutions.

### **Significance of the Study**

The significance of this study, in its extension of research, is twofold; it extends knowledge on College Level Examination Program student success, and it extends knowledge on retention of accelerated online adult student populations, which are two subjects consistently growing in importance. Little research has been done recently on College Level Examination Program student success, but what has been done points positively towards College Level Examination Program students being successful in higher education. Barry (2013) found that College Level Examination Program students are likely to have higher grade point averages and to graduate earlier than their counterparts, Scammacca and Dodd (2005) corroborate the grade point average findings, and Boatman, Hurwitz, Lee, and Smith (2019) found College Level Examination Program students were more likely to graduate than other students. While these findings focus on general student populations, however, this study focuses on online adult populations' relationship to College Level Examination Program exams and graduation. As online student populations have grown considerably in the past two decades, Clinefelt and Aslanian (2016) found that 74% of online students were adults, which Bean and Metzner (1985) define as being older than 24. How this population interacts with prior learning assessment has been under study (Bergman & Herd, 2017), but more research is needed especially considering

the dearth of any kind of research on College Level Examination Program student success within specific disciplines of the tests. As the landscape of higher education changes and Prior Learning Assessment options become more plentiful (a trend precipitated by the increased adult learner population), how and when College Level Examination Program and other forms of Prior Learning Assessment are used will become vital to understand.

While studies have been done on the success of College Level Examination Program students (Beaver & Paul, 2007; Barry, 2013; Boatman, Hurwitz, Lee, & Smith, 2019; Scammacca & Dodd, 2005) and almost all of them suggest College Level Examination Program students perform at or above the levels of their classmates, more is needed to explicitly address concerns of institutions. Institutions of higher education are concerned with questions of graduation rates as an indicator not only of student success but also of institutional success. This study's findings could suggest to institutions that College Level Examination Program exams and College Level Examination Program students are supportive of retention rates or that these exams hurt student success and thus institutional retention goals. This is significant to institutions because as higher education changes with the advent of online learning and an ever-increasing adult and non-traditional learner population, new approaches to education can mean success for students and institutions alike.

### **Research Question**

**RQ:** Can the number of exams earned from specific College Level Examination Program (CLEP) disciplines (language arts, history, science, or mathematics) predict graduation status for online adult undergraduate students?

### **Definitions**

1. *Persistence* – Persistence is an attitude or value of motivation, confidence, or

commitment that leads a student to continue pursuing a higher education degree until graduation (Graham, Frederick, Byars-Winston, Hunter, & Handelsman, 2013; Savage, Strom, Hubbard, & Aune, 2017).

2. *Six-year graduation* – A measure of how many students who originally enrolled in a class graduated with a four-year bachelor's degree within six years (Chen, Chen, & Oztekin, 2017; Hester & Ishitani, 2018; Johnson & Stage, 2018).
3. *Retention* – Retention is a measure of how many students in a particular class re-enroll the next semester (Hagedorn, 2006).
4. *Prior learning assessment* – Prior learning assessment is the offering of college credit for experiences or knowledge previously gained by a student; how it appears varies from institution to institution, and it has many sub-types including institutional credit and third party evaluated credit (Bergman & Herd, 2017).
5. *Adult learner* – An adult learner is a college student over the age of twenty-four (Schroeder & Terras, 2015; Chen, 2017).
6. *Online learner* – Students who take classes primarily through the Internet rather than in a bounded physical location (Clinefelt & Aslanian, 2016).
7. *Non-traditional student* – A student older than twenty-four, not living on campus, or being part-time (Bean and Metzner, 1985).
8. *Attrition* – The act of a student not returning to school after having been enrolled the semester previous (Tinto, 1975).

## **CHAPTER TWO: LITERATURE REVIEW**

### **Overview**

This literature review organizes scholarship surrounding the research question of whether the number of College Level Examination Program (CLEP) exams adult, undergraduate, online learners take correlates to their likelihood of graduation within six years. Relevant theories include self-determination theory, non-traditional undergraduate student attrition, Tinto's model of college student attrition, and Holland's theory and patterns of college student success; these are studied for useful frameworks that will be used to construct the theoretical underpinnings of this study. The review then considers the relationship of CLEP exams to higher education and considers previous studies on how students who use those exams perform in higher education otherwise. Literature is then presented on adult learners, online learners, and how each group performs in a higher education setting. Finally, the constructs of retention, graduation, and persistence are studied in an attempt to later formulate a definition of this study's dependent variable: student graduation within six years. Within all of this literature, there is a gap surrounding an understanding of how CLEP exam usage relates to student graduation likelihood.

### **Theoretical Framework**

The theoretical framework for this dissertation draws on Deci and Ryan's (1980) self-determination theory, Tinto's (1975) model of college student attrition, Bean & Metzner's (1985) theory of non-traditional undergraduate student attrition, and Rovai's (2003) theory of online student retention. Most pertinent throughout all of this is a continuous theme of student dropout being informed by environmental and internal factors that make persisting more viable, less viable, or impossible (in the case of academic dismissal). Arranged from most broad to most specific, these inform my theoretical assumptions for analyzing and discussing results.

## **Self-determination Theory**

Self-determination theory (Deci & Ryan, 1980) underpins this dissertation's theoretical framework for understanding why students make persistence decisions. According to Deci and Ryan (1980; Ryan & Deci, 2000) self-determination theory concerns the relationships between conscious behaviors (extrinsic, intrinsic, and amotivational) and subconscious behaviors (automatized and automatic). Extrinsic motivators account for environmental stimuli (such as student debt, a difficult course, or GPA) that prompt decision-making, and intrinsic motivators are more closely related to values a person holds or experiences they would like to have (such as being curious, a need to self-actualize, or a desire for friendship). Amotivational factors are less central to this theory but center around deterrents to action; Deci and Ryan (1980) use depressive states as an example. Self-determination theory studies the process by which a person considers the benefits of possible future states by analyzing intrinsic and extrinsic factors. The person decides which predicted future state is the most desirable for them; the assumption is that they will then make the more desirable decision—the decision that leads towards “people’s inherent growth tendencies and innate psychological needs” (Ryan & Deci, 2000, p. 68). These needs are proposed to be competence, relatedness, and autonomy. This theory informs a discussion of CLEP student graduation by suggesting that either extrinsic or intrinsic factors lead CLEP students to decide to continue taking courses so as to graduate or lead them to drop out despite having already earned credit before attending classes. Self-determination theory’s usefulness is in its basic understanding of how decisions are made.

Self-determination theory is a popular underpinning of much research, particularly in the social and psychological sciences, so it has a strong presence in higher education studies both concerning retention and student performance. Pilkington (2018) used it to inform a study on

online undergraduate student motivation in computer programming courses. Pilkington approached student motivation in the course via a gamification intervention that introduced competition as an external motivator—one of the facets of self-determination theory proposed by Deci and Ryan (1980). Jenkins-Guarnieri, Vaughan, and Wright (2015) used it to inform a self-determination measure for studying college students. They advocated it as a strong explanatory tool, and they used it as the central element of their measure particularly citing Deci and Ryan's (2002) three key psychological needs of autonomy, competence, and relatedness. Jenkins-Guarnieri, Vaughan, and Wright (2015) designed their measurement based on these three variables (in addition to measuring student satisfaction) by asking students to rate their agreement with statements that reflected those values. After alterations and refinement, their measurement, based on Deci and Ryan's (1980) work, was overall successful and self-consistent in describing student self-determination. Two other examples of recent uses of self-determination theory in higher education studies include Dell, Verhoeven, Christman, and Garrick's (2018) use of it to study female retention in engineering programs and Dyrberg and Holmegaard's (2019) use of it to study student success in first year science, technology, engineering, and mathematics courses.

### **Tinto's Theoretical Model of Dropout Behavior**

Tinto's (1975) predictive model of college student attrition identifies factors in a student's dropping out from college. His model, based on Durkheim's (1961) theory of suicide (an application first done by Spady (1970)), defines terms and characteristics of dropping out while studying the interplay between significant individual and institutional factors. Tinto (1975) attributes dropping out to a lack of integration into either the social system of an institution or its academic system; dropping out because of poor social integration usually is

voluntary, and dropping out because of poor academic integration is usually compulsory (such as dismissal), but the two can be related. The theory holds that students' expectations and abilities upon enrollment are defined by family background, their own personalities, and school experiences before college. They integrate into social systems with peers and faculty; their academic integration is related to their performance as well as satisfaction with the academic system. If a student is not integrated or successful in both, it could lead to a drop-out decision on their part or the institution's part. Tinto's theory's reliability suggests its appropriateness as a theoretical underpinning for this dissertation: it was used to understand dropout decisions; Tinto informs a difference in types of dropout and creates a theoretical understanding of why a student might drop out.

Tinto's theory is popular; it has been applied or ratified in many other studies domestically and internationally (Terenzini & Pascarella, 1980; Terenzini, Pascarella, Theophilides, & Lorang, 1985; Lopez, 2018; Henderikx, Kreijns, & Kalz, 2017). Terenzini and Pascarella (1980) reviewed six studies on college student retention and attrition to study and validate Tinto's theory. They found that among the variables Tinto proposes, casual interactions with faculty members are among the most important to student withdrawal decisions, but they found that student background characteristics were less useful as predictors. Overall, they concluded that Tinto's theory was a useful descriptor of student attrition processes. In a later follow-up study, Terenzini, Pascarella, Theophilides, and Lorang (1985) created questionnaires for 2,183 students regarding the different elements of Tinto's theory. They sent follow-up questionnaires to students the spring after and received 723 usable responses. Again, background characteristics were weak or unusable as predictors of dropout activity, but the study found that student goal and institutional commitment were indeed still strong predictors of

persistence. Overall, Terenzini, Pascarella, Theophilides, and Lorang (1985) found strong support (with some exceptions) for Tinto's theory and suggested explanations unique to the situation for some of the discrepancies.

Tinto's theory is also present as a theoretical underpinning in many studies on student retention; Lopez (2018) used it to inform a literature review on Native American persistence in higher education, citing it as one of the most prominent theories on college persistence. Henderikx, Kreijns, and Kalz (2017) also cited Tinto as one of the primary and earliest theories on college student persistence. They used it to inform a study on defining success for students taking massive open online courses, noting that one of largest inconsistencies was the different definitions of success when comparing institutional and student goals. They used Tinto's (1975) model prominently to inform categorization of goals and factors that would affect student completion of the courses. Additionally, at least one other study has been done that proposes alterations to Tinto's theory in special cases (Kommers & Pham, 2016). Kommers and Pham (2016) studied Tinto's dropout theory in the context of international students from Asian countries and found that academic and social integration variables correlated to persistence differently than they did for non-Asian students; they suggested that cultural background needed to be considered even more strongly. In studies focusing on international students, this should be considered, but Kommer and Pham's (2016) results do not present a need to strongly depart from Tinto's original theory.

