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Success in online credit recovery: Factors influencing student academic performance

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SUCCESS IN ONLINE CREDIT RECOVERY: FACTORS INFLUENCING STUDENT ACADEMIC PERFORMANCE

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Abstract

Success in online credit recovery: Factors influencing student academic performance

by

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Recent estimates show nearly 90% of school districts nationwide offer some form of online credit recovery. Additionally, credit recovery services have become one of the fastest growing areas of educational software. Despite the widespread adoption of these programs, there is a lack of scholarly research on the effectiveness, rigor, and suitability of online credit recovery. Given the popularity of online credit recovery and the mixed results that these programs have received, more study is imperative.

Currently there is a dearth of research surrounding the suitability of online credit recovery for students. Much of the research conducted on virtual schooling indicates that the ideal student for this platform is autonomous, socially and emotionally mature, in possession of solid time management skills, and commands a developed internal locus of control. However, these characteristics are not typically embodied by the at-risk students primarily enrolled in online credit recovery courses. Given the disparity between the ideal online student and the typical recovery student, research examining the characteristics of students who have demonstrated success in online credit recovery could prove exceptionally beneficial.

This study examined potential success factors of students enrolled in online credit recovery academic core discipline courses [English, Mathematics, Science, and Social Studies] within a school system in the mid-Atlantic region of the United States. The predictors of success

in online credit recovery included student level variables: gender, race, grade-level, school discipline history, Individualized Educational Plan (IEP) status, Gifted & Talented (AIG) status, middle school state-standardized reading assessment results (reading EOG), middle school state-standardized mathematics assessment results (mathematics EOG), and middle school state-standardized science assessment results (science EOG). Student outcome (pass/fail) in the credit recovery course was the dependent variable. Descriptive statistics, chi-square, and binary logistic regression analysis were performed. Findings revealed that grade-level, IEP status, and middle school EOG results influenced outcomes in online credit recovery courses. Ancillary analyses revealed that underclassmen were less likely to achieve positive outcomes in science and social studies credit recovery courses compared to upperclassmen, and that results on 6-8th grade reading, mathematics, and science EOGs could have an influence on performance in science recovery courses. Possible implications of these findings are discussed.

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Thank you also to my dissertation chair, Dr. Kendall Hartley. Your willingness to work with me, despite all your administrative responsibilities, will be forever appreciated.

Dedication

This document is dedicated to the two most important women in my life: My mother, Virginia ‘Van’ Nourse, and my wife, Autumn Nourse. Thank you for always believing in me. I love you.

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Chapter One | Introduction

"There's never going to be a great time in America again

to be a high-school dropout" (Klimasinska, 2014).

~ David Autor is a professor of economics at Massachusetts Institute of Technology.

Introduction

The statistics are staggering – over their lifetime a typical high school dropout will earn less money, face a higher probability of being incarcerated, and suffer higher rates of unemployment. Indeed, half of all welfare families are headed by dropouts and over fifty percent of the prison population failed to complete high school (Educational Testing Service, 1995). The consequences of dropping out are nothing short of catastrophic. Yet despite all the ramifications, over 700,000 students dropped out of U.S. schools during the 2011-12 school year (NCES, 2015). That equates to roughly 1.5 students every minute of every day! Graduation rates for minorities, especially in urban school districts like Clark County, Nevada, are precariously low. Clark County's graduation rate for African American students is below 50 percent and below 55 percent for Latinos (NDOE, 2015). This is endemic of urban areas nationwide (Bridgeland, Dilulio, & Morison, 2006).

There is no single reason why students choose to withdraw from school prior to obtaining a diploma. Research suggests that limited engagement with formal education along with weak basic skills and challenging transitions to high school can all contribute to the likelihood that a student will fail to complete school. A key indicator of a potential dropout is success in ninth grade. It has been estimated that 60 percent of high school freshmen who fail to promote to tenth grade will eventually leave school (Russell, Hoffman & Higgins, 2009). Roderick (1993) reports that freshmen who fail to earn the minimum number of credits required to advance to the next

grade level will drop out of school at a rate five-times higher than sophomores who successfully earned enough credits to be promoted.

With ninth grade being such a critical year for eventual secondary success, educators have been keen to establish mechanisms to assist at-risk students in the hopes that they can keep children in school and get them closer to graduation. Recently, online learning has emerged as an innovative and viable option for educators to utilize to educate secondary students (Archambault et al., 2010; Holstead, Spradlin & Plucker, 2008). With these online tools, at-risk students are offered the opportunity to complete coursework and recover credit for courses they were initially unsuccessful in, while remaining enrolled in regular face-to-face classes at their brick-and-mortar school.

Online learning has been praised for offering a flexible and engaging educational environment that is personalized, self-paced, and led by licensed teachers who provide individualized assistance (Natsu, 2011). Online credit recovery is the arm of online instruction aimed at offering students the chance to recover credit, get back on track for graduation, and ensure they remain in school (Watson & Germin, 2008). While credit recovery has been found to help schools increase their graduation rates, critics have voiced concerns that online learning generally, and credit recovery specifically, may move at-risk students through coursework without receiving an actual educational benefit. A recent report released by the International Association for K12 Online Learning (Powell, Roberts, & Patrick, 2015) indicates that some of these concerns are not without merit.

Despite the trepidation surrounding online credit recovery, it has become a mainstay in public education. Reports estimate that nearly 90 percent of school districts nationwide utilize some form of credit recovery (Carver, Lewis & Coopersmith, 2011; Queen & Lewis, 2011).

Additionally, credit recovery software has become one of the fastest growing sectors of the educational software industry (Sapers, 2014). Despite the widespread adoption of these programs, there is a lack of scholarly research on the effectiveness, rigor, and suitability of online credit recovery. The largest study of online credit recovery to date is currently underway in Chicago (Heppen et al., 2013 & Heppen et al., 2014). This randomized experimental study is examining how students who initially failed Algebra I perform in an online credit recovery course compared to students retaking the course in a traditional face-to-face setting. Preliminary results show some short-term benefits for students enrolled in face-to-face sections over online credit recovery sections, but no differences on long-term outcomes. Couple these outcomes with positive reports from several states and school districts that have implemented credit recovery programs, and a compelling case for credit recovery begins to emerge (UMass Donahue Institute, 2012; Zinith, 2011)

Given the popularity of online credit recovery and the varying reports that these programs have received, not to mention the multi-billion dollar industry that credit recovery has developed into, it becomes clear that more study is imperative. Currently there is a dearth of research surrounding the suitability of online credit recovery for students. Much of the research conducted on virtual schooling indicates that the ideal student for this platform is autonomous (Oliver, Kellogg, Townsend & Brady, 2010), socially and emotionally mature (Picciano & Seaman, 2007), in possession of solid time management skills (Lewin et al. 2008), and commands a developed internal locus of control (Fazey & Fazey, 2001). However, these characteristics are not typically embodied by the at-risk students primarily enrolled in online credit recovery courses. Given the disparity between the ideal online student and the typical recovery student, research examining the characteristics of students who have demonstrated success in online

credit recovery could prove exceptionally beneficial. The results of such an investigation may provide a deeper understanding of what factors influence success in online credit recovery and should assist school teachers, advisors, counselors, and administrators in the appropriate placement of students into online credit recovery courses.

Background

Credit recovery is an offshoot of online learning which has its roots in the traditional distance educations systems of the mid-twenty century. For nearly all of the 1900s, distance education was based upon a correspondence model where lessons were delivered via Postal Service or transmitted to students via radio, television, or satellite (Sack, 2003; Brown & Brown, 1994). The large majority of these lessons were done independently by students who upon completion would mail, or transmit via facsimile, their work back to instructors for evaluation and grading. In the 1980s, personal computers started becoming affordable for the average consumer and software began being developed offering students instructional materials in a digital format (Harvey & Farmer, 2003). Recognizing the potential of the PC, educators and educational vendors began developing programs and applications with comprehensive lessons, activities, and assignments becoming widely available and easily accessible (Casey, 2008). The technological capabilities inherent in today's Internet offer student engagement, access to information, and the sharing of knowledge (Sack, 2003). Distance education today couples the processing power of modern computers with the technological capacities inherent in the World Wide Web providing students a rich learning experience (Zucker & Kozma, 2003).

Over the past 20 years the US has seen a tremendous increase in the number of K12 virtual schools as well as the number of students who have been served via online learning. In the 2010-2011 school year there were over 2,500,000 students being educated through online

schools in all 50 states plus the District of Columbia (iNACOL, 2013). In April 2006 the state of Michigan established the requirement that all students complete an online course to be eligible for a high school diploma (iNACOL, 2013). Since that time Virginia, Arkansas, Alabama, and Florida have added online learning requirements. In 2015 growth in online course enrollment slowed somewhat; despite this the International Association of K12 Online Learning (iNACOL) estimates that virtual school enrollments will continue to expand in years ahead (iNACOL, 2015).

Online learning provides students many benefits including the ability to offer individualized instruction to meet the learning styles and other unique needs of students as well as the flexibility to offer courses without the constraints of meeting in a physical space or on a specific day and time (Kellogg & Politoski, 2002). Picciano, Seaman, Shea and Swan (2012) report that the two primary reasons students enroll in K12 virtual education options are to gain access to courses that are not available at their home school and to retrieve credit for failed courses (credit recovery). Online credit recovery enables students to retake courses that they previously failed at their own pace while receiving individualized instruction, personalized interventions, and real-time feedback (Watson & Germin, 2008; Biesinger & Crippen, 2008). With nearly one-in-five students failing to complete high school, school districts are increasingly relying on online credit recovery as a tool to keep children in school and help at-risk students graduate.

Statement of Problem

During the 2011-12 school year over 700,000 students dropped out of US schools (NCES, 2015). The decision to withdraw from school before earning a diploma can have devastating consequences. High school dropouts have higher rates of unemployment, teen

pregnancy, incarceration, homelessness, and mental and physical health problems (Stillwell, 2009; Sum, Khatiwada, McLaughlin & Palma, 2009; Freudenberg & Ruglis, 2007; Varlas, 2005). Additionally, the societal costs for dropping out of high school are staggering. Sum et al. (2009) estimate that a single dropout will cost taxpayers an average of $292,000 over a lifetime due to the costs associated with incarceration, health care, and lack of tax revenue.

In addition to the enormous personal and societal ramifications of early school withdraw, States and school districts have been under considerable pressure to stem the tide of dropouts and raise graduation rates. Since the No Child Left Behind Act of 2001 (NCLB) was enacted, students have been required to successfully complete one grade per year beginning in ninth grade in order to satisfy Federal graduation requirements (NCLB, 2008). While States have the leeway to slightly modify this requirement, US Department of Education guidelines mandated that a student must finish high school within four years to be considered a graduate. In 2015 President Obama signed the Every Student Succeeds Act (ESSA) into law; this legislation continues the accountability trend that NCLB started with significant emphasis placed upon graduation rates (ESSA, 2015).

Bridgeland et al. (2006) note that credit deficiency is one of the primary reasons students choose to drop out of school. Research indicates that a disproportionate number of students who are retained in ninth grade due to insufficient credits eventually drop out. Additionally, being held back in ninth grade is oft considered the greatest risk factor for early school withdraw (Neild & Balfanz, 2006). Russell, Hoffman and Higgins (2009) note that freshmen who fail to promote to tenth grade have a dropout rate close to 60 percent. Roderick (1993) reports that freshmen who fail to earn the minimum number of credits required to advance will drop out of

school at a rate five-times higher than sophomores who successfully earned enough credits to be promoted to the next grade.

Traditionally when students have been unsuccessful in a course, they would be required to repeat the same course in summer school or the following academic year. With the advent of online learning however, new avenues have become available for students to quickly obtain credit for courses they were initially unsuccessful in. In many cases, credit can be earned during the same academic year that the original course was failed in. These programs are known as "credit recovery." Credit recovery is understood as "a structured means for students to earn missed credit in order to graduate from high school" (McCabe & St. Andrie, 2012, p. 1).

Given the intense pressure to increase graduation rates, schools and districts nationwide have been quick to establish credit recovery programs. Reports estimate that nearly ninety percent of school districts offer online credit recovery as a means to help students regain course credit and stay on track for graduation (Carver, Lewis & Coopersmith, 2011; Queen and Lewis, 2011). Despite the widespread adoption of these programs, there is a lack of scholarly research on the effectiveness, rigor, and suitability of online credit recovery. Additionally, there exists a small but growing number of critics who have expressed concern about the widespread proliferation of recovery programs (Guerra, 2015b; Finn, 2012; Mathews, 2012, Bloomfield, 2009).

Purpose of the Study

In an effort to add to the existing literature on credit recovery, this study examines an issue heretofore unexplored, namely is credit recovery suitable for all students? Much of the research conducted on virtual schooling indicates that the ideal student for this platform is autonomous (Oliver, Kellogg, Townsend & Brady, 2010), socially and emotionally mature

(Picciano & Seaman, 2007), in possession of solid time management skills (Lewin et al. 2008), and commands a developed internal locus of control (Fazey & Fazey, 2001). However, these characteristics are not typically embodied by the at-risk students primarily enrolled in online credit recovery courses.

A review of the literature reveals multiple characteristics and factors that capture the profile of at-risk students. At-risk students typically possess a limited self-concept (Bulger, 2006), doubt their academic capabilities (Bulger, 2006), have limited parental support (Martin, 2006), do not feel supported by their teachers or school (Tompkins & Deloney, 1994), are not encouraged to succeed by their community (Roderick, 1993), and experience an external locus of control (Coleman et al., 1966). These characteristics are generally not considered conducive for school success in either online or face-to-face settings.

Given the disparity between the ideal online student and the typical at-risk student in need of credit recovery, research examining the characteristics of students who have demonstrated success in online credit recovery could prove exceptionally beneficial. A solid grasp on the type of student who could be successful in an online credit recovery setting may provide school teachers, advisors, counselors, and administrators valuable insight, improve the enrollment process, and save school districts from expending scant resources on a program that may ultimately prove to be unsuccessful for certain students.

Research Problem

Currently there is no clear set of characteristics that have been identified to predict success in online credit recovery. Liu and Cavanaugh (2010, 2011a, 2011b, 2012) developed a model which investigated success factors of students in high enrollment K12 virtual school courses. This model examined student characteristics including gender, race, grade-level,

free/reduced lunch status, full/part-time status, and exceptionally. The researchers also examined course interaction factors such as time students spent working within the Learning Management System (LMS) and the number of times a student logged into the LMS. Results indicated that certain factors such as free/reduced lunch status and full/part-time status all influenced academic achievement.

Building on the work conducted by Liu and Cavanaugh, this researcher conducted a quantitative study examining the success factors of students enrolled in online credit recovery core-courses required for graduation [English, Mathematics, Science, and Social Studies] within a school system in the mid-Atlantic region of the United States. In addition to many of the student factors examined by Liu and Cavanaugh, this researcher incorporated longitudinal data in the form of state administered reading, mathematics, and science assessment scores from middle school, school discipline history, and Gifted/Talented (AIG) status.

Purpose Statement

Based on the lack of models for predicting success in online credit recovery, this study examines the factors and characteristics that influence performance in virtual recovery courses that satisfy high school graduation requirements.

Research Questions

The researcher will consider the following overarching question in this study: What are credit recovery course success factors?

The following sub-questions were developed to address the overarching question:

1. Does a student's gender and or race predict achievement in online credit recovery core discipline courses? If so, how?

2. Does a student's grade-level predict achievement in online credit recovery core discipline courses? If so, how?
3. Does a student's discipline history predict achievement in online credit recovery core discipline courses? If so, how?
4. Are there differences between credit recovery students with Individualized Education Plans (IEPs) and others without with respect to their academic achievement in online credit recovery core discipline courses?
5. Are there differences between Academically and Intellectually Gifted (AIG) credit recovery students and non-AIG students with respect to their academic achievement in online credit recovery core discipline courses?
6. Do middle school state-standardized reading, mathematics, or science assessment results at any grade-level predict student achievement in online credit recovery core discipline courses? If so, how?

Hypotheses

1. The gender of students does not significantly predict achievement in online credit recovery core discipline courses.
2. The race of students does not significantly predict achievement in online credit recovery core discipline courses.
3. The grade-level of students does not significantly predict achievement in online credit recovery core discipline courses.
4. The disciplinary incident history of students does not significantly predict achievement in online credit recovery core discipline courses.

5. There is no significant difference in the Individualized Educational Plan (IEP) status of students who pass online credit recovery core discipline courses than students who fail.
6. There is no significant difference in the Academically and Intellectually Gifted (AIG) status of students who pass online credit recovery core discipline courses than students who fail.
7. The middle school standardized reading assessment results of students at any grade-level do not significantly predict student achievement in online credit recovery core discipline courses.
8. The middle school standardized mathematics assessment results of students at any grade-level do not significantly predict student achievement in online credit recovery core discipline courses.
9. The middle school standardized science assessment results of students do not significantly predict student achievement in online credit recovery core discipline courses.

Conceptual Framework

Finn's (1989; 1993) participation-identification model of school engagement provides the primary theoretical framework for this study. Finn reported that positive student engagement at school directly relates to students' chances for successful school completion. Finn felt that the engagement of students in school (i.e., actively participating in the educational process) facilitated their chances to graduate. He also reported that student identification with the school promoted improved academic performance.

The data from Finn's model related the dropout problem to issues dealing with students' lack of engagement, participation, and identification with the school, social bonding, and

personal investment in learning. Finn suggested that the success of students in school paralleled the students' level of participation and identification with the school. He commented, "As long as early participation is accompanied by some rewards for success, a sense of comfort or 'belonging' can develop and become internalized" (1993, p. 15). Results of Finn's study indicated that the involvement of students in school is directly related to the quality of instruction, students' participation in school activities (e.g., response to requirements, class-related initiatives, extracurricular activities, and decision making), students' abilities, successful performance outcomes, and identification with the school (e.g., sense of belonging and being valued as individuals and students). Although Finn studied primary grades, he offered several suggestions that informed the subject school's processes, policies, and programs to better encourage and promote engagement among students identified as the most at-risk to not graduate.

In their research brief, *An exploration of at-risk learners and online education*, Archambault et al. (2010) provide a framework for understanding how at-risk students can be successful in a virtual-learning environment. The authors cite the US Department of Education's (1992) definition of an at-risk student as a "student who is likely to fail at school" (Archambault et al., 2010, p. 2). Building off of the work of Rose & Blomeyer (2007) the authors contend that virtual education is "well positioned to directly address the needs of at-risk learners" (Archambault et al., 2010, p. 3). With this as their guiding premise the authors propose several strategies that online educators can implement to potentially increase the likelihood of at-risk student success.

Archambault et al. note that virtual schools attempting to serve at-risk students should provide a supportive faculty and staff that can assist them in progressing through their classes.

The authors also argue that online schools should individualize their instructional methods to support each student at their own level as well as utilize specific instructional strategies and pedagogies that support at-risk student achievement. Archambault et al. maintain that increased contact with stakeholders is paramount for student success along with targeted professional development for staff members. Finally, the authors argue that at-risk students should be identified as early as possible so, if necessary, interventions can be introduced early in the course.

In addition to strategies that online programs should implement to ensure the success of their at-risk students, Archambault et al. list a series of challenges that online programs will have to consider if they wish to adequately serve their at-risk charges. The authors note that student engagement and motivation is a chief concern in the virtual environment. The hiring and training of qualified teachers and staff to support this vulnerable population is another vital concern. Finally, ensuring students have the requisite technical skills in order to be successful in the online environment should be high on any virtual program's list of considerations.

Combining Finn's (1993) participation-identification theoretical framework with Archambault et al.'s (2010) at-risk virtual learner framework provides a unique lens in which to view the literature and interpret data gathered on early school withdraw and credit recovery. Using Finn's model, this researcher will be able to evaluate literature that can inform the problem by appraising the adverse impact of low academic achievement, low motivation, and gradual disengagement in the classroom and from school. Using Archambault et al.'s framework this researcher will be able to evaluate literature that can inform the problem by examining the impact of virtual learning curricula on at-risk student achievement and engagement.

