

# **The Disconnect Between College Eligibility and College Readiness**

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With graduation rates for four-year schools at 58 percent, and two-year schools at 28 percent, the idea that college eligibility equates to college readiness seems to be flawed. Many researchers have attempted to identify factors, attributes, and behaviors that could predict the likelihood of students' success in college. Building on that body of research, this study aims to identify whether the criteria that determines college eligibility is flawed in predicting college readiness. In addition to identifying possible flaws with traditional measures of college eligibility and readiness, this study strives to identify whether other factors, such as academic behaviors, provide insight into college readiness.

This study is a mixed-methods case study of one school; it seeks to explore the disconnect between college eligibility and college readiness. Specifically, this study examines traditional measures utilized in college admissions versus other measures of college readiness. Three methods anchor the study: descriptive statistics were utilized to determine whether participants from Gilpin High School were college eligible. Students' transcripts were analyzed for weighted GPA, unweighted GPA, core subject GPA, units of classes taken, numbers of high-level courses taken, and PSAT scores. The second method was a modified academic behavioral survey designed to determine students' college readiness. The third method consisted of a Principal Component Analysis that provided insight into the relationship between traditional and non-traditional measures utilized to determine college eligibility and college readiness. In addition, two matrices were created, one utilizing scores from the academic behavioral survey and weighted GPA, the

second utilizing scores from the academic behavioral survey and PSAT scores. The results of both illustrate the number of students who were college eligible and college ready, college eligible and not college ready, not college eligible and college ready, or not college ready and not college eligible.

Results can be utilized in curriculum development, interventions, and evaluation at the secondary level. At the post-secondary level, results could inform admissions practices that could be modified to include behavioral measures. In regard to future studies, self-discipline could be studied to determine whether this characteristic is a bridge from high school success to college success.

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## **1.0 Problem of Practice**

Each year, hundreds of thousands of students gain admission into post-secondary institutions across the country. Of those students, 40 percent of first-year students attending a four-year college will be placed into one or more remedial courses (Chen & Simone, 2016). Of students enrolling in two-year colleges, 68 percent will be enrolled in one or more remedial courses (Chen & Simone, 2016). Of the 40 percent of students enrolled in remedial courses at four-year institutions, only one in three will graduate, while of the 68 percent of students enrolled in remedial courses at two-year schools, only one in 10 will graduate (Higher Education Bridge to Nowhere, 2012). With overall graduation rates at four-year schools at 59 percent and two-year schools at 28 percent, it could be argued that a student can be college eligible but not college ready (National Center for Education Statistics, 2018).

Understanding factors that predict college performance and the attributes needed for success in college would allow admissions officers to more accurately identify eligible students who are college-ready. A body of research documents that students' past academic performance, measured by grades and standardized test scores, have been deemed the best predictors of future achievement (Bettinger, Evans & Pope, 2011; Cyrenne & Chan, 2012; Dooley, Payne, & Robb, 2012). Bettinger, Evans, and Pope (2011) found that the ACT, specifically mathematics and English scores, are highly predictive of prospective students' success. Unfortunately, admission offices often use composite scores in their decision-making, which utilize not only math and English scores but also combine them with their science and reading scores, which reduces the predictive accuracy of the ACT. Additionally, Cyrenne and Chan (2012) found, among numerous factors, that high school grade point average was a strong predictor of college performance.

Dooley, Payne, and Robb's (2012) findings support the idea that high school grades, married with numerous other factors such as standardized test scores and neighborhood income levels, were the best predictor of college success. With a large body of research supporting the predictive power of a students' past academic performance on their probability of graduating college, it is easy to understand why admission gates and interventions at the post-secondary level are currently based primarily on students' prior grades and entrance examination scores (Bettinger, Evans & Pope, 2011; Cyrenne & Chan, 2012; Dooley, Payne, & Robb, 2012). However, it should be noted that utilizing students' prior performance, whether high school grades, college entrance exam scores, or a combination of both, still only account for a small proportion of variance in who will actually graduate. What other student factors could improve the accuracy of statistical models to predict the likelihood of students' success in college? In other words, are there other measures that admissions officers should be taking into consideration?

Admission offices often vet applicants with a set of academic criteria that may consist of high school grade point average (HSGPA), high school course selection (e.g., college-preparation courses), and assessment scores (e.g., PSAT, SAT, ACT, and other standardized measures) (Clinedinst, & Koranteng, 2017; Wechsler, 2017). The by-product of these academic benchmarks to determine admission creates, at least on paper, a student body profile of similarly achieving students. In other words, the student body profile created by utilizing academic criteria means that the majority of students who are admitted have a minimum standard HSGPA, high school course selections, and standardized assessment scores. The idea of a student body profile is nothing new; publications such as *Barron's Profile of American Colleges* and *The Princeton Review* have been providing this type of information for quite some time. Publications that provide information on student body profiles have led to online programs such as Naviance, which matches students to

colleges by using measures such as GPA and standardized test scores. With the majority of students falling into the same academic profile (i.e., similar HSGPA, SAT/ACT scores, and class rank), future academic success should be relatively predictable if measures of GPA and entrance examinations reliably predict college graduation. However, it would seem that a problem exists with admission offices *only* utilizing high school success (i.e., HSGPA and standardized assessment scores) for college entrance because college graduation rates are low and enrollments in remedial courses are high.

Utilizing grades and assessment scores as predictors of post-secondary success is contingent on a number of assumptions that could be responsible for the contradiction of a student's high performance in high school and lack of performance in college. The dynamics of the teacher-student relationship, behaviors needed for success, skills needed for success, and the role of self-discipline are different in post-secondary environments (Conley, 2007a). College professors expect students to be independent learners, make inferences, write multiple well-developed papers, and advocate for themselves when they need help (Conley, 2007b). Unfortunately, the skills, behaviors, quantity of work, and quality of work expected in college is the exception in high school, not the norm (Conley, 2007b, 2008). Is the lack of uniformity in expectations, behaviors, skills, and content between high school and college a major reason for college-eligible students not being college ready?

Can a student be college eligible (by meeting admission criteria) but not college ready (having the ability and/or skills to succeed in college entry-level courses)? Could different measures help to predict college readiness? This question is explored through a case study utilizing a mixed methods approach. Informed by the literature on college success, the researcher collected data on 15 different variables ranging from unweighted HSGPA (i.e., all courses being assigned

the same point value in calculating grade point average, regardless of the level of difficulty), weighted HSGPA (i.e., higher point values assigned to rigorous courses such as Advanced Placement courses when calculating grade point average), and standardized assessment scores (such as SAT, ACT, and PSAT). In addition to this, a Likert scale survey was administered on academic behaviors in the areas of self-discipline, learning skills, and study skills as a proxy for whether a student possesses the personal habits to be considered “college ready.” The analysis of these 15 variables provided evidence on whether a student can be college eligible yet not college ready. In addition to exploring college eligibility and college readiness, the analysis attempts to add to the literature in regards to the possible relationship (or lack thereof) between variables.

## 2.0 Review of Literature

The process of demonstrating college readiness and eligibility in order to gain admission to college can be traced back to Harvard University in 1642 (Broome, 1903). Harvard created a code of laws that provided a framework of the knowledge and skills a prospective student would need in order to gain admittance. The law, stated in part:

When any scholar is able to read Tully or such like classical Latin Author extempore, and make and speake true Latin in verse and prose, suo (ut aiunt) Marte, and decline perfectly the paradigms of nounes and verbes in ye Greeke tongue, then may hee bee admitted into ye College, nor shall any claime admission before such qualifications. (Broome, 1903, p.18)

The admission gates of reading and speaking Latin, and understanding the “paradigms” of Greek grammar existed for 150 years (Broome, 1903). With little to no change in the criteria needed to gain entry into college, secondary schools were able to provide curricula aligned with college admissions (Broome, 1903). This sustained uniformity of college admission criteria communicated a very clear and specific message to secondary schools on the types of content and skills prospective students needed to gain entry into college.

Eligibility for college and admission criteria began to change in the nineteenth century due to the emergence of private academies (Beale, 2012). Private academies were created due to a growing demand for a practical versus a classical education (Beale, 2012; Coleman & Hoffer, 1987). In reaction to new private academies, colleges began to expand practical education course offerings in areas such as engineering and agriculture (Library of Congress, 2017). A consequence of additional courses was the expansion of admissions criteria (Broome, 1903). In addition to



assessing students' knowledge of classical languages, students now needed additional classes such as arithmetic, ancient history, and English for admission purposes (Boylan & White, 1987; Cohen, 1998; Rudolph, 1990). The added subjects of ancient history, English, and arithmetic, along with the required depth of knowledge varying from one post-secondary institution to another, made college eligibility and college readiness difficult for secondary schools to address.

During the mid-twentieth century, admission criteria became categorical (Atkinson & Geiser, 2009; *Beyond the Rhetoric: Improving College Readiness*, 2010; Geiser & Santelices, 2006; Jimenez, Sargrad, Morales, & Thompson, 2016). Emanuel (1953) and Beale (2012) found that a type of uniformity had set in, albeit different from the uniformity seen in the eighteenth and nineteenth centuries, as most colleges were granting admission based on six major categories: high school graduation, certain unit of classes taken within a subject, class rank, recommendations, interviews, and aptitude/standardized test scores. This era of college admissions eventually ushered in the major role college admission exams, such as the SAT and ACT, play in the admissions process (Hurwitz, Smith, Niu, & Howell, 2015; Woods, Park, Hu, & Bertrand Jones, 2018). The present college admission categories have not changed; what has changed is the increased emphasis placed on college entrance exams, HSGPA, and types of courses taken (Beale, 2012; Camara & Michaelides, 2005; Camara & Echternacht, 2000; Emanuel, 1953; Woods, Park, Hu, & Bertrand Jones, 2018).

## **2.1 Has Anything Changed in 400 Years?**

Evidence would suggest that the gap and the cause of the gap between secondary and tertiary education that Broome (1903) highlighted 120 years ago still exists today (Casazza, 1999;

Cline, Bissell, Hafner, & Katz, 2007). With 4,583 degree-granting institutions presently operating in the United States, along with the evolving diversity of subjects and content offered within each of these degree-granting institutions, it appears that secondary and post-secondary education are growing further apart (Chen & Simone, 2016; College & University-Statistics & Facts, 2018). As colleges continue to expand their course catalogues with new subjects and new programs, the ability of secondary schools to keep pace with the content knowledge needed in these new courses becomes increasingly difficult (Broome, 1903; Mind the Gap, 2010). Whether admissions gates are subject specific, as seen in the nineteenth century, or categorical, as seen in the twentieth and twenty-first centuries, a population of college eligible students who are not college ready still exists (Broome, 1903; Chen & Simone, 2016; Conley, 2008; Emanuel, 1953; Royster, Gross, & Hochbein, 2015).

Grades and assessment scores can provide a certain amount of insight into college readiness; however, GPA and assessment scores have limitations for identifying who is ready for college (Clinedinst & Koranteng, 2017; Conley, 2007a; Westrick, Robbins, Radunzel, & Schmidt, 2015). A growing body of research suggests that the development of academic attributes (e.g., skills in studying, researching, identifying main ideas, paraphrasing, framing problems, and self-discipline), combined with traditional academic knowledge, provides the greatest insight into whether a student possesses the skills and knowledge needed to pass entry-level courses without remediation regardless of the subject or degree-granting institution a student attends (College Admissions Decision, 2017; Conley & French, 2014; Lombardi, Conley, Seburn, & Downs, 2013; Lombardi, Seburn, & Conley, 2011; Mattern et al, 2014).

## **2.2 College Remediation: A Juxtaposition or Life Line?**

College admissions would seem to be a straightforward process: If one meets the standards set forth by the institution, that student gains entry; if one does not meet the standards, that student does not gain entry. This simplistic view leaves little reason to offer remedial courses, yet the practice of admitting students who are not college ready is a practice that is presently utilized and deeply rooted in the past. It would seem that the ability to admit and remediate students who are borderline college eligible yet not college ready, but can afford to pay tuition, has been a contributing factor of financial stability for post-secondary institutions (Cohen, 1998; Rudolph, 1990). Phipps (1998) argues that remedial education is very much in the eye of the beholder. Remediation is not based on a uniform set of standards; rather, it is often determined by the admissions requirements of a particular institution (Bettinger & Long, 2009).

Higher education institutions could turn away students who are not ready for the rigors of college, but as Phipps (1998) and Bettinger and Long (2009) have found, eligibility for remedial courses is often in the eye of the beholder, which provides for flexibility when admitting students. The practice of admitting students who are borderline college eligible and/or not college ready would undercut admission gates, but given that nearly 700 colleges closed due to financial reasons before the Civil War (Rudolph, 1990), it is understandable that colleges were looking for ways to increase enrollment in order to improve their financial stability. This necessity led to the practice of admitting students based on their ability to pay and not on their academic acumen (Cohen, 1998). With survival on the line, most colleges chose to address the readiness challenges of their admitted students. Higher education's response to this challenge was the creation of "conditional" admission for students who did not possess the skills to pass credit in college-level courses and "preparatory programs" to provide the necessary instruction. Preparatory programs were viewed

as secondary schools within postsecondary settings, which provided “preparation” to new college students who lacked basic competencies in subjects including reading, writing, and arithmetic (Boylan & White, 1987; Cohen, 1998; Rudolph, 1990). The University of Wisconsin was credited with forming the first formal preparatory program; reading, writing, and math were the first subjects offered in the program (Brier, 1984). Such programs allowed colleges to admit more students, which aided in making their intuitions financially viable (Brier, 1984). Students who enrolled in preparatory programs often took six years to complete their studies.