### **Non-Traditional Undergraduate Student Attrition**

Bean and Metzner's (1985) conceptual model of non-traditional undergraduate student attrition builds on Tinto's (1975) model and others (Bean, 1985; Pascarella, 1980; Spady, 1970; Tinto, 1975) to describe the attrition process of non-traditional students. While not disputing the

application of Tinto's model to traditional students, Bean and Metzner (1985) theorize that non-traditional students' decision-making processes surrounding dropping out are unique. They define a non-traditional student as "older than 24" or as not living "in a campus residence" or as "a part-time student" (Bean & Metzner, 1985, p. 489), and they define dropping out as enrolling for at least one semester but not enrolling for the next one (without having graduated). Bean and Metzner (1985) explain that the central differences between traditional and non-traditional students are that non-traditional students are affected less by social integration, care more about the quality and utility of their degrees, and are more likely to be affected by environmental variables. Using a pathway model, they show how social integration is deprioritized and environmental variables (such as employment, finances, and family support) are highly influential to non-traditional students. What is more, the academic variables and experience are still important to these students but are often filtered through what Bean and Metzner (1985) call "psychological outcomes," which include "utility," "satisfaction," "goal commitment," and "stress" (p. 491). These and environmental variables are key to informing a non-traditional student's decision to drop out, which makes this model relevant to my study of adult, online students who fulfill at least two of Bean and Metzner's three possible states of being non-traditional. In addition, CLEP exam credit being transferred in fits well as both an academic and environmental variable: it eases course choice difficulties and frees up finances. By building on the work of previous models, Bean and Metzner's (1985) theory fits my study well and makes it easy to integrate my variables into their model for study and discussion.

Bean and Metzner's theory appears in other recent literature informing both new theoretical models and empirical research projects. Choi and Park (2018) cite it as an informing theory in their testing of a "path-analytic model of adult dropout in online degree programs" (p.

130); their study determined theorized and tested relationships between dropout-inducing variables for online adult students. Likewise, Laux, Luse, and Mennecke (2016) proposed and tested another model concerning student success in light of online learning communities. Their work was heavily founded on the theoretical work of Bean (1980) and of Bean and Metzner (1985). They referred to definitions and models provided by Bean and Metzner and based much of their model on work done by Bean (1980). Bean (1980) and Bean and Metzner (1985) were referenced in an empirical study by Permzadian and Crede (2016) in which they studied the effects of first-year seminars on student grades and retention. Finally, Ashour (2019) referenced Bean and Metzner (1985) in a study of university attrition in the United Arab Emirates, and Wagner (2015) used their theory to inform a study that found that strong social frameworks and attending certain schools predicted higher retention rates for Hispanic students. Bean and Metzner (1985) have provided a strong framework and popular theory for studying online undergraduate student attrition.

### **Online Student Retention**

Tinto (1975) and Bean and Metzner (1985) described retention and persistence theories for residential students, but Rovai (2003) held that their models did not fully account for the needs of online students. Drawing on the work of both Tinto (1975) and Bean and Metzner (1985), Rovai (2003) outlined a synthesized and expanded theory that further described how online students (all inherently non-traditional students) make persistence decisions. Rovai (2003) remarked that Tinto's (1975) model was limited in its ability to explain behavior of non-traditional students, older students, and students strongly affected by adverse external factors. Rovai (2003) found that Bean and Metzner's (1985) model gave stronger consideration to external factors that might be more likely to affect non-traditional students; thus, Rovai (2003)

concluded that combining the two models would be most effective for considering the paths of online students.

Rovai (2003) arranged his model in two splits, a pre-admission split between skills and characteristics and a post-admission split between internal and external factors while attending college. Pulling on Tinto (1975) and Bean and Metzner (1985), student characteristics included demographic information, intellect, and academic ability. These would inform what a student's cultural and personal backgrounds were but would also put significant importance on a student's intellectual strength and experience prior to attending college. Rovai used research by Rowntree (1995) to inform what skills online students needed before beginning online courses. These included "skills in . . . computing . . . literacy discussion . . . time management . . . and interpersonal interaction . . ." (2003, p. 9-10). Student success in online courses requires different skills than are required in residential classes; online, technological skills and written communication are emphasized over face-to-face interactions or public speaking abilities. In addition, online students would normally have less face-to-face accountability and thus would need more self-discipline. Cole (2000) noted that writing becomes more important in distance classes and that online students need heightened information literacy skills. Rovai (2003) concluded that characteristics and skills are the pre-admission elements that inform a student's persistence decision in college.

The elements of Rovai's (2003) theory that apply after admission were split into external and internal factors. Rovai suggests external factors applicable to online students from Bean and Metzner (1985); these included "finances, hours of employment, family responsibilities, and outside encouragement" (2003, p. 10). While many residential, traditional students need not worry about these elements thanks to loans, full-time student status, family support, and their

times of life, online students share these considerations in common with most non-traditional students because despite attending college online, many of them still maintain their other, regular responsibilities at work and home (Rovai, 2003). The final consideration in leading to a student's persistence decision in Rovai's (2003) model was internal factors. Rovai cited Tinto (1975) in reference to the question of integration (academic and social), commitment, and community and cited Bean and Metzner (1985) in reference to student performance and emotional health listing factors such as "[c]urrent GPA" and "[s]tress" (Rovai, 2003, p. 9). Workman and Stenard (1996) are cited as describing unique needs of online students, which include "clarity," "self-esteem," "identity with the school," "social integration," and "access to support services" (p. 10-11). "Clarity" referred to students knowing policies and special requirements rules or contact information, self-esteem relates to a students' self-confidence in learning online, the identity with the school helped students to feel part of a community, social integration covered personal relationship with school personnel and other students, and access to services referred to students' ability to get the help they need from departments outside of the main academic unit. Finally, Rovai (2003) reported that internally supporting and encouraging self-directed learning helps students to persist. Rovai (2003) concluded that while no simple answer would ensure student persistence, studying characteristics, skills, external factors, and internal factors would help support online students. Rovai's study was referenced in other studies (e.g. Evans, Baker, & Dee, 2016; Grau-Valldosera, Minguillon, & Blasco-Moreno, 2019) on online education and is one of the most prominent models for studying online student retention.

### **Related Literature**

#### **CLEP Exams in Higher Education**

CLEP exams were introduced in the United States in 1965 as an alternative to general

education courses (Beaver & Paul, 2007). They give students the opportunity to demonstrate knowledge in 34 subject areas. As of 2017, more than 7 million students had taken a CLEP exam (“Celebrating 50 Years,” 2017) representing an enormous amount of college credit granted for students ranging from military adult learners to homeschooled students to traditional learners, attested to by College Board’s advertising decisions (“Home,” n.d.). CLEP received an initial burst of popularity in the late 1960’s and early 1970’s when colleges like the University of Iowa and Utah State University used them to advertise faster graduation times, cheaper degrees, and less time in general education courses (Beaver & Paul, 2007). Most notably, San Francisco State College in 1971 had incoming freshman take general CLEP exam causing 38% of those students to enter their first year as sophomores (Beaver & Paul, 2007). The cause of that high percentage was a very low standard set by San Francisco State College for what counted as passing, and now the College Board and American Council on Education have higher recommended standards for what score should grant students college credit. Even still, CLEP exams continued to grow in popularity and were soon being accepted by hundreds of colleges and growing to current number of over 2,900 higher education institutions (“Search Institution Policies,” n.d.).

However, relatively little research has been done on CLEP exams and most research relevant to this study was sponsored by the College Board, which owns the CLEP brand; this creates a need for further third-party research. To continue an understanding of CLEP, research on Prior Learning Assessment (PLA) is also relevant because CLEP exams originally were and still are a form of PLA (Boatman, Hurwitz, Lee, & Smith, 2019), which in general gives students the chance to earn credit for experiences gained. As an expression of the concept of PLA, CLEP exams have been useful to students and are worth more research for their wide usage.

**CLEP validity.** CLEP has not been without controversy regarding the validity of its tests and the rightness of offering college credit for completing a single exam. In an article titled “CLEP and the Great Credit Giveaway,” Stecher (1977) argues that early versions of CLEP exams were unreliably normed and that success on the tests did not represent adequate knowledge of the subject material. Earlier in 1973, Caldwell argued that CLEP exams were more likely on the high school level than on the college level and suggested that the then current trend of accepting scores at the 25<sup>th</sup> percentile was flawed. Caldwell (1973) advocated higher standards for granting CLEP credit and claimed that not doing so could lead to long term plans for the credit-by-exam initiative. By not maintaining high standards for CLEP students and evaluating and norming results to in-class standards, the American Council on Education could invalidate their own efforts. Caldwell (1973) further reported that the American Council on Education used to have very little justification for the suggested cut-off of the 25<sup>th</sup> percentile and that serious studies still needed to be conducted. And in doing further studies, Caldwell (1973) found that the tests were not normed to student performance and needed strong standardization. Galfo (1974) called into question Caldwell’s methods but voiced a popular sentiment that institutions needed to use caution in integrating CLEP into their missions and credit-granting processes.

The question of CLEP validity continued more recently with Moulder, Abdulla, and Morgan (2005) acting under the auspices of the College Board to study “Validity and Fairness of CLEP Exams” (p. 1). Their goals were study whether CLEP students were as successful as non-CLEP students in later discipline-specific courses and to determine whether their grades were comparable to their classmates. Taking a sample from 11 schools and using the College Algebra and Freshman College Composition (which has since been renamed “College Composition”)

exams, they compared later course success rates of students who passed CLEP exams with success rates of those who did not. Despite small sample sizes, they found that CLEP students were more likely to be successful in later courses and that the sample of students who took CLEP exams were more likely to earn A's and B's in subsequent courses as compared to their classmates who took the original course. More recently, in 2016, Godfrey and Jagesic completed a similar study also under supervision of the College Board. Studying composition and literature, math, and Spanish CLEP exams, they too found that students who took CLEP exams scored at or above the levels of their classmates who took the original exams. The trend of CLEP student stayed consistent through all three subjects, and Godfrey and Jagesic (2016) found that CLEP students were competitive with or excelled compared to their non-CLEP counterparts. They proposed that this signified CLEP students' efforts in their CLEP exams being a valid measure of their ability.

