Factors Influencing Student Academic Performance in Online Credit Recovery

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ABSTRACT

Recent estimates show nearly 90% of school districts nationwide offer some form of online credit recovery. Despite its widespread adoption, there is a dearth of research surrounding the suitability of online credit recovery for students. This study examined potential success factors of students enrolled in virtual recovery courses in a school district in the mid-Atlantic region of the United States. Descriptive statistics, chi-square analysis, and binary logistic regression modeling was used for data analysis to account for the influence of student characteristics on credit recovery outcome. Findings revealed that grade-level, IEP status, and middle school End-of-Grade Test results could be linked to achievement in online credit recovery courses. Implications of these findings for educators are discussed

Introduction

While graduation rates across the United States have steadily increased over the past decade, school dropout remains a critical issue. During the 2015-16 school year over 500,000 students dropped out of U.S. schools (McFarland, Cui, Rathbun & Holmes, 2018). The decision to withdraw from school before earning a diploma can have devastating consequences. For instance, high school dropouts have higher rates of unemployment, teen pregnancy, incarceration, homelessness, and mental and physical health problems (Freudenberg & Ruglis, 2007; Stillwell, 2009; Sum, Khatiwada, McLaughlin & Palma, 2009; 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 generated.

Bridgeland, Dilulio and Morison (2006) report that credit deficiency is one of the primary reasons students choose to drop out of school. Students who fall behind their peers early in their high school experience face myriad challenges as they attempt to catch up (Watson & Germin, 2008). Traditionally when students have been unsuccessful in a course, they are required to repeat the same course in summer school or the following academic year. With the advent of online learning however, additional avenues have become available for students to quickly obtain credit for courses they were initially unsuccessful in (Carver, Lewis & Coopersmith, 2011). In many cases, credit can be earned during the same academic year that the original course was unsuccessfully attempted. These programs are known as "online 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).

Surveys 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 (Queen & 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 (Rickles, Heppen, Allensworth, Sorensen & Walter, 2018). In practical terms, this means students may be enrolled into credit recovery courses by counselors and administrators without completely understanding if this intervention is the most appropriate instructional mechanism for them to regain credit.

This study examines an issue heretofore unexplored, namely is credit recovery suitable for all students? No clear set of characteristics have been identified that influence success in online credit recovery. An investigation of the factors that influence success in online credit recovery would assist school counselors and administrators with the course

enrollment process and save school districts from expending scant resources on a program that may ultimately prove to be unsuccessful for certain students.

Brief Review of the Literature

As an offshoot of online learning, credit recovery grew 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, 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 showed that credit recovery was one of the most common applications of online coursework (Greaves & Hayes, 2008). Credit recovery has been referred to as "the fastest growing area of online learning" (McCabe & St. Andrie, 2012, p. 1).

Online credit recovery programs typically utilize a mastery or competency-based model (Powell, Roberts & Patrick, 2015). These programs allow students to complete coursework at their own pace by remediating in academic areas where they were found to be deficient (Zenith, 2011). Credit for a previously failed course is awarded after the requisite units have been mastered (McCabe & St. Andrie, 2012).

There is disagreement as to the effectiveness of online credit recovery. An experimental study of Chicago Public Schools students enrolled in Algebra 1 revealed that online credit recovery students had lower passing rates than students who retook the course in the classroom (Heppen et al., 2017). Despite this, there were no significant differences between online and face-to-face students in passing rates in subsequent mathematics courses or their likelihood of being on track for graduation at the end of the second year of high school (Heppen et al, 2017).

Credit recovery programs have been criticized for their lack of rigor and limited oversight (Davis, 2015). Powell et al. (2015) note that many "credit recovery 'solutions' have lowered the bar for passing" (p. 10). This is attributed to pressure school districts are facing to "do something" to raise graduation rates. Additionally, credit recovery has become a multi-billion dollar business. Courseware 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.

Students enrolled in credit recovery courses are generally identified as "at-risk" (Heppen, Sorensen, Allensworth, Walters, Stachel & Michelman, 2014). A review of the literature reveals multiple characteristics and factors that capture the profile of at-risk students. These 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 stand in contrast from the characteristics often associated with success in the online learning environment, including being academically 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 possessing a developed internal locus of control (Fazey & Fazey, 2001).

Despite this dichotomy, virtual schooling programs "are well positioned to directly address the needs of at-risk learners" (Archambault et al., 2010, p. 3). This investigation examines the factors that influence success for credit recovery students and will better assist educators in leveraging this powerful tool.