The criteria that determine whether a student needs remedial courses can vary from one institution to another; however, a number of common characteristics are usually present across post-secondary institutions. Post-secondary institutions usually utilize standardized college admissions exams, such as the SAT or ACT, with a cut-off score to determine whether a student will be placed into one or more remedial courses (Jimenez, Sargrad, Morales, & Thompson, 2016). Common characteristics of remedial courses include content or coursework that is below college-level, does not earn graduation credit, and focuses on math and/or English Language Arts (ELA). These courses are offered in order to provide a bridge to academic competencies needed to earn a “C” or better in credit-bearing college courses (Complete College America, 2012; DiPerna & Elliot, 2000; Jimenez, Sargrad, Morales, & Thompson, 2016).

Unfortunately, evidence suggests that little progress has been made in the area of college readiness over the past 400 years. Present trends do not seem to differ from those of the eighteenth and nineteenth centuries. Casazza (1990) found that by the late nineteenth century, half of admitted Harvard students were considered “conditional” and required some form of preparation or remediation. Chen and Simone (2016) found that presently 68 percent of first-year college students who enter a two-year college enroll in at least one remedial course, while 40 percent of

students entering four-year colleges enroll in at least one remedial course. In addition to the percentage of students enrolling in remedial courses staying relatively the same from the 1700s to the present day, late graduation (i.e. taking more than four years) for students enrolled and not enrolled in remedial courses continues to be an unsolved issue (Boylan & White, 1987; Chen & Simone, 2016).

### **2.3 College Admission Uniformity: The Change Agent for High School**

If American colleges had remained unchanged from their colonial roots, preparatory schools could have kept their focus on classical languages and the articulation between secondary and post-secondary schools would not have become so complicated. Colleges began to deviate from the Elizabeth Statutes in the latter part of the 1700s (Kraus, 1961), which allowed colleges to offer more subjects and expand content within the classical course offerings found in colonial colleges. In 1862, the Morrill Act provided a platform for states to create land grant colleges, which had to include the teaching of military tactics, agriculture, and the mechanical arts in addition to traditional classical studies (Library of Congress, 2017.)

The increased number of subjects offered at colleges, along with an increase in the number of colleges (with their individual admissions expectations), made preparing students for college increasingly complicated (Cafarella, 2014; National Center for Public Policy and Higher Education & Southern Regional Education Board, 2010). In colonial times, the main focus for high schools was to educate students who were not college bound (Broome, 1903). With the increase in subject offerings and an expansion in classical content, preparatory charter schools were not able to consistently prepare college-bound students (Broome, 1903). As Broome (1903)

highlights, preparatory charter schools became increasingly unable to keep pace with the changing expectations of what students needed for college readiness, and high schools became the main vehicle for educating *both* college- and non-college-bound students. Once this two-pronged purpose of educating both college- and non-college bound students was established, high schools struggled to strike a balance in readying students with the academic competencies needed after high school.

## **2.4 Education Standards and College Admissions: Back to the Future for Uniformity**

In 1892, the National Educational Association created the Committee of Ten to address the issue of college readiness (Broome, 1903; Mirel, 2006). The Committee of Ten argued that certain “educational principles” should underlie secondary instruction, such as teacher training for secondary teachers; liberal education in math, English, foreign language, history, and science for all students regardless of whether they were college bound; and making secondary school a six-year program (Broome, 1903; Ravitch, 1985.) Without these educational principles, the committee felt that the goal of addressing the college readiness gap would collapse.

In an effort to create such “educational principles,” state standards were created (Klein, 2014). Nearly a century after the Committee of Ten made their recommendations, and six years after “A Nation At Risk” was released in 1983, a two-day national educational summit, which included 49 governors and the president of the United States, convened (Klein, 2014). The goals of the 1989 educational summit were that all children will start school ready to learn; graduation rates will increase to 90 percent; students will demonstrate competency in core subjects in grades four, eight, and twelve; and the United States would lead the world in mathematics and science by

the year 2000. The goals set during the 1989 summit led to the creation and implementation of new educational standards (Klein, 2014). As a state right, each individual state manages its own education system. In an effort to achieve the six goals from the 1989 education summit, the Commonwealth of Pennsylvania initially created and adopted educational standards for K-12 in 1999. Currently, Pennsylvania is one of 41 states that adopted the Common Core Standards (Common Core State Standards, 2018) in 2010, which then led to the PA Core Standards (PA Core Standards, 2018).

Pennsylvania adopted the PA Core Standards in 2010 (Pennsylvania Department of Education, 2013). The PA Core Standards are based on the Common Core, which was the result of a multi-state effort in 2009 to address the lack of consistency regarding graduation standards and proficiency from one state to another (Development Process, 2018). Both the Common Core and the PA Core share the goal of equipping students with academic competencies needed to pass college-level courses. The PA Core's main focus is to "define the knowledge and skills students should have within their Kindergarten through grade 12 educational experience so that they will graduate high school able to succeed in entry-level, credit-bearing academic college courses..." (Pennsylvania Department of Education, 2013).

Pennsylvania is aligned with the Common Core through the creation and adoption process of the PA Core, which took place in 2010. The spirit of the Common Core has not changed the actual graduation requirements articulated in the PA Code. According to PA Code 57.31, students in grades nine through twelve complete 120 hours of instruction in the following 21 units of credit: four credits of English, three credits of mathematics, three credits of science, three credits of social studies, two credits of arts and/or humanities, one credit of health and physical education, and five additional credits that are locally approved for graduation, which can include vocational education.

Districts are responsible for designing curriculum and planned instruction that allow students to attain the PA Core Standards (PA Code 4.12, 2018). Even though the required courses are mandated to be aligned to the PA Core, the quality and requirements of each course still vary from school to school and even from classroom to classroom. Given this inconsistency, fulfillment of PA Core requirements may not be as useful of an indicator of college-readiness.

Variances in requirements not only exist between classrooms but are also apparent between states as well. Other educational systems such as Delaware, Tennessee, and the District of Columbia approach college readiness differently. The Delaware Department of Education requires students to complete high-level courses such as Algebra II, Biology, and world languages. In an effort to expand their scope beyond academia, Delaware requires all students to take and pass three credits in the area of career pathways (Delaware Department of Education, 2018). The standard District of Columbia Diploma requires students to complete four math credits, three of which must be Algebra I, Algebra II, and Geometry; four science credits, three of which must be lab courses; two world language credits; and half credits in art and music (District of Columbia Department of Education, 2018). If a student in the District of Columbia wants to earn a “Diploma of Distinction,” that student must complete an additional two credits of a world language. Students enrolled in a career and technology/vocational-technical school in the District of Columbia must complete the standard diploma requirements along with courses in a single career cluster pathway, as delineated by the National Association of State Directors of Career and Technical Education Consortium. Tennessee students must earn 22 credits in the areas of math, English, science, social studies, physical education, foreign language, fine arts, personal finance, and electives (My Tennessee Public Schools, 2018). In math, students must earn four credits, three of which must be Algebra I, II, and Geometry, with the fourth credit a math deemed higher than the



aforementioned courses. In science, students must earn three credits, which must include Biology, Chemistry or Physics, and a third lab course. The foreign language and fine arts requirement for students may be waived if a student is not going to university (My Tennessee Public Schools, 2018). Delaware, Tennessee, and the District of Columbia appear to utilize ideas proposed by Miller and Mittleman (2012), which state that college readiness is best attained through exposure to high level courses such as Algebra II, science courses with labs, and Advanced Placement courses.

## **2.5 College Readiness Indicators (CRI): An Imperfect Science**

College readiness indicators (CRIs) are used by admission officers to determine whether students possess the academic competencies and knowledge to succeed at their respective institutions. Each institution may differ in regard to the indicators utilized and the levels of expectations within the indicators to determine whether a prospective student will be accepted. Some of the most common indicators utilized in the admissions process are high school grade point average (HSGPA); high school transcripts (HST); and standardized test scores, such as the SAT, PSAT, or ACT (Admissions Decisions: What Counts, 2017; Bridgeman, Pollack, & Burton, 2008; Wiley, Wyatt, & Camara, 2011).

Before delving into the multiple CRIs utilized to determine the readiness of prospective college students, a major point needs to be articulated. Leading researchers in the field of college readiness, regardless of their area of concentration (i.e., HSGPA, standardized tests, high school transcripts, or academic competencies) agree that multiple indicators provide the most accurate insight when determining college readiness (Bridgeman, Pollack, & Burton, 2008; Conley, 2012;

Mattern et al., 2014; Wiley, Wyatt, & Camara, 2010). Indicators have been added over time in an effort to improve insight and accuracy when identifying college-ready students. Even though researchers emphasize the importance of multiple measures, many studies attempt to highlight a single indicator that best predicts college readiness. Examples of these attempts can be seen in the comparison between the predictability of future performance based on HSGPA versus standardized tests results, or whether the number of high-level courses taken better predicts college readiness than standardized test scores, or whether academic competencies better predict how a student will perform after high school than a student's HSGPA (Bridgeman, Pollack, & Burton, 2008; Conley, 2012; Mattern et al., 2014; Wiley, Wyatt, & Camara, 2010). Currently, most colleges use college eligibility indicators, while minimizing or all together ignoring college readiness indicators, when deciding whether to admit a student. College admission offices set criteria that prospective students must meet or exceed in order to gain entry. The criteria utilized to vet students are normally college eligible indicators such as HSGPA and assessment scores (SAT and/or ACT). College eligibility indicators provide insight into the level of knowledge a student has obtained in a certain area or a number of areas but provides very little insight into how the level of knowledge was obtained. However, college readiness indicators provide insight into the "how" by examining areas such as self-discipline, study skills, and approaches to learning. For the purpose of this literature review, each indicator will be discussed individually.

### **2.5.1 College Eligibility Indicator (CRI): High School Grade Point Average (HSGPA)**

High school grade point average (HSGPA) is one of the most common indicators utilized to determine a student's college readiness (Bromberg & Theokas, 2016; Conley, 2007b; Geiser & Santelices, 2007). HSGPA can signify whether a student has mastered high school content.

According to the National College and Career Readiness Indicators (2017), a 2.8 is the lowest HSGPA that signifies readiness, while Bromberg and Theokas (2016) argue that the HSGPA threshold should be 2.5. Both the National College and Career Readiness Indicators and Bromberg and Theokas (2016) further state that the letter grade of “B” is the lowest grade a student can receive to signify college readiness. Many researchers argue that HSGPA is the best predictor of whether a student will be successful in college (Bromberg & Theokas, 2016; Geiser & Santelices, 2007; Hodara & Cox, 2016). Geiser & Santelices (2007) further argue that HSGPA also seems to have a less adverse impact on underrepresented minorities compared to other indicators such as standardized tests; HSGPA also communicates other unique information about a student’s academic competencies, such as motivation and academic tenacity (Dweck, Gregory, & Cohen, 2014). It is important to note that when utilizing HSGPA as a predictor of college success, a student must enter college within a year of high school graduation (Hodra & Lewis, 2017). If a student does not enroll in college within a year of high school graduation, standardized test scores become just as predictive as HSGPA (Hodra & Lewis, 2017).

Geiser and Santelices (2007) found that HSGPA accounted for 20.4 percent of explained variance in predicting cumulative fourth-year college GPA at the University of California. By itself, HSGPA had the highest explained variance out of any other predictor of college success, which included SAT I, SAT II, family income, and parents’ education (Geiser & Santelices, 2007). At the University of California, the average freshman had a HSGPA of 3.52, but at the end of freshman year, the average GPA was 2.97. From sophomore year to senior year, student GPA gradually increased each year from 2.97 to 3.07 by the senior year (Geiser & Santelices, 2007). Similarly, Hodra & Lewis (2017) found that HSGPA explained 9 to 18 percent of the variance in

college course grades among urban students, and 7 to 21 percent for rural students in math and English grades.

### **2.5.2 College Eligibility Indicator (CRI): Academically Rigorous Courses**

High school grade point average (HSGPA) can provide insight into a recent high school graduate's college readiness (Bromberg & Theokas, 2016; Geiser & Santelices, 2007; Kowarsky, Clatfer & Widman, 1998). A number of researchers agree with that premise but argue that greater insight into the level of college readiness can be gleaned from considering the level of rigor, which applies to standards of performance a class requires, versus the grade earned (Adelman, 1999; Adelman, Daniel, & Berkovits, 2003; Wyatt, Wiley, Camara, & Proestler, 2011).