In addition, Barry (2013) also studied student performance in subsequent courses particularly related to the College Algebra CLEP exam and the English Composition CLEP exam. Barry identified students who had passed these exams ( $n=1,822$ ) and compared their performance in subsequent courses with students who had taken the original courses represented by those exams. While CLEP students scored higher than their counterparts in both categories, they only scored significantly higher in regard to the English Composition CLEP; there was no significant difference between scores in subsequent math courses. Both of these results affirmed the validity and appropriateness of the studied CLEP exams for predicting student success. Of course, both of these final two studies, while recent, were commissioned by the College Board but are among the only studies to validate CLEP exams recently, suggesting a need for further research into CLEP exam validity and CLEP student success.

## **CLEP Student Performance in Higher Education**

In assessing the value of CLEP exams, the most popular questions have surrounded CLEP student performance in higher education compared to their peers. Many studies have been conducted on CLEP student performance (Beaver & Paul, 2007; Barry, 2013; Boatman, Hurwitz, Lee, & Smith, 2019; Scammacca & Dodd, 2005), but the majority of them were conducted in the 1970's shortly after CLEP was first created (Cashin, 1974; Enger & Whitney, 1974; Tittle, Weiner, & Phelps; 1975). And because the questions and designs of CLEP exams change regularly, the studies from the 70's are less relevant to the question of whether CLEP exams correlate to higher student performance. Even still, those studies generally found that CLEP students performed at or above the levels of their non-CLEP classmates. The standard explanation for this tended to be that the students who pass CLEP exams might already be more academically skilled (Beaver & Paul, 2007), but more optimistic researchers conclude that studying for CLEP is comparable to in-class experiences as far as level of preparation for later course (Godfrey & Jagesic, 2016). The skills and knowledge acquired in preparing for a CLEP exam or the skills and knowledge signified by passing a CLEP exam are generally held in recent studies to be equivalent to the skills and knowledge acquired in taking the equivalent course (Godfrey & Jagesic, 2016; Scammacca & Dodd, 2005).

While little to no qualitative research has been done on persistence in CLEP students, Firmin and Gilson's 2007 study of undergraduate students who earned their degrees in only three years suggests some characteristics in common with CLEP students. Firmin and Gilson's students were self-motivated and driven by a combination of personality and environmental factors that included wanting to save money, move on to graduate school, or not be bored. The students were interviewed to determine why they earned their degrees so quickly and to

determine whether they were happy with their choices. The students generally confirmed that they were happy with their choices, but follow up research was needed to determine the long-term responses to their educational choices. In addition, Firmin and Gilson's students seemed to evince a high degree of academic self-confidence, which helped them to be less stressed by their heightened workloads. This sort of a relationship was also studied in Tan and Tan's (2014) study on high ability students. Tan and Tan found that students with higher optimism and self-esteem scores typically felt less stressed by their workloads. Since students who pass CLEP exams generally have higher-than-average GPAs (Barry, 2013, Beaver & Paul, 2007; Scammacca & Dodd, 2005) and are likely to graduate before non-CLEP students (Barry, 2013), generalization of these high-ability studies may be applicable to understanding CLEP students' persistence. While not all CLEP students would be considered high ability, their educational paths mirror high ability students in some respects with the end results of higher success and retention rates than average students.

**Role of credit for students.** For students, CLEP exams generally have two central appeals: saving time and saving money (Beaver & Paul, 2007). In fact, Beaver and Paul (2007) found that the students ( $n = 201$ ) in their study valued the saving of time more than the saving of money with 40.3% ( $n = 81$ ) claiming that saving time was their strongest motivation for taking a CLEP exam and 23.9% ( $n = 48$ ) claiming graduating on time. Only 36.8% ( $n = 74$ ) claimed saving money as their primary reason. This suggests some of their students could have been lightening course loads by one class per semester or have been trying to graduate early. Beaver and Paul (2007) also suggested it could mean that some students who use CLEP are trying to eliminate a pre-requisite for a higher-level course. In addition to saving time and money, Beaver and Paul (2007) also reported that 7.0% ( $n = 14$ ) of students wanted to skip a course and 4.0% ( $n$

= 8) wanted to fill up free electives space. (Beaver and Paul did note that some students chose multiple options.) Simultaneously, student reasons for using CLEP may also be similar to student reasons for using Advanced Placement (AP) credit (Evans, 2019). Evans (2019) found that students who applied AP credit to their degree were motivated by graduating college early, taking more courses, or taking more difficult courses—results that align with what Beaver and Paul (2007) found. When CLEP students anticipate the benefits of applying CLEP credit to their degrees, they generally envision saved time and money.

Boatman, Hurwitz, Lee, and Smith (2019) confirm that students who use CLEP exams do generally save money on a credit-by-credit basis. They claim that at a then current cost of \$85 per CLEP exam (not including sitting or study material fees), students could expect to save approximately \$1,200 to \$2,000 per exam based on the kind of school the student was attending. Beaver and Paul (2007) also report that in comparison to the time of taking a class, 77.4% (n = 72) of students who took a CLEP exam and had taken a similar class in high school spent fewer than 15 hours preparing. Of students who had not taken an equivalent high school course, 61.1% (n = 66) spent fewer than 15 hours studying. Compared to spending three hours in class per week for approximately six weeks in addition to homework, studying for fewer than 15 hours is a significant time savings for students in the short term. In the long term, several CLEP exams taken could mean an entire semester of time and tuition saved for ambitious students.

**Graduation rates of CLEP students.** The College Board claims that students who use CLEP exams are more likely to graduate than their peers (“CLEP: Supporting Academic Success in Higher Education,” 2018), but the relationship generally remains one of correlation rather than of causation in the literature (Beaver & Paul, 2007). Research studies’ findings support this correlation and correlations to other graduation and student success related performance metrics.

Barry (2013) conducted a study of 8,124 students who had passed a CLEP exam and graduated from a higher education institution. Controlling for demographic variables, Barry found that CLEP students were likely to graduate in fewer semesters of enrollment and with less credit overall than their peers (graduating with fewer credits suggests a more focused track to graduation and less time spent taking unneeded courses). CLEP students in Barry's study graduated in 9.50 semesters on average and non-CLEP students graduated in 9.88 on average. This could signify heightened motivation on the parts of CLEP students, but that gap could also be represented by time saved through the use of CLEP exams. Furthermore, CLEP students in Barry's (2013) study graduated with on average 1.5 fewer credits than their counterparts, which could also have helped encourage shorter times spent in classes and further signifies a perceived heightened awareness in CLEP students of what courses they do and do not need to take—a characteristic that seems to align with CLEP students being more likely to graduate since they would be able to more strategically plan their degrees and course schedules and thus be less likely to fall behind or handicap their own graduation attempts.

While Barry did not look for an increased likelihood of graduation—only an increase in the speed of graduation—Scammacca and Dodd (2005) found that in certain years (1994-1996) and for certain CLEP exams, CLEP students were more likely to graduate than their peers. They studied students who had taken nine different CLEP exams including English Literature, Psychology, Macroeconomics, and others. In five of the exams and in at least one year each, CLEP students were somewhat or very likely to be more likely to graduate than their non-CLEP peers; and of all the groups compared (CLEP, non-CLEP, AP, non-AP), CLEP students were more likely to graduate than their peers more often than any other group. However, despite descriptive statistics being in favor of more CLEP students than non-CLEP students graduating,

Scammacca and Dodd (2005) did not come to a significant conclusion other than to find that CLEP students were at least as likely to graduate as their peers. Boatman, Hurwitz, Lee, & Smith (2019), however, studied a larger sample of 800,000 first-time CLEP-takers and found a significant relationship between scoring a 50 (the ACE recommended score) on a CLEP exam and graduating. Student graduation likelihood was increased 5.5% for students who had passed a CLEP exam, and the speed at which it was earned was also increased according to Boatman, Hurwitz, Lee, & Smith (2019). While these results suggest that graduation likelihood may correlate to CLEP exam usage, few recent studies, a lack of study of student sub-populations, and limited resources suggest further research is needed.

**GPA.** Studies have compared CLEP student GPA with average GPAs and found CLEP students performing at or above the level of their peers. Scammacca and Dodd (2005) found that on average, students who took one of the nine CLEP exams focused on in their study had higher overall GPAs than their classmates, but they found little difference in GPA in subsequent courses of a similar subject to the exam taken. Barry's (2013) study found that CLEP students were likely to have a higher GPA than their peers. Barry (2013) also found that while students who took the College Algebra CLEP did not have significantly higher scores in subsequent math courses, students who took the English Composition CLEP exam did have higher scores in subsequent English courses than their peers. Finally, Beaver and Paul (2007) found a slight correlation between passing CLEP exams and GPA, but both also correlated to time spent studying, so the result was unsurprising. While studies generally reflect positively on the relationship between CLEP and GPA, Beaver and Paul (2007) questioned whether this was due to the CLEP exams themselves or to characteristics of students who are likely to pass CLEP exams: students who pass CLEP exams seem likely to be smarter and perhaps more motivated.

While no study has shown a causal relationship between CLEP exams and GPA, CLEP students are not performing less well in subsequent courses.

### **Measures of Student Success**

Student success in higher education can be measured by persistence, retention, and graduation. While these terms are sometimes intermingled, persistence is the act of a student returning to any school for another semester, and retention is the act of a student returning to their original college for another semester within a specific timeframe (Romine, Baker, & Romine, 2018; Graham, Frederick, Byars-Winston, Hunter, and Handelsman, 2013). Both of these are valid measures of student success; they are used by theorists (Bean & Metzner, 1985; Spady, 1970; Tinto, 1975) and empirical researchers alike (Chen, Chen, & Oztekin, 2017; Hester & Ishitani, 2018; Johnson & Stage, 2018). Persistence and retention measures are used to study year-to-year rates and enrollment-to-graduation rates; particularly, successful student graduation is often measured as the retention of a student who graduates within six years (Chen et al., 2017; Johnson & Stage, 2018).

**Persistence and retention.** While retention involves students being retained by one specific institution until graduation, persistence involves students continuing to pursue their bachelor's degree at one institution or another, and much research on persistence is tied to Tinto's (1975) model of student attrition; by decreasing or addressing causes of attrition Tinto mentions, student persistence can increase as can graduation rates. Graham, Frederick, Byars-Winston, Hunter, and Handelsman (2013) posited that STEM majors needed extra attention in persistence to be able to graduate in enough numbers to meet workforce demands. The researchers proposed that persistence is informed by student motivation and confidence, and their study outlined a persistence framework, which held that motivation, confidence, identity,

and external motivators interacted with each other to encourage student persistence highlighting the idea that persistence applies strongly to student motivation rather than administrative efforts. Savage, Strom, Hubbard, and Aune (2017) propose that it is also informed by commitment (which Tinto (1975) corroborates); they hold this can be influenced through interpersonal communication from instructors. The researchers posited using Rusbult's (1980) investment model to further study student persistence. Both of these studies use Tinto's (1975) work to undergird their theories. Using a longitudinal model of dropout, Tinto suggests a more holistic and institutional approach to persistence that is a predictive model rather than a descriptive one.