Significance of Study

The National Center for Education Statistics reports that approximately 88 percent of school districts around the U.S. offer some form of credit recovery course or program (Carver, Lewis & Coopersmith, 2011). A survey administered to 168 randomly selected public high schools in in Iowa and Wisconsin during the 2013-14 school year found that the primary use of online courses was to provide students with opportunities to recover credit for failed courses (Clements, Stafford, Pazzagila, & Jacobs, 2015). A survey administered to 59 randomly selected high schools in New York had similar results. Researchers discovered 59 percent of all high schools had students enrolled in online courses during the 2012-13 school year with the primary objective to provide students with opportunities for credit recovery (Clements, Zweig & Pazzagila, 2015). A report from the International Association for K-12 Online Learning notes that one of the chief reasons school districts offer virtual learning options is to provide students an alternative opportunity to make progress towards graduation (iNACOL, 2013).

As the demand for online credit recovery increases, for-profit educational courseware providers, including Pearson, Advanta, Edgenuity, and Apex Learning, are all competing for a share of the many multi-million dollar contracts offered by school districts in need of virtual recovery options. Butrymowicz (2010) reports that content providers may charge school districts between $175 and $1,200 per student, per recovery course. Providing online credit recovery has quickly become a multi-billion dollar industry (Matthews, 2012).

Given the rapid growth of online credit recovery over the past ten years, its widespread implementation throughout US schools, and the cost to taxpayers to offer, more research is imperative. To date, research on credit recovery has primarily focused on the effectiveness of credit recovery programs and the implications to school districts for starting one. An extensive

search of the literature revealed no studies focusing on student factors and characteristics that may influence success in an online credit recovery course. Given the costs to enroll a single student in just one credit recovery course, it would benefit school districts nationwide to have more information regarding what types of at-risk students have the highest likelihood of success within this virtual environment.

If school districts were to have more information on credit recovery course success factors, school teachers, advisors, counselors, and administrators could selectively place the at-risk students *most* likely to succeed into credit recovery sections. At a time when district budgets nationwide are still reeling from the effects of the Great Recession, this could save school districts valuable resources. Furthermore, with a solid understanding of the type of student that is *not* likely to be successful in the online environment, districts could save at-risk students valuable time whereby they could instead pursue credit through other means instead of languishing in a program where they are unlikely to see success. Lastly, as the pressure to raise graduation rates remains a constant weight on shoulders of school districts, a more complete understanding of the type of at-risk student likely to be successful in online credit recovery can help schools more effectively implement dropout interventions.

Delimitations & Limitations

This study analyzes data from a school district in the mid-Atlantic region of the United States from the 2014-15 and 2015-16 school years. This study is delimited to high school students engaged in online learning for credit recovery in core courses required for high school graduation.

This study's primary limitation is the results are only indicative of one school district in the mid-Atlantic region of the US. Results may not be generalizable outside of this district or

geographic area. Further, the school district examined only utilized credit recovery from two for-profit courseware providers. Results may not speak to all credit recovery providers, either for-profit or not-for-profit. Additionally, because this study relies upon data previously collected by the school district, it cannot account for unobservable characteristics, such as motivation; therefore results are descriptive and cannot be considered prescriptive.

Definition of Terms

Asynchronous Instruction: Instruction, primarily online, that occurs at different times and is not bound by geographic location. Asynchronous learners typically choose when and where to access course materials (Mayadas, 1997).

At-risk student: A student who is likely to fail at school. School failure is typically seen as dropping out of school before graduation (Kaufman & Bradbury, 1992).

Credit recovery: An opportunity for a student to earn credit for a course that they previously failed. The goal of credit recovery programs is to keep at-risk students in school and get them closer to graduation (Watson & Gemin, 2008).

Distance Education: "Planned learning that normally occurs in a different place from teaching, requiring special course design and instructional techniques, communication through various technologies and special organizational and administrative arrangements" (Moore and Kearsley, 2005, p. 2).

Dropout: A student who leaves school without a diploma or similar exit credential and does not return (Bylsma & Ireland, 2005).

Face-to-Face: An in-person interaction between teacher and student generally occurring within a "traditional" classroom.

Hybrid Learning: A combination of face-to-face and online instruction occurring within the same course. Also commonly referred to as “blended learning” (Rudestam & Schoenholtz-Read, 2010)

Online Learning: Educational content and instruction that is provided primarily by using internet based tools. Online learning is often also referred to as "virtual learning", “e-learning", or "cyber learning" (iNACOL, 2011).

Retained (or Retention): A student held back or forced to repeat the same grade for the second time.

Synchronous Instruction: A method of course delivery that involves a group of people learning the same thing at the same time (Foreman, 2003).

Virtual School: A K-12 program, organization, or school offering web-based instruction operating exclusively online (Clark & Berge, 2005).

Organization

This study will analyze data obtained from a school system in the mid-Atlantic region of the United States to determine student factors and characteristics that may influence success in online credit recovery courses. Core courses required for high school graduation from the 2014-15 and 2015-16 school years will be examined. This study will be divided into five chapters. Chapter one introduces and provides background on the topic, offers a statement of the problem, the purpose of the study, the research problem and associated questions and hypotheses, introduces a conceptual framework, the significance of the study, delimitations, limitations, and definition of terms. Chapter two includes a review of the pertinent literature on the danger of dropping out, at-risk students, online learning, and credit recovery. Chapter three describes the research design. It also includes the rationale for conducting quantitative research and discusses the data collection and analysis methods. If approved, chapter four will present the findings from

the study and chapter five will discuss the findings and their relationship to the relevant literature.

Summary

The United States is in the midst of a dropout epidemic. Nearly one in five students leave high school before earning a credential. The consequences of early school withdraw are nothing short of devastating, both for the individual and for society at large. Virtual learning generally, and credit recovery specifically, has been demonstrated to be a successful intervention to keep at-risk students in school. School systems across the country have been quick to implement online recovery programs. Nearly ninety percent of districts nationwide offer some form of online credit recovery. The research on credit recovery is scant, however. This study adds to the existing literature on credit recovery by examining student success factors and characteristics that may influence success in recovery courses. Recommendations from this study should enable school personnel to be confident that the at-risk students they place in recovery courses will ultimately be successful. Additionally, results from this study provide future credit recovery researchers some new lines of inquiry heretofore unexplored.

Chapter Two | Review of the Literature

"Cutting the U.S. high school dropout rate by half would save taxpayers $90 billion a year, or $1 trillion over 11 years" (Levin & Rouse, 2012)

~ Henry Levin is a professor of economics and education at Teachers College, Columbia University.

~ Cecilia Rouse, is a professor of economics and public affairs at Princeton University, and was a member of President Obama's Council of Economic Advisers from 2009 to 2011.

Introduction

This chapter will examine the literature on school dropout, online learning, and credit recovery. It begins with a broad overview of the high school dropout crisis in America, looking specifically at what causes students to drop out and the ramifications of doing so. It then shifts to online learning, offering a glimpse into how virtual learning developed and why it may be an effective tool to help stem the Nation's dropout crisis. It concludes with an overview of online credit recovery; what it is, how it developed, and what the challenges are as more and more school districts turn to virtual recovery options to increase their graduation rates.

This literature review was conducted by utilizing the search engine Google and Google Scholar as well as the academic databases ERIC, PsychInfo and ProQuest. The following terms were queried: "Online Credit Recovery," "Online Dropout Prevention," "Credit Recovery," "High School Dropout," "Online Learning," and "Online Learning History." Additionally, a catalog search at the University of Nevada, Las Vegas library was conducted using the query "High School Dropout Prevention." Many books, peer-reviewed journal articles, and reports published by educational policy/research organizations were selected for consideration. Special

emphasis was given to works dealing with the history of early school withdraw, the ramifications of early school withdraw, and online learning, specifically credit recovery.

At-Risk Students

A Dropout Crisis

A sobering report published in 2006 declared America to be in the midst of a dropout "epidemic" (Bridgeland, DiIulio & Morison, 2006). Between the 2005-06 school year and 2011-12, the most recent year we have data available, the graduation rate increased from 73 percent to 81 percent (NCES, 2015). While this is an improvement, America continues to produce over 700,000 dropouts each year (NCES, 2015). That equates to roughly 1.5 students every minute of every day. Graduation rates for minorities, especially in urban school districts like Clark County, Nevada, are precariously low. Clark County's graduation rate for African American students is below 50 percent and below 55 percent for Latinos (NDOE, 2015). This is endemic of urban areas nationwide (Bridgeland et al., 2006).

Causes for Dropping Out

There are myriad reasons a child may choose to exit school before obtaining a diploma. Dropping out of high school is often influenced by individual and familial stressors that begin early in a child's life (Garnier, Stein & Jacbos, 1997). Poor academic achievement in lower grades, placement in the juvenile justice system, foster care placement, drug use, and adult responsibilities all increase the likelihood that a student may opt to withdraw from school early (Neild & Balfanz, 2006; Jerald, 2006; Garnier et al., 1997). The National Dropout Prevention Center reports, "there is no single risk factor that can be used to accurately predict who is at-risk of dropping out" (Hammond, Linton, Smink & Drew, 2007, p.1). Dropping out of school appears

to be the result of a concordance of multiple events occurring over multiple domains, with many events often interacting or impacting one another (Hammond et al., 2007). Students generally edge closer to dropping out as a result of multiple situations compounding upon one another rather than making one definitive decision to withdraw based upon a single event.

To date there is no sure method to identify students who will exit school early. Despite this, recent cohort research has made progress in identifying key characteristics of school dropouts (Neild & Balfanz, 2006; Jerald, 2006). As a result, many potential dropouts can be identified early in middle school, and in certain situations some may be identified even earlier. Balfanz and Herzog (2005) note that over 50 percent of the sixth graders they studied who exhibited the following conditions eventually dropped out; these include, being absent over 20 percent of the school year, constant behavioral issues, and failing either English or mathematics. Neild and Balfanz, (2006) report that sixth graders who miss more than five weeks of school or fail English or mathematics have a nearly 75 percent chance of early school withdraw. Students who exhibit behavioral issues in elementary and middle school are at higher risk for dropping out. As these students reach high school, course failure and behavioral issues often converge causing these students exit school early (Herzog and Balfanz, 2005). In Philadelphia teachers assigned sixth graders marks in behavior; these consisted of excellent, satisfactory, or unsatisfactory. Balfanz and Herzog (2005) report that sixth graders who earned a grade of "unsatisfactory" only had 25 percent chance of making it to the 12th grade on time. Retention in elementary school is also associated with dropout. Alexander, Entwistle and Horsey (1997) note that 64 percent of students who were retained a year in elementary school left school before earning a diploma.

Success or failure in ninth grade can profoundly impact a student's likelihood of graduating or dropping out. Herlihy (2007) notes that more students fail ninth grade than any other grade in high school. Additionally a disproportionate number of students who are retained in ninth grade eventually drop out. Neild and Balfanz (2006) report that being held back in ninth grade is considered the greatest risk factor for early school withdraw. Russell, Hoffman and Higgins (2009) note that freshmen who fail to promote to tenth grade have a dropout rate close to 60 percent. Roderick (1993) reports that freshmen who fail to earn the minimum number of credits required to advance will drop out of school at a rate five-times higher than sophomores who successfully earned enough credits to be promoted to the next grade.

Social and academic disengagement from school are important factors associated with early school withdraw (Rumberger, 2011; Rumberger, 2001). Bridgeland et al. (2006) surveyed students who withdrew from school early and reported the following reasons for dropping out:

- a lack of interesting classes (i.e. boredom) (47 percent);
- absentee issues and not being able to get caught up (43 percent);
- negative peer influence (42 percent);
- lack of, or limited, parental influence and too much freedom (38 percent);
- failing in school (35 percent).

A lack of engagement with school is often considered a precursor to dropout as disengagement generally leads to academic failure (Finn, 1993). Newmann, Wehlage, and Lamborn (1992) state that disengagement from school is typically not linked to a single defining event; rather it is the end result of a long process. Yazzie-Minz (2010) notes that disengagement is not exclusive to those who drop out of school; indeed, a majority of secondary students report they are bored in school often or every day. Tragically, many high school students fail to see

even a small connection between what they are required to learn in their courses and what they imagine they will need to use later in their lives (Yazzie-Minz, 2010). Bridgeland, Balfanz, Moore and Friant (2010) report that many students associate their academic failure with being bored in class and feeling generally unmotivated. Among the causes that led students to dropout, 47 percent indicated their classes were unappealing and 69 percent indicated they did not have the motivation to finish required coursework. 70 percent of surveyed students felt they could have completed their high school studies if they were effectively stimulated (Bridgeland et al., 2010).

Effects of Dropping Out

The decision to withdraw from school before earning a diploma can have devastating consequences. High school dropouts have higher rates of unemployment, teen pregnancy, incarceration, homelessness, and mental and physical health problems. Stillwell (2009) discovered significant differences between high school dropouts' and graduates' joblessness and incarceration rates. The unemployment rate for high school dropouts following The Great Recession was measured at 12 percent (Breslow, 2012). As a comparison, the unemployment rate among college graduates was 4.1 percent (Breslow, 2012). Stillwell (2009) notes that if an individual in 2008 had not graduated from high school, he or she was more likely to be unemployed than to have a job. Unemployment contributes to the high levels of dropouts classified as living in poverty. High school dropouts are four times as likely to be living below the poverty line compared to those with college degrees (Stillwell, 2009). Additionally, the earnings potential for high school dropouts is significantly lower than it is for high school and college graduates (Breslow, 2012). The Census bureau reports that dropouts can expect to earn

an annual income of just over $20,000. High school graduates can expect to earn nearly $10,000 more a year.

Possessing a high school diploma is associated with lower rates of teen pregnancy and incarceration. Of all the single mothers in US in 2006 to 2007, 22.6 percent were high school dropouts (Sum, Khatiwada, McLaughlin & Palma, 2009). Female high school dropouts were six times more likely than college graduates to have had children when they were in their teens. Incarceration rates for high school dropouts are 63 times higher than for college graduates (Breslow, 2012). Sum et al. (2009) report it is more likely for a minority male dropout to be in jail than his high school graduate counterparts. African American male dropouts have the highest rate of incarceration among all demographics. Varlas (2005) estimates over 60 percent of Black dropouts have been incarcerated.

America's dropout "epidemic" has long been understood as a public health issue (Sum et al., 2009). Freudenberg and Ruglis (2007) report that individuals without a high school diploma are much more likely to develop severe mental and physical health problems, suffer throughout life dependent upon drugs, and die at an earlier age. Further, the authors indicate that the less schooling individuals have, the higher their levels of risky health behaviors such as tobacco addition, obesity, and low levels of physical activity (Freudenberg & Ruglis, 2007). The Robert Wood Johnson Foundation (2013) reports that high school graduation is linked with lower stress, improved access to health care, and higher levels of cognitive capacity.

Costs of Dropping Out

The societal costs for dropping out of high school are staggering. Sum et al. (2009) note that a single dropout will cost taxpayers an average of $292,000 over a lifetime due to the costs

associated with incarceration, health care, and lack of tax revenue. Hauke (2008) reports that taxpayers in Maryland pay approximately $42 million per year for students who fail to earn a high school diploma. That figure does *not* account for the lower earning potential of the dropouts and the decrease in potential tax revenue. Princiotta and Reyna (2009) note that the cost associated with dropping out of high school is over $300 billion per year. Gewertz (2009) reports that if half of the students from the Class of 2008 who withdrew from school early actually graduated, they "would have generated $4.1 billion more in wages and $536 million in state and local taxes nationally in one average year of their working lives" (p. 5). Levin (2007) reports that if US dropouts rates were cut in half, society would see close to $45 billion in savings and additional tax revenues.

The At-Risk Student

It has been long understood that the term "at-risk student" meant one that had a high probability of failing or dropping out of school (Placier, 1993). The US Department of Education expanded the definition of "at-risk student" to include not only those students who were likely to fail school, but also those students who did not reach a proficiency in key subjects such as math and reading (Kaufman & Bradbury, 1992). The Goals 2000: Educate America Act, signed into law in 1994, defined an at-risk student as one who "because of limited English proficiency, poverty, race, geographic location, or economic disadvantage, faces a greater risk of low educational achievement or reduced academic expectations" (Kominski et al., 2001, p. 99-100). Despite these various descriptions, Watson and Gemin (2008) note that K-12 education lacks a single, commonly held definition for the term "at-risk."

Common At-Risk Characteristics

A review of the literature reveals multiple characteristics and factors that capture the profile of at-risk students. Indicators typically associated with at-risk students "fall into one more categories: individual, family, school, and community" (Watson & Gemin, 2008, p.4).

Individual factors including internal characteristics such as self-concept and confidence may influence an at-risk student's potential for success in school (Bulger & Watson, 2006). Parr, Richardson and Scott (2008) report that students often have the capability to succeed in school, but psychological, emotional, and/or social needs prevent them from reaching their full potential. 50 years ago, the Coleman Report (1966) discussed how a student's locus of control can influence their ability to achieve academic success. Locus of control is often associated with the belief that individuals can exercise control over their life. The report's authors note that students who experience an external locus of control – outside factors they feel have control over their destiny – experience lower academic achievement (Coleman et al., 1966). Bulger (2006) reports that at-risk students who possess a limited self-concept and who doubt their academic capabilities have the potential to create a self-fulfilling prophecy of failure. That premonition of failure can directly impact an at-risk student's motivation to learn, ultimately leading to a disengagement from school (Lan & Lanthier, 2003).

Parental support plays an important role in a student's academic experience and in their capacity to be successful. The literature is in agreement that the absence of parental support can negatively impact a student's likelihood of academic achievement (Martin, 2006; Taylor-Dunlop, 1997; Kaufman & Bradbury, 1992). Kaufman and Bradbury (1992) report that parents who are not actively involved in their child's school, who do not talk to their child about school-related matters, and who hold low expectations for their child's future are common among at-risk

students. Family composition can also affect a student's ability to achieve academic success. Bull, Salyer, Montgomery and Hyle (1992) report that students from single-parent homes have a significantly higher rate of dropping out compared to students from two-parent households. Additionally, in their study examining the link between attachment and academic success, Chapman and Sawyer (2001) suggest that students with weak attachments share the following academic at-risk characteristics: they are less likely to be committed to their studies, they are reluctant to participate in extracurricular activities, and they do not see the purpose of investing time and effort into school.

Barriers such as poverty and low parental education levels have also been linked to low academic achievement. A 2011 report from the National Center for Education Statistics estimates that students from low income families are six times as likely to withdraw early from school as those from high income families (Snyder & Dillow, 2011). McKinney, Flenner, Frazier, and Abrams (2006) note that children from families classified as high-income have a 1.6 percent dropout rate whereas children from low-income families have a dropout rate over 10 percent. As children often have little to do with household finances, one may stipulate that parental educational level, which is often linked with income, is an important predictor of children's educational outcomes. Davis-Kean (2005) confirms this, noting that parental education, especially that of the mother’s, has a positive effect on student achievement.

A student's relationship with school and school personal can have an impact on their potential to attain academic success. Roderick (1993) reports that an at-risk student who perceives being singled out or treated differently from his or her peers can respond by withdrawing from accepted academic norms resulting in lower academic achievement. Examining teacher's attitudes and treatment towards students identified as at-risk, Tompkins and

Deloney (1994) report less feedback, more criticism, and "less eye contact and other nonverbal communication of attention and responsiveness" (p. 52). The effects of such behavior can have adverse consequences on an at-risk student's potential for success (Tompkins & Deloney, 1994). Further, Kaufman and Bradbury (1992) report that students with passive teachers and students whose teachers believe they are underachievers are commonly characterized as at-risk.