When examining high school transcripts, Wyatt, Wiley, Camara, & Proestler (2011) found that students who completed a core curriculum (four years of English, three years of math, three years of natural science, and three years of social science or history) scored higher on ACT composite and subject tests. On average, composite test scores were 2.5 to 3.1 points higher than the scores of students who did not take a core curriculum. Similar ranges of higher scores for core curriculum or more (e.g., additional core coursework, advanced placement courses, honors courses, and the like) curriculum completers are noted for each subject test: English (2.8 to 3.5 points), reading (2.4 to 3.0), mathematics (2.6 to 3.0), and science (2.2 to 2.7) (Wyatt, Wiley, Camara, & Proestler, 2011). Adelman (1999) argues that of all pre-college curricula, the highest level of math course completed provides the greatest insight into whether a student will successfully earn a degree: If a student finishes a course beyond Algebra II, such as trigonometry, calculus, or statistics, that student is twice as likely to earn a degree than a student who does not complete a course beyond Algebra II. Other researchers support this claim by citing the inverse

of Wyatt, Wiley, Camara, & Proestler (2011); they find a negative relationship between the level of rigor experienced in high school and remediation in college, meaning the less rigor a student was exposed to in high school, the lower the standardized test scores and the more likely that student would have to enroll in a remedial course (Adelman, 1999; Adelman, Daniel, & Berkovits, 2003).

### **2.5.3 College Eligibility Indicator (CRI): Standardized Tests**

Popham (1999) defines a standardized test as an assessment that is “administered and scored in a predetermined, standard manner” (para. 3). Two major categories of standardized assessments exist: aptitude and achievement tests (Popham, 1999). For this review, the focus will be on aptitude tests, such as the SAT, PSAT, and ACT, which are designed to predict how well a person will perform in an educational setting. Camara and Michaelides (2005) argue that because standardization does not exist among grades from state to state, school to school, or course to course, standardized assessments should be utilized in determining college readiness. A study conducted by College Board found that the SAT is a reliable predictor of college success. According to the study, both HSGPA and SAT scores were identical for college freshman grade point average.

College Board created college and career readiness benchmarks for their standardized tests (i.e., SAT, PSAT, and ACT). The benchmarks for SAT scores are a result of a validity study conducted in 2015 that examined SAT scores, HSGPA, and freshman year grade point average. According to College Board, students who meet or exceed benchmarks in both math and writing have a 75 percent chance of earning at least a “C” in their respective courses during the first semester of college (The Redesigned SAT, 2015; Understanding Your PSAT Scores, 2018).

#### **2.5.4 College Readiness Indicator (CRI): Academic Competencies**

College readiness is the preparation a student needs to succeed without remediation. Success in this context can be understood as passing a course with a level of understanding that allows a student to take the next sequential course (Conley, 2007a). Do HSGPA, college entrance exam scores, and high school transcripts provide the type of data needed for admission officers to identify college eligible students who possess the skills needed to be successful in college? Current remedial and graduation rates would suggest that HSGPA, college entrance exam scores, and high school transcripts do not offer the information needed to identify students who will succeed in college. A growing body of research suggests that the behaviors or habits of students, or students' academic competencies, offer greater insight into college readiness than traditional measures (Conley, 2007a, 2007b; Gonyea, & Kinzie, 2015; Mueller & Oppenheimer, 2014; Villarreal & Martinez, 2018.).

Academic competencies can be defined as “a multidimensional construct consisting of the skills, attitudes, and behaviors of learners that contribute to success in the classrooms” (DiPerna & Elliott, 2002, p. 294). Academic competencies can include but are not limited to such skills, attitudes, and behaviors as time management, short-term and/or long-term goal setting, hypothesizing/theorizing, analyzing, being aware of how one learns, persistence, self-monitoring, and problem formulating (Conley, 2012; Conley & French, 2014; Coutinho, 2007; Horn & Carroll, 2001; Lombardi, Sebrun, & Conley, 2011; Lombardi, Conley, Sebrun, & Downs, 2012). One impetus for this body of research is the observed misalignment between students who are college eligible and accepted into college but are not college ready (Conley, 2005).

## 2.6 Goal Setting

A number of researchers have identified different competencies that could bring about alignment between college eligibility and college readiness. One of these competencies is the ability to set goals. Setting goals, both long-term and short term, monitoring those goals, and creating a process to achieve one's goals is one of a number of variables highlighted as key to college readiness.

Conley (2012), Lombardi et al. (2011), and Lombardi, Sebrun, and Conley (2011) agree that a key variable to college success is the ability to set long-term and short-term goals, understanding or creating the process needed to achieve long-term/short-term goals, and tracking progress towards those goals while addressing gaps in skills and knowledge along the way. Conley and French (2014) argue that academic goal setting provides a certain amount of ownership over the process of one's learning. Regardless of whether the goals are long term or short term, creating and monitoring goals while addressing gaps in skills and knowledge along the way illustrates a level of engagement with content that can create levels of understanding needed for success in college coursework. Lombardi, Sebrun, and Conley (2011) argue that setting goals is important, but argue that goal-driven behaviors such as persistence, study skills, and self-monitoring are equally important. Lombardi, Sebrun, and Conley (2011) highlight a number of examples of goal-driven behaviors such as taking notes while reading, analyzing test questions to create strategies, creating to-do lists, and identifying resources needed to complete a specific task. As the aforementioned researchers have highlighted, one stand-alone variable, such as goal setting, does not guarantee college success; multiple variables working together lead to not only the achievement of personal goals but college success as well.

Long-term and/or short-term goals that lead to goal-driven behaviors can lead to success in college, but so can the creation of performance and mastery goals. According to Livingston (1997), metacognition is comprised of higher order thinking and control over the thinking process. The way one controls the thinking process is by setting goals, creating a thinking process, utilizing appropriate skills/strategies, and tracking one's progress toward those goals (Castelló & Monereo, 2005; Coutinho, 2007; Dunslosky & Thiede, 1998; Livingston, 1997). Coutinho (2007) divides academic goals into two categories: performance goals and mastery goals. Performance goals center on assessment scores (Elliot & Dweck, 1988) and encourage easier tasks that provide the best odds of high scores on assessments (Cutinho, 2007). Mastery goals are characterized not by a score but by the drive to obtain comprehensive knowledge or control over the task, skill, etc. (Elliot & Dweck, 1988). Mastery goals are usually applied in difficult or challenging tasks that allow for improved performance over time (Elliot & Dweck, 1988). According to Cutinho (2007), students who utilize or favor "mastery" goals over "performance" goals were more likely to succeed on tasks, score higher on assessments, and/or obtain higher GPAs. Based on expectations, how students are expected to grapple with content, and the higher levels of thinking needed or utilized in college classrooms, evidence would suggest that mastery goals and the behaviors and mindset needed to achieve those goals are more conducive to post-secondary success than performance goals.

Once goals are set, specifically mastery goals, how does one go about achieving those goals? Within the concept of metacognition, setting mastery goals is important, but arguably just as important to having goals is possessing the knowledge and strategies to create a process to fulfill that goal (Zhao, Wardeska, McGuire, & Cook, 2012). The knowledge and strategies needed to create a process that one will implement to achieve goals can be obtained in a number



of different ways, which could be contingent on any number of variables such as learning styles, prior knowledge, and preference.

## **2.7 Note Taking**

Lecture or direct instruction is still one of the most common methods of conveying information to college students (Raver & Maydosz, 2010), and note taking is one of the most common ways to record, remember, and study relevant information from lectures at later times and dates (Castello & Monereo, 2005; DiVesta & Gray, 1973; Dooley, Payne, & Robb, 2012). The act of note taking seems to be a simplistic action of recording information deemed important from the instructor, but the research provides a more complex narrative. Taking notes is a complex exercise that is contingent on a number of other skills beyond just transcribing information from the instructor (Chen, 2013; Kiewra, 1988). Variables such as the ability to listen actively, record information accurately, retrieve prior knowledge on the topic, and the ability to identify the main idea or major point the instructor is discussing can impact the quality of notes (Dooley, Payne, & Robb, 2012; Lazarus, 1991; Raver & Maydosz, 2010). Evidence suggests that a student's level of preparation for assessments, the quality of assignments, and the overall success of a student could be directly related to the quality of a student's notes (Chen, 2013; Erickson & Strommer, 1991; Lazarus, 1991; Peverly, Ramaswamy, Brown, Sumowski, & Alidoost, 2007; Raver & Maydosz, 2010).

With evidence supporting the relationship between quality of notes and student success (Boyle, 2011; Chen, 2013; Peverly, Ramaswamy, Brown, Sumowski, & Alidoost, 2007), researchers have also noted that the general quality of students' lecture notes varies widely, and in

many cases is found to be poor (Brazeau, 2006; Erickson and Strommer, 1991; Raver and Maydosz 2010). In an effort to improve the quality of student notes, many instructors began providing guided notes to students. Guided notes, which are simply instructor-provided notes pointing students to the important aspects of the content (Konrad, Joseph, & Eveleigh, 2009), were found to improve the accuracy of students' notes along with assessment scores (Chen, Teo, & Zhou, 2016; Konrad, Joseph & Eveleigh, 2009). Guided notes can come in many forms, such as handouts, PowerPoint slides, or outlines posted on the board or slide presentation. With noted improvements in student note-taking and assessment results, it would seem that some form of this strategy would be a fundamental component of everyday instructional practices.

Research on the effects of guided notes at the postsecondary level has a number of gaps. Unfortunately, studies on improvements in note-taking accuracy and assessment scores can only be found at the secondary level. Research that has attempted to study guided notes at a post-secondary level has not demonstrated sound methods, consistent results, or explicit measurement of the effects of guided notes (Konrad, Joseph, & Eveleigh, 2009; Larwin & Larwin, 2013). With a lack of evidence supporting instructor-aided notes, students still need to gain the skills to take independent notes at the college level (Conley, 2007a, 2007b; Heckman & Rubinstein, 2001). With minimal impact and a lack of evidence correlating improved student success with instructor-provided note strategies such as guided notes, evidence would suggest that students need to learn how to take accurate, independent notes (Austin, Lee, Thibeault, Carr, & Bailey, 2002; Heckman & Rubinstein, 2001; Nagaoka, Farrington, Roderick, Allensworth, Keyes, Johnson & Beechum, 2013).

## 2.8 Time

Concepts of grit, growth mindset, and the power of “yet” are some of the more prominent frameworks being applied to student learning (Duckworth, 2016; Dweck, 2014). A central theme within each of these frameworks is time. In describing grit, Duckworth (2016) defines the term as a combination of passion and long-term perseverance, which is needed to stay the course throughout the length of a challenge. In a speech on the power of “yet” and growth mindset, Dweck (2014) discusses concepts of time such as the future, praising the process, perseverance over time, and developing over time. If the development of grit and growth mindset takes time to develop, how does one develop grit and/or growth mindset over time?

Researchers such as Ukpong and George (2013) and Lahmers and Zulauf (2000) have found evidence linking increased study time and an increase in GPA. Ukpong and George find that students should study at least two to three hours daily, while Lahmers and Zulauf found evidence that each additional hour spent on studying equated to a 0.04 increase in GPA points. In the same vein, students who were successful in a desired career, job, or major logged more time studying than their counterparts (Barbarick & Ippolito, 2003; Kunal, 2008). The correlation between time spent studying and academic achievement is not universally accepted. Evidence has emerged in other studies that increased time spent studying may have had an impact student achievement, but time was one of a number of possible variables that may have impacted student achievement (Lahmers & Zulauf, 2000; Nonis & Hudson, 2010; Plant, Ericsson, Hill, & Asberg, 2005; Proctor, Prevatt, Adams, Hurst, & Petscher, 2006). Lahmers and Zulaf (2000) found that time studying and time management skills impacted cumulative GPA. Nonis and Hudson’s (2010) study revealed a relationship between time studying and a student’s study habits. Plant, Ericsson, Hill, and Asberg (2005) found that time spent studying was a strong predictor of student success

only when the quality of study and prior performance were taken into consideration. Proctor, Prevatt, Adams, Hurst, and Petscher (2006) found that factors such as concentration, anxiety, selecting main ideas, time management, and test taking strategies were attributes that set successful students apart from struggling students.