Many empirical studies have been done on student persistence in an attempt to better serve students and to improve services and graduation rates (Bahi, Higgins, & Staley, 2015; Roberts & Styron, 2009; Bowman & Denson, 2014). In reference to major-choice persistence, Bahi, Higgins, and Staley (2015), found that math students were more likely to switch majors early in their college careers. Roberts and Styron (2009) found that students who had a high opinion of their social connectedness and their institution's faculty approachability were more likely to have persisted that semester. Bowman and Denson (2014) proposed that student persistence and commitment were related to student-institution fit, suggesting that if a student finds their values do not fit those of their institution, they will be less likely to persist. Waldron and Yungbluth (2007) found that students integrated into learning communities were also more likely to persist than those who were not.

But more central to the study of CLEP student persistence, if students who transfer in CLEP credits are similar to transfer students, studies on transfer student persistence will be more relevant; of course, regular transfer students will already have failed to persist at one school even if they are persisting overall at another. CLEP students will not necessarily have failed to persist

at another school, but the research is worth describing. Beyond that, much of the research on transfer students is focused on students transferring from community college to four-year institutions (D'Amico, Dika, Elling, Algozzine, & Ginn, 2014; Lee & Schneider, 2018), but even that may be somewhat analogous to CLEP student experiences. D'Amico et al. (2014) found that transfer students were more likely to persist semester-to-semester if they were participating in classes and academically integrated. Lane, Martin, and Henson (2015) found that transfer students were less likely to be attached to their universities than traditional students, which opens further questions about whether CLEP students might have less affiliation to their university depending on previous credit—affiliation (or institutional commitment) being a key factor in persistence (Savage et al., 2017). Lee and Schneider (2018) found that academic advising strongly influenced transfer student persistence possibly because reliable academic advising was necessary to their being able to apply their credits to their new degrees and to maintain graduation deadlines. Tuttle and Musoba (2013) found that transfer students with higher GPAs, who were younger, and who were taking full-time classes were also more likely to persist than those who did not meet those criterion corroborating Tinto's theory that students who are more academically integrated were less likely to fall prey to attrition. Higher semester GPAs and transferring in as a sophomore, junior, or senior (rather than a freshman) were shown to have a strong correlation to persistence (Ishitani, 2008).

Overall, high performing students or students with more credits seem more likely to persist than others even after having transferred. If CLEP students are high achievers or transfer in significant amounts of credit, this could have implications for them being more likely to persist than other transfer students. However, there is a significant gap in the research

concerning CLEP persistence behaviors even though universities often classify CLEP credit as transfer credit.

**Retention.** The terms “persistence” and “retention” are often used interchangeably, but many define retention as a measure of persistence at a particular institution (Hafer, Gibson, York, Fiester, & Tsemunhu, 2018; Sorensen & Donovan, 2017). Hagedorn (2006) further clarifies that the former is a student-centric term and the latter is an institution-centric term: “institutions retain and students persist” (p. 6). Hagedorn (2006) disambiguates the term “attrition” from these by defining it as the “diminution in numbers of students resulting from lower student retention” (p. 6) and further differentiates these from “graduation rates,” which is the percentage of students graduating from a single institution. Graduation rates and overall retention are often measured via four, five, or six-year rates (Hagedorn, 2006).

While the definitions sometime vary across research, both retention and persistence are closely related to graduation. Retention discussions, while sometimes student-focused, are usually based on actions controlled by institutions (in line with Hagedorn’s (2006) definition), and sometimes those actions include admissions departments being more selective or admitting only students with more persistence-based characteristics (Bingham & Solverson, 2016). Many other studies that use a definition similar to Hagedorn’s have been done on institutional retention including Hafer et al. (2018), Pleitz, MacDougall, Terry, Buckley, & Campbell (2015), Sneyers & De Witte (2017), and Sorensen & Donovan (2017). These retention studies tend to be quantitative and encompass large sample populations usually looking for variables that predict either graduation and retention or attrition.

Hafer, Gibson, York, Fiester, and Tsemunhu (2018) and Sorensen and Donovan (2017) found that GPA had a strong correlation to retention. Hafer, et al. (2018) particularly found that

among students at a two-year school, GPA was the strongest predictor of retention and that GPA combined with enrollment status and progress so far were even better able to predict student success. Sorensen and Donovan (2017) studied retention for online students at a for-profit university particularly noting student grades in their last and second-to-last course before they dropped out. Sorensen and Donovan (2017) found that the more courses a dropout took, the higher their GPA tended to be when they dropped out. Sneyers and De Witte (2017) found that improving student satisfaction, increasing first-year selectivity, better preparing students, supporting specific at-risk demographics, increasing average staff age, and increasing difficulty of sophomore year entry policies improved retention in a Dutch university. By studying incoming freshmen at a midwestern university, Pleitz et al. (2015) found that students were entering school with unrealistic expectations concerning academic, social life, and the institution with the academic expectations being the least reliable. They found that encouraging realistic expectations of college may help students to be retained for their sophomore year, concluding that institutions may have failed to accurately prepare students for what to expect. The field of retention study continues to expand as new populations enter higher education, new technologies make retention questions more complicated, and a changing economy affects higher education.

### **Non-traditional Students**

In 1985 Bean and Metzner established a model for attrition of non-traditional students; they defined these students as being older than 24, not living on campus, or being part-time, but the definition in general has not remained consistent. With the rise of the Internet and alternative forms of education, definitions of non-traditional students have adapted or not been made clear (Trowler, 2015). The term has been used to refer to a wide variety of characteristics such as sexuality (Trowler, 2015), economic background (Meuleman, Garrett, Wrench, & King, 2015),

being first in their family to attend college (Meuleman, Garrett, Wrench, & King, 2015), or ethnicity (Trowler, 2015), but as Trowler, a Marxian theorist, points out, the most common theme in the use of the term is to describe students who are not cohesive with the “norm” and whose central shared characteristic is a difference from what is standard. Chung, Turnbull and Chur-Hansen (2014) studied 45 articles referring to non-traditional students so as to categorize the ways the term was defined. They found definitions (in order of prominence) based on age, multiple roles, part-time status, gaps in study, commuter status, demographic differences, sex, admission pathways, participation in non-traditional programs, “being disadvantaged” (p. 1232), ethnicity, disability and trauma, and having a degree already (Chung, Turnbull, & Chur-Hansen, 2014). While these definitions prompt discussion of bias or disadvantage for those outside the norm, they also provide strong (if fluid) evidence for the only commonality in how all researchers define non-traditional students: outliers. However, with the growth of online and adult student populations, the days of those populations being “non-traditional” in the literature may be numbered.

**Adult undergraduate students.** According to Chung et al. (2014), the most common definition of non-traditional students was based on their age, and usage by other researchers (Bean & Metzner, 1985; Trowler, 2015; Safford & Stinton, 2016; Thompson & Porto, 2014) confirm that age is the most reliable marker of a non-traditional student. Age-wise, the most common definition of an adult learner specifically is being enrolled in undergraduate or graduate studies at an age greater than 24 (Schroeder & Terras, 2015; Chen, 2017), but Kasworm (2018) suggests that roles outside of education and psychological development are more relevant to whether someone operates as an adult student. Kasworm (2018) calls for a more in-depth definition of adult learners based on an age of 25 years or more; “adult roles” with family, work,

or community; a “gap in formal schooling,” and “social independence from a parental family unit” (p. 84). Kasworm’s definition noticeably differs from Bean and Metzner’s (1985) definition of non-traditional students in that it focuses on social status and a break from schooling, but it still falls within the category of a non-traditional learner since Bean and Metzner’s categories are inclusive rather than exclusive.

As unique as their definitions, adult learners differ from traditional students in more than age and social status, but according to Chen (2015) there is a lack of large-scale research on adult learners because many institutions focus on youth-centric populations and tend to exclude adult learners. Kasworm (2018) claims that adult students are often more focused in their goals than traditional students likely because they have the benefit of more life experience and know better their own goals—goals that must be strong in order for them to re-enroll in college while maintaining their other multiple roles. Kim and Baker (2015) found that adult learners who acquired two-year degrees were likely to earn higher wages after graduation but that they often had to work fewer hours or work lower-paying jobs while taking courses so that they had time to take classes. Adult learners are also often unsure of how to navigate the logistics of college life (Taylor & Bicak, 2019)—they have strong preferences for thorough and personalized advising help as they seem to lack confidence in advising themselves (Schroeder & Terras, 2015). They want to be understood and valued for their own demographic identity, and they want personalized help from instructors or student support associates (Stone & O’Shea, 2019).

Even still, perhaps the most important finding about adult learners comes from Holyoke and Larson’s (2009) qualitative study and the different generations considered adult learners. While it may be tempting to assume that adult learners are a homogenous population, they rarely are, and more research needs to be done on sub-populations (divided by age, gender, ethnicity, or

other demographics). Kasworm and Pike (1994) found that adult learners received higher GPAs than traditional students, but few large-scale studies have been done on the adult learner population or prominent sub-populations (Chen, 2015). Particularly, there is a need for further study of adult learner success in traditional classrooms. While there is research on their success in online learning environments—a sector they significantly outnumber traditionally-aged students in (Clinefelter & Aslanian, 2016)—adult learners are still something of a mystery that many universities seem to prefer to forget (Kasworm, 2018).

**Online undergraduate students.** Online learning is the most recent addition to the list of possible definitions for non-traditional students. Online learners learn through the Internet and are often completely outside of the brick-and-mortar classroom. This can lead to feelings of isolation (Dickey, 2004; Croft, Dalton, & Grant, 2010) and can cause distance students to have to more actively use self-regulated learning strategies (Broadbent, 2017). The identified isolation has often found its remedy in online student-generated content that helps to promote discussion and a sense of community (Dickey, 2004; Croft, Dalton, & Grant, 2010). Zimmerman (2012) found that online student success (as measured by GPA) correlated significantly to amount of time spent interacting with course material (a prime self-regulated learning strategy). Further, Clinefelt and Aslanian (2016) found that 74% of online learners were also adult learners, a population that is currently not digitally native but still needs to use Internet technology to be educationally successful (Chen, Lambert, & Guidry, 2010). This comes with challenges of students being frustrated with technology but also means that online students can be more easily observed and at-risk students can be more quickly identified (Hughes, 2007). Finally, while online students appreciate the convenience and other aspects of online courses that allow them to learn while still engaging in their outside “non-traditional” roles (Cole, Shelley, & Swarts, 2014),

their needs are often still similar to residential students' needs in relation to faculty: they want valuable interactions with their faculty the same as a traditional student might (Chen, Lambert, & Guidry, 2010; Cole, Shelley, & Swarts, 2014).