Community factors can also play an important role in shaping how a child will do in school. England (2005) reports that students who belong to cultural groups that do not value education frequently report scholastic underachievement and high failure rates. Indeed, minority groups often report high levels of school failure and dropout (Kaufman & Bradbury, 1992). Social problems that typically plague communities where poverty is rampant, including drug and alcohol abuse, high rates of incarceration, and teen pregnancy are all factors that can effect academic achievement (Powell, Roberts & Patrick, 2015). Tompkins and Deloney (1994) argue that students with little or no community support are at a higher risk for failure and dropout than students who have the support of their community. In this context the authors are referring to a "community" as a place where individuals hold themselves responsible for neighborhood children by "knowing and caring" about what those children are doing (p. 55). Students who do not live in an area with a vibrant sense of community do not have access to many social resources to draw upon and thus are at higher risk of school failure (Tompkins & Deloney, 1994).

Students who face one or a combination of these conditions are considered at-risk. Hixson and Tinzmann (1990) report that at-risk students are at a higher risk than their peers for experiencing events that may interfere with their ability to complete academic work. As at-risk students become disengaged from their educational environment, a slow detachment process

begins (Hixson & Tinzmann, 1990). Waterhouse (2007) notes that this detachment process sets in motion student behaviors that remove them from typical school values. After this removal process occurs, a student may begin to feel isolated and alienated from their school. The final step in this process of disengagement is a student choosing leave school.

The need to address the challenge of early school withdraw is a national priority. Currently, technologically sophisticated web-based pedagogical tools offer high school students a modern, adaptable, and efficient means of learning. These technologically rich teaching tools afford 21st century at-risk students a viable opportunity to complete academic requirements, recover credits and graduate from high school.

Online Education

History of Online Education

Modern online learning has its roots in the traditional distance learning systems of the mid-to-late 20th century. Distance learning itself can be traced back to Great Britain during the Middle Ages (Sack, 2003). Upper-class families who did not have the means or resources to maintain an instructor in-house would instead have their children study via correspondence. Messengers would carry assignments back-and-forth between teachers and households. As society developed and education became institutionalized, messengers were eventually replaced by the mail service, but a similar correspondence format between instructor and pupil remained (Sack, 2003). By the early twentieth century, correspondence schools were offering a wide variety of courses to serve students who, because of geographic, financial, or familial responsibilities, could not attend traditional face-to-face classes (Brown & Brown, 1994).

In 1907, the University of Wisconsin at Madison established a radio station to broadcast adult education programs via terrestrial airwaves (Univ. of Wisc., n.d.). Brown and Brown (1994) note that this was one of the first broadcast entities in the country to utilize radio waves for distance education. Following a published broadcast schedule, students were able to tune into specific lessons and then submit their assignments via the US Postal Service. Radio lectures continued until the mid-20th century when they were replaced with television broadcasts (Brown & Brown, 1994). Again, students could watch their lessons and send their work to school via the mail service.

As the twentieth century continued, technology began to have a greater influence on these distance learning systems. In 1974 NASA placed the Applications Technology Satellite-6 (ATS-6) into orbit (Moore & Kearsley, 1996). NASA's goal was to provide communications capabilities to poor, rural, or geographically remote communities. In the 1970s, the University of Alaska took advantage of NASA's ATS-6 satellite to transmit continuing education courses to teachers in remote areas of Alaska, thus becoming the first institution of higher education to use this technology (Moore & Kearsley, 1996).

The 1970s were a time of critical change for distance education. Universities and public school systems began collaborating to develop synchronous distance learning options offering, for the first time, communication between instructor and student in real-time (Carr, 2000). Teleconferencing introduced audio transmissions, allowing real-time conversations to occur between student and instructor as well as the transmission of graphics and images and the submission of assignments through telefax (facsimile). Concurrent with this, technology was being developed by the military and university researchers allowing for the transmission of data between two sites. The advent of the USENET and the Bulletin Board System (BBS), both

precursors of today's Internet, offered users worldwide the ability to communicate on virtual discussion boards (Moore & Kearsley, 1996; Casey, 2008).

In the 1980s, personal computers started becoming affordable for the average consumer and software began being developed offering students instructional materials in a digital format (Harvey & Farmer, 2003). Recognizing the potential of the PC, educators and educational vendors began developing programs and applications with comprehensive lessons, activities, and assignments becoming widely available and easily accessible (Casey, 2008). The proliferation of the PC throughout the 1980s and 90s coupled with the development of the Internet as we know it today led to what Zucker and Kozma (2003) describe as the electronic learning model. In the electronic learning model, technological tools such as visualization, simulation, and modeling are employed as aids to education. Coupling these tools with the ability of the Internet to deliver data to students via a telephone line or broadband connection is the latest iteration of the distance education movement. The ability to deliver online, web-based programs and courses through the use of asynchronous and synchronous methods of instructional delivery became a reality. The technological capabilities inherent in today's Internet offer student engagement, access to information, and the sharing of knowledge (Sack, 2003). As Casey (2008) succinctly notes, "distance learning over the Internet [is] the next instructional frontier. The potential for interactive, virtual classrooms [is] limited only by the budget, institutional vision, and course management software" (p. 48). Today, with the wide accessibility of computers in homes, classrooms, and libraries across North America, most other forms of distance learning have all but disappeared; online learning is now the preeminent mode of distance education on this continent (Baggaley, 2008).

Overview of Virtual Schooling

Virtual schools are institutions that utilize web-based technology to offer students coursework and coursework-related services. Russell (2001) reports that virtual schools are a "form of schooling that uses online computers to provide some or all of a student's education" (p. 2). Clark (2000) defined virtual schools as "a state approved and/or regionally accredited school that offers secondary credit courses through distance learning methods that include Internet-based delivery" (p. i). Virtual schools differ from traditional brick and mortar schools through the "physical medium that links students, teachers, and administrators" (Clark, 2000).

Virtual schools have many characteristics. Clark (2001) published a report that provided a summary of K12 virtual school offerings throughout the US. This study examined the various types of virtual schools in existence. Seven categories were established defining virtual schools (Table 1).

Just as the types of virtual schools differ greatly, so to do the delivery mechanisms K12 virtual schools choose to employ. As Kaseman and Kaseman (2000) note, certain virtual school courses operate in a manner similar to twentieth century correspondence school courses, with interaction limited to reading assignments, writing activities and formal responses from the instructor. Other virtual schools feature students interacting with their teachers and classmates through e-mail, instant messaging, discussion forums, IP audio, video webcams, and chatrooms. Student interaction within virtual schools can be unscheduled, whereby students work a pace that is convenient and comfortable for them, or scheduled, thus allowing for real-time interactions. Unscheduled interaction is described in the literature as asynchronous learning. Mayadas (1997) notes asynchronous learning is a method of teaching and learning that utilizes online resources to facilitate the sharing of information outside of the constraints of time and space. Conversely,

scheduled learning is described in the literature as synchronous learning. Foreman (2003) describes this method of delivery as a group of people learning the same thing at the same time.

Table 1: Virtual School Profiles

SCHOOL TYPE	DESCRIPTION
State-Sanctioned "State-Level" Virtual Schools	Online schools officially recognized by the state legislature or state governing body as providing, "Virtual school" access to students throughout the state. Examples are the Florida Virtual School or the North Carolina Virtual Public School.
College and University-Based Virtual Schools	An example of this type of school is Oklahoma State University. University online courses may be marketed to virtual schools and offered in conjunction with the virtual school. Independent-study high schools are established by universities.
Consortium and Regionally-Based Virtual Schools	Consortiums typically combine the resources of smaller virtual or public schools together. The Virtual High School Consortium in Massachusetts and the Colorado Online Consortium are two examples.
Local-Education Agency-Based Virtual Schools	These schools provide supplemental online resources to students attending traditional schools, such as the York County (VA) Schools Virtual Learning Program.
Virtual Charter Schools	Typically operated by regional education agencies. In some states non-profits and for-profits may operate the virtual school. Generally used by homeschoolers. An example of this type of online school is Nevada Virtual Academy.
Private Virtual Schools	Proprietary private and non-profit K-12 schools, targeting homeschoolers. Many do not have accreditation. (Christa McAuliffe Academy).
For-Profit Providers of Curricula, Content, Tools and Infrastructure	Examples are Apex Learning and Aventa. These companies provide course materials and often have proprietary instructional software.

Adapted from Clark (2001)

Development of K12 Virtual Schools

The first K12 virtual schools were instituted in mid-1990s in Utah, Massachusetts, and Florida (Davis & Roblyer, 2006). The Virtual High School (VHS), based in Maynard, Massachusetts, is one of the oldest virtual high schools in the US. Established as the Concord Virtual High School in 1996 with a $7.4 million grant from the US Department of Education,

VHS grew quickly over five years to 232 separate member schools offering 156 course sections to over 3600 students (Virtual High School, n.d.). VHS has been noted as one of "the most successful collaborative or barter model virtual school[s] in existence" (Clark, 2001, p. ii).

The Florida Virtual School (FLVS) is the largest virtual school in the nation. Established in 1997, FLVS grew quickly and by the year 2000 offered an online curriculum of 52 high school courses serving "65 public school districts, private schools, home schools, and charter schools" (Clark, 2000, p. 3). Bonk (2009) examined the growth of FLVS from its inception to 2007, at which time over 52,000 students grades 6-12 were enrolled. The success of FLVS has been attributed to several factors. According to Bonk's (2009) analysis of the program, FLVS has been successful due to its "rigor, depth, innovation, and quality" (p.109). Currently, FLVS serves over 400,000 students annually (iNACOL, 2013).

Between 1996 and 2002, 14 states established K12 virtual schools that were officially recognized as 'the' state virtual school (Clark, 2003). The pace and rate of virtual school development grew quickly through the 2000s. Watson, Murin, Vashaw, Germin, and Rapp (2014) report that at the start of the 2013-14 school year each state in the U.S. was providing online learning opportunities to K12 students. The most recent data iNACOL has available indicates that 29 states and the District of Columbia have a state recognized full-time virtual school (iNACOL, 2013). In addition to state-run virtual schools, virtual learning has been embraced by private, charter, and home schools, as well as by for-profit curriculum providers. Currently there are over 400 for-profit, not-for-profit, and publicly operated K12 online education programs in operation (Molnar et al., 2015).

The past 19 years have seen a tremendous increase in the number, and types, of K12 virtual schools as well as the number of students who have been served via this delivery

platform. In April 2006 the state of Michigan established the requirement that all students complete an online course to be eligible for a high school diploma (iNACOL, 2013). Since that time Virginia, Arkansas, Alabama, and Florida have added online learning requirements (iNACOL, 2013).

Benefits of Online Education

The significant growth in virtual schooling is attributed to the many perceived benefits it offers to students, teachers, administrators and policymakers. Kellogg and Politoski (2002) note that the benefits of virtual education to schools and students includes the ability to offer individualized instruction to meet the learning styles and other unique needs of students as well as the flexibility to offer courses without the constraints of meeting in a physical space or on a specific day and time. Berge and Clark (2005) report four similar benefits to virtual education including: offering high quality learning opportunities, allowing educational choice, improving student skills and outcomes, and expanding access to educational opportunities.

Expanding educational access is one of the most cited benefits of online education. Cavanaugh (2001) reports that virtual schooling allows small and rural K12 schools to offer expanded course opportunities they would be hard-pressed to teach otherwise. Zucker (2005) notes the most common reason school districts offer when asked why they provide online education is the ability to deliver courses they would not normally be able to offer. Additional reasons include the ability to meet the unique needs of students as well as the ability to offer college and AP courses (Zucker, 2005).

In addition to flexibility of scheduling and educational access, virtual schooling also provides a financial benefit to states and school districts. In their review of the Florida and

Illinois Virtual Schools, Blaylock and Newman (2005) report that online instruction "addresses the reality of curtailed budgets" (p. 382). Problems surrounding overcrowded classrooms, teacher inequities, and financial issues can all be addressed by online education (Blaylock & Newman, 2005). Watson et al. (2014) reiterate this by noting that online learning affords administrators the ability to provide individualized learning for students, schedule courses they otherwise may not be able to offer due to lack of qualified teachers, and address overcrowding concerns in brick and mortar schools. In light of last decade's Great Recession, these benefits are especially crucial for principals and superintendents facing limited budgets.

Virtual schooling is redefining how K12 students view their curricular experience. Bolstad and Lin (2009) report that secondary students attending courses online feel they have more flexibility in their education. Some students feel they have more flexibility on homework assignments compared with their face-to-face classes, and other students enjoy the ability to cover the online course content at their own pace, as "the online curriculum gives the program the capacity to meet students at their own level and accelerate their progress as needed" (Tucker, 2007, p. 3). Rice (2006) notes that virtual schooling provides flexibility to students who may not be able to attend traditional school due to hospitalization, incarceration, familial, or work obligations. This flexibility extends beyond what is considered to be class time. Bolstad and Lin (2009) report that students frequently discussed course materials with peers using the online course technology outside of what was considered to be regular class time.

Types of K12 Online Education Programs

Picciano, Seaman, Shea and Swan (2012) report that the two primary reasons students enroll in K12 virtual education options are to gain access to courses that are not available at their home school and to retrieve credit for failed courses (credit recovery). Nearly 20 years after K12

online schools were initially established, they are continuing to hold true to their original values, to provide "more affordable, consistent, and equitable access to high-quality educational opportunities for students who need them most: rural, underserved, and at-risk populations" (Davis & Roblyer, 2005, p. 400). Reporting on the results from a survey administered during the 2009-10 school year, Queen and Lewis (2011) indicate that the primary types of virtual K12 schooling courses include credit recovery, dual enrollment, Advanced Placement, and career and technical education. iNACOL (2011) developed a set of definitions in order to promote a greater understanding of the various types of online learning platforms. These definitions have been summarized in Table 2.

Table 2: iNACOL Online Learning Definitions Project Definitions of Terms

Term	Definition
Blended / Hybrid learning	A format where a student learns in part at a physical location away from home, typically a brick and mortar school, and in part through online delivery with an degree of student control over place, time, and pace.
Credit recovery	A format whereby a student receives credit for a course that she previously attempted but was unsuccessful in earning academic credit towards graduation.
Dual enrollment	A format where secondary students earn college credit for courses taken through a postsecondary institution.
Online learning	Educational instruction and content that is delivered primarily via the Internet. Synonyms include "virtual learning", “e-learning", and "cyber learning.
Online school	A state, charter, private, or public entity which delivers full time educational content via the Internet.
State virtual school	State virtual schools are created at the state level by the state legislation or other state-level agency. Students may enroll in one or more courses from anywhere in the state. Enrollments can be on a course by course basis and students rarely attend state virtual school on a full time basis, although there can be exceptions.

Adapted from iNACOL (2011)

Online Learning for At-Risk Students

The rapid growth in K12 online learning has stimulated development in many specialized areas, the largest of which being offering students the opportunity to make up credit required for graduation (iNACOL, 2013). Despite credit recovery holding the highest level of enrollment in K12 online education, the literature examining at-risk students in the virtual setting is rather sparse. Recognizing this need, Archambault el al. (2010) developed a comprehensive study examining how online learning can benefit at-risk students. The authors examined two specific issues: First, how virtual schools are implementing strategies specifically targeted at at-risk students. And second, how virtual schools determine the online delivery and design methods for assisting at-risk students. One of the primary findings by Archambault el al. (2010) was that increased communication between schools and parents/guardians resulted in increased achievement by students. Additionally the authors found that by implementing interventions to at-risk students early in the semester, efforts could be made to keep the student "on pace" prior to them developing the opportunity to "fall behind." The authors note that by identifying students who may be at-risk as early as possible, schools can ensure that "they receive the necessary attention and support needed for their success" (p.7). Finally, the authors discovered that specialized professional development for instructors working with an at-risk population can help ensure that online facilitators have the tools necessary to properly assist their students.

Watson and Gemin (2008) examined how technology and online access can reinvent at-risk students' learning experiences. The authors report that "motivating students who have failed in the traditional classroom setting is a key to success for credit recovery programs" (p. 14). Given this, online credit recovery programs that can motivate their students by offering self-paced courses, along with the opportunity for work to be completed at an accelerated pace, may

see success with their at-risk populations. Additionally, online credit recovery programs that individualize their instruction enable at-risk students to spend their time working on material that they were initially unsuccessful on rather than repeating material where they have previously demonstrated success. By focusing only on material where remediation is required, credit recovery can keep students engaged and focused. Finally, the authors note that the self-paced nature of courses, aside from acting as a motivational tool, can provide at-risk students relief from the "difficulties and stress" often associated with "learning deadlines imposed by arbitrary calendars or school hours" (p. 15).

Success Factors in Online Courses

The literature is notably thin when it comes to identifying success factors in K12 online courses. Liu and Cavanaugh (2011a) examined student outcomes in high enrollment K12 virtual classes and determined that eligibility for free/reduced lunch can influence course success. Participation in a school's free/reduced lunch program is often used as measurement for the student's family SES in the literature on student academic performance (Sirin, 2005). As aforementioned in the section on *common at-risk characteristics*, low levels of family income can profoundly influence a student's at-risk status.

Gender has been linked to success in online course success. In a study examining the differences in course achievement between male and female college students in Texas, researchers determined that male students outperform female students when both sets of students have a lower grade point average (Kupczynski, Brown, Holland & Uriegas, 2014). As grade point average increases, however, the differences were found to dissipate. Interestingly, a large-scale study completed by researchers at Columbia University's Teachers College comparing success in online college courses to face-to-face sections found that males do poorer in online

courses than females (Xu & Jaggars, 2014). While both of these studies focused on post-secondary data, the implications should resonate with K12 online educators.

A student's race/ethnicity may also impact success in online courses. The same Columbia University study found that African American college students performed poorer in online courses than in traditional face-to-face sections (Xu & Jaggars, 2014). Xu and Jaggers (2014) also discovered that Asian students had higher rates of success in seated compared to virtual sections.

As school counselors nationwide face an average caseload of 367 students each (College Board, 2012), identifying any distinguishing factors or characteristics that may predict success in online course work should be a priority for K12 researchers. This information could prove exceptionally beneficial to counselors who are often tasked with selecting appropriate students for virtual coursework with only a limited working knowledge of the students themselves. A broader understanding of the type of successful K12 online student could also be valuable to course designers who should be concerned with making online coursework as accessible as possible. This study may help bridge some of the gap in the literature on success factors of K12 online students, specifically those at risk of dropping out of high school.

Credit Recovery

What is Credit Recovery?

Despite its widespread proliferation in America's K12 schools, a Federal definition of credit recovery does not exist (McCabe & St. Andrie, 2012). Watson and Germin (2008) define credit recovery as "a student passing, and receiving credit for, a course that the student previously attempted but was unsuccessful in" (p. 3). Carver, Lewis and Coopersmith (2011)

note that credit recovery allows “students to recover course credits from classes they have missed or failed" (p. B-8). Most commonly, credit recovery is understood as “a structured means for students to earn missed credit in order to graduate from high school” (McCabe & St. Andrie, 2012, p. 1). The primary goal of credit recovery is to offer students the opportunity to retake courses they failed in an effort to keep them on track to graduate and ensure they remain school (Watson & Germin, 2008).

Credit recovery programs typically utilize a proficiency or mastery-based model to get students on track (Zenith, 2011). Under this model, students may demonstrate mastery of key knowledge and skills in a specific course as an alternative for completing seat-time requirements. States have rushed to adopt credit recovery programs because seat-time is not a factor in determining if credit can be awarded (Zenith, 2011). The North Carolina State Board of Education policy manual states “the length of credit recovery courses shall be dictated by the skills and knowledge the student needs to recover and not be a fixed length of seat time” (NCSBE, 2015). By waiving seat-time requirements, schools allow credit recovery students the opportunity to complete coursework at an accelerated pace (Watson & Germin, 2008). By accelerating the pace at which students can re-earn credit for failed courses, the possibility that these students may catch up to their peers and get back “on track” to graduate becomes more distinct (Carr, 2015).