The hypothesis that increased study time equates to higher rates of student success has produced mixed results. Ukpong and George (2013) and Lahmers and Zulauf (2000) find that increased time spent on studying could have a positive impact on student performance, but other researchers have found that what was done during study time was as important as the increased study time itself (Lahmers & Zulauf, 2000; Nonis & Hudson, 2010; Plant, Ericsson, Hill, & Asberg, 2005; Proctor, Prevatt, Adams, Hurst, & Petscher, 2006; Tuan & Tu, 2013). A major influence in regards to the quality of a student's study time is technology, specifically social media (Abu-Shanab & Heyam, 2015; Rouis, 2012; Tuan & Tu, 2012). Findings on the impact social media has on students' study time and overall success are mixed. Tuan and Tu (2013) find that students utilizing Facebook were more willing to reach out and ask for help, create a support system for studying, and experience greater satisfaction at the university. Rouis (2012) finds that increased usage of social networking sites such as Facebook did not negatively impact students' GPA. Rouis further states that in addition to student GPAs not being impacted, family and social ties became stronger as a result of social media use. Rouis also finds that social media does not have a significant impact on student achievement, engagement in class/subject area, and overall satisfaction with the university. Abu-Shanab and Heyam, (2015) differ from Rouis, as they find that the higher the frequency of social media use, the lower the grades and the higher the negative impact on student achievement. Al-Menayes (2015) supports Abu-Shanab and Heyman (2015) in that social networking sites have negative impacts on student achievement. A meta-analysis

conducted by Marker, Gnambs, and Appel (2018) shows that social networking sites' impact is contingent on how it is utilized. If utilization was during test preparation or assignment completion, the correlation was negative, but if the social network site was used for academic purposes, a positive correlation was present.

Overall, the evidence points to time as a factor related to student achievement (Lahmers & Zulauf, 2000; Ukpong & George, 2013). What is debatable is how much time matters in trying to determine what separates successful students from struggling students. Evidence suggests that there is not a single stand-alone time management variable that determines student success, but, rather, that a number of variables are connected (e.g., amount of time spent studying, how one studies, prior success) that provide insight into a student's level of success (Lahmers & Zulauf, 2000; Nonis & Hudson, 2010; Plant, Ericsson, Hill, & Asberg, 2005; Proctor, Prevatt, Adams, Hurst, & Petscher, 2006).

## **2.9 Study Skills: Deliberate Practice**

Taking notes, increasing study time, utilizing technology, and study settings play varying roles in a student's academic success. But as evidence has suggested in previous sections, how students take notes, how accurate a student's notes are, how students spend their time studying, and how technology is utilized are equally important

In most cases, individuals begin a regimen of effortful activities called *deliberate practice*, which are designed to optimize improvement (Ericsson, Krampe, & Tesch-Römer, 1993). The evidence on deliberate practice is somewhat mixed in explaining the end result, which is mastery. The concept of "mastery" is understood in many different ways. For professionals in the

workforce, mastery is judged by length of experience, reputation, and perceived mastery of knowledge and skill (Ericsson, 2008). In education, mastery may require a demonstration of essential knowledge and skills measured against standards or benchmarks (Lipsky & Cone, 2018). In these definitions of mastery, the end result or final product is articulated, but what role does deliberate practice have in the process of *achieving* mastery? Ericsson et al. (1993) studied master performers in chess and music and found that master performers had logged thousands more hours of deliberate practice than less accomplished performers. In a more recent study, Platz, Kopiez, Lehmann, & Wolf, (2014) conducted a meta-analysis for the purpose of quantifying the impact deliberate practice has on skills acquisition. Platz et al. (2014) found that in regard to new skill acquisition, a 61 percent correlation existed, meaning that deliberate practice was 61 percent responsible for the individual acquiring the new skill, which means that the other 39 percent was due to other factors. Since Ericsson et al. (1993), and Platz et al. (2014), a number of studies have revealed evidence that challenges the impact deliberate practice may have on acquiring mastery. Gladwell (2008) takes the Ericson (1993) study a step further by asserting that an individual needs to log at least 10,000 hours of deliberate practice in order to become world class. In addition to 10,000 hours of deliberate practice, Gladwell (2008) cites other factors such as available resources, cognitive ability, and a number of other variables that play varying roles towards a person acquiring mastery. Campitelli and Gobet (2011) support Gladwell's (2008) claims that deliberate practice is an important function in acquiring mastery but so are other variables such as cognitive ability, season of birth, and handedness. Hambrick, Altmann, Oswald, Meinz, and Gobet, (2014) argue that Platz et al.'s (2014) correlation is too high and that deliberate practice only accounts for about 33 percent of new skills acquisition.

Sixty-one percent, 33 percent, or somewhere in-between, deliberate practice is important when trying to acquire new knowledge or a new skill. Students need to be able to identify their weaknesses, utilize strategies or interventions to strengthen their weakness, and evaluate the effectiveness of the strategies or interventions. At first glance this may seem like a process beyond a student's means, but schools have been utilizing the process of deliberate practice for a number of years. This process can be found in programs such as Response to Intervention (RTI), which utilizes a scientific method approach, (i.e. multiple measures beyond IQ) for identifying students for special education services (Mandlawitz, 2007). The goal of RTI was to conduct a baseline screening of every student, the results of which would provide insight into student challenges and allow educators to react and intervene appropriately. Interventions and practice were based on the weaknesses identified in the baseline assessment. The newest iteration of RTI is called Multi-tier System of Supports (MTSS). MTSS shares a number of aspects with RTI in that students are screened and, based on the results of the screenings, interventions are implemented. MTSS deviates from RTI in that RTI's main purpose was academic monitoring, whereas MTSS monitors both a student's academics and social and emotional well-being (Bender, 2009). Regardless of whether the specific purpose of deliberate practice is on the skills acquisition process, the fundamental technique of identifying a weakness, practicing to address the weakness, monitoring progress, and starting the identification process over again is a cornerstone in skills acquisition and mastery.

## 2.10 Self-Discipline

Zimmerman and Kitsantas (2014) define self-discipline as the “processes that learners use to activate and maintain cognitions, emotions, and behaviors to attain personal goals” (p. 145). In addition to managing cognition, emotions, and behaviors in order to attain goals, self-discipline allows learners to create their own feedback loops, which provide learners the autonomy to evaluate their effectiveness and to adapt their functioning. Evidence suggests that the attribute of self-discipline is an important variable in order to achieve challenging goals, but how much of an impact does this attribute play in academic success?

Intellectual strengths such as memory and abstract thinking, along with non-intellectual strengths such as self-regulation, drive, and self-discipline contribute to a student’s academic success (Duckworth & Martin, 2005). Duckworth and Martin’s research attempted to uncover the impact self-discipline has on student achievement. They found that self-discipline was a better predictor of student achievement than IQ. In addition to predicting student achievement, self-discipline was a better predictor of which students were more likely to improve their grades over time.

Jung, Zhou, and Lee (2017) support the findings of Duckworth and Martin and find that self-discipline has a mediating impact on academic grades. Duckworth, Grant, Loew, Oettingen, and Gollwitzer (2011) conducted a study on mental contrasting, which is a strategy to help improve self-discipline by identifying the process and actions needed to achieve a goal. The study found that students who utilized the mental contrasting strategy completed 60 percent more practice problems than their counterparts who did not utilize the mental contrasting strategy. Zimmerman and Ktsantas (2014) somewhat support the idea that self-discipline is an important variable, but not the most important variable, when examining student achievement or trying to predict student



success. Zimmerman and Kitsantas (2014) identify self-regulatory behaviors as having more of an impact on achievement and predicting future achievement. It should be noted that Zimmerman and Kitsantas include self-discipline as part of their self-regulatory definition in the study.

Self-discipline is an important attribute in attempting to understand student achievement. The results of these studies would suggest a possible reason why students who are college eligible fall short of their academic potential. In keeping with the theme of not relying on a stand-alone variable for future success, it seems that the attribute of self-discipline, among others, has a role to play in students' academic success.

## **2.11 Summary**

One of the major objectives of secondary schools has been to ready prospective students for the rigors of post-secondary academia. Although a difficult task, laws such as the Elizabeth Statutes and mandated uniform admission requirements provided a stable set of standards that guided what college readiness and college eligibility meant for practitioners at the secondary level. The difficulty of readying students for the rigors of post-secondary education began to increase during the mid-nineteenth century. A number of factors contributed to the increased difficulty in achieving college readiness, such as expanding course requirements, new levels of autonomy for post-secondary institutions, and demands for practical education in areas like agriculture and engineering, which ultimately led to the detrition of a uniform admissions criteria that all post-secondary schools had to follow. This lack of uniformity for admissions blurred the lines for practitioners at the secondary level of the content and skills students needed in order to be deemed college-ready and college-eligible. The lack of uniformity meant individual post-secondary

institutions determined what college readiness and eligibility looked like, which translated to multiple targets and expectations that practitioners at the secondary level had to meet.

College readiness became such an issue during the late nineteenth and early twentieth centuries that regional and national committees were created with the purpose of addressing this challenge. Members of these committees, like the Committee of Ten, argued that the best way to deal with the growing issue of students not possessing the skills and content knowledge needed for the rigors of post-secondary education was admissions uniformity similar to what was seen under the Elizabeth Statutes. Unfortunately, such uniformity was not attainable due to factors such as geography, population, and regional needs.

In the twentieth century, a different type of uniformity in admissions began to emerge. This uniformity was not based on specific content like that of the Elizabeth Statutes, but was based on a series of college-eligibility indicators such as HSGPA, standardized test results, letters of recommendation, and interviews. Uniformity among the criteria used for admissions decisions provided some structure to practitioners at the secondary level in regards to what is needed for college eligibility, but still allowed autonomy for individual post-secondary institutions to set their own eligibility standards in each category (e.g., lowest standardized test score acceptable for admission). Unfortunately, uniformity around eligibility requirements does not appear to be the answer to the deeper college readiness problem. With graduation rates hovering between 40 and 60 percent for post-secondary institutions, evidence suggests that a misalignment exists between college readiness and college eligibility.

The literature varies in regards to the key attributes that communicate college readiness and college eligibility. Colleges utilize traditional measures such as HSGPA, standardized test scores, and the types of courses taken in high school to determine college eligibility, and they may

even assume these same indicators also serve as indicators of college readiness. Yet, a growing body of research argues that the behaviors, habits, and approaches students utilize provide the most accurate picture of whether a student possess the skills needed to be deemed college ready. Understanding the behavioral attributes that communicate college readiness and the traditional benchmarks that communicate college eligibility is the central focus of this study.

### **3.0 Methods**

One of the major goals of secondary schools is to produce college-ready students. Not every student attends a post-secondary institution after graduating, but many of the characteristics that are present in college-ready students are needed in other walks of life. Secondary schools are well versed in evaluating college readiness through traditional measures such as grades (in math, English Language Arts, science, and social studies) and standardized test scores. Secondary schools, on the other hand, seem to fall short in evaluating the academic behaviors and competencies students utilize in their classes (Conley, 2007b). The review of literature in the previous chapter provides a definition of college readiness, college eligibility, traditional measures of college readiness and college eligibility, and academic competencies. This mixed methods study investigates whether a misalignment exists between college readiness and college eligibility. If a misalignment exists, this study also attempts to provide details in terms of where such misalignments exist.

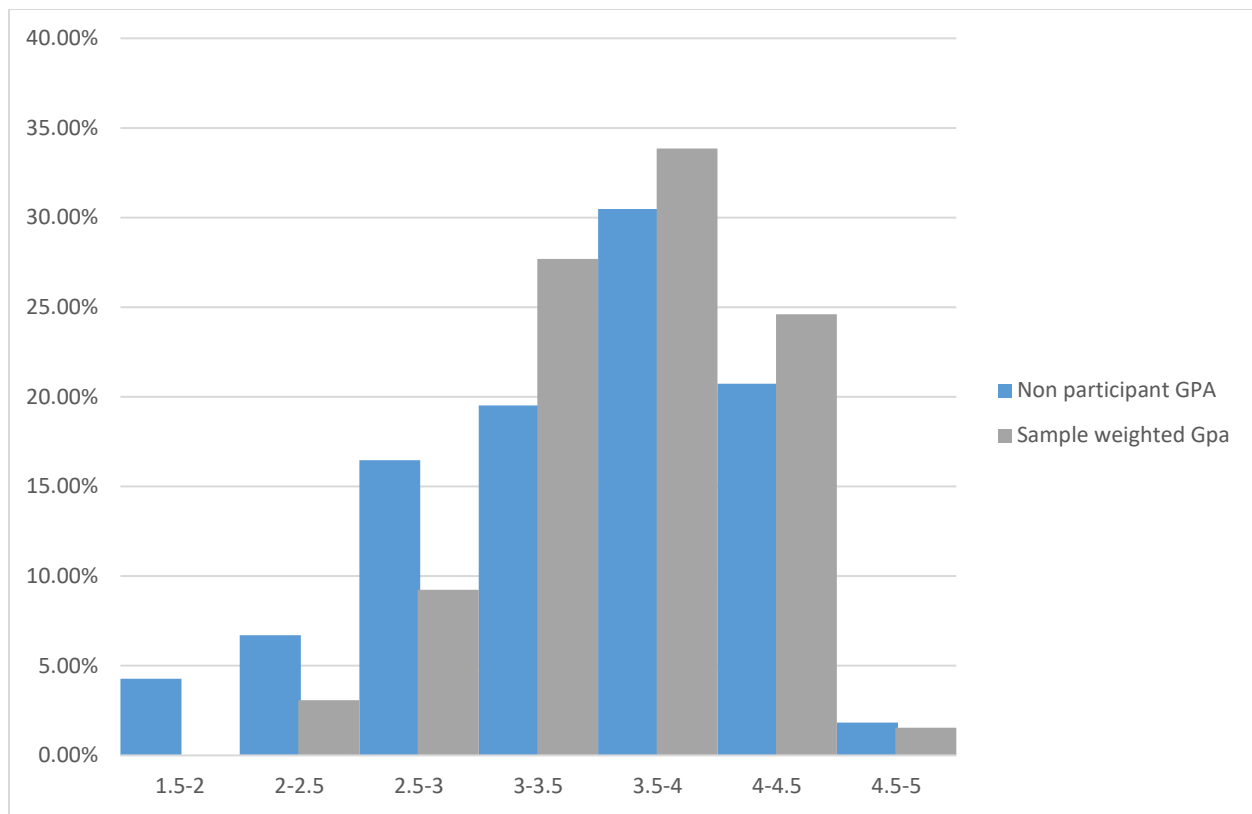
#### **3.1 Site Description**

The setting for this study is a rural senior high school in Pennsylvania, grades 9 through 12, with an enrollment of 815 students. The student population is 97.3 percent White, 0.74 percent multi-racial, 0.74 percent Hispanic, 0.49 percent African-American, 0.37 percent Asian or Pacific Islander, and 0.37 percent American Indian. Gilpin High School has an economically disadvantaged rate of 21 percent, which is defined as students who qualify for “Free and Reduced