Significance of this Study

The U.S. Department of Education reports that approximately 89 percent of school districts in the U.S. offer some form of credit recovery (US DOE, 2018). The International Association for K-12 Online Learning lists credit recovery as one of the chief reasons school districts offer virtual learning (Powel et al., 2015). Despite its widespread adoption, an extensive search of the literature revealed scant research focusing on student factors and characteristics that may influence success in an online credit recovery course.

This research provides school teachers, counselors, advisors and administrators insight into credit recovery course success factors. This knowledge

will provide school personnel the tools necessary to 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 systems 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. Lastly, as the pressure to raise graduation rates remains a constant weight on shoulders of school districts, a more comprehensive understanding of the type of at-risk student likely to be successful in online credit recovery can help schools refine and implement dropout interventions.

Purpose and Research Questions

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?

To date, no clear set of characteristics have been identified to predict success in online credit recovery. Liu and Cavanaugh (2011 & 2012) developed a model which investigated success factors of students in high enrollment K12 virtual school courses, examining student characteristics including gender, race, grade-level, and exceptionality. Building on the work conducted by Liu and Cavanaugh, this research examines the success factors of students enrolled in online credit recovery for core academic subjects, including English, mathematics, science and social studies. These disciplines were selected, as successful passage is necessary in order to graduate from high school in the state where the study took place.

The variables of interest in this study include: gender, race, grade-level, discipline/behavior history, exceptionality/IEP status, Academically/Intellectually Gifted (AIG) status, middle school mathematics End-of-Grade (EOG) assessment results, middle school reading EOG assessment results, and middle school science EOG assessment results. These constitute the study's independent, or predictor, variables. Student outcome in the credit recovery course constitutes the dependent variable for the study. Per the policy in the state where the study took place, students do not receive a letter grade when they complete their credit recovery

coursework; rather those who successfully complete all requirements receive a grade of P (pass). Unsuccessful course outcomes are listed with a F (fail) or I (incomplete).

The research questions in this study included:

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 those without IEPs, with respect to their academic achievement in online credit recovery core discipline courses?
5. Are there differences between Academically/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?

Methodology

Participants and Data Collection

The target population for this study is high school students who enrolled in an online credit recovery course in a school district in the mid-Atlantic region of the United States. The school district examined utilizes two credit recovery courseware providers: NovaNET and Apex Learning. NovaNET identifies students' current level of performance by analyzing the results of a pre-test. The courseware provides an individualized remediation 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 post-test unit exam, they are deemed to have achieved mastery

of the subject (Pearson, 2004). Apex Learning leverages video, graphics, animation, and audio to support at-risk students who may not read, or otherwise perform, at grade-level. Apex Learning's credit recovery courseware has been lauded as more rigorous than other credit recovery providers (Sapers, 2014). The school district contracted with Apex Learning specifically because of their reputation for rigor. All instruction was conducted in a computer lab with no in-person meetings with teachers. In the computer lab students had access to a teachers' aide who could assist with technological matters and basic instructional issues.

Table 1: *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

The primary source of data for this study is final grades from credit recovery courses for high school students enrolled in academic core discipline courses during the 2014-2015 and 2015-2016 school years. Table 1 shows a list of the academic core discipline courses. These courses were selected as they are required for graduation. Data were 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.

Table 2 provides student demographic information and descriptive statistics for the independent variables. The sample 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 course (n = 171, 49.3%).

Table 2: *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

Variable	N	%
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

Variable	N	%
Discipline		
English	37	10.7
Math	80	23.1
Science	59	17.0
Social Studies	171	49.3

Coding

During the data analysis, all categorical variables were coded accordingly. Table 3 shows the coding information.

Table 3: *Coding of independent variables*

Gender	0: male 1: female
Race/Ethnicity	0: White 1: African American/Black 2: Hispanic/Latino 3: other
Grade Level	9: 9th grade 10: 10th grade 11: 11th grade 12: 12th grade
Academically / Intellectually Gifted (AIG)	0: not identified as AIG 1: identified as AIG
Individualized Educational Plan (IEP)	0: no IEP on file 1: IEP on file
Discipline/incident history	0: no incidents on file 1: incidents on file
Middle school mathematics End of Grade (EOG) standardized assessment	1: Level I 2: Level II 3: Level III 4: Level IV
Middle school reading EOG standardized assessment	1: Level I 2: Level II 3: Level III 4: Level IV
Middle school science EOG standardized assessment	1: Level I 2: Level II 3: Level III 4: Level IV

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

Research Design

This study is descriptive in nature and as such, non-experimental. The study aims to identify certain factors that influence success in online credit recovery courses without intervening within the courses themselves. Demographic and academic background information was collected from 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 is combined into the four overall core disciplines: English, mathematics, science, and social studies. For example, results from Earth & Environmental Science, Biology, Chemistry, and Physical Science are grouped together into a discipline titled "Science."