Credit recovery differs from traditional course repetition or remediation in many ways. Zenith (2011) illustrates several of the key differences in the two approaches:

Table 3: Credit Recovery Compared To Traditional Remediation

	Credit Recovery	**Traditional Remediation**
Which grades?	Typically High School; some states provide for grades 6-12	Any grades K-12
How are students identified?	Students who have previous failed a course; often a course required for graduation	Students may have failed a state exam or course, or identified as a student likely to fail a course
When is a student "done"?	When a student has demonstrated mastery of targeted knowledge/skills.	Normally seat time completion
Goal	Increase high school graduation rates	Improve student proficiency in targeted subjects

Table adapted from Zenith (2011)

The mastery-based model typically employed by credit recovery programs has been touted as a way to keep the at-risk student engaged in their learning in a way that traditional remediation cannot. For example, a student forced to repeat an entire class may begin to feel frustrated sitting through the same material they sat through previously (McCabe & St. Andrie, 2012). Further, Zenith (2011) argues that requiring students who are only missing a few key concepts from a course to retake a course in its entirety is an inefficient use of limited school resources.

Many credit recovery programs offer pre-test features which allow students to skip course content if they can demonstrate mastery (McCabe & St. Andrie, 2012). If a student demonstrates mastery of a course topic, they can proceed to the next topic without unnecessary delay, i.e. waiting for a teacher to grade an exam or approve the advancement. If the student is not proficient in a particular course topic, they can complete coursework aimed at broadening the student's knowledge of the material. Once the requisite coursework has been completed a post-test will assess if they have successfully mastered the material. If proficiency is not attained, the student will complete additional remediation activities aimed at ensuring mastery. Course credit is awarded when a student successfully masters all modules or sections within the course

(Mileaf, Paul, Rukobo & Zyko, 2012). Some states also require students to pass an end-of-course test for credit to be obtained (McCabe & St. Andrie, 2012). For students who failed a course for exceeding the number of absences specified by school policy, or who did complete a certain number of required assignments, mastery-based learning can provide the opportunity to demonstrate their knowledge of the material and quickly regain credit for the initially failed course (Zenith, 2011).

In many cases, credit earned by students while completing credit recovery coursework is awarded by their home-district, regardless of the school, agency, or company providing the course material (McCabe & St. Andrie, 2012). Some states have adopted specific guidelines to regulate and control how grades obtained through credit recovery are documented (McCabe & St. Andrie, 2012). North Carolina, for example, has opted to forgo providing final grades for students who make-up credit via credit recovery; rather once the credit recovery coursework has been successfully completed the student's transcript lists the course as passed (Beamon, Brown & Garland, 2010).

Types of Credit Recovery Programs

Credit recovery has evolved from summer school and afterschool remediation programs to "just-in-time programs" where instructional components are delivered in a blended or completely virtual format (Mileaf, Paul, Rukobo & Zyko, p. 14, 2012). Many credit recovery programs have designed their platforms to take advantage of virtual learning's flexible "anytime/anywhere" model, thus allowing students to access course materials outside of the traditional school setting (Watson & Germin, 2008). Different credit recovery programs offer students the opportunity work on their coursework over the summer, on breaks, afterschool, over the weekend, at home, and in the evenings (McCabe & St. Andrie, 2012).

The two primary models of credit recovery delivery are the blended approach and the fully online approach. Blended learning models combine the fundamental elements of face-to-face instruction with some of the best features of online education (Dessoff, 2009). Face-to-face interaction with teachers offers students the support, assistance, and encouragement necessary for them to stay on track (Mileaf et al., 2012). Meanwhile, the online component allows students the ability to complete their coursework independently and at their own pace (Mileaf et al., 2012). Blended learning programs are typically pre-programmed and self-contained thus allowing teachers to aid students when needed and oversee and prompt as necessary (McCabe & St. Andrie, 2012).

Fully online credit recovery is defined as a program where course materials are delivered exclusively online and there are limited or no opportunities for student-teacher interaction in-person (Mileaf, et al., 2012). Curricula for online credit recovery can be provided through software purchased or licensed by the school/district from for-profit or not-for-profit providers, or through a partnership with a state-run virtual school, charter school, or other educational entity (McCabe & St. Andrie, 2012). Students complete courses by watching live-action and animated video presentations as well as completing web-based learning activities. To encourage engagement, online credit recovery courses are typically designed to be highly interactive with activities such as mini-games, and very limited text-based work (Dessoff, 2009).

Online credit recovery programs can be developed to be facilitated by an instructor or non-facilitated. Platforms delivering facilitated instruction offer opportunities to interact with the instructor; the instructor can give students feedback and may differentiate instruction if concepts are not being mastered (Mileaf, et al., 2012). Communication between teacher and student is often a key component of facilitated online credit recovery. Indeed, many online credit recovery

programs require teachers communicate with their students a specific number of times each week the facilitated online credit recovery class is in session (NCVPS, 2015; D'Agustino, 2013). Non-facilitated credit recovery is delivered in prescribed asynchronous format with little, and often no, opportunity to interact with a teacher or subject area expert (Mileaf, et al., 2012). Non-facilitated credit recovery requires students to take a much greater responsibility for their own learning.

Popularity of Credit Recovery

Credit recovery has grown rapidly as a result of the reforms required by No Child Left Behind (Dessoff, 2009). School districts, under pressure by federal and state mandates to improve test scores and raise graduation rates, have found credit recovery to be a cost-effective option to fulfill both needs (Zehr, 2010). Results from a nationwide survey of K12 online learning administered to over 2,500 school district superintendents and administrators indicated that credit recovery was one of the most common applications of online coursework (Greaves & Hayes, 2008). A report published by National Center for Education Statistics found similar results with credit recovery topping the list of virtual course offerings (Queen & Lewis, 2011). These results seem to be corroborated by the brisk sales of credit recovery products. Zehr (2011) reports that from 2008-2010, sales for the credit recovery line of courses produced by Aventa Learning increased eightfold. In 2009 roughly a third of annual course enrollments at the Nation's largest virtual school, the Florida Virtual School, were made up of students taking credit recovery (Dessoff, 2009). Credit recovery has been referred to as "the fastest growing area of online learning" (McCabe & St. Andrie, 2012, p. 1). In 2011 it was estimated that nearly 90 percent of school districts nationwide utilized some form of credit recovery (Carver, Lewis & Coopersmith, 2011). This number has almost certainly increased in the intervening time.

As aforementioned, the cost-effectiveness of credit recovery has led to its widespread implementation. While the costs to offer a credit recovery course varies greatly between vendors, there is general agreement that a school district offering credit recovery as an option to regain credit toward graduation is less expensive than a school district that places students back into a traditional face-to-face setting (Carr, 2014; Matthews, 2012; Sawyers, 2010; Picciano & Seaman, 2009).

Implementation: What Credit Recovery Looks Like

As credit recovery has grown in popularity, the options for credit recovery have increased (Heppen et al., 2013). School systems may opt to create their own credit recovery program, partner with a state-run virtual school, or purchase a credit recovery program from a vendor (Archambault et al., 2010). This section will profile three school districts and examine how they have implemented these various options for credit recovery.

East Valley School District (Spokane, WA)

The East Valley School District operates a credit recovery program in conjunction with the Squaxin Indian Nation (eSchool News, 2011). In the Squaxin culture children come of age at 15, so a traditional high school education is often difficult to manage. The EVSD provides credit recovery as an option so graduation can remain a reality even after students leave school to go to work. Computers have been made available at a school building on the reservation allowing students to complete online course work without having to go off site. Superintendent John Glenewinkle notes that teachers monitor the recovery program to make sure that students are completing work (eSchool News, 2011). EVSD teachers have the ability to modify course material to make it culturally relevant. Additionally, teachers are made available when students require assistance. The school remains open during breaks and holidays so students can complete

their work at any time. The school has also implemented a system “whereby the principal and counselors … sit down with a list of all students and look at where each student should be at benchmark moments” (eSchool News, 2011, p. 3). If students are found to not be meeting their benchmarks, interventions are put in place which will help the student stay on track and recover credit.

Putnam County Schools (Tenn.)

In 2008 the Putman County Schools developed the Virtual Instruction to Accentuate Learning (VITAL) program (Powell, Roberts & Patrick, 2015). The mission of VITAL is to assist students who are behind in their courses catch up or recover course credit. Credit recovery students may work on online coursework at home, during lunch, or after school. Students also have the option of completing coursework during school breaks and holidays. Students who have failed a course but earned a grade of 65% or higher may participate in an accelerated recovery program to make up the difference in points to receive a passing grade in the course (Powell et al., 2015).

The VITAL program utilizes a team-teaching approach to ensure student success. Directing the student through their credit recovery coursework is a state-certified online teacher from the Florida Virtual School. This teacher works in conjunction with an onsite facilitator "who is an active participant in the student learning experience" (Powell et al., 2015, p. 18). The facilitator may answer specific questions that students have, assist with technical issues, and customize courses based on student needs. Powell et al. (2015) note that VITAL recovery program is credited with improving the district's graduation rate from 86% in 2008 to 93% in 2014.

Chicago Public Schools

The Chicago Public Schools (CPS) utilize the for-profit course provider Aventa Learning for their credit recovery needs (Heppen et al., 2013). Aventa employs subject-certified teachers who have been trained in online pedagogy to lead their online recovery courses. This training includes best practices in online instruction, strategies to inspire and maintain student engagement, and ongoing professional development. Additionally, the CPS provides schools an on-site mentor responsible for ensuring students have the resources and support needed to complete their recovery coursework. On-site mentors also assist students navigate the curriculum, proctor assessments, and communicate with the Aventa teachers about student issues.

Aventa's interactive credit recovery lessons are aligned to CPS standards and are designed so students can progress at their own pace and receive instantaneous feedback on what they have learned. Lessons include "avatars, flash technology, animations, and interactive games to promote student engagement with the content" (Heppen et al., 2013, p. 13). Aventa teachers can communicate with students through the web-based course platform, online chatrooms, or virtual classrooms that allow for real-time student-to-student and teacher-to-student dialogue. CPS students can receive several types of instructional support through the Aventa credit recovery platform including, lowered reading level of content, shortened topics, and read-aloud features. These supports are designed specifically to give at-risk CPS students the supports needed to progress through the coursework and recover credit.

Effectiveness of Credit Recovery

Admittedly, only a small body of research currently exists on the effectiveness of credit recovery programs; some of it positive and some of it negative. In an effort to understand the

factors that contribute to the successful completion of online high school courses, Simeroth (2007) studied students who completed an online Algebra I course. While three research questions were established for the study, only one directly pertained to credit recovery: Was there a statistically significant difference in the achievement rate of students who enrolled in Algebra I to:

1. Get ahead in their required coursework;
2. Complete regular coursework online;
3. Recover credit for courses they failed.

237 students from across the United States were randomly selected from the for-profit course provider Advanced Academics' online Algebra I pool. From the sample, 28 percent of students wanted to get ahead in their coursework, 43 percent were completing their regular Algebra I course online, and 29 percent were attempting to recover credit for an Algebra I course they took previously. Results from a One Way ANOVA revealed that the students who enrolled in online algebra to get ahead in their coursework succeeded at a significantly higher rate compared to the two other reasons for enrollment. The results of this study, while not groundbreaking, do shed an important light on the topic of credit recovery – simply enrolling students in an online course is not enough for them to be successful. At-risk students completing a credit recovery course generally need some degree of support to be successful.

A study conducted by Christian (2003) sought to determine how at-risk students working on a self-paced computer-guided credit recovery program fared compared to students retaking a traditional seated class. The author sought to determine the extent to which an online credit recovery program improved the academic success for first year high schoolers. Christian designed a statistical investigation to analyze the relationship between student success

(dependent variable) and gender, ethnicity, socioeconomic status, reading standardized assessment results, and mathematics standardized assessment results (independent variables). Christian's research findings showed no relationship existed between success in the credit recovery program and the independent variables. The author concluded that additional study was required to determine the most effective way to provide academic assistance to struggling ninth graders.

Franco and Patel (2011) examined the results of a pilot credit recovery program deployed at an Ohio high school. The author's based their results on a convenience sample of 23 freshman enrolled in summer school. Criteria for participation in the pilot program was contingent upon having failed "at least one of the two semesters of a class during the academic year" (p. 21). Core teachers were asked to "nominate" students for the program based upon "their experiences with the students" (p. 21). Core teachers were also asked to only nominate students who had earned above a 50% as their final grade.

The credit recovery curriculum was developed by school teachers and mapped to state content standards. Students attended the program, held in a computer lab, from 8-10a, Monday through Friday, for seven consecutive weeks. State-certified content specialists were on hand throughout the seven week pilot period as well as the school psychologist and a community college instructor to assist students with any issues. The authors found that the pilot program was successful in getting students who had failed core high school courses as freshmen closer to graduation by making up for lost credit. Questions of generalizability remained, however, due to the small sample size.

In an attempt to investigate the effectiveness of credit recovery as an instrument to improve academic achievement and increase high school graduation rates, Robbins (2011)

designed an analysis to test how well a web-based online credit recovery program was meeting the needs of at-risk students. To this end the author established the three research questions:

1. Did the online program assist at-risk students recover lost credit and increase their graduation rate?
2. Did school administrators and other members of the school-community support the online credit recovery program as an approach to regain lost credit?
3. Did a dearth of student technology skills, or access to technology, prevent students from utilizing the credit recovery program?

To examine these questions the researcher developed a survey to be administered to educational practitioners in the East Central region of Indiana. Participants included a convenience sample of 40 secondary educators. Results from Robbins' research revealed a strong belief among the school community that the credit recovery program had a positive academic effect on the schools involved. Interestingly, all stakeholders surveyed had strong support for the credit recovery program, except teachers. Supportive stakeholders included school administrators, school board members, community members and students. Survey results indicated that students felt competent with the technology and had no issues accessing the online credit recovery program. Additionally, 16 of the 20 school districts surveyed saw improvement in their graduation rate over the three-year period that the credit recovery program was being utilized. 18 out of the 20 school districts experienced a reduction in their reported dropout rate. Analysis of achievement test results indicate that the survey population pass rate in Algebra I improved from 56.1 percent proficient in 2010 to 66.2 percent in 2011. The results from the administration of the English 10 assessment showed that the population improved from 59.9 percent proficient to 76.4 percent.

The results of this study demonstrate that the credit recovery program as being implemented in East Central Indiana achieved its goal of assisting at-risk students move closer to graduation and of obtaining higher results on assessment exams. One curious finding of this study, however, was that teachers – arguably the most important group of stakeholders outside of the students – did not support the credit recovery program to the same degree as the other groups of stakeholders. Naturally, this leads one to question *why* the teachers did not support it as strongly. The following section will address some of the criticism surrounding credit recovery including the evidence of rigor in credit recovery programs.

Four years after implementing an online credit recovery program the Boston Public Schools (BPS) commissioned a study by the Donahue Institute for Research and Evaluation at UMass to determine the program's successes and challenges in order to "inform ongoing strategic planning and program management decisions" (UMASS, 2012, p. 4). The BPS credit recovery program targeted students who were 18 years old, or older, and were within four credits of graduating, but were flagged as "high risk" for dropping out. A total of 1,274 students were enrolled in 2,618 credit recovery courses during the 2010-11 school year. Of these, 441 students successfully completed one or more courses. 350 of these students ultimately graduated from high school.

A mix of site observations, structured interviews, and focus groups revealed several findings. First, on-site teachers play an important role in fostering the success of credit recovery students. Second, case managers who contact students directly, encouraging them to attend school and complete their coursework, are critical. Third, students who were enrolled in fewer credit recovery courses had higher rates of completion. Fourth, math and science credit recovery courses are more challenging to complete compared to history, English and foreign language.

The authors noted that to be successful, credit recovery students "must be self-reliant and motivated to consistently put in the necessary time at [school] as well as at home" (UMASS, 2012, p. 22). Researchers concluded that the BPS credit recovery program is one of "high quality" that provides a "rigorous strategy for recovering courses needed to graduate" (UMASS, 2012, p. 22).

One of the most comprehensive studies to examine the effectiveness of credit recovery is currently underway in Chicago. Investigators from the American Institute for Research and the Consortium of Chicago School Research received a $3.1 million dollar grant from the US Department of Education to assess the effectiveness of an online Algebra I credit recovery course for at-risk ninth grade students (Heppen et al., 2012; Heppen et al., 2014). Fifteen Chicago public high schools received funding to implement two types of Algebra I credit recovery courses over four summers beginning in 2011, one online and one face-to-face. Investigators are attempting to address four specific research questions:

1. "To test the efficacy of online Algebra I for credit recovery, compared with standard f2f Algebra I for credit recovery.
2. To determine the supporting classroom conditions under which online Algebra I for credit recovery yields higher efficacy.
3. To gauge the extent to which credit recovery can help at-risk students get back on track, relative to students who passed Algebra I in 9th grade.
4. To gauge the effects of expanding summer credit recovery options through online courses." (Heppen, 2012, p.1)

Target students for this study were first time freshmen who failed the second semester of an Algebra I course. Within each participating school, students were randomly assigned to the experimental group (online) or the control group (face-to-face).

Over the first two years of the study 1383 students were assigned to one of 38 online or face-to-face sections of Algebra I credit recovery, with each section averaging 18 students. The online program utilized for the study was developed by Aventa Learning, a for-profit course provider that the Chicago Public School District has used extensively for online learning purposes in recent years. The recovery course was offered to students in computer labs at their districted high school with each lab featuring an on-site mentor trained by CPS. Students also had access to an online algebra teacher provided by Aventa that they could interact with virtually. The control group received the traditional face-to-face second semester Algebra I course. The course followed the standard Chicago Public School District Algebra I curriculum and was led by a fully licensed math teacher.

The investigative team used hierarchical linear modeling techniques to determine the effects of taking online Algebra I credit recovery compared with retaking Algebra I as a traditional face-to-face summer course. Researchers examined students' mathematics scores on the Chicago end-of-course proficiency assessment as well the total number of credits attained. Results based upon the first two cohorts have been mixed. While results from the first cohort showed no significant difference on the end-of-course assessment exam between the two groups, findings from the second cohort showed assessments scores significantly lower for the online group compared to the face-to-face group. In both cohorts, students in the online course earned significantly lower final grades. Additionally, the research team discovered that in the 2011 cohort, 58 percent of students assigned to the online course successfully recovered credit

compared with 65 percent of students assigned to the face-to-face course (Heppen et al., 2012), while in the 2012 cohort, 72 percent of students assigned to the online course recovered credit compared with 82 percent of students in the face-to-face course (Heppen et al., 2014).

A large-scale study in Florida examined how students in online courses do compared to their peers in face-to-face classes (Hughes, Zhou & Petscher, 2015). While this study was non-experimental, it did provide researchers significant insight into how credit recovery students fared in a variety of disciplines compared to their face-to-face counterparts. Hughes et al. (2015) examined enrollment data in the 20 most common online academic courses in Florida over a four year period from 2007-08 through 2010-11. They compared online student's outcome data to Florida students enrolled in face-to-face courses during the same period. The research team paid special attention to outcomes for key demographic subgroups including minorities and students receiving free and reduced lunch. Analysis included general online academic courses as well as credit recovery courses. Researchers discovered that online students were more likely to earn a C or better than traditional students in face-to-face settings. Results were consistent for students in regular online sections as well as students in credit recovery sections. The authors found that ninth grade online learners outperformed their peers in traditional face-to-face courses by the largest margin. The margin narrowed with each successive grade level, and by twelfth grade, online students had the smallest differences in success rates between online and face-to-face courses (Hughes, Zhou & Petscher, 2015). Arguably this study's largest limitation is that in many cases enrollment in an online course reflects a "choice" on the part of students and their counselors. Students who choose to enroll in classes online may differ significantly from those who do not. Given this, it is important to consider that this study does not provide causal evidence that online learning is better than face-to-face instruction. Differences such as higher

levels of self-motivation and/or self-regulation may be inherent in students who self-select or are selected by teachers for online course work.

In an effort to capture the perceptions of students who enrolled in an online credit recovery program and record the specific factors they believed contributed to their success, Jones (2011) provides what this researcher has determined to be the only glimpse into how students who are participating in online credit recovery view the initiative.