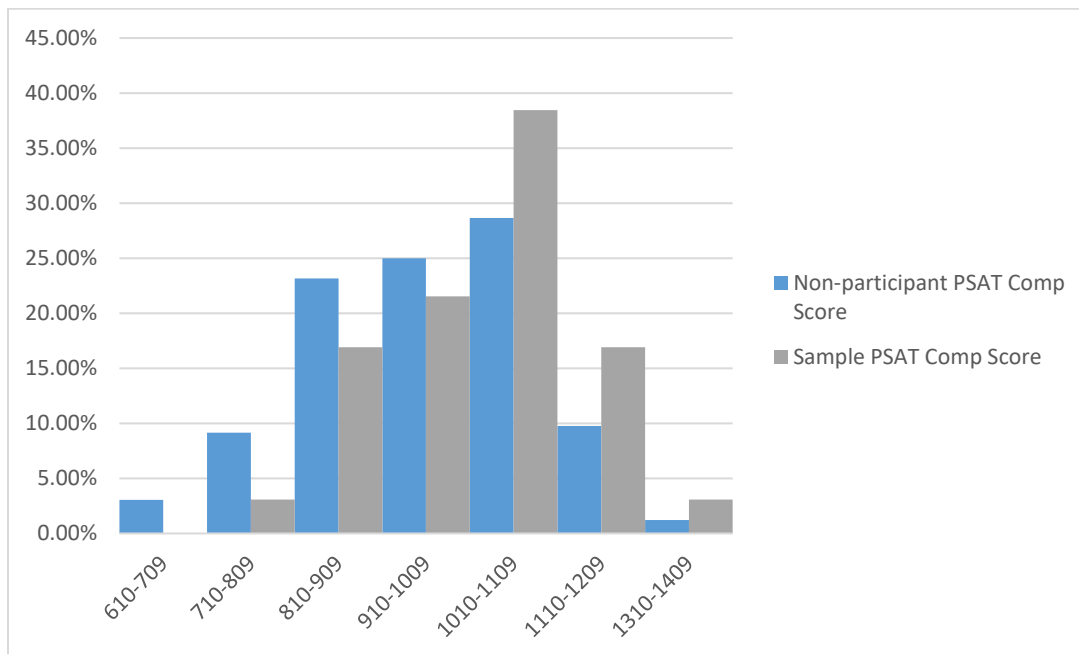
Lunch Status” set forth by the Pennsylvania Department of Education (PDE). According to PDE, a child qualifies for “economically disadvantaged” status if a child’s family’s income level is at or below 130 percent of the poverty level, receives Temporary Assistance for Needy Families (TANF), and receives food stamp benefits (Kids Count Data Center, 2018).

### **3.2 Participant Population**

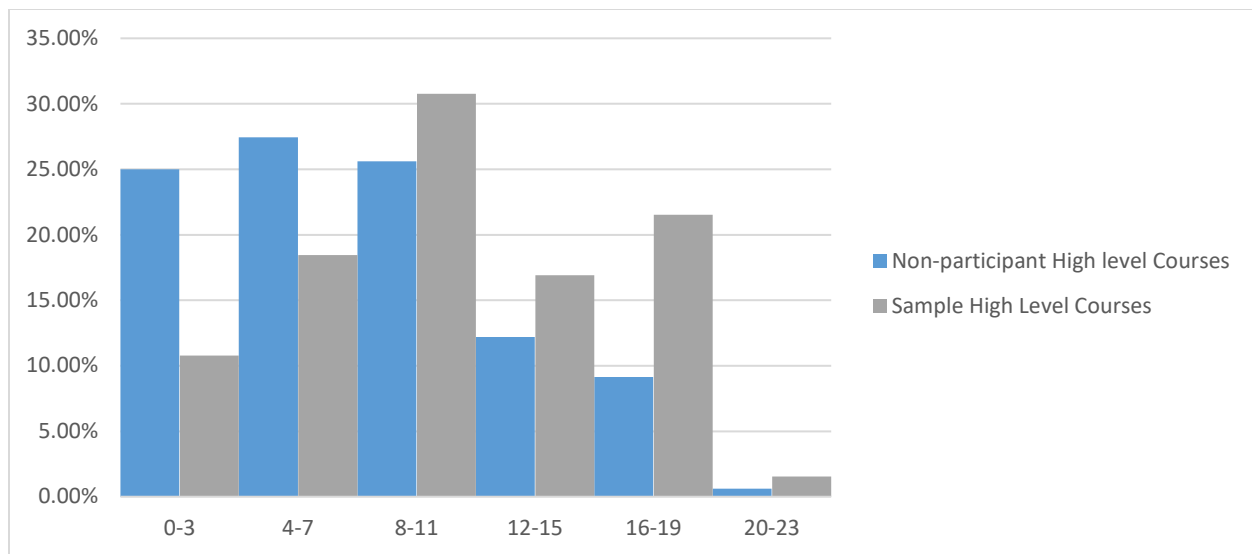
Student graduation rates over the past five years have been at or above 97 percent (Gilpin High School records). Twelfth grade students from the class of 2017-2018 enrolled in Gilpin High School are the population for this study. There were 220 students in Gilpin High School’s class of 2017-2018; complete data sets exist for 65 students. The data, which consists of high school transcripts; overall weighted GPA; overall unweighted GPA; unweighted GPA in science, math, English, and social studies; PSAT scores; number of high-level courses taken; and academic behavior survey results. The majority of students did not have a complete data set, which was due to not participating in the academic behavior survey. The following figures provide additional details regarding students who participated versus those who did not participate in this study: Figure 1: Histogram of Gilpin High School 2018 Seniors Weighted GPA, Figure 2: Histogram of Gilpin High School 2018 Seniors PSAT Composite Scores, and Figure 3: Histogram of Gilpin High School 2018 Seniors High Level Courses. The data was retrieved from the Gilpin High School’s student information system, and Qualtrics survey system.



**Figure 1. Histogram of Gilpin High School 2018 Seniors Weighted GPA**



**Figure 2. Histogram of Gilpin High School 2018 Seniors PSAT Composite Score**



**Figure 3. Histogram of Gilpin High School 2018 Seniors High Level Courses**

### **3.3 Methodology**

This is a case study that utilized a mixed methods approach to determine whether a misalignment exists between college eligibility and college readiness. This methodology was chosen to explore the possible misalignment between college readiness and college eligibility due to the site being a single high school with a sample of 65 students. Through a review of the literature, 15 variables were identified for measuring college readiness: overall unweighted GPA, overall weighted GPA, unweighted subject (math, science, English, and science) GPA, percentage of high-level courses taken, number of high level courses taken, PSAT composite score, PSAT math score, PSAT Evidence Based Reading-Writing (EBRW) score, composite academic behavior survey score, and sub-scores within the academic behavior survey (study skills, learning skills, and self-discipline). Descriptive statistics were used to analyze traditional measures, which closely

mirror how college admission offices determine college eligibility and college readiness. Analysis of academic competencies involved a student survey comprised of 21 items, all on a 1-4 Likert scale. The survey's questions are based on academic competencies that prior studies suggest lead to success for college students. The goal of the survey is to identify the academic competencies students utilized in secondary school that are conducive to success in college. Finally, a principal component analysis (PCA) was conducted on all of the variables, including all of the traditional measures and four scales created from the academic competencies survey – i.e., 15 variables in total. The goal of the PCA was to explore the relationships among all 15 variables – some traditional and some non-traditional.

### 3.3.1 High School Grade Point Average (HSGPA)

One of the most common ways colleges measure the readiness of applicants is by utilizing high school grade point average (HSGPA) through a four-point scale, for which numbers are assigned to letter grades, which in turn are added up and averaged to create a student's HSGPA. See Table 1: High School Grade Point Average.

**Table 1. High School Grade Point Average**

Letter Grade	HSGPA Point Value
A	4
B	3
C	2
D	1
F	0



It is not uncommon for secondary schools to assign weight, or a higher point value, to rigorous courses (i.e., instead of receiving a 4.0 for an A, a student may receive a 4.5) such as Advanced Placement (AP), honors courses, or higher level math. For this study, both weighted (i.e., overall Grade Point Average) and unweighted (i.e., overall Grade Point Average and core subject Grade Point Average) will be utilized.

Unfortunately, HSGPA can be deceiving as a measure for college readiness, due to the fact that every course a student enrolls in impacts a student's grade point average. Core courses such as math, English, science, and social studies play a role in impacting a student's grade point average, but so do electives such as art, music, and physical education. Evidence suggests that electives play an important role in preparing students for life beyond secondary school, but in regards to measuring college readiness based on grade point average, the literature concentrates on the core areas (Wyatt, Wiley, Camara, & Proestler, 2011). According to the literature, a benchmark of a "B" grade or higher, which is an 81 percent, or a 2.6 HSGPA or higher at Gilpin High School, signifies mastery and college readiness within that subject (Bromberg & Theokas, 2016; National College and Career Readiness Indicators, 2017). See Table 2: Gilpin High School Grading Scale.

**Table 2. Gilpin High School Grading Scale**

Percentage	Letter Grade	GPA
100-92	A	3.7-4.0
81-91	B	3.69-2.6
71-80	C	2.59-1.6
61-70	D	1.59-.67
60-Below	F	.66-0

Student grades were retrieved from the Gilpin High School student information system. Grades from social studies, science, math, and English courses were utilized to calculate an overall core grade point average (i.e., every social studies, science, math, and English course) and an individual core subject grade point average (i.e., social studies, science, math, and English received their own respective grade point averages) were calculated. Weight was not assigned to Advanced Placement (AP) or dual credit College in High School (CHS) classes for core grade point average but was included in the overall grade point average. Descriptive statistics are provided for HSGPA and core subject grade point average to provide a picture of the collective performance and how tightly or loosely clustered the population sample is. Weighted and, on a separate scatter plot matrix, unweighted HSGPA are among the variables included.

### **3.3.2 Higher Level Courses**

Enrollment in any advanced course provides students with exposure to rigorous post-secondary material while providing a platform for students to cultivate strategies on how to meet those rigors (Adelman, 1999; Wyatt et al., 2011). According to Adelman (1999), the minimum number of higher level courses a student needs for college readiness is one course; therefore, the benchmark for high level courses will be set at one course. AP and CHS courses, honors courses, Algebra II, Geometry, Trigonometry, Algebra III, Statistics, Calculus AB, Calculus BC, Chemistry, and Physics are considered high level courses for this study. (Based on the current course of studies, there are 132 courses to choose from. From those courses, 22 percent are considered to be “high level” courses, and 15 percent are considered “high level” courses in core areas.) This data was retrieved from student transcripts. Once student transcripts were examined for high level courses, descriptive statistical analysis was conducted, which include the mean,

standard deviation, and z-score of the number and percentage of high-level courses taken. Weighted HSGPA is an additional indicator of high-level courses taken. Descriptive analysis of mean, standard deviation, and z-score was conducted on the sample's weighted HSGPA. Descriptive statistics provide a picture of the collective performance and how tightly or loosely clustered the population sample is in regards to high level courses taken.