Online students differ considerably from residential students in technological needs and life-roles, but the literature suggests that interaction with others—classmates and instructors—is one vital step towards increased satisfaction and persistence. This is unexpected because while Tinto (1975) posits that social integration (academically and with peers) is an important factor in traditional student persistence, later theorists Bean and Metzner (1985) minimize the value of social integration for non-traditional students. However, Bean and Metzner (1985) do not completely discount it, and, building on the theories of both Tinto and Bean and Metzner, Rovai (2003) suggests a new theory of persistence for online students that identifies the effect of “Interpersonal Relationships” on student persistence decisions (p. 9). Again, however, the need is minimized and only briefly mentioned. The results of other studies (Chen, Lambert, & Guidry, 2010; Cole, Shelley, & Swarts, 2014) suggest that perhaps more research should be done into social integration for online students; at the same time, the use of greater amounts of CLEP exams may shorten a student's stay at an online college, which could reduce the opportunity and the need for interpersonal relationships, suggesting further implications for adult online learners transferring in CLEP credit.

Online student retention has been researched, but the research is often in the form of a case study or phenomenological study, which while helpful lacks the generalizability of quantitative research. But just as there is a large-scale lack of research into adult learner populations (Chen, 2015), more large-scale research is needed on population-wide factors of online learners. Unfortunately, with the ever-widening gamut of who online learners are,

comprehensive profiling of a central “online learner” avatar will be difficult if impossible, so uniquely specialized studies or generalities (despite their inadequacy (Kasworm, 2018)) will have to suffice.

However, some studies have been done on online learners and have found some of the facets that separate or identify them with traditional student populations. Sorensen and Donovan (2017) studied online learners at a for-profit institution and found high GPAs and good recent course scores correlated to students persisting. Thistoll and Yates (2016) found that staff and students agreed that distance students would be served well by institutions having quality tutoring and clear curriculum. Cochran, Campbell, Baker, and Leeds (2014) found that GPA and class standing were strong predictors of retention for online students. And Park and Choi (2009) found that online learner success was enhanced by relevancy of courses (suitable for ostensibly practically minded students) and by organizational support.

In regard to online student non-retention, student reasons for dropping out often involve extrinsic reasons or bad interpersonal interactions with university staff. Sorensen and Donovan (2017) found that online students were likely to drop out because of finances or because they did not like their interactions with their professors; Thistoll and Yates (2016) found students blamed bad advising and life requirements for not finishing; and Packham, Jones, Miller, and Thomas (2004) identified changes at work, workload, and time available as prime reasons for dropping out. But as Moore and Fetzner (2009) point out, online student success (measured by course rates in their study) are widely disparate between institutions, and what works for one online student population may not work for another or may be hard to incorporate at another institution, making online student retention difficult to study with full generalizable confidence.

## **Prior Learning Assessment**

Despite CLEP exams having taken on a researched and practical life of their own, they remain a subset of a larger category of means to earn college credits: prior learning assessment. Boatman, Hurwitz, Lee, & Smith (2019) identified prior learning assessment as “a form of competency-based education” (p. 2). Prior learning assessment can take on many forms ranging from test-based to essay-based to project-based to portfolio-based. Sometimes these exams are internally created at institutions; in these, students can earn credits directly from the institution. And other times, these exams are created by a third-party and endorsed by an organization like the American Council on Education, an accrediting body, or individual universities. The student can then transfer that credit to any accepting institution. As exemplified by CLEP exams, prior learning assessment opportunities are often exam-based and focused on general education competency, meant to be straightforward ways for high school seniors to demonstrate competency in typically freshmen and sophomore classes. Evans (2019) particularly noted that, concerning uses of prior learning assessment (Evans studies advanced placement in particular), students cited a desire to take advanced classes, take more classes, or finish early. Boatman, Hurwitz, Lee, & Smith (2019) explained that, like CLEP exams, most students used prior learning assessment to save money or time in their degree programs. As a subset of prior learning assessment, much of the research on CLEP exams is broadly applicable to most forms of prior learning assessment, and further study of general prior learning assessment creates a clearer context for CLEP exams.

Harrop, Casey, and Shelton (2018) proposed that prior learning assessment may have an important place in higher learning for adult learners in a society with access to the Internet. Calling on theories of loose andragogy and Kolb’s theory of experiential learning (Merriam et

al., 2007). Harrop, Casey, and Shelton (2018) explained a model at George Fox University in which students submitted portfolios and essays describing experiences and knowledge at the university level from personal and professional experiences. Some of the credit opportunities were associated with simple eight-week courses that specially prepare students to earn the portfolio credit. Harrop, Casey, and Shelton (2018) suggested that in a digital, information era, a rigorous prior learning assessment system may be a strong way to encourage adult learners to develop information literacy skills and take ownership of their own degrees while still maintaining academic standards. Bergman and Herd (2017) confirmed that prior learning assessment is useful for non-traditional, adult students, particularly those in the military. They proposed prior learning assessment systems as a way to help military service members translate experience earned in the military into college credit. In this case, prior learning assessment does the double duty of representing college credit and as providing a rephrasing of military experience “into terms that civilian employers will understand” (p. 79).

Stevens, Gerber, and Hendra (2010) further studied prior learning assessment at the University of Massachusetts at Amherst. In this program, students provided long written documents, essays, and reflections concerning past life experience. Students further used scholarship and research to contextualize what they learned or experienced within academia as a bridge to assessing their credits. Stevens, Gerber, and Hendra (2010) suggested that this process is also a learning process itself as the self-reflection, description, and contextualization helps students better understand and learn from their own past experiences. All of these elements including a “series of narratives . . . a prior learning transcript statement, resume, degree plan, learning autobiography, reference list, and supporting documentation” completed the students’ portfolios (p. 380). Faculty then read students’ projects and assigned credit for the students;

these credits were integrated into unique degree programs designed around each student.

Stevens, Gerber, and Hendra (2010) concluded that through transformational learning guided prior learning assessments can have educational value for students beyond the credits they earn. This, then, is the current state of prior learning assessment. Many institutions and students use it as a short cut to earning college credit, but in a 21<sup>st</sup> century learning environment, it may have unexplored potential for taking a more central role in higher education especially for non-traditional, adult, and online learners; CLEP exams, as a central example of prior learning assessment, may be the most thoroughly integrated form at this point, and further study into these and prior learning assessment serves student populations and institutions well.

### **Summary**

Little research has been done on whether CLEP exam usage correlates significantly to adult, undergraduate, online student graduation rates, but the literature does include information on each of those individual constructs. Bean and Metzner's (1985) model of non-traditional undergraduate student attrition will be the most useful in interpreting the results of the proposed study though Tinto's (1975) model helps to inform it, and self-determination theory (Deci & Ryan, 1980) is the underpinning of both of these. The research on CLEP exams is sparse, and many of the studies about them (Barry, 2013; Scammacca & Dodd, 2005) have been sponsored by the company that offers them—the College Board. Even still, early results suggest that traditional students who use CLEP exams tend to perform at or above the levels of their peers (Barry, 2013). This data may need to be ratified, and a similar study still has not been done on non-traditional, adult learners. The research on adult and online learners is extensive and supports a believe that there are demands on their resources not shared by traditional students—these demands can lead to attrition (Chen, 2017). Studies referring to persistence, graduation,

and retention served as valuable enforcer of the idea that graduation within six years is not only practical but also common in retention and student success studies (Chen, Chen, & Oztekin, 2017; Hester & Ishitani, 2018; Johnson & Stage, 2018). Overall, the literature provides helpful starting points and highlights an important gap that needs to be filled by further research.

## CHAPTER THREE: METHODOLOGY

### Overview

The following lists the various portions of the methodology for this study. Details are provided regarding the correlational quantitative design and how it will answer the research questions and null hypotheses. The participants, setting, instrumentation, and procedures are explained. The data analysis process is given in detail and with consideration for appropriateness to the proposed question.

### Design

This study used a non-experimental correlational quantitative design to study the predictive relationship between College-Level Examination Program (*CLEP*) exams in four disciplines and six-year graduation completion status at an accredited university. Correlational research is a nonexperimental method that is used to discover predictor variables that relate to criterion variables (Gall, Gall, & Borg, 2006). While true causal relationships are difficult to determine, correlational research is particularly well suited to studying such possible relationships between variables (Gall, Gall, & Borg, 2006). Correlational research does not lead to strong results in terms of causation. This is because it is limited in scope and may not consider confounding variables (Gall, Gall, & Borg, 2006); it was chosen here because it allows researchers to discover “information concerning the degree of the relationship between the variables being studied” and because a large dataset of un-manipulated variables is used (Gall, Gall, & Borg, 2006, p. 336). Furthermore, correlational research is also useful for enabling prediction of scores in a variable (Gall, Gall, & Borg, 2006).

Because this study analyzed the strength of the relationship between varying numbers and types of *CLEP* exams in specific disciplines and a student’s likelihood of graduation,

correlational research design was the appropriate choice. Similar studies have used a correlational design, but many of them are older because less study has been conducted on CLEP exams in the last three decades: Appenzellar and Kelley (1983) studied correlation of CLEP student calculus grades and CLEP scores, and Curran, Appenzellar, Kelley, and Osborn (1983) found a correlation between CLEP score and algebra grades. Including both CLEP and retention into one study, Enger and Whitney (1974) showcased the appropriateness of a correlational design by using it to study the likelihood of graduation among students who applied CLEP credits to their degrees at an Iowan university. The use of a correlational design in Enger and Whitney (1974) confirmed the appropriateness of that design to this current study.

In this study, the predictor variables were the number of credit-by-exam tests obtained from the College-Level Examination Program (*CLEP*) and type of exam credit. CLEP credit is earned when students pass CLEP exams at an institution's minimum standards and then transfer credit to that school (Enger & Whitney, 1974). The predictor variable consists of four sub-variables; they are the number of credits the student earned in the following categories: English, history, science, and mathematics from the College Level Examination Program. The purpose of comparing the different disciplines was to determine whether early college credit and proficiency in a particular subject related to persistence.