Data Analysis

Univariate analyses were conducted to explore the relationship among the variables gender, race/ethnicity, grade level, AIG status, IEP status, and discipline/incident history, and the dependent variable. 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. Binary logistic regressions were utilized to identify the effect that one or more predictors have on a single dichotomous dependent variable. 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.

Results

The results of the analyses indicate that gender and race do not demonstrate a significant effect on

credit recovery course outcome (χ^2 (4) = 8.42, p = .077). Grade level is found to have a strong and significant effect on course outcome (χ^2 (1) = 19.88, p < .001), (B = 0.92, 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. The full results of this analyses are presented in Table 4.

Table 4: *Results of the Binary Logistic Regression using Grade Level on 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)

No significant effects are demonstrated when examining disciplinary incidents (χ^2 (1) = 2.11, p = .146). There are differences in student outcome based on whether or not an IEP was implemented (χ^2 (1) = 8.51, p = .004). 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. Full results are presented in Table 5.

Table 5 *Results of the Chi-Square Comparing IEP Status and Student Outcome*

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

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

There is no significant difference in student outcome based on AIG status (χ^2 (1) = 1.93, p = .165). The results of the overall binary logistic regression were significant when examining 6-8th grade math, reading, and science End-of-Grade Test scores (χ^2 (7) = 18.24, p = .011). While the overall model was significant, no variable was individually significant, suggesting that they only effect student outcome when combined in the model. Table 6 details the results of the analyses on individual End of Grade exams.

Table 6: *Results of the Binary Logistic Regression using Math, Reading, and Science End of Grade Scores on 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: $\chi^2 (7) = 18.24$, p = .011

Discussion and Implications

In this study the influence of several factors on the outcome of students enrolled in online credit recovery courses was investigated. These factors include gender, race, grade level, discipline history, IEP status, AIG status, and middle school reading, mathematics, and science End of Grade (EOG) results. Each of the variables included in the estimating equation are examined in light of their relationship with student academic achievement in other studies.

Influence of Grade Level in Online Credit Recovery

Dowling (1994) reported that at-risk high school students could be classified into two groups: freshmen and sophomores, and junior and seniors. Dowling 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) can be taken as 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.

Influence of IEP Status 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 (Fichten et al., 2009; Müller, 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. 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 technology will undoubtedly 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 their enrollment in a course. Online credit recovery is a viable option for students with disabilities, but 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.

Influence of Middle School Mathematics, Reading, and Science End-of-Grade Test Results in Online Credit Recovery

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 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 (Wright, Sanders & Rivers, 2006).

Conclusion and Future Study

Grade Level Impact

Given the dearth of research on success factors in online credit recovery, the present study investigated the influence of several factors on student outcome in core courses to explore success in the virtual recovery environment. The effect of grade level on recovery outcome warrants attention. While many underclassmen have the capacity to be successful in online recovery, factors such as maturity and previous academic success must be considered prior to enrollment. Any virtual learning experience requires a degree of self-discipline; it does a disservice to underclassmen to enroll those who do not have the self-reliance and discipline necessary to be successful. Upperclassmen who are closer to graduation may see online credit recovery as a means-to-an-end. These students are better equipped to envision life after high school and as such are in a better position to see the value of online recovery. Given the lack of recent literature on high school completion by upperclassmen vs. underclassmen, additional study is reasonable. Research centered around motivation, maturity, and prior academic success in their academic career, should all be considered.

IEP Status Impact

The effect of IEP status on credit recovery outcome cannot be overlooked. Students with documented disabilities often require additional learning supports and interventions that are not inherent or built into online credit recovery platforms. 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. Future research should 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 support students with IEPs as they complete their virtual recovery coursework.

End-of-Grade Test Score Impact

Standardized test scores have the potential to be one of the most powerful yet problematic tools for practitioners. 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 (SAS, 2016). These predictions are based upon a student's performance on previously administered assessments. While not without significant limitations (Amrein-Beardsley, 2009), educators from states and districts that utilize value-added statistical packages based upon state-standardized assessment test results would be remiss if they did not take advantage of the predictive capabilities of the software. It must be noted that 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. Unfortunately, at this time, statistical modeling techniques like this may not be an available option for course enrollment personnel such as counselors and school administrators. And even if it were, 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 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 reliably predict outcomes.

Final Thought

Virtual recovery has been in existence for over 15 years, but much is still unknown about the appropriateness of this educational intervention for at-risk students. This study is but the first sentence in what hopefully will be a deep and robust conversation about the factors that influence success in online credit recovery.

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