**Table 3. Higher Level Courses**

<b>English and Foreign Language</b>	<b>History and Social Science</b>	<b>Humanities and Fine Arts</b>	<b>Math and Accounting</b>	<b>Science and Technology</b>
Honors English 10	AP American History	AP Art History	Geometry	AP/CHS Computer Science
AP English Language & Comp 11	AP European History	CHS Theater: Performance Studies	Algebra II	AP Computer Science Principle
AP English Language & Comp 12	AP Macroeconomics		Algebra III	AP Chemistry
German IV			Pre-Calculus /Trigonometry	Academic Chemistry
Spanish IV			AP/CHS Calculus AB	Honors Biology
Spanish V			AP/CHS Calculus BC	AP Biology
			CHS College Accounting	CHS Web Site Design & Development
			AP Statistics	CHS Python
				Academic Physics
				AP/CHS Physics

The researcher recognizes that college admission offices normally utilize SAT and/or ACT scores. Because PSAT scores are more readily available, and because PSAT scores are comparable to SAT scores (College Board, 2018), those scores are utilized for this study. The College Board states that PSAT scores equate to SAT scores (PSAT 10 Understanding Scores, 2018). Results of the 2017-18 senior class PSAT assessments were retrieved from the school district's student information system.

The College Board provides readiness benchmarks in two areas on the PSAT: Evidence-Based Reading and Writing (EBRW) and Math (see Table 3: PSAT Benchmarks). A simple table shows the number of students who met College Board's benchmark of college readiness in Math, EBRW, and composite score. A scatter plot (figure 4 and figure 5) illustrates students' composite scores along with each student's academic behavior survey composite score in order to provide insight into the students who are college eligible but not college ready or college ready but not college eligible (PSAT/NMSQT: Your Summary Score Report, 2016).

**Table 4. PSAT Benchmarks**

<b>PSAT Section</b>	<b>College Benchmark Score</b>
EBRW	460-760
Math	510-760

### **3.3.3 Academic Competencies**

The academic behavior survey highlights three categories: study skills, learning strategies, and time management. Because academic competencies are not measured with a grade, each survey question has a four-point Likert scale to measure student's academic competencies. The

questions were handicapped on a 2 to -2 scale. The academic competency questions in the survey highlight characteristics that research indicates is important (or detrimental) to success in college. If a question is positive in nature (e.g., I set academic goals for myself), a response of “always” receives a value of 2, a response of “usually” receives a value of 1, a response of “sometimes” receives a value of -1, and a response of “almost never” receives a value of -2. If a question is negative in nature (e.g., distractions are present when I study), a response of “always” receives a value of -2, a response of “usually” receives a value of -1, a response of “sometimes” receives a value of 1, and a response of “almost never” receives a value of 2. The sum for the overall survey and each individual category was calculated. The composite score for each student is presented in a scatter plot matrix (i.e., one matrix with HSGPA, and the other matrix with PSAT composite scores), which helps to identify students who may be college eligible but not college ready or vice versa. See Appendix A: Academic Behavior Survey.

**Table 5. Major data source and benchmarks**

Exposure to high level/rigorous course work	Math (Algebra II or higher), any Advanced Placement (AP) course, and Science course with a lab.
PSAT College Readiness Benchmark	Three separate categories were examined: math, EBRW, and composite score. College readiness benchmarks created by College Board were used. Scatter Plot: randomly chosen six college SAT composite scores from schools that admit fewer than 25 percent, 26 to 50 percent, and 51 to 75 percent. The six SAT composite scores were averaged to create an X axis for college eligibility on the scatter plot matrix.
Academic Competencies survey	Likert survey seeks to uncover the academic competencies a student possesses.

High School Grade Point Average (HSGPA)	<p>Competencies are based on research in metacognition, study skills, self-discipline, cognitive strategies, and learning styles, and taken from a post-secondary perspective.</p> <p>Scatter plot: randomly chose six college GPAs from schools that admit fewer than 25 percent, 26 to 50 percent, and 51 to 75 percent. The six GPAs were averaged to create an X axis for college eligibility on the scatter plot matrix.</p>
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### 3.3.4 Principal Component Analysis

Using SPSS (v.24), a principal component analysis (PCA) was run on 15 variables, including all of the college eligibility and college readiness indicators. PCA was run in order to reveal if these variables create a single factor – in which case there may not be a distinction between college eligibility and college readiness – or whether a two-factor solution is preferred, suggesting that students might meet eligibility requirements and still not possess the academic competencies needed to be successful in college. Factors would be determined if the Eigenvalues were greater than one within the PCA. Each factor with eigenvalues greater than one was retained as a component in explaining the relationships between variables and then was interpreted by the researcher based on the score in the component matrix. A scree plot (Figure 6) was created to illustrate the number of components that best explain the relationship between the variables. Numbers of components, Eigenvalues, and percentage of variation explained are illustrated in a component matrix (Table 10).

### **3.4 Exploring Differences Between College Eligibility vs College Readiness**

Two scatter plot matrices (Figure 4 and Figure 5) were created to illustrate the categories of college eligible and college ready. The first scatter plot illustrates the relationship between strong academic behavior (a college-readiness indicator measured by the academic competencies survey) and a college-eligible HSGPA. The four quadrants represent students with strong academic behavior and an eligible HSGPA, strong academic behavior and an ineligible HSGPA, weak academic behavior and an eligible HSGPA, and weak academic behavior and an ineligible HSGPA. One question this analysis helps answer is whether college eligibility always equates to college readiness. The scatterplot illustrates combinations that should give admission offices pause, such as students who do not possess college eligible HSGPA but self-report a high college-ready score, or students who have high college-eligibility scores but self-report a low college-ready score. The second matrix utilizes academic behaviors and composite PSAT scores to create the following quadrants: strong academic behavior in the areas of self-discipline, study skills, and learning skills and an eligible PSAT composite score; strong academic behavior and an ineligible PSAT composite score; weak academic behavior and an eligible PSAT composite score; and weak academic behavior and an ineligible PSAT composite score. Academic behavior composite scores were utilized for the Y axis on both matrices. Based on the 10 most attended post-secondary schools' average student body GPA, a mean GPA was calculated for the X axis. The second matrix utilized PSAT composite scores for the X axis. Based on the 10 most attended post-secondary schools' average student body SAT score, a mean SAT composite score was calculated for the X axis.

In addition, to further explore the relationships among indicator variables for college eligibility and college readiness, a table (Table 8 in Chapter 4) was created to compare the specific

GPA, PSAT, and academic behavior results. This table illustrates the number of students from the sample who were eligible for the 10 most attended colleges, based on each college's student body profile of GPA and SAT scores. In addition to GPA and SAT scores, the table includes academic behavior scores along with whether participants possess the academic behaviors to be deemed college ready. Additional columns include the number of students who are college ready but do not have the grades and/or SAT scores to be college eligible, along with students who possess the HSGPA and SAT score to be college eligible but not the behaviors to be college ready. The mean academic behavior composite score is -.10, with a range from -42, which would indicate the lowest academic score, to 42, which is the highest academic behavior score.

### **3.5 Apparatus and Materials**

The apparatuses that were utilized for data collection include student Chromebooks, Prosoft (the high school's student information system), SPSS (statistical software), Qualtrics (the University-approved software for survey distribution), student Gmail accounts, the College Board website, and Naviance. Naviance is a college and career readiness program that districts use to aid students with college and career readiness, applying to colleges, tracking the number of students who attend college from the district, general admission criteria (i.e., average HSGPA of student body, average SAT score of student body, and percentage of students accepted); based on the aforementioned criteria, the system provides a list of schools that a prospective student may be eligible for (Connecting Learning to Life, 2018). For the class of 2018, a list of the 10 most attended post-secondary schools Gilpin students have gained entry to will be provided by Naviance. College eligibility (i.e. HSGPA and SAT or ACT scores) will be based on the student



profile Naviance provides for the list of 10 schools. Student transcripts were retrieved from Pro-Soft. The survey was distributed through Qualtrics and sent to students' school-assigned Gmail accounts to be completed on school-issued student Chromebooks. SPSS software was used for statistical analysis.

### **3.6 Limitations**

This study is limited to one high school; therefore, results may not be generalizable. Demographics is another area that poses a limitation due to the lack of ethnic and racial diversity of the population. During the survey window, not all 220 students completed the survey due to attendance or the decision to opt of the study.

In the area of GPA and course selections, participants may have had incomplete transcripts due to attending a school in other districts. Further, if student transfers had matching course names, the researcher did not utilize those scores due to the fact that grading criteria, grading scales, and expectations can differ from one district to another. Therefore, a population of twelfth-grade students who attended Gilpin will be left out of subsequent analyses because they had some form of missing data.

Making large scale changes in curriculum, teacher evaluations and/or teacher goals, professional development time, and utilization of classroom time would be challenging based on the current data set. For teacher practices, professional development, and evaluations to be modified, a more robust or detailed data set would be required. However, the current data set may be incomplete, but it does provide insight into areas that can be the focus of future evaluations, surveys, and data collection. Future evaluations in the areas of academic competencies and

performance within the traditional measures may provide the impetus needed to make modifications in the Gilpin School District so students are college ready in both the areas of academic performance *and* academic competencies.

PSAT results may also present a limitation, as some students may not have PSAT scores due to absence on the day of the test or opting out of the test. Student transfers also may not have PSAT results, as not every district mandates student participation in the PSAT assessment. If PSAT results were available for transfer students, the scores were included in the analysis since PSAT assessments are standardized.

## 4.0 Results

The 15 variables that were utilized to measure college eligibility and college readiness are listed in Table 6: Descriptive Statistics. All 15 variables are listed with mean scores and standard deviation. According to this data, the average student in the sample enrolled in just over nine high-level courses during a high school career, and has a weighted HSGPA of 3.38 and an unweighted HSGPA of 3.13, which makes that student a “B” student. The average Gilpin High School student in the sample excels in English Language Arts with a subject GPA of 3.28, while the lowest grades can be found in math, with a subject GPA of 2.7. The average academic behavior score is -.4810, with self-discipline as the strongest academic behavior at 3.79, and study skills the lowest at -4.079. The mean PSAT score was 881, with EBRW scores 28 points higher than math. Utilizing the weighted HSGPA and composite PSAT score for the average student found in the student sample, Naviance found that the average Gilpin High School student in the sample would be eligible for colleges such as Temple University, Kean University, Kent State University, Thiel College, and Montclair State University. Most of the schools the average student would be eligible for would not be considered “highly selective” or “selective.” Depending on the post-secondary institution, acceptance rates at the time of the study ranged between 50 and 85 percent. Temple University, one of the more selective schools on the list, accepts around 52 percent of applicants, while Kent State accepts around 85 percent of all applicants. In schools where an average Gilpin High School student would be eligible for admission, the six-year graduation rates exhibit a range between 42 percent and 71 percent. Thiel College has one of the lower six-year graduation rates at 42 percent, while Temple University boasts one of the higher graduation percentages at 71 percent.

**Table 6. Academic Behavior Survey**

	N	Mean	Std. Deviation	N (Non College Bound)	Non College bound Mean
Academic Behavior Scores	65	-.4810		3	-20
Learning Skills Scores	65	-.6329	5.84452	3	-12.5
Study Skills Score	65	-4.0759	6.90182	3	-10.66
Self-Discipline Scores	65	3.7975	7.64665	3	-1
High Level Course	65	9.3418	5.49099	3	6
Percentage of High Level Courses	65	.7908	5.56909	3	17%
Unweighted GPA	65	3.1301	.93492	3	3.133
Weighted GPA	65	3.3835	1.03222	3	3.42
Unweighted Math GPA	65	2.7909	.97442	3	2.386
Unweighted ELA GPA	65	3.2873	.98458	3	3.25
Unweighted Science GPA	65	3.2702	1.00498	3	3.3866
Unweighted Social Studies GPA	65	3.2744	.95836	3	3.533
PSAT Composite	65	881.3924	373.52354	3	1036.6667
PSAT Math	65	426.7089	184.08973	3	476.6667
PSAT EBRW	65	454.6835	193.89949	3	560

Based on the results of the academic behavior survey, high school students do not consistently employ the study skills, learning skills, and self-discipline recommended for successful navigation at the post-secondary level.

In the areas of study skills (activities necessary to prepare for assessments and complete assignments), the data indicate that the behaviors students utilize to navigate secondary school are not necessarily conducive to success in college. When preparing for assessments or completing

assignments, students do the bulk of their preparation the night before. Students do not utilize all available materials when studying or completing assignments; the overall goal of studying is to memorize facts. Students do not take notes or record questions for the instructor on topics they may not fully understand. When reading, studying, or completing assignments, distractions (e.g., cell phones, TV, or music) are usually present. The literature indicates that the different expectations, larger work load, and the level of thinking needed for success at a post-secondary will be difficult to meet if students utilize the same learning skills and habits from high school.

In the area of learning skills (the process utilized to acquire new knowledge or skills), the data indicate a disconnect between the types of learning skills students use for success at the secondary and post-secondary levels. Secondary students often rely on one preferred method of learning, tend to procrastinate, usually do not create a plan of action for studying or assignments, and utilize teacher-created study guides as the main source of information to study and complete assignments. The ability to take accurate notes, learn in multiple ways, write down questions for instructors, avoid procrastination, and avoid distractions while studying is paramount to a student's success in college. Based on results from the learning skills section of the academic behavior survey, evidence suggests that the learning skills needed for success in high school do not consistently mirror the behaviors needed for success in college.