The criterion variable was a student's six-year graduation status as a retention status, which is counted when a student graduates with an undergraduate degree within six years of enrolling—a measurement used frequently in student retention research (Chen, Chen, & Oztekin, 2017; Hester & Ishitani, 2018; Johnson & Stage, 2018). Because the criterion variable was dichotomous (students who graduated and those who did not), a logistic regression was used to analyze the data.

### **Research Question**

**RQ:** Can the number of exams earned from specific College Level Examination Program (CLEP) disciplines (language arts, history, science, or mathematics) predict graduation status for online adult undergraduate students?

### **Hypothesis**

**H<sub>0</sub>:** There will be no predictive relationship between the criterion variable (six-year graduation status) and the predictor variables (number of exams earned from specific College Level Examination Program (CLEP) disciplines—language arts, history, science, and mathematics College Level Examination Program exams) for online adult undergraduate students.

### **Participants and Setting**

The participants for this study were adult, online, undergraduate students at a private, religious university in the southeastern United States. These students enrolled in 2010-2011, 2011-2012, or 2012-2013 school years. The university that was chosen is dedicated to providing education in various fields and disciplines but with a religious and liberal arts overtone and a focus on career preparation. It was a younger school, founded within the last five decades, that came into national prominence when it began offering online courses and experienced a large population surge. It now hosts over 100,000 active and enrolled students. The students who enrolled were often religious, minority, military, and adult learners; as online students, they were non-traditional students according to Bean & Metzner, 1985. Most classes were online with some students able to take residential intensives. The courses were usually held in an eight-week format and were asynchronous and usually had weekly assignments and deadlines.

The sampling procedure was a non-probability one in which participants were selected

based on the presence of a variable rather than random choice (Gall, Gall, & Borg, 2007). In this case, the entire population of relevant students from the three years was used apart from those whose data was invalid or corrupted; invalid data was equated to students missing data elements or with data that did not match the research variables being observed. This provided a large sample to study and increased the reliability of the study. The data was archival, so permission from the school was gained, but the participants did not need to be made aware of their participation. Six-hundred-and-sixteen participants were needed to conduct data analysis and measure a small effect size, but only 66 were needed to measure a medium effect size (Gall, Gall, & Borg, 2007).

Archival data was used in this study. The sample size was 34,927 participants. Having more participants than required by Gall, Gall, & Borg's (2007) requirement of 616, made it possible to conduct the study with a small effect size and a statistical power of .7 at the .05 alpha level. The age range of the participants was from 25 to 84 years old, the average age was 37.45 years old. These students were from diverse major and professional backgrounds, but all were involved in the online environment of learning and enrolled in 2010-2011, 2011-2012, or 2012-2013.

The criterion variable was dichotomous: those who graduated within six years and those who did not. The portions of the sample population were referred to as graduated and non-graduated students, and the only differentiating factor in determining the groups was their six-year graduation status. The graduated group had 11,358 members. The age range of the graduated students was from 25 to 76, the average age was 37.4. The non-graduated group had 23,569 members.

## **Instrumentation**

This study used archival data concerning how many general education CLEP exams students applied to their degrees and whether or not they were retained; because of this, the predictor variable (number of CLEP exams) and type of CLEP exams taken were the criterion variable. The criterion variable was six-year graduation and is well documented as a commonly used measurements for student persistence (Chen, Chen, & Oztekin, 2017; Hester & Ishitani, 2018; Johnson & Stage, 2018). The purpose of this particular combination was to study the success of students who use prior learning assessment opportunities like CLEP exams in specific disciplines.

### **CLEP Exams (Predictor Variable)**

CLEP exams have been used by the College Board, American Council on Education, and nearly 3,000 universities and colleges to determine student knowledge regarding general education subjects like math, composition, history, and foreign languages (“Key Exam Information,” n.d.). Students are tested on a scale of 20-80, and in most cases a score of 50 is enough for most college to grant credit; students are generally given 90 minutes to complete each exam. Colleges and universities make their own decisions regarding which CLEP exams they accept, how much CLEP credit they accept, and at which scores they accept CLEP credit. At the university in question, all but one CLEP exam was accepted, and most were accepted at a minimum score of 50. These exams were then accepted for between 3 and 12 credits with most being accepted for 3 credits. The credit was treated as transfer credit and did not count towards the institutional credit requirement. CLEP exams are developed by the College Board using expert scholars from various disciplines. The scholars develop hundreds or thousands of questions for each CLEP exam, and these questions are sorted into groups or categories that are

then randomly organized to form each testing experience by each student; using this method, the chances of two students having the same testing experience are very low. The CLEP exams are then tested by college-aged students, and the scores and questions are normed to predict what score a student should earn in each CLEP exam to be able to earn college credit. The College Board further differentiates between types of CLEP exams by sorting them into broad categories: Composition and Literature, World Languages, History and Social Sciences, Science and Mathematics, and Business (“CLEP exams,” n.d.). For this study only the four areas that focus solely on CLEP exams that fall into traditional general education categories of language arts, history, science, and mathematics were used.

The language arts exams offered by College Board include American Literature, Analyzing and Interpreting Literature, College Composition, College Composition Modular, and English Literature (“CLEP exams,” n.d.). These exams ranged from 50 to 100 multiple choice questions with American Literature and English Literature being the longest ones and College Composition having the fewest multiple choice questions (“American literature,” n.d.; “Analyzing and interpreting literature,” n.d.; “College composition,” n.d.; “College composition modular,” n.d.; “English literature,” n.d.). College Composition Modular had no essay option, and College Composition required an essay. The other three exams had optional essays; students who completed the optional essays were also considered in this study. The exams ranged from 90 minutes to 120 minutes of allotted time with 90 minutes being the mode and College Composition being the longest. The American and English Literature exams tested students on their knowledge of the history of literature pursuant to its geographic origination. Analyzing and Interpreting Literature tested students on basic literary analysis and knowledge of terms related

to literary analysis. College Composition and College Composition Modular tested students on their ability to write short essays in an academic setting.

The history exams offered by College Board included History of the United States I, History of the United States II, Western Civilization I, and Western Civilization II (“CLEP exams,” n.d.). Each of the four exams required students to answer 120 questions in 90 minutes (“History of the United States I,” n.d.; “History of the United States II,” n.d.; “Western civilization I: Ancient near east to 1648,” n.d.; “Western civilization II: 1648 to the present,” n.d.). History of the United States I contained questions spanning colonization of the United States to 1877. History of the United States II spanned 1865 to the present in United States history. Western Civilization I spanned ancient history to 1648. And Western Civilization II spanned 1648 to the present.

The sciences exams offered by College Board included Biology, Chemistry, and Natural Sciences (“CLEP exams,” n.d.). The Biology exam is 115 questions and 90 minutes long; it covered molecular and cellular biology, organismal biology, and population biology (“Biology,” n.d.). The Chemistry exam was 75 questions and 90 minutes long; it covered structures of matter, states of matter, reaction types, equations and stoichiometry, equilibrium, kinetics, thermodynamics, descriptive chemistry, and experimental chemistry (“Chemistry,” n.d.). The Natural Sciences exam was 120 questions and 90 minutes long; it covered biological science and physical science (“Natural Sciences,” n.d.).

The mathematics exams offered by College Board included College Algebra, College Mathematics, Precalculus, and Calculus (“CLEP exams,” n.d.). The College Algebra and College Mathematics exams were both 60 questions and 90 minutes long (“College algebra,” n.d.; “College mathematics,” n.d.). The former covered algebraic operations, equations and

inequalities, functions and their properties, and number systems and operations. The latter covered algebra and functions, counting and probability, data analysis and statistics, financial mathematics, geometry, logic and sets, and numbers. The Precalculus exam was 48 questions and 90 minutes long; it covered algebra, functions, representations of functions, analytic geometry, trigonometry, and functions as models (“Precalculus,” n.d.). The calculus exam was 44 questions and 90 minutes long; it covered limits, differential calculus, and integral calculus (“Calculus,” n.d.).

CLEP credit has been studied previously as an impactful data point (Barry, 2013; Boatman, Hurwitz, Lee, & Smith, 2019; Scammacca & Dodd, 2005). Barry (2013) compared CLEP students and non-CLEP students on different student success metrics. Barry found that CLEP students were more likely to graduate early and with higher grades; the only differentiation between the two populations was the presence of CLEP exams. Boatman, Hurwitz, Lee, and Smith (2019) performed a regression analysis of students who took CLEP exams and found they were more likely to graduate and more likely to earn higher incomes. Scammacca and Dodd (2005) found that students who took CLEP exams were just as likely or more likely than their non-CLEP classmates to do better in future courses. CLEP credit is an important though under-studied artifact of higher education culture, and it serves as a valuable measurement of student achievement.

### **Retention (Criterion Variable)**

Likewise, six-year graduation is a commonly used measurement of student success in research studies (Chen, Chen, & Oztekin, 2017; Hester & Ishitani, 2018; Johnson & Stage, 2018). Chen, Chen, and Oztekin (2017) studied retention as an important measurement of success for an institution and cited it as a metric that should be given more credence. Hester and

Ishitani (2018) studied economic impact of expenditures on six-year graduation rates and emphasize the importance of studying graduation rates. Johnson and Stage (2018) studied six-year graduation rates' relationship to high-impact practices for institutions. Six-year graduation rates are measured when students enroll at a particular university and graduate with an undergraduate four-year degree within six years. Students who do not graduate may continue studies and graduate later but are not counted in this statistic. Both of these data elements are institutional data, which, while not necessarily generalizable to a larger population, can serve as valid research data (Howard, McLaughlin, & Knight, 2012; Hagedorn, 2006). Permission to use the data was acquired from the dean of the College of Arts and Sciences (see Appendix A).

### **Procedures**

All data used in this study was procured from the institution's data archives. Permission to gather this information from the institution's archives was procured from the researcher's immediate supervisor, the dean of the College of Arts and Sciences. This was requested several weeks before the data was needed; the permission was recorded in written and digital form. Further permission was obtained from the institution's Internal Review Board (IRB) through a review process created by said board. Appendices were created to contain both approvals given. This was requested once the research proposal was written, defended, and approved by the researcher's chair and reader. Once these permissions were gathered, the data regarding six-year graduation, CLEP credit data, and demographic information was requested through a university-based, digital information technology help ticket system with emphasis placed on a quick turnaround time. The information was delivered in the form of digital spreadsheets in accordance with university policy.