Jones' (2011) study was driven by the following four research questions:

1. What factors do credit recovery students attribute their success to?
2. How do credit recovery students view their chances of graduating on time?
3. What is the relationship between credit recovery and the one-to-one laptop program administered by the school district?
4. What is the environment of an online credit recovery course like compared to a traditional face-to-face class?

Jones (2011) discovered several themes in his interviews with participating recovery students. These themes included a feeling of control over their learning and the environment where their learning took place. Control was exhibited by being able to complete courses at their own pace and without distraction. Students also expressed a feeling of control over their own learning through the mastery-based learning modules that the credit recovery program utilized. Students noted that they did not experience the same feelings of control in their regular face-to-face classes. The researcher also discovered that students who participated in the online credit recovery program felt their chances to graduate on time were improved because they could quickly gain credit for a course that they had failed initially. Finally, the author discovered that

students felt they would continue to experience success if they were permitted to make up other courses through the credit recovery program.

The themes discovered by Jones (2011) substantiate the many claims that credit recovery is an appropriate option for at-risk students. Given the findings from this study, it is reasonable to stipulate that credit recovery is a popular option not only with educators but also with students.

Criticism of Credit Recovery

Despite the pomp and circumstance surrounding credit recovery, there exists a small but growing number of critics who have genuine concerns about the widespread proliferation of recovery programs (Guerra, 2015b; Finn, 2012; Mathews, 2012, Bloomfield, 2009). Many of these concerns revolve around two basic tenets:

- The rigor of recovery courses;
- The powerful interests behind the recovery movement.

To understand where these concerns stem from, one must first acknowledge that the explosive growth in credit recovery is a direct result of pressure to raise graduation rates by Federal and State accountability systems (Zehr, 2010). Irvin Scott, the former superintendent of Boston's Public Schools, stated in an interview that his decision to launch an online credit recovery program in the Massachusetts capital was motivated in large part by pressures to meet graduation expectations as defined by No Child Left Behind (NCLB) (Zehr, 2010). Finn (2012) notes that NCLB's requirement that students Nationwide attain universal proficiency by 2014 led school districts across the country to "cut corners" in an attempt to meet unrealistic expectations (p. 1). In the manic rush to increase proficiency and graduation rates, credit recovery was viewed as a panacea. Henry Levin, a noted educational economist at Columbia University's Teachers College, remarked in an interview with NPR that credit recovery programs "are really responses

to the pressures to raise high school graduation rates, rather than a serious attempt to educate students" (Guerra, 2015b, p. 3).

Generally, the chief complaint about credit recovery programs revolves around their lack of rigor (Davis, 2015; Guerra, 2015a; Carr 2014; Matthews, 2012, Finn, 2012). In their assessment of the current state of credit recovery for iNACOL, Powell et al. (2015) note that many "credit recovery 'solutions' have lowered the bar for passing" (p. 10). They attribute this to pressure school districts are facing to "do something" to raise graduation rates.

Bloomfield (2009) states that instead of challenging students to raise their performance to the level they must attain to be successful, many school districts are turning a blind eye and are willingly allowing students to get through with minimal effort via credit recovery options. Reporting for Columbia University's Hechinger Report, Sarah Butrymowicz (2010) notes that former New York City school superintendent Joel Klein was lambasted for allowing students who failed courses to regain credit in hours, rather than weeks or months. In an article for the New York Times, Javier Hernandez (2009) reported that a high school student in Brooklyn was promoted to 12th grade after completing many of his required courses through credit recovery and after school remediation programs, despite being unable to write full sentences or read a line of text. Additionally, at a magnet school in Queens, several students received credit simply for clicking through a series of questions until they got the right answer (Hernandez, 2009). Davis (2015) notes that reports like these about the lack of rigor in recovery programs has led many to question if credit recovery is holding students adequately accountable for their learning.

As a result of questionable rigor in online courses, specifically credit recovery, the National Collegiate Athletic Association (NCAA) began scrutinizing the records of high school athletes submitting applications for eligibility to participate on college athletics teams (Carr,

2014). Beginning in 2010 the NCAA began receiving reports that high school student-athletes were earning credit for courses by taking the same multiple-choice assessments again and again until they attained passing marks. This lack of rigor meant students were completing their recovery coursework in days, and in some egregious cases only minutes or hours (Carr, 2014). To ensure athletes were sufficiently prepared for higher education, the NCAA devised its own system to evaluate recovery courses. For a credit recovery course to satisfy NCAA academic guidelines it must meet all of the following requirements:

- The course must be designed to prepare students for college-level academic work;
- the course must be comparable to courses taught in traditional face-to-face settings in terms of content, rigor, and length;
- students must regularly interact with a teacher for instruction, assistance, and assessment throughout the course;
- the course must be completed in a finite amount of time (i.e. a semester).

If a credit recovery course fails any of these stipulations, it cannot satisfy NCAA player eligibility guidelines (NCAA, n.d.).

The lack of rigor within credit recovery programs have led some to question the value of a high school diploma obtained in part through the use of credit recovery. New York University educational historian Diane Ravitch notes "the fact that a student can make up a semester's worth of credit in a few days or a week is reason enough to suspect that credit recovery is a scam … it's an easy way to get credits and a diploma without educational value" (Sparks, 2013, p. 3). Many educational leaders echo Ravitch's concern that credit recovery courses are sub-par and results in a "watered-down" high school diploma (Finn, 2012; Bloomfield, 2009). Columbia University's Henry Levin states that students who have achieved their diploma through credit recovery "are

not high school graduates in the normal sense … [credit recovery] gives an illusion of knowledge and functioning that is not based on real evidence" (Guerra, 2015, p. 3).

While critics often question the rigor of credit recovery courses, the powerful forces behind the recovery movement also cause concern for many. Finn (2012) notes that educational course providers, school districts, and States all have powerful incentives to set their standards at low levels that lots of students will meet. The author argues that this has little to do with educational integrity and true concept mastery, and more to do with what will paint each of these interests in the most favorable light. Finn (2012) notes, "In today's America, those incentives are stronger than the impulse to demand bona fide 'readiness' for college and careers" (p. 3). Therefore credit obtained through recovery coursework many not "mean" anything.

An additional concern is the value of the credit recovery market. In 2012 it was estimated that credit recovery accounted for roughly half of the $2 billion online education industry (Matthews, 2012). Large for-profit educational vendors including Pearson, Kaplan, and others are trying to capitalize on the burgeoning credit recovery business (Butrymowicz, 2010). Course providers are fiercely competing for multi-million dollar contracts with states and large school districts. This competition creates powerful commercial incentives to ensure students are receiving credit (Finn, 2012). In many cases this means lower standards and higher passing rates.

The Future of Credit Recovery

Overall there is a general consensus that at-risk students deserve a second chance to succeed in courses they were initially unsuccessful in (Sparks, 2013; Butrymowiz, 2010). While the future of credit recovery appears secure, there are certain fundamental challenges that must be addressed to quell critics' concerns and assure policymakers that tax dollars are being appropriately utilized. The primary challenge recovery advocates must tackle is how to gauge the

"credit worthiness" of students' work (Finn, 2012, p. 3). Due to a lack of standardization between various credit recovery platforms and providers, "mastering" a particular topic may mean different things in different places. Finn (2012) argues that a standardized examination such as the Common Core assessments in English and Mathematics or state End of Course tests may provide a reliable indicator to schools that a student has successfully mastered a particular topic or course. In her article for Education Week, Sparks (2013) quotes Amber Winkler, The Fordham Institute's vice president for research, about determining a credit recovery program's quality. "There's a fundamental belief that kids deserve a second change, but is [credit recovery] a high-quality intervention that will help them" (p. 13)? Susan Patrick, iNACOL's president and CEO, notes that too many credit recovery programs are pushing students to graduation with low rigor and inadequate skills development. "We intentionally call that out as being not appropriate" (Patrick, as quoted in Davis, p. 8, 2015).

In their report on credit recovery for iNACOL, Patrick et al. (2015) state that many of the most successful recovery programs have a significant face-to-face component for delivering student support and feature the ability to adapt or personalize lessons based upon student needs. Moving forward the onus will be on recovery providers to not only feature these best practices in their courseware, but also find ways to provide adequate assessment tools that can reliably demonstrate student mastery.

Summary

The need to address our nation's dropout crisis is immediate and can potentially happen with the technological resources afforded to us in the 21st century. Online learning for at-risk high school students is a modern, adaptable, and efficient means of providing opportunities to learn, recover credit, and graduate from high school. Online credit recovery is an engaging tool

that has the potential to help educators move at-risk students closer to graduation. If at-risk students are more engaged, inspired, and satisfied with their high school learning experience the potential to stem our dropout crisis becomes greatly improved. However, online credit recovery is still a relatively new tool and much is unknown about the most appropriate ways to utilize it. Too often, credit recovery has been abused and used as a way to move struggling students along. This study will attempt to glean more about what student is most appropriate for online credit recovery coursework. Having a solid understanding of this can assist teachers, counselors, and administrators determine which students may be the most successful in a recovery setting.

Chapter Three | Methodology

"Dropouts are our next class of nonperforming assets. Each year they represent $320 billion in lost lifetime earning potential" (Fields, 2008)

~ Marguerite Kondracke is the president and CEO of America's Promise

Introduction

This chapter outlines the research design used to determine the academic success factors of at-risk students enrolled in online credit recovery courses. The chapter begins with a restatement of the research problem, research questions, and hypotheses. Information about the student population and sampling procedures is then provided. The chapter concludes with information on data sources, research design, predictor and outcome variables, research methods, and data analysis procedures.

Restatement of Research Problem

Given the intense pressure to increase graduation rates, schools and districts nationwide have been quick to establish credit recovery programs. Reports estimate that nearly ninety percent of school districts offer online credit recovery as a means to help students regain course credit and stay on track for graduation (Carver, Lewis & Coopersmith, 2011; Queen and Lewis, 2011). Despite the widespread adoption of these programs, there is a lack of scholarly research on the effectiveness, rigor, and suitability of online credit recovery. Additionally, there exists a small but growing number of critics who have expressed concern about the widespread proliferation of recovery programs (Guerra, 2015b; Finn, 2012; Mathews, 2012, Bloomfield, 2009). In an effort to add to the existing literature on credit recovery, this study examines an issue heretofore unexplored, namely is credit recovery suitable for all students?

Currently there is no clear set of characteristics that have been identified to predict success in online credit recovery. Building on the work conducted by Liu and Cavanaugh (2010, 2011a, 2011b, 2012), this quantitative study examined the success factors of students enrolled in online credit recovery core discipline courses [English, Mathematics, Science, and Social Studies] within a school system in the mid-Atlantic region of the United States. Success was measured by successfully receiving credit in an online recovery course. Student level data including gender, race, grade-level, discipline history, exceptionality (IEP) status, and Gifted/Talented (AIG) status were examined. Additionally, longitudinal achievement data in the form of state administered mathematics, reading, and science middle school assessment results was examined.

Restatement of Research Questions

The researcher considered the following overarching question in this study: What are credit recovery course success factors?

The following sub-questions were developed to address the overarching question:

1. Does a student's gender and or race predict achievement in online credit recovery core discipline courses? If so, how?
2. Does a student's grade-level predict achievement in online credit recovery core discipline courses? If so, how?
3. Does a student's discipline history predict achievement in online credit recovery core discipline courses? If so, how?
4. Are there differences between credit recovery students with Individualized Education Plans (IEPs) and others without with respect to their academic achievement in online credit recovery core discipline courses?

5. Are there differences between Academically and Intellectually Gifted (AIG) credit recovery students and non-AIG students with respect to their academic achievement in online credit recovery core discipline courses?
6. Do middle school state-standardized reading, mathematics, or science assessment results at any grade-level predict student achievement in online credit recovery core discipline courses? If so, how?

Restatement of Hypotheses

1. The gender of students does not significantly predict achievement in online credit recovery core discipline courses.
2. The race of students does not significantly predict achievement in online credit recovery core discipline courses.
3. The grade-level of students does not significantly predict achievement in online credit recovery core discipline courses.
4. The disciplinary incident history of students does not significantly predict achievement in online credit recovery core discipline courses.
5. There is no significant difference in the Individualized Educational Plan (IEP) status of students who pass online credit recovery core discipline courses than students who fail.
6. There is no significant difference in the Academically and Intellectually Gifted (AIG) status of students who pass online credit recovery core discipline courses than students who fail.

7. The middle school standardized reading assessment results of students at any grade-level do not significantly predict student achievement in online credit recovery core discipline courses.
8. The middle school standardized mathematics assessment results of students at any grade-level do not significantly predict student achievement in online credit recovery core discipline courses.
9. The middle school standardized science assessment results of students do not significantly predict student achievement in online credit recovery core discipline courses.

Population and Sample

The target population for this study was high school students who enrolled in an online credit recovery course in a school district in the mid-Atlantic region of the United States. As reflected in table four, the district has a diverse student population: 43 percent Caucasian, 31 percent Latino, and 21 percent African American. The district has a Free and Reduced Lunch rate of 68.2 percent, an English Language Learner (LEP) rate of 12 percent and an Academically and Intellectually Gifted (AIG) rate of 12 percent. 12 percent of students have an active Individualized Educational Plan (IEP). The school district has a four year cohort graduation rate of 86.2 percent.

Table 4: Ethnicity Breakdown of School District

Caucasian	**African American**	**Latino**	**American Indian**	**Asian**	**Pacific Islander**
43%	21%	31%	1%	1%	0%

This study examined final credit recovery course grades for high school students enrolled in academic core discipline courses during the 2014-2015 and 2015-2016 school years. Academic core discipline courses included:

Table 5: Academic Core Disciplines and Associated Courses

Discipline	**Core Courses**
English	English I English II English III English IV
Mathematics	Integrated Math I / Algebra I Integrated Math II / Geometry Integrated Math III / Algebra II Higher Level Mathematics course
Science	Earth and Environmental Science Biology Chemistry or Physical Science
Social Studies	World History US History Civics & Economics

Data Sources

Quantitative research methods were utilized to examine the academic success factors of students enrolled in online credit recovery courses. The primary source of data for this study was final grades from credit recovery courses. Data was collected via reports generated from the student data information management system utilized by public schools within the state. When final grades are queried, individual student data can be linked via relational database to academic, demographic, and historical information on each student who received a grade in a credit recovery course.

Approval to collect data from the school district was received from the district superintendent in January 2016. Permission to conduct the study based upon guidelines set forth by the University's Institutional Review Board (IRB) was received in May 2016.

Credit Recovery Courseware Providers

NovaNET. NovaNET dates back to the 1960s when researchers at the Computer-based Education Research Laboratory (CERL) at the University of Illinois at Urbana-Champaign received a grant from the National Science Foundation to develop a computer-based learning system (Pearson, 2004). In 1970 CERL released PLATO (Programmed Logic for Automated Teaching Operation). This system was the predecessor to NovaNET and served as the foundation on which the NoveNET platform was ultimately built (Pearson, 2004). In 1994 the University of Illinois Urbana-Campaign, rebranded PLATO "NovaNET" and sold the platform to University Communications in Arizona which later sold it to Pearson Learning (Munger, 2009). Pearson Learning has marketed NovaNET across the country to school districts claiming that the program can help students "struggling and behind in credit find success and achievement" (Munger, 2009, p. 58). NovaNET's prescriptive state-aligned curriculum identifies students' current level of performance by analyzing the results of a pre-test. The courseware then provides an individualized learning experience through the use of adaptive instructional models based on the results of the pre-test. After completing the requisite lessons and activities, students take a post-test; if students score an 80 or above on the unit exam NovaNET concludes that they have achieved mastery of the subject (Pearson, 2004). The school district examined in this research study has utilized NovaNET for online credit recovery since 2007.

Apex Learning. While known initially as an online learning platform centered around offering Advanced Placement courses to schools with limited resources, Seattle-based Apex Learning expanded its courseware in recent years to offer credit recovery and in-school remediation services (McCabe & St. Andrie, 2012). Apex Learning leverages video, graphics, animation, and audio to support at-risk students who may not read, or otherwise perform, at

grade-level (Trotter, 2008). Officials at Apex Learning estimate at least 50% of current enrollments are for credit recovery courses (McCabe & St. Andrie, 2012). Apex Learning's credit recovery courseware has been lauded as more rigorous than other credit recovery providers (Sapers, 2014). The school district examined in this study contracted with Apex Learning specifically because of their reputation for rigor; they have been utilizing this recovery courseware provider since 2015.

Credit Recovery Student Selection Criteria

When considering students for enrollment in online credit recovery courses, the school district examined for this study utilizes the following selection criteria:

Limited English Proficiency (LEP) status. Students designated as LEP have a limited grasp of the English language. Reading comprehension skills may be below or well-below grade level. School counselors do not place students identified as LEP into online credit recovery courses, opting instead to place students back into traditional face-to-face sections.

Final grade in initially failed course. The school district examined operates on a seven-point grading scale with a failing grade being a 69 or lower. School counselors consider the final grade potential credit recovery students earned in their initial course with strong preference given to students who earned between a 55-69.

Individual Student Factors. When possible, school counselors consider social circumstances that may have impacted a student's potential for success in the initial course such as a parent's divorce, pregnancy, or illness. Students who had been successful academically prior to the significant life event are considered for enrollment in credit recovery.

Research Design

This study is descriptive in nature and as such, non-experimental. The researcher aims to identify certain factors that influence or predict success in online credit recovery courses without intervening within the courses themselves. No causal inferences will be drawn due to the non-experimental nature of the study.

The researcher collected demographic and academic background information on participants in all academic core high school credit recovery courses from the 2014-15 and 2015-16 school years. The initial analysis combines recovery data from all core courses. Ancillary analysis parses credit recovery data by subject. To ensure there is sufficient power for this data analysis, credit recovery course data will be combined into four overall core disciplines: English, Mathematics, Science, and Social Studies. For example, results from Earth & Environmental Science, Biology, Chemistry, and Physical Science will be grouped together into a discipline titled “Science.”

The variables of interest in this study include: gender, race, grade-level, discipline history, exceptionally/IEP status, Gifted/Talented (AIG) status, middle school mathematics End of Grade assessment results, middle school reading End of Grade assessment results, and middle school science End of Grade assessment results. These constitute the study's independent, or predictor, variables. Student outcome in the credit recovery course constitute the dependent variable for the study. For this study successful course outcome will be determined by a grade of P (pass). Unsuccessful course outcome will be based on grades of F (fail) or I (incomplete).

Independent/Predictor Variables

Gender

The student's gender, specified as female or male. A dichotomous variable represents gender in the study (0 = male, 1 = female).

Race

The student's race/ethnicity, specified as Hispanic/Latino, African American, White, or Other. Due to the very limited population, American Indian, Asian, and Pacific Islander were dummy coded as "Other."

Grade Level

The student's academic grade-level at the time the recovery course was completed. Grade level is assigned by the district based upon the number of high school credits successfully completed and was represented as 9, 10, 11, or 12.

Academically and Intellectually Gifted (AIG)

If the student was identified as academically and intellectually gifted at any point in their academic career. A dichotomous variable represents AIG in the study (0 = not identified as AIG, 1 = identified as AIG).

Individualized Educational Plan (IEP)

If the student has an active Individualized Educational Plan due to a disability identified under the law. A dichotomous variable represents IEP in the study (0 = no IEP on file AIG, 1 = IEP on file).

Discipline History

A disciplinary incident is classified as either an in-school suspension or out-of-school suspension. A dichotomous variable represents discipline history in the study (0 = no incidents, 1 = one or more incidents).

Middle School Mathematics End of Grade Standardized Assessment (MEOG)

The student's achievement level on the State's 6th, 7th and 8th grade mathematics End of Grade exams. The variables 1-4 represent an achievement level ranging from I-IV.

Middle School Reading End of Grade Standardized Assessment (REOG)

The student's achievement level on the State's 6th grade reading End of Grade exam. The variables 1-4 represent an achievement level ranging from I-IV.

Middle School Science End of Grade Standardized Assessment (SEOG)

The student's achievement level on the State's 8th grade science End of Grade exam. The variables 1-4 represent an achievement level ranging from I-IV.