Out of the three categories, students' self-discipline behaviors shared the most with the types of self-discipline needed at a post-secondary level. In this section of the survey, students indicated that they set academic goals for themselves, did not give up on assignments, felt in control of how well they learned, worked hard for good grades, and would try their best even if the content was dull or boring. Control of how well one learns, working hard for one's grades,

and not giving up regardless of how hard or dull the task, are attributes that successful college students possess.

Based on the sample's GPA and results from the academic behavior survey, evidence suggests that study and learning skills and behaviors needed for successful navigation in high school do not consistently mirror the study and learning skills and behaviors needed for successful navigation of college. However, the forms of self-discipline that students utilized to navigate high school did mirror the type of self-discipline needed for success at the post-secondary level. Overall, the data suggests that study and learning skills and behaviors may need to undergo modifications in order to limit struggles and to help students navigate post-secondary courses.

#### 4.1 Naviance: Gilpin High School Data

Naviance provided data for the 10 most attended post-secondary schools from the class of 2018 for Gilpin High School (Table 7: Naviance Post-Secondary Data). In addition to the 10 most attended post-secondary schools, the number of students, student body average GPA, student body average SAT score, and selectivity/percentage of students admitted annually are also presented in the table.

**Table 7. Naviance Post-Secondary Data**

School Name	Number of Gilpin HS students attending	Avg student body HSGPA for University/college	Avg SAT: student body composite score	Overall acceptance rate for post-secondary institution
Indiana University of Pennsylvania	23	3.37	1079	92%

Slippery University Pennsylvania	Rock of	20	3.57	1152	69%
Pennsylvania University	State	16	3.97	1242	56%
University Pittsburgh	of	13	3.97	1270	55%
Robert University (PA)	Morris	10	3.61	1171	80%
Westminster College		5	3.9	1202	74%
Clarion of Pennsylvania	University	5	3.36	1030	93%
Duquesne University		5	3.08	1220	74%
Kent University	State	5	3.7	1130	85%
Pennsylvania University Erie- Behrend College	State	5	3.45	1200	88%

Utilizing the admissions information in Table 7: Naviance Post-Secondary Data, a matrix that illustrates college readiness and college eligibility could be created. The composite academic behavior score was utilized to illustrate a student's level of college readiness. Responses were handicapped on a 2 to -2 scale. The statements in the survey highlight characteristics that research indicates is important (or detrimental) to success in college. If a statement is positive in nature (e.g., I set academic goals for myself), a response of "always" receives a value of 2, a response of "usually" receives a value of 1, a response of "sometimes" receives a value of -1, and a response of "almost never" receives a value of -2. If a statement is negative in nature (e.g., Distractions are present when I study), a response of "always" receives a value of -2, a response of "usually" receives a value of -1, a response of "sometimes" receives a value of 1, and a response of "almost never" receives a value of 2. The range of scores for the survey was -72 to 72. The sum for the overall survey and each individual category was added for an individual composite score. For a student to be college ready, a student's composite score had to be greater than or equal to "0." Based on the academic behavior score of "0" for college readiness, the results indicated that 34 out of 79 students were college ready.

The academic behavior score was utilized with HSGPA and PSAT composite scores to create Table 3 along with two separate matrices (Scatter Plot 1 and Scatter Plot 2) that illustrate students' college readiness and college eligibility. Table 3 provides the academic behavior score (a college-readiness indicator) and the individual colleges' admissions expectations for HSGPA and Composite SAT scores (college-eligibility indicators). Thus, Table 3 illustrates the number of students college ready and college eligible, college ready but not college eligible, college eligible but not college ready, and not college eligible but college ready. The scatter plots in Figure 4 and Figure 5 provide similar data, but on a more generalized level. Scatter Plot 1 (Weighted



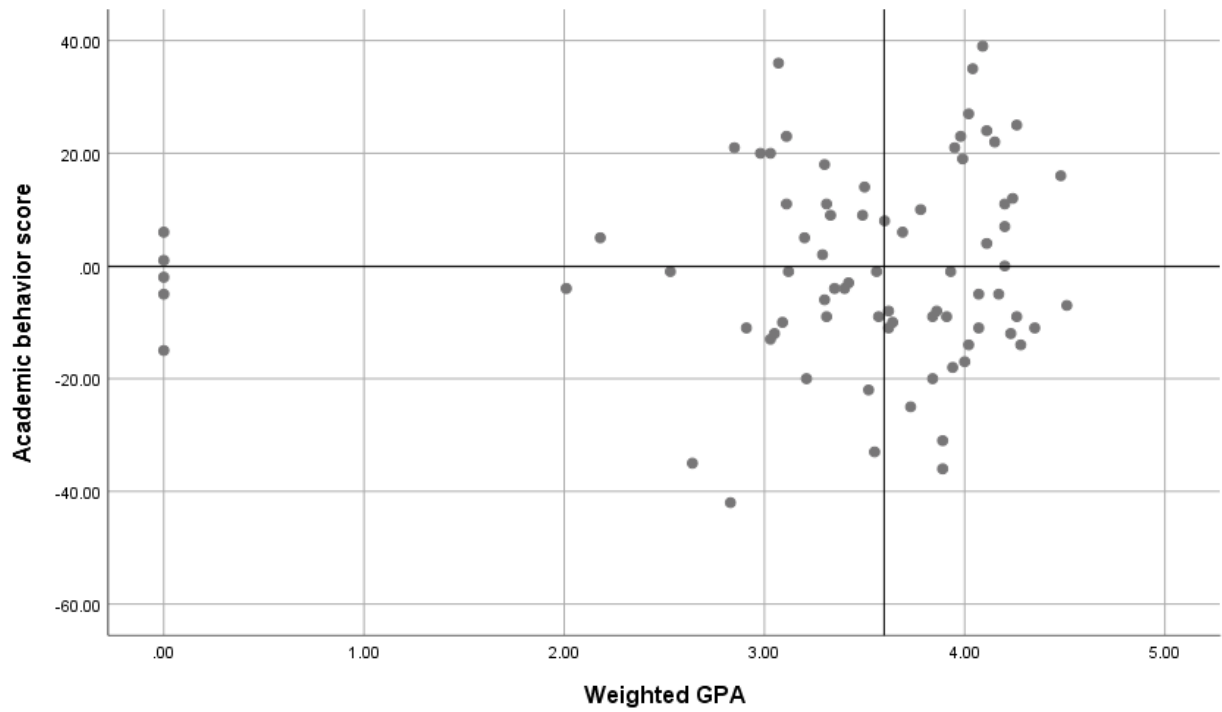
HSGPA) utilizes weighted HSGPA and academic behavior scores for the plot. The y axis, college eligibility, is the mean weighted HSGPA of the student body listed in Table 8: College Eligibility and Readiness. Scatter Plot 2 (PSAT) utilizes composite PSAT scores and academic behavior scores for the plot. The y axis, college eligibility, is the mean composite SAT score of the student body listed in Table 3: College Eligibility and Readiness.

**Table 8. College Eligibility and Readiness**

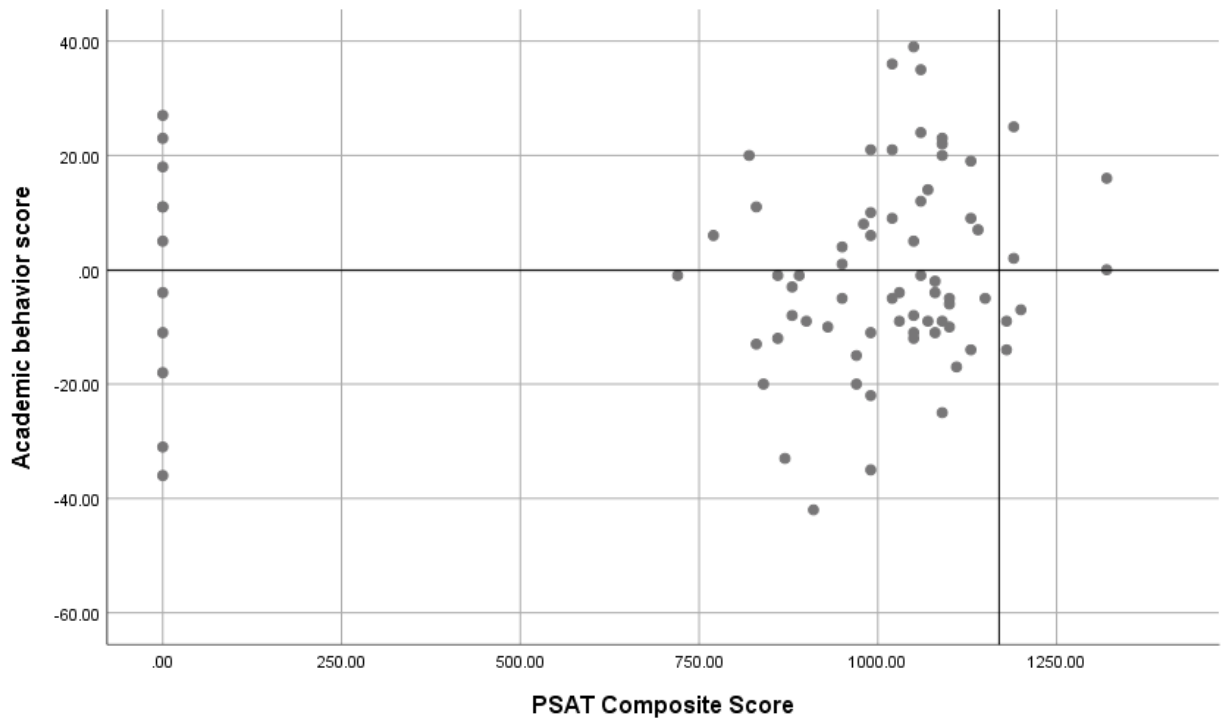
School Name	College Ready and College Eligible GPA	College Ready and College Eligible PSAT composite score	College Ready and College Eligible GPA and PSAT composite score	Not College Ready but College Eligible GPA	Not College Ready but College Eligible PSAT Composite Score	Not College Ready but College Eligible GPA and PSAT composite score
Indiana University of Pennsylvania	20	10	7	28	14	12
Slippery Rock University of Pennsylvania	18	4	3	23	3	3
Pennsylvania State University	14	2	2	10	0	0
University of Pittsburgh	14	2	2	10	0	0
Robert Morris University (PA)	17	4	4	22	3	3
Westminster College	15	2	2	13	0	0

Clarion University of Pennsylvania	20	16	12	28	21	16
Duquesne University	27	2	2	34	0	0
Kent State University	16	5	5	19	5	5
Pennsylvania State University Erie- The Behrend College	20	2	2	26	0	0

Based on the results, a population of students exist in all four quadrants of the matrices of college readiness and college eligibility based on GPA and/or PSAT scores. Based on the data in Table 8, of the 34 students who were deemed college ready, depending on the individual college or university, a range of 41 percent to 79 percent were deemed college ready and possessed a college eligible GPA. Students who were college ready and possessed both an eligible GPA and composite PSAT score ranged from 5 percent to 35 percent. Of the 45 students who were not college ready, a range of 29 percent to 75 percent possessed a college eligible GPA. Students who possessed a college eligible PSAT score but were not college ready ranged from 0 to 62 percent. Students who possessed both a college eligible GPA and PSAT composite score but were not college ready ranged from 0 to 47 percent.



**Figure 4. Scatter Plot 1: Weighted GPA**



**Figure 5. Scatter Plot 2: PSAT Composite**

## **4.2 Principal Component Analysis: Results**

The Principal Component Analysis (PCA) produced three components that describe the relationship among the 15 variables for measuring college readiness and college eligibility. Three of the components met the Eigenvalue rule of greater than one and were interpreted based on the component score matrix. The first factor explained greater than 40 percent of the variance between items, while the second and third factors explained an additional 20 percent and 18 percent of the variance, respectively (Table 9).