The data requested included information on all online undergraduate students at the university who enrolled in 2010-2011, 2011-2012, and 2012-2013 school years. Data categories included student age, sex, ethnicity, six-year graduation status, number of CLEP credits accepted, and type of CLEP exams accepted. CLEP credits and exams were shown as having been accepted if the students took a CLEP exam, transferred it to the university's registrar, and their transfer scores were high enough to match university standards. Other data such as student ID number was included for identification then deleted to protect the confidentiality of the students. The tests may have been taken anywhere but must have been successfully transferred to and evaluated by the institution. This data was collected over time by the institution's registrar as students enrolled, transferred CLEP exams, and graduated or failed to graduate.

The data gathered was analyzed for corruptions or student entries with missing data. It was then entered into IBM's Statistical Package for the Social Sciences software. Student six-year graduation was coded as a 1, and a student not graduating within six years was coded as a 0. The number of CLEP exams that students applied was transferred directly into the program as was the amount of CLEP credit applied.

### **Data Analysis**

A logistic regression was used to analyze the data collected for this study. This was appropriate because in both cases the predictor variable was an ordinal continuum, and the criterion variable was categorical dichotomous with only two possible outcomes: those who graduated within six years and those who did not.

There are four assumptions required for a logistic regression analysis (Warner, 2013), and all are met in this study. Warner (2013) assumes the "outcome variable is dichotomous" (p. 1008), which it is in the case of students either being graduated or not graduated. Additionally,

those scores, from student to student, must not affect each other, and the outcome variable categories needed to be “exhaustive and mutually exclusive” (p. 1008). In this case, one student’s graduation (especially considering these are online students) did not affect the results of other students’ graduations, and the categories of being graduated or not graduated excluded each other and were absolute. Third, Warner (2013) holds that the model should include only relevant predictor variables; in this case, because CLEP exams were the only predictor variable being considered, this assumption was met. Finally, the categories of the criterion variable must be exclusive of each other—no data point can fit into both categories (Warner, 2013). This requirement was met as a student cannot be both graduated and not graduated simultaneously.

A logistic regression analysis was used to test the null hypothesis at the 95% confidence level. Data was screened for data errors or inconsistencies. A Chi squared test of association was reported for the logistic regression model. Cox and Snell’s and Nagelkerke’s statistics were used to measure the strength of the model and Wald ratios were reported for regression coefficients.

## CHAPTER FOUR: FINDINGS

### Overview

In Chapter Four, the research question and hypothesis will be reviewed. Descriptive statistics for the data collected and analyzed will be given focusing on gender and CLEP exam usage. Discussion of data screen processes and assumptions testing will be given. And the null hypothesis will be tested using a logistics regression, which will be followed by discussions of the significance and strength of the correlations.

### Research Question

**RQ:** Can the number of exams earned from specific College Level Examination Program (CLEP) disciplines (language arts, history, science, or mathematics) predict graduation status for online adult undergraduate students?

### Hypothesis

**H<sub>0</sub>:** There will be no predictive relationship between the criterion variable (six-year graduation status) and the predictor variables (number of exams earned from specific College Level Examination Program (CLEP) disciplines—language arts, history, science, and mathematics College Level Examination Program exams) for online adult undergraduate students.

### Descriptive Statistics

This analysis studied data from 34,927 students at a private institution of higher education in central Virginia. All students enrolled and began their first courses in the years 2010-2011 (n = 10,078), 2011-2012 (n = 13,039), or 2012-2013 (n = 11,810). Of students who chose to identify their gender, 21,015 were female and 13,752 were male. At the point of enrollment, the average age of students was 37.45 years old with the youngest being 25 years old

and the oldest being 84 years old. Approximately 32.5% of these students were retained to graduation within six years, and 924 used at least one CLEP exam. On average, students who used CLEP applied 2.50 passed CLEP exams to their degrees for an average of 7.53 credits transferred in from CLEP exams. Of the 924 CLEP students, 525 applied English CLEP credit, 184 applied math CLEP credit, 147 applied history CLEP credit, and 96 applied science CLEP credit.

## **Results**

### **Data Screening**

The data was prepared and scanned for corrupted, superfluous, or potential analysis-confusing data for SPSS using Microsoft Excel. The requested data was provided with superfluous information, so students whose first terms were not in 2010-2011, 2011-2012, or 2012-2013 were removed from the data; student personal information was removed; and student majors were removed. The remaining data was assessed for integrity and reliability. Student graduation within six years was coded as 1 – retained to graduation within 6 years and 0 – retained to graduation within 6 years.

### **Assumptions**

Warner (2013) lists four assumptions that are necessary for a logistic regression analysis, and all are met in this data. The “outcome variable is dichotomous” (Warner 2013, p. 1008) since retention is split into two possible outcomes: graduated within six years or not. Warner (2013) holds that the outcome variable results for individual students must be independent of each other, which they are as one online students’ graduation is not directly related to others’ graduation. This study meets the third assumption because only relevant predictor variable is considered—the number of CLEP exams (Warner, 2013). Finally, this study meets the fourth

assumption because the criterion variable options are exclusive of each other (Warner, 2013)—a student must be either graduated or not and cannot be both.

### Results for Null Hypothesis

A logistics regression analysis model was used to predict the 6-year retention of adult, online, undergraduate students at the 95% confidence level. Students in this sample were sorted by a predictor variable that tracked whether they had taken any language arts, science, math, or history CLEP exams and how many. The results of this test for the null hypothesis was to confirm that the relationship was statistically significant,  $X^2(4) = 381, p < .001$ . But the model was weak according to Cox and Snell's  $R^2 = 0.011$  and Nagelkerke's  $R^2 = 0.015$  which reported only weak relationships. Even still, the null hypothesis was rejected. See Table 1 for the Omnibus Tests of Model Coefficients, and Table 2 for the Model Summary.

Table 1

#### *Omnibus Tests of Model Coefficients*

		Chi-square	df	Sig.
Step 1	Step	381.005	4	.000
	Block	381.005	4	.000
	Model	381.005	4	.000

Table 2

#### *Model Summary*

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	43677.4 <sup>a</sup>	.011	.015

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Further research into each predictor variable discovered that several of them were strongly significantly related to the outcome variable. For the variable of how many English CLEP exams students had taken, the Wald ratio was statistically significant,  $X^2(1) = 156, p < .001$ . The odds ratio was 3.04, which showed that students who had taken English CLEP exams were 3.04 times more likely to graduate within six years.

The second variable considered was adult, online, undergraduate students having taken math CLEP exams. The result was also significant with  $X^2(1) = 19, p < .001$  suggesting there is indeed a relationship between the two variables. That relationship was less profound than the relationship between English CLEP exams as the odds ratio for math CLEP exams was only 2.06, which meant that students who took math CLEP exams were 2.06 times more likely to graduate than those who did not take math CLEP exams.

The third variable considered was students having taken history CLEP exams. The correlation between this variable and six-year graduation was significant,  $X^2(1) = 20, p < .001$ . And the odds ratio was higher than it was for math but lower than it was for English at 2.24. This means that students who took history CLEP exams were 2.24 times more likely to graduate in six years than those who did not take history CLEP exams.

The final variable considered for a significant relationship was students having taken science CLEP exams. This relationship was significant,  $X^2(1) = 7, p = .007$ . The odds ratio was 1.42, which means that science CLEP exam students were only 1.42 times more likely to graduate than those who did not take a science CLEP exam. Because the odds ratio was close to a 50/50 split, the researcher determined that this was not a viable predictor of six-year graduation. The results for the four tables can be seen in Table 3, Variables in the Equation.

Table 3

*Variables in the Equation*

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 <sup>a</sup>	ENGL_CLEP	1.113	.089	156.045	1	.000	3.043	2.556	3.624
	MATH_CLEP	.725	.163	19.807	1	.000	2.064	1.500	2.841
	HIST_CLEP	.804	.178	20.321	1	.000	2.235	1.576	3.171
	SCI_CLEP	.351	.131	7.189	1	.007	1.420	1.099	1.835
	Constant	-.760	.012	4308.695	1	.000	.467		

a. Variable(s) entered on step 1: ENGL\_CLEP, MATH\_CLEP, HIST\_CLEP, SCI\_CLEP.

## **CHAPTER FIVE: CONCLUSIONS**

### **Overview**

This chapter will provide in-depth discussion of the results of Chapter Four. It will seek to contextualize the results in the scholarly literature and will discuss further implications for higher education policy and admissions, seeking to integrate the results of Chapter Four into an understanding of higher education's relationship to CLEP exam and student admissions policy. Limitations of the study will be discussed, and finally, recommendations for future research will be given.

### **Discussion**

The purpose of this study was to determine whether having earned CLEP exams in specific fields of CLEP exams was a significant predictor of online, adult, undergraduate students' six-year graduation likelihood. The null hypothesis was that there would be no predictive relationship between the criterion variable (six-year graduation status) and the predictor variables (number of exams earned from specific CLEP disciplines) for online adult undergraduate students. Applicable CLEP exams were sorted into four general education categories: English, math, history, and science. These were then analyzed using a binary logistic regression test, and while the model effect overall was very small, the relationships between three predictor variables and six-year graduation were significant with math, history, and English CLEP students being more likely to graduate than other students who did not take those genres of CLEP exams. Of those three disciplines, students who took English CLEP exams were at least three times more likely to graduate than students who did not take CLEP exams.

## **CLEP Exams and Retention**

CLEP students being more likely to graduate parallels general results in the literature. Deci and Ryan's (1980) Self-determination Theory would suggest that students who have already earned credit are more likely to persist because of the extrinsic factor of having fewer barriers or required courses between them and graduation and the intrinsic factor of the inherent motivation already present in a student who earns college credit through a CLEP exam on their own. Tinto's (1975) Theoretical Model of Dropout Behaviour, Bean and Metzner's (1985) conceptual model of non-traditional undergraduate student attrition, and Rovai's (2003) adapted model for online students also support CLEP student persistence. Their models suggest that an experience like having earned CLEP exam credit points to measurable academic or intellectual achievement and means fewer credits between the student and graduation, which makes persistence and graduation more attainable. While earning CLEP credit does not necessarily lead to stronger community integration (Tinto, 1975), it may help increase or signify student pre-admission preparation (Bean and Metzner, 1985) and supports academic integration (Tinto, 1975). CLEP students have already accomplished important requirements and have college credits affirming those accomplishments. Of course, according to any of the theoretical models, the fewer college credits needing to be paid for also makes CLEP students more likely to persist.