Dependent Variable/Outcome Measures

Credit Recovery Outcome

The dependent variable, success or failure in a credit recovery course, is included in each student's record. A value of zero (0) for this variable represents a student who failed or received an incomplete in the recovery course. A value of one (1) for the variable represents a student who passed the recovery course.

Research Methods

Quantitative research methods were employed in this study to determine whether specific student factors are related to successful online credit recovery course completion. Borg and Gall (1996) report that quantitative research seeks to draw conclusions about a population from a sample drawn from the population.

Statistical methods used in this research study include descriptive statistics, Chi-Square analysis, and binary logistic regression. Gall et al. (1996) report that descriptive statistics can be used to summarize background and demographic data so that information can be presented in a clear and insightful manner. Field (2013) reports Chi-Square analysis is a nonparametric test

utilized to determine the association between two categorical variables. Hosmer and Lemeshow (2000) note that Chi-Square analysis can be utilized to determine the levels of significance of independent variables for possible inclusion in a binary logistic regression model. Binary logistic regression models can identify if any of the independent variables are statistically significant in predicting success or failure in online credit recovery courses (Field, 2013).

Data Analysis Procedures

Descriptive statistics were utilized to organize the data from the nine independent variables and present a concise summary of information. Univariate analyses were conducted to explore the relationship between each independent variable and the dependent variable as specified in research questions one through six (H_{01}-H_{09}). Group comparisons for categorical variables were performed using Binary Logistic Regression and Chi-Square analysis. The Chi-Square analysis was utilized to determine if there was a significant relationship between two categorical variables (Hosmer & Lemeshow, 2008). Binary logistic regressions were utilized to identify the predictive effect that one or more predictors have on a single dichotomous dependent variable (Stevens, 2009). A p value of 0.05 is generally used as the level of significance when examining the results of a Chi-Square analysis and Binary Logistic Regression. Odds ratios were then calculated to examine the practical significance of the findings (Field, 2013).

Summary

This chapter explained the research methodology and procedures necessary for conducting this study. After a brief introduction, a description of the research questions, hypotheses, student population, sampling procedures, data sources, credit recovery courseware and program, research design, predictor and outcome variables, research methods, and data analysis were described.

Chapter Four | Results

"Dropping out of high school is no longer an option. It's not just quitting on yourself, it's quitting on your country—and this country needs and values the talents of every American" (Obama, 2009)

~ President Barack Obama

Introduction

The purpose of this study was to examine the factors and characteristics that influence performance in virtual recovery courses that satisfy high school graduation requirements. In this chapter, the results of the data analysis procedures are presented. This chapter begins with a description of the data cleaning procedures, including the removal of missing cases and the creation of dummy coded variables. Next, descriptive statistics are reported for demographic information. Following this is an overview as well as a more detailed analysis of the results. This chapter is concluded with a brief summary.

Data Cleaning

The school district provided outcome data for 1028 academic core credit recovery courses from the 2014-15 and 2015-16 school years. Prior to analysis, the data was assessed for missing cases. There were 391 cases removed for missing substantial amounts of data (>50%). There were 293 duplicate cases removed, with the first entry for each student retained. This left a final sample of 347 unique cases.

In order to be utilized in the analyses, some variables needed to be dummy coded. The variable of race was dummy coded into Black, Hispanic, and White, with the smallest group, Other, treated as the reference category. The variable of academic discipline was dummy coded

into English, Math, and Social Science, again with the smallest category, Science in this case, as the reference category.

Descriptive Statistics

Summary of Descriptive Statistics

The final sample of students consisted mostly of boys (*n* = 205, 59.1%). Most of these students were classified as Black (*n* = 121, 34.9%), while 114 students (32.9%) classified themselves as Hispanic, 100 classified themselves as White (28.8%), and 12 classified themselves as Other (3.5%). Most students were in the 11th grade (*n* = 129, 37.2%), did not have an IEP (*n* = 305, 87.9%), and were not identified as AIG (*n* = 329, 94.8%). Most students had no disciplinary incidents reported (*n* = 210, 60.5%). Of those who had disciplinary incidents on record, the mean number of incidents was *M* = 6.76 (*SD* = 8.34). Most students scored a level III in Math in 6th (*n* = 159, 46.9%) and 7th (*n* = 128, 37.8%) grades, while the majority of students scored a level 1 in 8th grade (*n* = 140, 41.7%). The majority of students scored a level I in Reading in each grade (6th: *n* = 115, 34.3%; 7th: *n* = 116, 34.4%; and 8th: *n* = 135, 39.9%). In 8th grade Science, most students scored a level 1 as well (*n* = 128, 38.8%). The majority of students took Social Studies credit recovery courses (*n* = 171, 49.3%). See Appendix B, *Frequencies and Percentages for Categorical Variables*, on page 108 for a complete listing of the categorical variable's descriptive statistics.

Table 6: Means and Standard Deviations for Continuous Variables

Variable	Min	Max	*M*	*SD*
Disciplinary Incidents	1.00	48.00	6.76	8.34

Detailed Analysis

Summary of the Detailed Analysis Results

The results of the analyses detailed below indicate that gender and race do not significantly predict student outcome; the null hypothesis for Research Question 1 cannot be rejected. Grade level was found to be significantly predictive of student outcome, and as such, the null hypothesis for Research Question 2 can be rejected. For Research Question 3, the null hypothesis cannot be rejected, as disciplinary incidents do not significantly predict student outcome. There are differences in student outcome based on whether or not an IEP was implemented, thus the null hypothesis for Research Question 4 can be rejected. The null hypothesis for Research Question 5 cannot be rejected—there is no significant difference in student outcome based on AIG status. The null hypothesis for Research Question 6 may only be partially rejected, as 6-8th Grade math, reading, and science scores only significantly predict student outcome when examined collectively, rather than individually.

Detailed Analysis Results

Research Question 1:

Does a student's gender and or race predict achievement in online credit recovery core discipline courses? If so, how?

H_0 1. The gender of students does not significantly predict achievement in online credit recovery core discipline courses.

H_0 2. The race of students does not significantly predict achievement in online credit recovery core discipline courses.

In order to answer this research question, a binary logistic regression was performed. Binary logistic regressions are the appropriate analysis to perform when the aim is to identify the

predictive effect that one or more predictors have on a single dichotomous dependent variable (Stevens, 2009). In this analysis, student outcome was the dependent variable, with 0 = failed and 1 = passed. The predictor variables include gender, with female as the reference category, as well as race, with other as the reference category.

Due to the nature of the binary regression model, the restrictive assumptions generally associated with regression analyses, such as linearity, normality, and homoscedasticity, were not assessed (Lehmann, 2006). However, several assumptions do still apply. Absence of multicollinearity was assessed using a correlation matrix, which indicated that gender and race were correlated at $r = .18$, $p < .001$. Multicollinearity becomes an issue only when there are strong correlations ($r > .80$) among the predictor variables (Stevens, 2009), so the assumption was met. The assumption of independence of errors assumes that each observation is independent, e.g., not from a repeated measures or matched pairings research design. Duplicate cases originally present in the dataset were removed, so the assumption was met.

The results of the logistic regression indicate that gender and race do not significantly predict the likelihood of a student passing or failing their course, (χ^2 (4) = 8.42, $p = .077$). As such, the individual predictors were not examined. The null hypotheses for Research Question 1 cannot be rejected.

Research Question 2**:**

Does a student's grade-level predict achievement in online credit recovery core discipline courses? If so, how?

H_0. The grade-level of students does not significantly predict achievement in online credit recovery core discipline courses.

A binary logistic regression was performed in order to assess this research question. The predictor variable corresponded to grade level and the dependent variable corresponded to student outcome. The assumption of absence of multicollinearity was not assessed, as there was only one predictor variable included in this model. The assumption of independence of errors was met, because there were no duplicate cases included in the dataset.

The results of this analysis indicate that grade level ($B = 0.92$, $p < .001$) is a significant predictor of student outcome (χ^2 (1) = 19.88, $p < .001$). The Exp(B) value indicates that for every 1 unit increase in grade level, students have a 2.52 increase in the likelihood of passing their course. As such, the null hypothesis for Sub-Research Question 2 can be rejected. The full results of this analysis are presented in Table 7.

Table 7: Results of the Binary Logistic Regression with Grade Level Predicting Student Outcome

Variable	*B*	*SE*	Wald	*P*	Exp(*B*)
Grade Level	0.92	0.23	16.52	< .001	2.52

Note: (χ^2 (1) = 19.88, $p < .001$)

Research Question 3:

Does a student's discipline history predict achievement in online credit recovery core discipline courses? If so, how?

H_0. The disciplinary incident history of students do not significantly predict achievement in online credit recovery core discipline courses.

This research question was assessed using a binary logistic regression. The predictor variable corresponded to number of student disciplinary incidents, with student outcome as the dependent variable. The assumption of absence of multicollinearity was not assessed for this regression, as there was only one predictor variable. As the predictor variable for this regression was continuous, the assumption of independence of errors can be assessed using Levene's test, which was not significant ($p = .209$). As Levene's test was not significant, the assumption was

met. The results of the analysis indicate that disciplinary incidents is not a significant predictor of student outcome (χ^2 (1) = 2.11, p = .146). As such, the null hypothesis for Sub-Research Question 3 cannot be rejected.

Research Question 4:

Are there differences between credit recovery students with Individualized Education Plans (IEPs) and others without with respect to their academic achievement in online credit recovery core discipline courses?

H_0. There is no significant difference in the Individualized Educational Plan (IEP) status of students who pass online credit recovery core discipline courses than students who fail.

To address this research question, a Chi-Square analysis was performed in order to compare the differences in student outcome between students who do and do not have an IEP. Due to the non-parametric nature of the Chi-Square, there is no stringent assumption testing to be done. However, traditional caution while performing the Chi-Square is that expected frequencies below five should not compose more than 20% of the cells, and no cell should have an expected frequency of less than one (Pagano, 2010). Each of these requirements were met. The results of the Chi-Square were significant, (χ^2 (1) = 8.51, p = .004), suggesting that there are significant differences between these groups. Of those students who had no IEP, slightly more students passed than expected (n = 282 [276.90]). Within this no IEP group, 92.5% of students passed. Of those students who had an IEP, slightly fewer students passed than expected (n = 33 [38.10]). In this IEP group, 78.6% of students passed. Due to the overall significance of the Chi-Square, the null hypothesis for Sub-Research Question 4 may be rejected. See Table 8 for the full results of this analysis.

Table 8: Results of the Chi-Square Comparing IEP Status and Student Outcome

	Student Outcome	
IEP	Fail	Pass
Yes	23 [28.10]	282 [276.90]
	7.5%	92.5%
No	9 [3.90]	33 [38.10]
	21.4%	78.6%

Note: (χ^2 (1) = 8.51, p = .004). Expected counts are in brackets. Percentages are within IEP groups.

Research Question 5:

Are there differences between Academically and Intellectually Gifted (AIG) credit recovery students and non-AIG students with respect to their academic achievement in online credit recovery core discipline courses?

H_0. There is no significant difference in the Academically and Intellectually Gifted (AIG) status of students who pass online credit recovery core discipline courses than students who fail.

To address this research question, a Chi-Square analysis was performed comparing the differences in student outcome between students who are and are not flagged as AIG. Both of the requirements of the Chi-Square—that no more than 20% of the cells should have that expected frequencies below five and no cell should have an expected frequency of less than one—were met. The results of this Chi-Square were not significant (χ^2 (1) = 1.93, p = .165), indicating that there is not a significant difference within these groups. As such, the null hypothesis for Sub-Research Question 5 cannot be rejected. Due to the overall non-significance, the results of the Chi-Square were not evaluated further.

Research Question 6:

Do middle school state-standardized reading, mathematics, or science assessment results at any grade-level predict student achievement in online credit recovery core discipline courses? If so, how?

H_0 1. The middle school standardized assessment results of students at any grade-level do not significantly predict student achievement in online credit recovery core discipline courses.

H_0 2. The middle school standardized math assessment results of students at any grade-level do not significant predict student achievement in online credit recovery core discipline courses.

H_0 3. The middle school standardized science assessment results of students do not significantly predict student achievement in online credit recovery core discipline courses.

A binary logistic regression was performed in order to assess this research question. In this analysis, the predictor variables corresponded to math and reading scores for grades 6-8, as well as the science scores for grade 8. The dependent variable corresponded to student outcome. Absence of multicollinearity was assessed using a correlation matrix, which indicated that none of the predictors were correlated higher than $r = .70$. Multicollinearity becomes an issue only when there are strong correlations ($r > .80$) among the predictor variables (Stevens, 2009), so the assumption was met. The assumption of independence of errors assumes that each observation is independent. Duplicate cases originally present in the dataset were removed, so the assumption was met.

The results of the overall binary logistic regression were significant (χ^2 (7) = 18.24, p = .011), indicating that the math and reading scores for grades 6-8 as well as the grade 8 science scores collectively predict student outcome. Although the overall model was significant, no predictor was individually significant, suggesting that they only predict student outcome when combined in the model. As such, the null hypotheses for Sub-Research Question 6 can only be partially rejected. See Table 9 for the full results of this analysis.

Table 9: Results of the Binary Logistic Regression using Math, Reading, and Science Scores to Predict Student Outcome

Variable	*B*	*SE*	Wald	*P*	Exp(*B*)
Math 6th Grade	0.22	0.37	0.37	.541	1.25
Reading 6th Grade	-0.40	0.37	1.20	.274	0.67
Math 7th Grade	0.52	0.35	2.31	.129	1.69
Reading 7th Grade	-0.20	0.38	0.28	.597	0.82
Math 8th Grade	0.27	0.39	0.46	.496	1.30
Reading 8th Grade	0.26	0.39	0.43	.512	1.30
Science 8th Grade	0.52	0.33	2.41	.120	1.67

Note: χ^2 (7) = 18.24, p = .011

Ancillary Analyses

An ancillary analysis involved repeating the previously performed statistical tests using the *SPSS* split file function. The dataset was split by class discipline area (English, math, social studies, and science). The first analysis was a binary logistic regression using gender and race to predict student outcome. The analysis was not significant for English (χ^2 (4) = 3.86, p = .426), math (χ^2 (4) = 2.00, p = .736), science (χ^2 (4) = 5.51, p = .239), or social studies (χ^2 (4) = 3.08, p = .544), indicating that within each discipline area, gender and race did not significantly predict student outcome. As the overall models were not significant, the individual predictors were not examined further.

The second analysis was a binary logistic regression using grade-level to predict student outcome. The analysis was not significant for English (χ^2 (1) = 2.38, p = .123) or math (χ^2 (1) =

2.93, p = .087). However, the regression model showed significance for science (χ^2 (1) = 9.22, p = .002) and social studies (χ^2 (1) = 9.35, p = .002). Under science, grade-level was a significant predictor (B = 1.69, p = .016). The Exp(B) value indicates that students taking science courses have a 5.44 unit increase in the likelihood of passing their course, for every 1 unit increase in grade-level. Under social studies, grade-level was also significant (B = 1.04, p = .008). Students taking social studies courses have a 2.83 unit increase in the likelihood of passing their course, for every 1 unit increase in grade-level. See Table 10 for the full results of this split file regression.

Table 10: Binary Logistic Regression with Grade Level Predicting Student Outcome, Split by Course Discipline

Variable	*B*	*SE*	Wald	*P*	Exp(*B*)
English	1.25	0.93	1.81	.179	3.50
Math	0.62	0.38	2.69	.101	1.85
Science	1.69	0.71	5.78	.016	5.44
Social Studies	1.04	0.39	7.02	.008	2.83

The third analysis was a binary logistic regression using disciplinary incidents to predict student outcome. The analysis was not significant for English (χ^2 (1) = 2.78, p = .096), math (χ^2 (1) = 0.21, p = .646), science (χ^2 (1) = 0.01, p = .912), or social studies (χ^2 (1) = 2.23, p = .136). This indicates that within each discipline area, disciplinary incidents do not significantly predict student outcome.

The fourth analysis performed was a Chi-Square comparing students who do and do not have an IEP and their outcome. The Chi-Square analysis was not significant for English (χ^2 (1) = 0.26, p = .613), math (χ^2 (1) = 1.97, p = .161), science (χ^2 (1) = 3.79, p = .052), or social studies (χ^2 (1) = 3.26, p = .102), indicating that there is not a significant difference between students who do and do not have an IEP and their outcome, when independently assessed for each class

discipline area. It should be noted that the results for science approached significance so these findings should not be immediately discounted.

The fifth analysis performed was also a Chi-Square, comparing student outcome by AIG status. The Chi-Square was not significant for English (χ^2 (1) = 0.26, p = .613), math (χ^2 (1) = 0.50, p = .481), science (χ^2 (1) = 0.14, p = .711), or social studies (χ^2 (1) = 0.80, p = .371). This suggests that there is not a significant difference between students who are and are not AIG and their outcome, when independently assessed for each class discipline area.

The sixth analysis conducted was a binary logistic regression using 8th grade science scores, and 6-8th grade math and reading scores to predict student outcome. The results showed that the model was not significant for math (χ^2 (7) = 8.43, p = .296) or social studies (χ^2 (7) = 10.12, p = .182). The model was significant for English (χ^2 (7) = 15.09, p = .035) and science (χ^2 (7) = 18.24, p = .011). Under English, there were no individually significant predictors, suggesting that the 8th grade science, and 6-8th grade math and reading scores of students who took an English course only significantly predict student outcome when examined collectively. There were also no individually significant predictors under science, indicating that the 8th grade science, and 6-8th grade math and reading scores of students who took a science recovery course only significantly predict student outcome when examined collectively.

The results for students taking an English course had an exceedingly high exponentiated beta (Exp(B)) value for 7th grade reading (Exp(B) = 604893241349182000.00). A value this high indicates that these results are likely erroneous. As such, the 7th grade reading variable was taken out of the model and the analysis was conducted again. After this variable was removed, the math, reading, and science scores were no longer collectively significant predictors of outcome for English students (χ^2 (6) = 4.45, p = .617). The regressions utilizing math (χ^2 (6) = 5.48, p =

.484) and social studies (χ^2 (6) = 8.51, p = .203) students remained insignificant. The significance for the regression using science students persisted (χ^2 (6) = 16.39, p = .012). As before, there are no individual scores that predict outcome for science students; the math, science, and reading assessment results only predict outcome for science students when they are combined in the model. See Appendix B, *Binary Logistic Regression with 6-8th Grade Math, Reading, and Science Assessment Results Predicting Student Outcome, Split by Class Discipline Area*, on page 110 for the full results of this second analysis.

Credit Recovery Outcome Results

As an additional ancillary analysis, descriptive statistics outlining student outcome were conducted. The results of the descriptive statistics indicated that 315 students in the sample passed their course (90.8%) and only 32 students did not pass their course (9.2%). When split by class discipline area, descriptive statistics indicate that 94.6% of students taking an English class passed, that 86.3% of students taking a math class passed, that 88.1% of students taking a science class passed, and that 93% of students taking a social studies class passed. See Appendix C, *Frequencies and Percentages of Student Outcome Overall and Split by Discipline*, on page 111 for a listing of all frequencies and percentages.

Summary

This chapter began with a restatement of the research process. Pre-analysis data cleaning procedures were described, and the sample characteristics were analyzed. A brief overview of the research was followed by a more detailed analysis. The results of these analyses indicated that the null hypothesis for Research Question 1 cannot be rejected; gender and race do not predict student outcome. The null hypothesis for Research Question 2 can be rejected, as grade-level significantly predicts student outcome. For Research Question 3, the null hypothesis cannot

be rejected, as disciplinary incidents do not significantly predict student outcome. The results for Research Question 4 were significant; there are differences in student outcome based on whether or not an IEP was implemented. Thus the null hypothesis for Research Question 4 can be rejected. The null hypothesis for Research Question 5 cannot be rejected—there is no significant difference in student outcome based on AIG status. The null hypothesis for Research Question 6 may only be partially rejected; 6-8th grade math, reading, and science scores only significantly predict student outcome when examined collectively, rather than individually. A summary of the findings is presented in table 11.