Beyond theory, this study affirms the long studied and empirical equal or higher performance of CLEP students in general. Beaver and Paul (2007) explain that students who pass CLEP exams may be more academically skilled than their peers before admission so they are better prepared to persist than peers. And other studies (Godfrey & Jagesic, 2016; Scammacca & Dodd, 2005) theorize that, based on student performance, the albeit nontraditional preparation experience for CLEP exams is equivalent to the learning experience in equivalent

college courses. While no research has confirmed that CLEP exams directly cause higher graduation rates (Beaver & Paul, 2007), Barry (2013) found that CLEP students were likely to graduate more quickly than their peers. Scammacca and Dodd (2005) found that in certain years and for certain CLEP exams, CLEP students were more likely to graduate than their peers. Scammacca and Dodd's (2005) results are somewhat outdated and the correlations were weak, but Boatman, Hurwitz, Lee, and Smith (2019) conducted a more recent study that found that CLEP students were 5.5% more likely to graduate than their non-CLEP peers. While the CLEP model of the current research study was weak as a predictor, it affirmed the increased likelihood of CLEP students to graduate within six-years, which aligns with the general literature on the subject.

### **Science CLEP Exams and Retention**

The results for the logistics regression analysis between science CLEP exams and graduation was one of the more surprising results. Students who transferred science CLEP exams (Biology, Chemistry, and Natural Sciences) appeared more likely to graduate than students who did not receive any credit for science CLEP exams, but only 1.4 times more so and because this was close to an even split, the researcher was cautious in interpreting its significance. If these students did have an increased likelihood of graduation, it could be explained by Cohen and Kelly (2019) who found that community college students who took science courses had higher GPAs and were more likely to graduate or transfer to a four-year institution. Redmond-Sanogo, Angle, and Davis (2016) likewise found that students who took high school calculus, physics, and chemistry were more likely to do better in gatekeeper college courses for STEM degrees, again pointing to an incoming proficiency in sciences predicting student academic success. Perhaps a contributing factor to the non-result of the current study is

that the online university being studied had no purely science degrees, only a few STEM degrees, and very few general education science requirements. Thus, science CLEP students with high science proficiency had few opportunities to outperform their fellow students in science-related fields. In this environment, the skills needed to perform well in science courses may not have been as necessary as skills measured by the other CLEP disciplines. Or, perhaps, the skills measured by the science CLEP exams were not as foundational to overall higher education success as those measured by the other CLEP exams.

### **Math CLEP Exams and Retention**

Students who applied math CLEP exams (College Mathematics, College Algebra, Precalculus, and Calculus) were 2.1 times more likely to graduate than students who did not receive any credit for math CLEP exams. Cohen and Kelly (2019) found that community college students who took at least one math course were more likely to graduate or transfer to a four-year institution and to have a higher GPA than students who took no math courses, and Stumpf and Stanley (2002) found that high SAT I Math scores were one of the best predictors of six-year graduation. These studies parallel the present one by suggesting that a level of math proficiency is an important though not solitary predictor of college and academic success. The reason for these results could have to do with the fundamental analytical quantitative reasoning and problem-solving skills present and required in math courses (Ofqual, 2012), which could support academic success in general. The higher success rate of math CLEP students likely resulted from these students coming into college already proficient in math skills and thus maybe better prepared to graduate.

### **English CLEP Exams and Retention**

The results for the logistics regression analysis between English CLEP exams and

graduation was the most significant result. Students who took English CLEP exams (College Composition, College Composition Modular, English Literature, and American Literature) were 3.0 times more likely to graduate in six years than students who did not receive credit for English CLEP exams. This result was stronger than the others and reveals that English CLEP students were the readiest CLEP students studied to graduate online within six years.

A strong reason for this may be that, apart from tests, online college courses by necessity and function are often predicated on writing skills. From emails to discussion boards to essays to research projects, with less opportunity for face-to-face interaction, assessing students' knowledge through writing assignments is very common. At the institution in question, the online courses were universally prepared as asynchronous courses, which means there were no required livestreams, discussions, or required live interactions between professors and students. So, while some courses may have required video or design projects, the vast majority of assignments that were not exams were writing-based. The College Composition and College Composition Modular CLEPs, which measure grammar and composition skills, dwarf American Literature and English Literature in popularity with students ("CLEP and Your High School," n.d.). Thus, it stands to reason that they make up a majority share in the English CLEP credit transferred to the school in question. In fact, in stats no longer available through the DANTE program but preserved elsewhere by private CLEP student consultants, in 2017, 13,526 civilian students attempted College Composition and College Composition Modular tests while only 2,455 students attempted the literature CLEP tests ("CLEP & DSST Pass Rates," n.d.), suggesting that the majority of English CLEP students in the current study also may have taken composition-based CLEP exams.

If these students, who are entering a college environment that highly prioritizes writing skills for many assessments, have CLEP credit that proves they have an understanding of writing and grammar, they may be better prepared to thrive and graduate than their peers. Much of the literature on writing skills in higher education are focused on remedial writing, but Tsingos-Lucas, Bosnic-Anticevich, Schneider, and Smith (2017) found that undergraduate students who had good reflective writing skills were more likely to be successful in other assignments. Similarly, Barry (2013) found that while students who took the College Algebra CLEP exam did not do significantly better or worse in subsequent classes, students who took the College Composition CLEP exam did significantly better than peers in later English courses. This does not mean that the College Composition CLEP exam prepares students or that every student who takes it is a strong writer, but it seems to be a strong signifier of preparation for writing-intense English courses. Garret, Bridgewater, and Feinstein (2017) found that students in their study who failed a remedial writing course had only a 17 percent graduation rate, the lowest of any of the general education courses they studied. And the chance of graduation for students who failed freshman level academic or research writing courses dropped by more than any of the other first-year classes tested. Garret, Bridgewater, and Feinstein (2017) also found that performance in first year composition courses predicted performance in major area courses for students and predicted graduation suggesting that writing ability is key to success in many higher education disciplines. Considering Beaver and Paul's (2007) assertion that CLEP students may not be more successful because of the CLEP experience but because they may already be strong students, students passing ENGL CLEP exams seems to suggest that they enter college with strong writing skills that prepare them for the types of assignments they will face.

## **History CLEP Exams and Retention**

The results for the logistics regression analysis between history CLEP exams and graduation mirrored the math results. Students who took history CLEP exams (History of the United States I, History of the United States II, Western Civilization I, and Western Civilization II) were 2.2 times more likely to graduate than students who did not receive any credit for history CLEP exams. The reasons for this significant result likely stem from the same reasons for English CLEP students being so successful: success in history courses requires strong writing, research, detail-oriented, analysis, communication, and reasoning skills (Rees, Forbes, & Kubler, 2006). Students may have collected these skills in previous studies, which left them prepared for the history CLEP exams.

### **Implications**

Significant implications of this study centered on student preparation for higher education and admissions policies regarding CLEP exams. Most interestingly, CLEP exam preparation in three areas—history, English, and math—correlated to increased likelihoods of graduation. For online higher education, this suggests that institutions that value retention rates should welcome and even court CLEP students. Despite these CLEP students taking fewer credits at institutions (Barry, 2013), they are more likely to persist than the average student. This could mean increased revenue from later courses and stronger six-year graduate rates. Concerns about CLEP lowering standards have existed since CLEP was first introduced (Stecher, 1977), but with the present rigor of the exams, they appear to be strong predictors of college success, and so institutions do not seem to be risking quality of education by welcoming these students.

The research was also meant to study whether students who skipped specific in-class, general education experiences in favor of CLEP exams were still prepared to complete their

degrees. All subjects studied showed CLEP students to be at least as prepared if not more prepared to graduate than counterparts. This being true for general education courses in English, history, science, and math suggests that in-class, general education appears not to be necessary to ensure graduation rates for high achieving students in the environment studied. But because English CLEP students were so much more likely to graduate than every other population, serious thought needs to be given regarding admissions policies for online programs that rely heavily on writing skills. Of course, other studies have supported that entering school with strong writing skills is a strong predictor of student retention (Garret, Bridgewater, & Feinstein, 2017). This might not be as relevant to a residential program where presentations, discussion, and face-to-face interaction represent larger portions of student grades, but this seems especially valuable information for asynchronous, online programs where written communication is vital to student success. In programs where writing is one of the main measurements of student success, requiring strong writing skills for admission or providing intense and scaffolded writing instruction upon graduation may be one of the most impactful things online administrators could do to ensure student success.

### **Limitations**

This study was limited by only having access to data from one specific institution that only used asynchronous courses instead of synchronous courses. Other institutions, especially those with synchronous course design, may see different results, and for those institutions, writing skills and CLEP exams may be less predictive of student success. In addition, the data for this study did not represent an even split between members of the predictor variables, making the analytical model less predictable; this was partially mitigated by the large sizes of the samples. Other forms of credit-by-exam and prior learning assessment (such as StraighterLine

courses, DSST exams, AP, and other non-traditional credit options) were not considered. Finally, the researcher was unable to determine whether applied CLEP credits were earned while classes were being taken at the institution or whether they were taken before matriculation. This should have had miniscule effect on the results.

### **Recommendations for Future Research**

Further research into this topic should consider the effects of DSST, AP, StraighterLine, and other non-traditional transfer credit on student success. While CLEP may be one of the best known and most widely accepted credit-by-exam options, the others are growing in popularity and taking more important roles in college preparation. Researchers should consider how increased credit in these areas affect student success.

Further research needs to be done into composition skills as a predictor of college success. Good writing can be a difficult skill to learn and teach but a valuable one in college and in any work environment. If good writing means increased chance of college graduation, however, then it may be worth the extra effort especially in asynchronous, online environments.

Finally, more research, qualitative and quantitative, needs to be done to profile students who apply non-traditional third-party credit to college degrees. Especially as college costs continue to rise and alternatives to higher education become more available, students who still want a bachelor's degree will continue to look to these options to earn college credit less expensively and more quickly. This subset of the category of non-traditional, adult students will continue to grow and will have unique needs as they continue to move towards graduation.

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### **APPENDIX A: Permission Letter**

Proposed permission request text: Dr. [REDACTED], please allow me to use data on online students from school years 2010-2011, 2011-2012, and 2012-2013. I will be collecting data on online students regarding their six-year graduation, CLEP usage, and demographic information. Apart from large trends being reported in my dissertation, this data will be kept confidential. Thank you.

Future steps to procure permission to use archival data for this study:

1. I will email this letter to Dr. [REDACTED] who is my dean and is the granter of my permissions regarding requesting student data.
2. I have broader permission from the university to access this data for my job, so once I have procured his permission, I will submit a request to the appropriate information services department to collect this data.
3. It will be delivered in the form of spreadsheets.