Table 11: Summary Table

Research Question	Result	*p*
1. Gender & Race	Cannot Reject Hypothesis	.077
2. Grade-Level	Reject Hypothesis	.001
3. Disciplinary Incidents	Cannot Reject Hypothesis	.146
4. IEP Status	Reject Hypothesis	.004
5. AIG Status	Cannot Reject Hypothesis	.165
6. Middle School EOG Results (collectively)	Reject Hypothesis	.011

Ancillary analyses were also performed with the SPSS data file split by class discipline area. The first analysis found that gender and race do not predict student outcome. The second analysis indicated that grade-level was a significant predictor for science and social studies students. The third analysis suggested that disciplinary incidents do not predict student outcome. The fourth analysis indicated that there is not a significant difference between students who do and do not have an IEP and their outcome, as split by class discipline area. The fifth analysis suggested that there is not a significant difference between students who are and are not AIG and their outcome, as split by class discipline area. The sixth analysis indicated that the 6-8th grade math, reading, and science scores of students who took a science course only significantly

predict student outcome when taken collectively. Descriptive statistics suggested that overall, considerably more students passed than failed. The next chapter will discuss these results in terms of the existing literature. The strengths and limitations of this study will be described, and directions for future research will be provided.

Chapter 5 | Discussion & Conclusion

> *"The number of non-graduates remains alarmingly high among young people of color and those from low-income communities. In other words, a young person's chances for success still depends too much on his or her zip code and skin color and too little on his or her abilities and effort" (Balfanz et al., 2014)*

~ General Colin Powell (Ret.), Founding Chair, America's Promise Alliance

Introduction

This chapter will feature a discussion of the results of this research study. The chapter begins with a restatement of the research problem and the research questions. A review of the methodology is then provided. Next, a discussion surrounding the implications of the research findings is offered. The chapter concludes with recommendations for future research.

Restatement of the Research Problem & Questions

To date, research on credit recovery has focused primarily on the effectiveness of online credit recovery programs and the risks and benefits to school districts associated with starting one. Heretofore, no studies have been conducted focusing on student factors and characteristics that may influence success in online credit recovery courses. Liu and Cavanaugh (2010, 2011a, 2011b, 2012) developed a model which investigated success factors of students in high enrollment K12 virtual school courses. Their model examined predictors including gender, race, grade-level, free/reduced lunch status, full/part-time status, and exceptionally. Building upon their work, this researcher designed a study examining the success factors of students enrolled in online credit recovery core courses.

Based on the lack of models for predicting success in online credit recovery, this research study examined several predictors that may influence student performance in virtual recovery courses that satisfy high school graduation requirements. To that end, this research study considered the following overarching question: What are credit recovery course success factors? The following sub-questions were developed to address the overarching question:

1. Does a student's gender and or race predict achievement in online credit recovery core discipline courses? If so, how?
2. Does a student's grade-level predict achievement in online credit recovery core discipline courses? If so, how?
3. Does a student's discipline history predict achievement in online credit recovery core discipline courses? If so, how?
4. Are there differences between credit recovery students with Individualized Education Plans (IEPs) and others without with respect to their academic achievement in online credit recovery core discipline courses?
5. Are there differences between Academically and Intellectually Gifted (AIG) credit recovery students and non-AIG students with respect to their academic achievement in online credit recovery core discipline courses?
6. Do middle school state-standardized reading, mathematics, or science assessment results at any grade-level predict student achievement in online credit recovery core discipline courses? If so, how?

Review of the Methodology

This quantitative descriptive study utilized descriptive statistics, chi square analysis, and binary logistic regression to develop a predictive model for identifying students that had the

potential for success in online credit recovery courses as offered by a school district in the mid-Atlantic region of the United States. Predictor variables included several of those utilized in the Liu and Cavanaugh model (2010, 2011a, 2011b, 2012), including gender, race, grade-level, and exceptionally. In addition, this researcher incorporated longitudinal data in the form of state administered reading, mathematics, and science assessment scores from middle school, school discipline history, and Gifted/Talented (AIG) status. A review of the literature indicated that these variables had predictive power with at-risk K12 students in virtual settings (Lewis, 2014).

This study utilized final credit recovery course grades from students enrolled in academic core discipline courses during the 2014-2015 and 2015-2016 school years. Data was collected via reports generated from the student data information management system utilized by public schools within the state and organized via Excel spreadsheets. Outcome data for 1028 academic core credit recovery courses was provided to the researcher. Data was coded within SPSS and missing and incomplete datasets were removed. A final sample of 347 unique cases was included for analysis. Descriptive statistics, chi square, and binary logistic regression analysis were performed upon the remaining data.

Findings, Discussion & Implications

Prior to this study, no clear set of characteristics had been identified to predict success in online credit recovery courses. To provide context surrounding the study's results, literature on school dropouts, K12 virtual education, and post-secondary virtual education was utilized.

In the interest of full transparency, it must be noted before any discussion of implications, that these findings are indicative only of one school district in the mid-Atlantic region of the U.S. Caution must be taken not to generalize these results to *all* to recovery programs. The limitations section on page __ will provide additional warnings to researchers examining this document.

Research Question 1: Does a student's gender and or race predict achievement in online credit recovery core discipline courses? If so, how?

Binary logistic regression was utilized to address research question one. This analysis indicated that the predictor variables gender and race were not significant in predicting outcome in online credit recovery (p = .077). Ancillary analyses revealed that gender and race were not appropriate predictor variables for significantly predicting outcome in academic core discipline courses: English (p = .426), mathematics (p = .736), science (p = .239), and social studies (p = .544).

The results of the study indicated that the null hypothesis for Research Question 1 could not be rejected leading the researcher to conclude that gender and race do not predict student outcome in online credit recovery. These findings corroborate some of the exiting literature on outcome differences between genders in K12 virtual education (Slykhuis & Park, 2006; Lim, 2001) while contradicting other research conducted on the topic (Frischenschlager, Haidinger & Mitterauer, 2005; Taplin & Jegede, 2001; Barrett & Lally, 1999). In research on at-risk post-secondary students in Texas, researchers determined that male students outperform female students when both sets of students have a lower grade point average (Kupczynski et al., 2014). As this research study focused specifically on K12 virtual students classified as at-risk, it was important to investigate if there was any distinction in credit recovery course outcomes when gender was examined. While certainly not definitive, finding no differences between genders reinforces the notion that the credit recovery curriculum was designed appropriately for both male and female at-risk students.

As aforementioned, race/ethnicity was not an effective predictor of student outcome in online credit recovery. Many studies have found a relationship between race/ethnicity and

academic achievement. Bali (2004) examined the relationship between race and academic achievement and discovered there was a distinction between racial groups and outcomes on standardized tests scores. This finding backs up previous research where investigators discovered the mathematics achievement of 12th grade African American students was equivalent to white 8th graders (Barth, 2001). While decades of research have shown an academic racial gap between students (Hall, Davis, Bolen & Chia, 2000; Lockhead, Thorpe, Brooks-Gunn, Casserly & McAloon, 1985), this gap has not been maintained in the virtual environment. In their study of high enrollment virtual course success factors, Liu and Cavanaugh (2011a), discovered that race was a predictor of student academic achievement in only one of the 15 online high school courses examined. While this study's lack of relationship between race and credit recovery outcome corroborates Liu and Cavanaugh's general findings, it is by no means definitive that there is not a relationship between race and achievement in the K12 virtual school and credit recovery environment. These findings do, however, provide some evidence that credit recovery curriculum builders are designing their programs in a way appropriate to students of differing races/ethnicities.

Research Question 2: Does a student's grade-level predict achievement in online credit recovery core discipline courses? If so, how?

Binary logistic regression was utilized to address research question two. This analysis indicated that the predictor variable grade-level was significant in predicting outcome in online credit recovery ($p < .001$). The Exp(B) value indicated that for every 1 unit increase in grade level, students had a 2.52 increase in the likelihood of passing their course. Ancillary analyses revealed that grade-level was not an appropriate predictor variable for significantly predicting outcome in the academic core disciplines English ($p = .123$) and mathematics ($p = .087$);

however grade-level was an appropriate predictor variable for significantly predicting outcome in the academic disciplines science (p = .002) and social studies (p = .002). The science Exp(B) value indicated that for every 1 unit increase in grade level, students had a 5.44 increase in the likelihood of passing their course. The social studies Exp(B) value indicated that for every 1 unit increase in grade level, students had a 2.83 increase in the likelihood of passing their course.

The results of the study indicated that the null hypothesis for Research Question 2 could be rejected leading the researcher to conclude that grade level does predict student outcome in online credit recovery. These findings have interesting implications to credit recovery researchers. Dowling (1994) reported that at-risk high school students could be classified into two groups: freshmen and sophomores, and junior and seniors. Downing discovered that an at-risk population of freshmen and sophomores was significantly more likely to not complete a high school dropout prevention program than an at-risk population of juniors and seniors. The difference in the success of the dropout prevention program with the younger and older students led Downing to suggest that the root cause of the younger student's lack of success may be due to factors other than instructional strategies The author concluded that grouping all high school students together and providing the same instructional strategies was not an effective strategy for dropout prevention.

Examining the results of this research question through the lens of Finn's (1989; 1993) participation-identification model of school engagement provides additional perspective. The theory suggests that positive student engagement at school directly relates to students' chances for successful school completion. As older students have experienced more success in their secondary coursework, they may be more likely to complete their online credit recovery coursework. Conversely, younger students may have not had the opportunity to experience

much, or any, success in their secondary coursework, so their experience is marked by limited school engagement. With such limited school engagement, younger students may not see the value in completing their credit recovery coursework, whereas older students who have seen success do.

In their report tracking students who return to school after dropping out, Kolstad and Owings (1986) found that the percentage of those who ultimately complete high school was significantly higher for those who were classified as upperclassmen than those classified as underclassmen. 41% of students classified as seniors when they dropped out successfully earned a high school diploma when they reenrolled. This is compared to 37% of juniors and 27% of sophomores. Kolstand and Owings did not have data on freshmen who returned to school after dropping out but they surmise that the completion rate would be lower than 27%. These findings, coupled with Dowling's (1994) and Finn's (1989; 1993) should be an indicator that underclassmen need additional supports that upperclassmen do not. The implications as related to online credit recovery are clear: additional academic support and counseling for underclassmen are crucial to ensure success. As these at-risk students' progress through their high school experience they will become more self-sufficient and the need for the additional supports will decrease, however freshmen and sophomores should not be expected to complete their recovery coursework without assistance from school personnel.

Research Question 3: Does a student's discipline history predict achievement in online credit recovery core discipline courses? If so, how?

Binary logistic regression was utilized to address research question three. This analysis indicated that the predictor variable discipline history was not significant in predicting outcome in online credit recovery (p = .146). Ancillary analyses revealed that discipline history was not

an appropriate predictor variable for significantly predicting outcome in academic core discipline courses: English (p = .096), mathematics (p = .646), science (p = .912), and social studies (p = .136).

The results of the study indicated that the null hypothesis for Research Question 3 could not be rejected leading the researcher to conclude that school discipline history does not predict student outcome in online credit recovery. These findings have interesting implications for credit recovery researchers. Issues with school discipline, specifically school suspensions, have long been linked to negative academic outcomes and higher risks of dropout (Suh, Suh, & Houston, 2007; Brooks, Schiraldi, & Ziedenberg, 2000; Skiba, Peterson & Williams, 1997). Additional studies have documented the link between high schoolwide discipline rates and high schoolwide dropout rates (Lee, Gregory, & Fan, 2011; Christle, Jolivette, & Nelson, 2007). A study published by Columbia University's *Teachers College Record* reports that students who had been suspended were three times more likely to drop out of school by their sophomore year than students who had not (Ekstrom, 1986). Suh et al. (2007) note that if a student has a history of school discipline issues and suspension, the likelihood of that student dropping out increases by nearly 80%.

With school discipline playing such a critical role in the determination of a student remaining in school or dropping out, credit recovery and other virtual learning options should be seriously considered as an intervention when a student's behavior prohibits them from remaining inside a traditional brick and mortar classroom. This study's lack of statistical significance between school discipline incidents and credit recovery outcome may offer some support for a theory that when a student cannot attend traditional school, they could still be successful in a virtual setting. With the negative implications associated with suspension and subsequent school

dropout, any virtual option that can assist in keeping students engaged in their academics should be considered. In the future, researchers may wish to consider additional inquiry surrounding the efficacy of online credit recovery for students who have been suspended or expelled.

Research Question 4: Are there differences between credit recovery students with Individualized Education Plans (IEPs) and others without with respect to their academic achievement in online credit recovery core discipline courses?

Chi square analysis was utilized to address research question four. This analysis indicated that there was a significant difference in the outcomes of students with Individualized Educational Plans (IEP) and those without (p = .004). Interestingly however were the ancillary analyses which did not find a significant difference between students who do and do not have an IEP when the dataset was split by class discipline area: English (p = .613), mathematics (p = .161), science (p = .052), and social studies (p = .102). While the p-value for science was above .05, the results approached significance and care should be taken not to immediately dismiss the findings as insignificant.

The results of the study indicated that the null hypothesis for Research Question 4 could be rejected leading the researcher to conclude that IEP status does predict student outcome in online credit recovery. These findings have interesting implications to credit recovery researchers. In their 2011 annual report, the North Carolina Virtual Public School reported that students with disabilities are severely underrepresented in research studies (NCVPS, 2011). These findings have been echoed by several researchers in the years since (Burdette, Franklin, East & Mellard, 2015; Smith & Buurdette, 2014). Despite the lack of research, virtual education for exceptional students has been gaining momentum nationwide (Cavanaugh, Repetto & Wayer, 2011). A report published by the National Association of State Directors of Special Education

noted that many state run virtual schools provide services to students with disabilities, but there were large inconsistencies in the implementation and services offered to this population from state-to-state (Müller, 2009).

Virtual schooling provides many of the same benefits to students with disabilities as it does to at-risk students in general education. These benefits include individuated instruction, self-paced courses, the availability of interactive course materials and supplemental resources, frequent and immediate feedback, and the ease of communication with peers (Fichten et al., 2009; Rhim & Kowal, 2008). Despite these benefits, there are several challenges that virtual schools face when addressing the needs and concerns of online students with disabilities. These include the inaccessibility of websites and learning/course management systems, the limited accessibility of audio and video materials, inflexible time limits built into online exam software, the conversion of PowerPoint, PDF, and other file formats into a format compatible with screen-reading software, and the cost associated with revising curriculum for accessibility and providing certified personnel (Müller, 2009; Fichten et al., 2009).

Despite the myriad challenges associated with providing virtual education opportunities for students with disabilities, it is expected that virtual schools will continue to see an increase in this population's enrollment as educators recognize online schooling as a viable educational opportunity for at-risk students. Given this study's results, however, educators must be cautious when determining what students to enroll in online credit recovery courses. By its very definition, having an IEP means a student has an "individualized educational plan." As noted in the literature though, it has proven difficult for some learning management systems to customize or "individualize" coursework for students with disabilities who require specific accommodations. While undoubtedly technology will continue to improve in the years ahead, the

onus is on school counselors, administrators, and special education personnel to ensure that any credit recovery courseware utilized meets the specific needs of students with an IEP prior to enrollment. Online credit recovery is a viable option for students with disabilities, however as the results of this study demonstrate, additional efforts must be made to ensure that online credit recovery is as accessible to students with disabilities as it is to students in the general education environment.

Research Question 5: Are there differences between Academically and Intellectually Gifted (AIG) credit recovery students and non-AIG students with respect to their academic achievement in online credit recovery core discipline courses?

Chi square analysis was utilized to address research question five. This analysis indicated that there was not a significant difference in the outcomes of students identified as Academically and Intellectually Gifted (AIG) and those not identified (p = .165). Ancillary analyses revealed that AIG status was not an appropriate predictor variable for significantly predicting outcome in academic core discipline courses: English (p = .613), mathematics (p = .481), science (p = .711), and social studies (p = .371). The results of the study indicated that the null hypothesis for Research Question 5 could not be rejected leading the researcher to conclude that AIG status does not predict student outcome in online credit recovery.

Research into why gifted students drop out of school by Hansen and Toso (2007) resulted in the identification of several important factors. The researchers discovered that beginning as early as elementary school, many gifted students detect feelings of non-belonging. This lack of belonging leads to participation issues later in their curricular career and can be a determining factor in their remaining in school. The researchers also note that gifted students often find their academic curriculum irrelevant and unchallenging leading to disengagement as they progress

through school. Finally, Hansen and Toso (2007) discovered that many gifted students develop a lack of respect for teachers and fellow students. This lack of respect causes participation issues as well as a failure for gifted students to identify with school.

The school district where this research data originated typically identifies Academically and Intellectually Gifted (AIG) students in elementary school and provides them differentiated instruction and curricular enrichment activities through middle school. In middle school, AIG students begin taking high school level courses as early as 7th grade. In high school AIG students have the option of taking honors and Advanced Placement courses to keep them academically engaged. Despite the capacity to do higher-level work, there was no difference in credit recovery outcomes when comparing AIG identified students with students not identified. This could indicate that recovery coursework does not do enough to engage students with higher-level processing capacities. Credit recovery courseware developers should not discount the fact that students from both ends of the academic spectrum utilize their products and that as much care should be taken to make courseware accessible for AIG students as it is for students with documented learning differences.

Research Question 6: Do middle school state-standardized reading, mathematics, or science assessment results at any grade-level predict student achievement in online credit recovery core discipline courses? If so, how?

Binary logistic regression was utilized to address research question six. This analysis indicated that 6-8th grade reading, 6-8th grade mathematics, and 8th grade science state-standardized assessments results were significant in predicting outcome in online credit recovery (p = .011). Although the overall model was significant, no predictor was individually significant. This suggests that middle school standardized assessment results only predict credit recovery

outcome when combined in the model. Ancillary analyses revealed that state-standardized assessment results were not appropriate predictor variables for significantly predicting outcome in the academic core discipline courses: English (p = .617), mathematics (p = .296), and social studies (p = .182). State-standardized assessment results were appropriate predictor variables for significantly predicting outcome in science recovery courses (p = .011). However, as with the overall model, no predictor was individually significant suggesting that middle school mathematics, reading, and science assessment results only predict outcome for science recovery students when combined in the model.

The results of the study indicated that the null hypothesis for Research Question 6 could be rejected leading the researcher to conclude that middle school state-standardized assessment scores do predict student outcome in online credit recovery. These findings have interesting implications to credit recovery researchers. In their examination of Philadelphia public school students, Neild and Balfanz (2006) discovered that state administered standardized test scores could be used to predict students who would eventually drop out of high school. Specifically, students who scored extremely low on their 8th grade reading assessment exam had at least a 50 percent chance of dropping out. The researchers also discovered that of the Philadelphia students who dropped out in 9th or 10th grade, a majority had a 5th grade equivalent or below on their 8th grade reading and mathematics assessment results (Neild & Balfanz, 2006). These findings support the belief that a lack of the fundamental reading and mathematics knowledge typically gained in elementary school can have major implications later in a student's academic career, possibly even causing them to dropout.

The state-standardized assessment results utilized in this study can assist educators in understanding individual students' fundamental reading, mathematics, and science skills. While

no specific middle school assessment exam was statistically significant in predicting outcome in online credit recovery, there is still value in using assessment results to predict preparedness for recovery coursework. Individual teachers, counselors, and administrators do not have the time or statistical expertise to combine the state-standardized assessment results of every at-risk student into a model prior to enrolling them in recovery courses; fortunately, this is not necessary. Already, many states utilize statistical modeling of common assessment results for predictive probabilities and value-added educational benchmarks (SAS, 2016). The school district where this research data originated subscribes to SAS EVAAS for K12. This software builds on the Tennessee Value-Added Assessment System methodology developed by William Sanders and his research team at the University of Tennessee, Knoxville to enable educators to recognize progress and growth over time and predict success probabilities in the future (SAS, 2016). While not all States and school districts subscribe to value-added educational statistical packages, the technology is available and easily accessible. By utilizing educational statistical software services built around multivariate, longitudinal modeling, educators can make informed choices about enrollment of specific students into online recovery courses.

Implications for Practitioners

The results of this study have several implications for school personnel tasked with managing and implementing online credit recovery programs. These implications are detailed below.

Younger Learners vs. Older Learners. School personnel tasked with enrolling students in online recovery courses must be mindful that upperclassmen perform at rates significantly higher than their underclassmen counterparts. While many underclassmen have the capacity to be successful in online recovery, factors such as maturity and previous academic success must be

taken into account prior to enrollment. Virtual learning requires a degree of self-discipline and it does a disservice to underclassmen to enroll those who do not have the self-discipline and reliance necessary to be successful. Upperclassmen who are closer to graduation than to middle school may see online credit recovery as a means-to-an-end. These students are better able to think of life after high school and may be in a better position to see the value of online recovery, which enables them to regain credit for a previously failed course required for graduation at an accelerated rate.

Learners with Disciplinary Issues. School administrators tasked with the responsibility of suspending students due to disciplinary issues should look to online learning options like credit recovery to keep students involved in school even when they are forced to be away from the classroom. Being away from the classroom, even for a day, impacts student learning. Online credit recovery should be considered an option if a student must be removed from class, especially for extended periods.

Learners with IEPs. Educators must be especially cognizant of students with active IEPs enrolled in online credit recovery courses. These students may require additional learning supports and interventions that are not inherent or built into credit recovery software. Further, students with documented disabilities may face accessibility issues with the software itself. Before enrolling any student with an IEP in an online recovery course, school personnel must ensure not only that the software meets the specific physical needs of the student, but that the student has the requisite off-line supports necessary for them to be successful, much as they would have in a traditional brick and mortar classroom. While broad in scope, it should not be assumed that recovery programs will provide complete end-to-end support on their own.

Standardized Test Results. Educators from states and districts that utilize value-added statistical packages based upon state-standardized assessment test results should take advantage of the predictive capabilities of the software. No one standardized assessment can predict student outcome in online credit recovery, however with the statistical modeling provided to educators via packages like SAS's EVAAS for K-12, a student's entire history of assessment results can be combined to predict performance in future classes. While no educator should base their enrollment decisions on the results of a statistical model alone, a tool like this could provide an argument for enrollment in an online credit recovery course or a justification for an alternative option.

Future Research

While past its infancy, online credit recovery is still a very young educational technology. Much is not known about the technology and how to most appropriately utilize it. Here are several areas that future researchers could explore based upon the results of this study.

Examine additional credit recovery courseware providers. The school district observed in this study utilized NovaNET and Apex Learning's credit recovery programs. While these are both prominent online recovery courseware providers, they are by no means the only ones utilized by school districts. Researchers should consider broadening the scope of this study to examine additional credit recovery courseware providers to find additional predictive student factors.

Examine successful support interventions. With a nearly 91% passing rate, it begs the question what the school district examined did to support their at-risk students and help them regain credit for previously failed courses. Researchers should consider the support structures put in place by schools and districts designed to help their at-risk students succeed. As reported by

Patrick et al. (2015), providing the courseware alone is not enough to ensure that at-risk students will be successful in online credit recovery. Indeed, the most successful recovery programs have a significant face-to-face component for delivering student support and can adapt their programs based on specific students' needs. Surveys and case studies of successful online recovery programs that can pinpoint specific support structures could be especially beneficial to schools and districts that are implementing new recovery programs.

Examine the impact of grade-level on credit recovery success. The finding that grade-level has a significant impact on credit recovery success is worth additional study. The reasons behind this could be due to motivation level, greater maturity, academic success earlier in the high school career, or any number of other reasons. Additional investigation, possibly qualitative in nature, should be considered by future researchers.

Examine the impact of credit recovery on disciplined students. The evidence is overwhelming: being out of school due to suspension has a detrimental effect on one's academics. Online tools, such as credit recovery, may be used as a way to mitigate the damage done by long periods of time out of the classroom. Research examining online interventions provided to suspended students should be considered to see if these are appropriate options to provide to students who must remain away from school due to disciplinary reasons.

Examine the accessibility and appropriateness of credit recovery for students with IEPs. As aforementioned, the technology utilized by online recovery providers is still relatively young, and in some cases not able to meet the needs of students with specific academic needs. A comprehensive examination of credit recovery software should be completed to examine the benefits and potential challenges that students with documented disabilities could face if enrolled in recovery courses. This examination should also provide enrollment managers, including

teachers, counselors, and administrators, specific guidelines on how to best physically support students with IEPs as they complete their recovery coursework.

Examine additional potential predictor variables that may impact credit recovery outcomes. This study only examined some student-level variables for predicting success in online credit recovery. Future research should consider additional student-level variables including, Socioeconomic Status, commonly measured by free and reduced lunch eligibility, Grade Point Average, number of absences in elementary school and/or middle school, number of courses passed prior to enrollment in virtual credit recovery, age upon entry to high school, English Language Learner status, and 504 Disability Plan status. By examining these predictor variables researcher may be able to gain a greater understanding of the types of students most likely to be successful on online credit recovery coursework.

Examine the predictive capabilities of state-standardized statistical modeling for credit recovery success. Currently, statistical software packages like SAS's EVAAS for K-12 are used to predict the raw score a student will obtain on future state administered standardized assessments. These predictions are based upon that student's performance on previously administered assessments. Generally, results are utilized to help school administrators and district leaders predict the "growth" a student will see year-over-year and then compare the predicted growth to the actual growth for teacher assessment and accountability purposes. Future researchers should examine the predictive capacity of EVAAS and EVAAS-like systems to optional scholastic opportunities like virtual credit recovery to determine if there is a way to make reliable predictions of outcome.

Limitations

In the interest of full transparency, and as an aid for future researchers, it is important to reexamine the limitations of this study in light of the findings. First, it must be restated that this study only examines the online credit recovery outcomes of one school district in the mid-Atlantic region of the U.S.; caution should be taken before generalizing any of these results. Additionally, while the school district examined utilizes prominent credit recovery courseware developed by major vendors, there are several other virtual recovery solutions available. The results of this study do not necessarily reflect other recovery products currently on the market. Further, the number of students passing their virtual recovery coursework shouldn't be assumed. Over 90% of enrolled at-risk students re-gained credit for previously failed courses; this means school district initiated interventions are undoubtedly working as intended. It would be unwise, however, to assume that all schools and districts with credit recovery programs are implementing the same types of interventions for success. Finally, because this study relies upon data previously collected by the school district, it cannot account for unobservable characteristics, such as motivation; therefore results are descriptive and cannot be considered prescriptive.

Conclusion

While not without faults, online credit recovery is fulfilling its mission by helping schools keep their students most at-risk of dropping out *in school*. As a result, the Nation's dropout rate is falling. This study provided insight to the educational research community in an attempt to determine what educators can do to improve the credit recovery enrollment process, save critical district resources, and maximize the scant time schools have with at-risk students before they make the life altering decision to drop out.

Appendix A | UNLV IRB Approval

UNLV Social/Behavioral IRB - Exempt Review
Exempt Notice

DATE:	May 27, 2016
TO:	Kendall Hartley, Ph.D.
FROM:	Office of Research Integrity - Human Subjects
PROTOCOL TITLE:	[797203-1] Success in online credit recovery: Factors influencing student academic performance
ACTION:	DETERMINATION OF EXEMPT STATUS
EXEMPT DATE:	May 27, 2016
REVIEW CATEGORY:	Exemption category # 4

Thank you for your submission of New Project materials for this protocol. This memorandum is notification that the protocol referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46.101(b) and deemed exempt.

We will retain a copy of this correspondence with our records.

PLEASE NOTE:
Upon final determination of exempt status, the research team is responsible for conducting the research as stated in the exempt application reviewed by the ORI - HS and/or the IRB which shall include using the most recently submitted Informed Consent/Assent Forms (Information Sheet) and recruitment materials.

Any changes to the application may cause this protocol to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**. When the above-referenced protocol has been completed, please submit a **Continuing Review/Progress Completion report** to notify ORI - HS of its closure.

If you have questions, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 702-895-2794. Please include your protocol title and IRBNet ID in all correspondence.

Appendix B | Frequencies and Percentages for Categorical Variables

Variable	*n*	%
Gender		
Female	142	40.9
Male	205	59.1
Race		
Black	121	34.9
Hispanic	114	32.9
White	100	28.8
Other	12	3.5
Grade Level		
9th	84	24.2
10th	92	26.5
11th	129	37.2
12th	42	12.1
IEP Status		
Has IEP	42	12.1
Does not have IEP	305	87.9
AIG Status		
Yes	18	5.2
No	329	94.8
Incidents		
No Incidents	210	60.5
One or more incidents	137	39.5
Math 6th Grade		
I	54	15.9
II	103	30.4
III	159	46.9
IV	23	6.8
Reading 6th Grade		
I	115	34.3
II	68	20.3
III	136	40.6
IV	16	4.8

Math 7th Grade		
I	94	27.7
II	89	26.3
III	128	37.8
IV	28	8.3
Reading 7th Grade		
I	116	34.4
II	96	28.5
III	91	27.3
IV	33	9.8
Math 8th Grade		
I	140	41.7
II	95	28.3
III	82	24.4
IV	19	5.7
Science 8th Grade		
I	128	38.8
II	78	23.6
III	80	24.2
IV	44	13.3
Discipline		
English	37	10.7
Math	80	23.1
Science	59	17.0
Social Studies	171	49.3

Appendix C | Binary Logistic Regression with 6-8th Grade Math, Reading, and Science Assessment Results Predicting Student Outcome, Split by Class Discipline Area

Discipline Area		*B*	*SE*	Wald	*P*	Exp(*B*)
English						
	Math 6th Grade	0.10	2.73	0.00	.971	1.10
	Reading 6th Grade	-2.11	2.38	0.79	.375	0.12
	Math 7th Grade	3.59	3.77	0.91	.341	36.21
	Math 8th Grade	-1.64	1.89	0.75	.386	0.19
	Reading 8th Grade	-0.08	1.19	0.00	.950	0.93
	Science 8th Grade	1.35	1.28	1.11	.292	3.85
Math						
	Math 6th Grade	0.28	0.65	0.18	.671	1.32
	Reading 6th Grade	0.38	0.68	0.32	.574	1.46
	Math 7th Grade	0.43	0.67	0.41	.522	1.54
	Math 8th Grade	0.40	0.69	0.33	.564	1.49
	Reading 8th Grade	0.39	0.74	0.28	.595	1.48
	Science 8th Grade	-0.36	0.68	0.28	.597	0.70
Science						
	Math 6th Grade	0.11	0.73	0.02	.885	1.11
	Reading 6th Grade	0.16	0.87	0.03	.853	1.18
	Math 7th Grade	1.43	0.79	3.29	.070	4.17
	Math 8th Grade	1.31	1.24	1.12	.290	3.71
	Reading 8th Grade	-1.30	1.13	1.33	.249	0.27
	Science 8th Grade	2.58	1.86	1.92	.166	13.13
Social Studies						
	Math 6th Grade	0.46	0.71	0.42	.518	1.58
	Reading 6th Grade	-1.20	0.61	3.91	.048	0.30
	Math 7th Grade	-0.30	0.63	0.23	.631	0.74
	Math 8th Grade	0.46	0.69	0.45	.504	1.58
	Reading 8th Grade	1.33	0.88	2.28	.131	3.79
	Science 8th Grade	0.45	0.62	0.52	.469	1.56

Appendix D | Frequencies and Percentages of Student Outcome Overall and Split by Discipline

Variable	*n*	%
Student Outcome Overall		
Fail	32	9.2
Pass	315	90.8
English		
Fail	2	5.4
Pass	35	94.6
Math		
Fail	11	13.8
Pass	69	86.3
Science		
Fail	7	11.9
Pass	52	88.1
Social Science		
Fail	12	7
Pass	159	93

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Curriculum Vitae

EDUCATION

University of Nevada, Las Vegas, Las Vegas NV May 2017
- Doctor of Philosophy, Curriculum & Instruction [Technology Education]
  - Dissertation: Success in online credit recovery: Factors influencing student academic performance.

North Carolina State University, Raleigh NC Dec. 2010
- Graduate Certificate, Geographic Information Systems (GIS)

North Carolina State University, Raleigh NC May 2008
- Master of Education, Counselor Education

North Carolina State University, Raleigh NC May 2006
- Bachelors of Science, Criminology

STUDENT MEDIA EXPERIENCE

Student Radio Station Advisor 2011 – Present
KUNV Radio [University of Nevada, Las Vegas], Las Vegas NV
- Worked closely with the student leadership team to identify priorities, establish organizational goals and develop an annual budget.
- Mentored student programming, production and promotion teams to ensure station's priorities and goals were being implemented appropriately.
- Assisted in the procurement of funds from student government, area businesses and other outside sources.
- Assisted in the planning and coordination of live events on and off-campus.
- Developed relationships with Human Resource departments at local media companies to secure internships and employment for students.
- Organized & taught a 7-week introductory broadcast training course with lecture & lab components (offered 3x per year) to interested students and community volunteers.

Radio Training Instructor April 2005 – May 2007
Student Media Department, NC State University, Raleigh NC 27695
- Developed a comprehensive introductory radio training program that included classroom, production and practical components.
- Organized overall course structure and semester syllabus.
- Authored and maintained course training manual.

PROFESSIONAL MEDIA QUALIFICATIONS

Operations Manager 2011 – Present
KUNV Radio [University of Nevada, Las Vegas], Las Vegas NV
- Ensured the on-air and online reliability of 91.5 KUNV-FM, KUNV-HD2 & KUNV-HD3.
- Oversaw an operations staff consisting of 8 paid employees and over 100 volunteers.
- Managed 7 studios operating on an Axia Livewire audio-over-IP network.
- Monitored & maintained 13 ENCO DAD enabled on-air and production workstations.
- Scheduled & reconciled traffic (advertising/underwriting) for 91.5 KUNV-FM & HD2.
- Oversaw audio production and station imaging.
- Developed & maintained station's online presence (*KUNV.ORG*).
  - Coordinated development of the KUNV mobile application.
- Served on station's programming, marketing, and membership committees.
  - Led station efforts to administer donor surveys to ensure listener needs and station priorities were in tandem.
  - Led station efforts to initiate public radio member/donor appreciation events.
- Served as Executive Producer for KUNV's flagship Public Affairs program, *Our Metro*.
  - Formed discussion panels.
  - Scheduled & coordinated interviews.
  - Performed background research.
  - Collaborated with host and producers to identify potential show topics.

[continued]

Master Control Operator 2007 – 2011
Capitol Broadcasting Company, Raleigh NC

- Performed playback and monitoring functions for the origination of multiple 24x7 server-based satellite and web broadcast channels.
- Monitored the on-going reliability of automated programming.
- Reviewed, edited, and confirmed air, traffic & music logs and discrepancy reports.
- Quality controlled all media on active air and web servers.

Production Assistant (Contract) 2007
National Public Radio

- Provided specific assignment reporting assistance to NPR correspondent including spot news, interviews, and feature reports (Duke University Men's Lacrosse Trial).

Operations and Production Manager 2006 – 2007
WLHC-FM [Woolstone Corporation], Sanford NC

- Resolved all issues surrounding the technical operation of a digitally automated radio station.
- Scheduled all programming and commercial traffic.
- Processed and cleared affidavits pertaining to local and network commercial spot clearance.
- Coordinated and managed all station automation responsibilities.
- Provided training in technical radio operations to a station staff of 10+. Developed skills such as control room operation, broadcast techniques, copywriting and audio editing, as well as administrative support functions such as computer operation and maintenance.
- Produced and edited a variety short segments and spots.

Audio Engineer (fill in) 2006
WUNC-FM [North Carolina Public Radio], Chapel Hill NC

- Engineered studio recording and interview sessions;
- Produced and edited content for nationally distributed program utilizing digital editing software as well as ISDN and FTP communication (APM's *The Story* with Dick Gordon).

TEACHING EXPERIENCE

University of Nevada, Las Vegas August 2011 – Present
Box 452010, Las Vegas NV 89154-2010

- JOUR 223 | Contemporary Audio;
- JOUR 353 | Audio Production for Mass Media;
- JOUR 493 | Independent Study;
- JOUR 499 | Professional Internship.

- Guest Lecturer:
  - JOUR 100 (Introduction to Journalism & Media Studies);
  - JOUR 102 (News Reporting & Writing);
  - JOUR 310 (Advanced Reporting);
  - JOUR 323x (Radio News);
  - JOUR 403 (Broadcast Newswriting, Audio Gathering & Production);
  - JOUR 424 (Advanced News Practicum);
  - JOUR 486 (Interviewing);
  - PSY 451 (Basic Principles of Psychotherapy)

[continued]

		Student Services Administrator / Co-Technology Coordinator 2007 – 2011 Central Carolina Community College / Lee Early College High School, Sanford NC *Student Services Administrator responsibilities included:* • Providing individual planning and academic guidance/counseling to a caseload of 300. • Leading weekly academic & life support seminar for at-risk students. • Maintaining student records and processing student registrations via *Datatel Records Management Software* System. • Continually monitoring student progress and reporting mid-term grade deficiencies. • Offering college/university transfer advisement and counseling. • Providing career counseling services. • Serving as college board (SAT) & ACT coordinator. • Offering preventative and crisis response services, including the referral of students to various academic and student life support offices when necessary. • Continually collaborating with parents, instructors, high school and college staff & administrators, and other stakeholders to foster learning in an innovative community college/high school environment. *Technology Coordinator responsibilities included*: Supporting Early College faculty teaching traditional and hybrid-based courses in a 1:1 initiative environment through the development of instructional strategies, course materials, assessment techniques, integration of instructional technologies, and best practices. Additional responsibilities included: • School webmaster; • maintenance of course delivery platforms including BlackBoard and Moodle; • coordination of internet-based benchmark assessment systems; • primary contact for e-learning systems including NovaNET and OdysseyWare; • learning advisor for students enrolled in courses delivered through the NC Virtual Public School and the UNC i-school; • facilitator of online standards-based instruction, practice, and testing tools including Study Island and USA Test Prep.
OTHER EXPERIENCE		**Lacrosse Official** 2006 – Present NCAA/MCLA & US Lacrosse • US Lacrosse Certified Trainer and Clinician. • US Lacrosse Certified Observer. • Certified to referee Youth, High School, and Collegiate level competition.
AWARDS		**Fellowship, *Kenan Institute for Engineering, Technology & Science*** 2009 – 2011 • Investigated the effects of student-created video games and their attitudes towards STEM subjects.
LICENSES AND CERTS		**National Board of Certified Counselors** • National Certified Counselor (NCC) Credential [Exp. 2019] **Nevada Department of Education** • Standard Professional License [Exp. 2019] **North Carolina Department of Public Instruction** • Standard Professional II License [Exp. 2018]
SKILLS & PROFICIENCIES		Radio background: Axia Livewire network administration, ENCO DAD automation, AudioVault automation, Adobe Audition, Natural Music & Log, RCS Selector & Linker, the Public Radio Satellite System (PRSS), ContentDepot, and the Public Radio Exchange (PRX) SubAuto delivery platform. Additional tech background: web development (HTML, CSS, PHP, Wordpress, Drupal), PC repair, computer networking, Cisco router/switch management, and ESRI's ArcGIS platform. [continued]

VOLUNTEER WORK		Cultural Diversity Foundation Las Vegas, NV • Scholarship Committee Member • Host of the organization's annual scholarship fundraiser gala Nevada Interscholastic Lacrosse Officials Association Las Vegas, NV • Vice President • Association Trainer/Clinician • Webmaster Sunrise Hospital Las Vegas, NV • Oncology ward volunteer American Cancer Society Las Vegas, NV • Cancer Resource Room Coordinator o Provide resources to cancer patients and family members Including treatment info, financial assistance and transportation options.