**Table 9. Total Variance Explained**

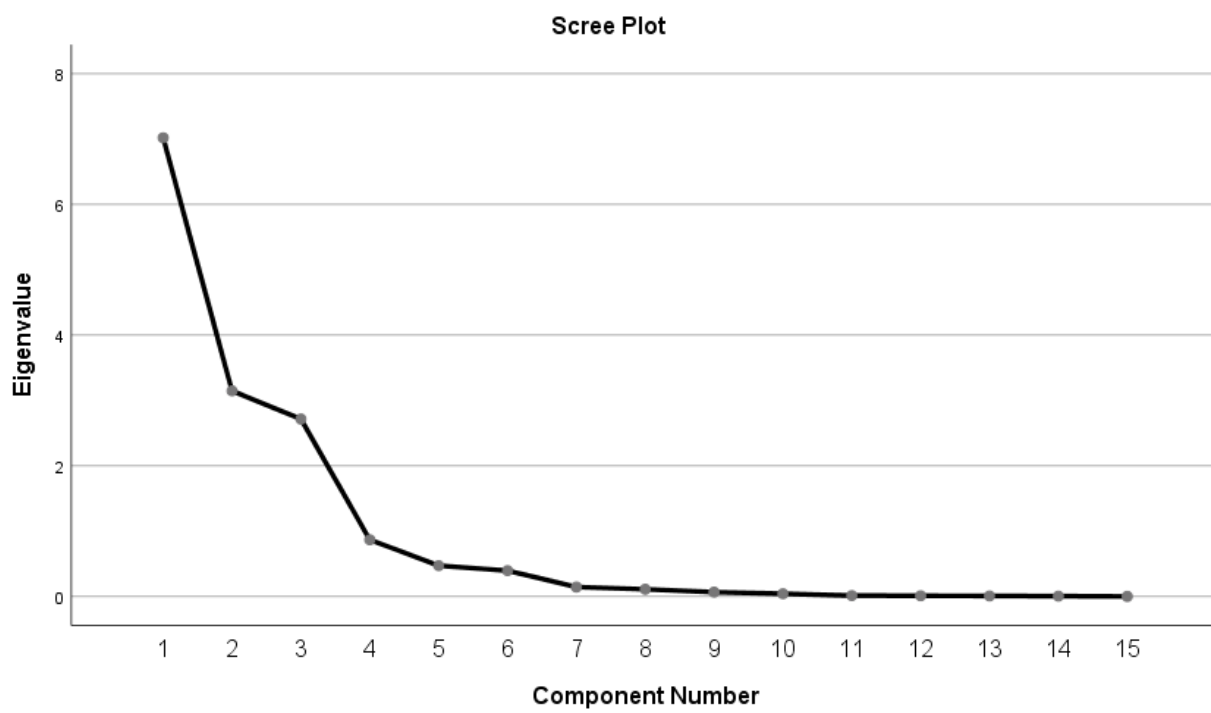
Initial Eigenvalues					Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
N	Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
79	1	7.019	46.794	46.794	7.019	46.794	46.794	6.81	45.397	45.397
79	2	3.145	20.969	67.763	3.145	20.969	67.763	3.051	20.343	65.741
79	3	2.714	18.095	85.858	2.714	18.095	85.858	3.018	20.117	85.858

Examining the three components with Eigenvalues greater than one, it appears that relationships within the three components are as follows: Component one illustrates a relationship between weighted GPA, unweighted GPA, and unweighted GPA for math, science, English, and social studies. Component two illustrates a relationship between academic behavior composite score, individual academic behavior scores of study skills, learning skills, and self-discipline, with PSAT composite scores, PSAT math scores, and PSAT EBRW scores. The third component illustrates a relationship between the academic behavior composite score, academic behavior score of study skills, academic behavior score of learning skills, and academic behavior score of self-discipline. (See Table 10: Component Matrix and Figure 6: Scree Plot 1.)

The results of the PCA support the idea that the academic behaviors utilized to navigate high school are not consistently mirrored in college. Based on the academic behavior results, the attribute of self-discipline seems to bridge the gap between secondary and post-secondary education. The approaches to studying and learning that are recommended for college do not seem to be utilized on a regular basis in high school. The results of this study align with the theory that part of the college readiness gap is behavioral, specifically with how students study and learn new material in college.

**Table 10. Component Matrix**

Component	1	2	3
Academic Behavior Score	.214	.749	.62
Learning Skill Score	.207	.632	.488
Study Skill Score	-0.035	.634	.558
Self-Discipline Score	.403	.605	.461
High Level Courses	.817	.026	-0.059
Percentage of High Level Courses	.797	.014	-0.029
Unweighted GPA	.962	-0.184	.055
Weighted GPA	.975	-0.18	.017
Unweighted Math GPA	.926	-0.105	.08
Unweighted Science GPA	.914	-0.141	-.05
Unweighted ELA GPA	.939	-0.222	.083
Unweighted Social Studies GPA	.902	-0.274	.059
PSAT Composite Score	.261	.636	-0.723
PSAT EBRW Score	.254	.616	-0.725
PSAT Math Score	.262	.64	-0.702



**Figure 6. Scree Plot 1**

## 5.0 Discussion

This study indicates that the idea that college eligibility is synonymous with college readiness is flawed and illustrates a major shortcoming of K-12 education. Proof of this shortcoming can be seen in the percentage of first-year students who have to enroll in remedial courses, 40 percent of first-year students at four-year colleges and 68 percent of first year students at two year colleges (Chen & Simone, 2016). These numbers, combined with an overall graduation rate of 59 percent for four-year schools and 28 percent at two-year schools, indicate that a large population of students still struggle to graduate after they are admitted to college (Higher Education Bridge to Nowhere, 2012; National Center for Education Statistics Graduation Rates, 2018). Based on two-year and four-year college remediation and graduation rates, it would seem that the current educational experience in secondary school is lacking in regards to readying students for the rigors of post-secondary education. In addition to secondary schools falling short of consistently reading students for the rigors of college, the traditional measures utilized in college admission offices seem to be falling short of their goal of identifying college eligible and college ready students.

In addition to K-12's role, post-secondary institutions are not blameless. I believe that admission officers need to recognize that indicators of college readiness extend beyond traditional measures such as HSGPA and standardized assessment scores. In their quest to identify the best candidates for admission, the traditional tools appear to be ineffective.

College admission standards have evolved from uniform (with universal requirements regardless of institution) to categorical (dependent on the type of program or institution) over the past 400 years. With the autonomy to govern their own admission standards, colleges could decide



the types of subjects needed, number of classes taken within certain subjects, levels of required achievement within certain subjects, and acceptable standardized assessment scores, as well as other potential requirements. This level of institutional autonomy for admissions gates has led to the categories that are utilized today: high school graduation, units of classes taken within a subject, class rank, recommendations, interviews, and assessment scores (e.g., SAT and ACT).

From the six categories utilized for college admissions, college readiness indicators (CRIs) were formed. CRIs allow admission offices to gauge how rigorous applicants' high school classes were and levels of mastery obtained in their high school careers. Traditionally, admissions offices have utilized all or a combination of these CRIs to determine whether students possess the content knowledge and behaviors to succeed at their respective institutions.

I believe traditional CRIs fall short when determining whether a student is college ready. A growing body of research, which was supported by the results of this study, indicates that a student's academic behaviors is equally or more important than grades and test scores themselves. These behaviors include but are not limited to goal setting, note taking, spending time on task, effective strategies for managing time, deliberate practice, and self-discipline. Researchers who have studied academic behaviors argue that the reason so many students are college eligible but not college ready can be found in how students obtain their grades in high school. Among the many behaviors that can impact college readiness, the following are ones that can be easily infused into current school settings: goal setting, deliberate practice, and self-discipline. I believe these skills/behaviors may have a greater impact on students' readiness than their understanding of the college application process, filling out student aid forms, and understanding college norms.

## **5.1 Goal Setting**

Setting short-term and long-term goals, monitoring those goals, and creating a process to achieve one's goals is one of a number of variables highlighted as key to college readiness. Goal setting provides a certain amount of ownership over the process of one's learning, regardless of whether the goals are long term or short term. Creating goals, and monitoring progress towards goals while addressing gaps in skills and knowledge along the way, illustrates a level of engagement with content that can create levels of understanding needed for success in college coursework. In the secondary setting, goal setting and tracking of progress could and in some cases is present within educators' daily lessons. One way educators could more consistently incorporate goal setting into their everyday curriculum is by having students create academic goals based on the academic standards. Once the students identify the relevant standard, students, with the aid of teachers, would create a process for using the skills, practice, and evaluation methods needed to complete that goal. Goal setting based on standards, the creation of a process, and progress monitoring will be an emphasis for the upcoming year at my own school.

## **5.2 Note Taking**

With lecture, or direct instruction, as one of the most common teaching methods, note taking is one of the most common ways to record, remember, and to study relevant information from lectures at later times and dates. At the secondary level, I encourage my educators to provide a variety of learning platforms or modalities beyond traditional lecture. Understanding that lecture is the most common form of instruction in college, secondary educators have begun discussing

uniform ways to teach and implement notetaking within their content areas. Numerous skills are needed to take accurate notes, such as the ability to actively listen and record information, write information accurately, draw from prior knowledge on a topic, and identify the main idea or major point the instructor is making. Within my building, staff members believe that teaching a uniform framework based on the ability to identify main ideas, vocabulary/key concepts, organization, and summarizing is the best approach that provides students with the opportunity to learn how to take quality notes. Based on this study and other studies on the topic of notetaking, the ability to identify main ideas, vocabulary, key concepts, organization, and summarizing are important skills needed for success in college.

### **5.3 Time**

The research is clear that the more time spent on a task, the more success one will see. In addition to the amount of time spent on task, another important factor is *how* one spends that time on task (i.e. the approach or process utilized to practice or learn). For this reason, in my district, three of the six professional development days in the 2018-2019 school year concentrated on classroom procedures and maximizing student engagement time. The 2019-2020 professional development days will continue to build on these concepts of classroom procedures, higher level questioning, positive narration, detailed directions, goal setting, and maximizing student engagement time.

## **5.4 Deliberate Practice**

Deliberate practice is the act of identifying weaknesses or areas of need, and partaking in effortful activities designed to address or improve the identified areas of need. I believe this is an area that many educators need to improve in. Educators are excellent at identifying student challenges, but the interventions to help student challenges is an area that needs improved. In my setting, teachers, especially teachers in the tested area, will begin creating interventions that are either state-provided and approved or research-based to help struggling students.

## **5.5 Self-Discipline**

Zimmerman and Kitsantas (2014) define self-discipline as the “processes that learners use to activate and maintain cognitions, emotions, and behaviors to attain personal goals” (p. 145). In addition to maintaining cognitions, emotions, and behaviors to attain personal goals, self-discipline allows learners to create their own feedback loops, which provides a learner the autonomy to evaluate their effectiveness and to adapt their functioning. Evidence suggests that the attribute of self-discipline is an important variable when attempting to achieve challenging goals and succeeding in college.

From what I have observed, teachers unintentionally prevent students from learning self-discipline by either “rescuing” students too early in the learning process (i.e. not letting students struggle) and allowing empathy for a situation to turn into sympathy, which could lead to extensions in due dates, lower expectations for a project, and the like. Allowing students too many extensions and modified expectations may actually implicitly validate low expectations for

students. If students do not believe they can complete a project, and the teacher validates this belief by allowing an extension or lesser assignment, this situation could have a negative impact on the students' academic futures.

I believe a possible alternative is to hold students accountable to original expectations and, when they struggle, not to be quick to rescue. An example could be seen with late work. Instead of allowing for an extension, record the grade the student earned. For the next assignment, the teacher and student could create a timeline that chunks the assignment and have the student check in leading up to the due date. Being reactive and validating lower expectations for students may feel like the best course of action in the short term, but in the long term it could be detrimental.

## **5.6 Results**

Fifteen variables were utilized to measure college eligibility and college readiness. The average student in the sample enrolled in just over nine high-level courses during a high school career, and had a weighted HSGPA of 3.38 and an unweighted HSGPA of 3.13, which made that student a "B" student. Participants scored highest in the area of ELA, with a subject GPA of 3.28, while the lowest subject area was math, with a subject GPA of 2.7. The average academic behavior score is -.4810, with self-discipline as the strongest academic behavior at 3.79, and study skills the lowest at -4.079. The mean PSAT score was 881, with EBRW scores 28 points higher than math. Utilizing the weighted HSGPA and composite PSAT score for the average student found in the Gilpin High School student sample, Naviance found that the average Gilpin High School student in the sample would be eligible for colleges such as Temple University, Kean University, Kent State, Thiel College, and Montclair State University.

### **5.6.1 Academic Behavior Survey**

Based on the results from the academic behavior survey, Gilpin High School students do not consistently employ the study skills, learning skills, and self-discipline recommended for successful navigation at the post-secondary level. In the areas of study skills, data reveals that when preparing for assessments or completion of assignments, students do the bulk of their preparation the night before. They also do not utilize all available materials when studying or completing assignment. The goal of studying appears to be memorizing facts; students do not take notes or record questions for the instructor when reading, and distractions (e.g., cell phones, television, and music) are present while students study or work on assignments.

In the area of learning skills, data indicates a disconnect between the types of learning skills students utilize for success at the secondary and post-secondary levels. Secondary students often rely on one preferred method of learning, tend to procrastinate, usually do not create a plan of action for studying or assignments, and utilize teacher-created study guides as the main source of information to study and complete assignments.

Self-disciplined behavior reported at the secondary level correlated, albeit weakly, the most with the type of self-discipline behaviors needed at a post-secondary level. Students indicated that they set academic goals for themselves, did not give up on assignments, felt in control of how well they learned, worked hard for good grades, and would try their best even if the content was dull or boring. Based on the results, student populations exist who are both college ready and college eligible, college eligible but not college ready, college ready but not college eligible, and not college ready or college eligible.

### **5.6.2 Gilpin Curriculum**

With PSSA Testing, Keystone Testing, Act 158, Chapter 339, state and local requirements, schools are mandated to provide a number of services and assessments. The idea of adding an additional course that teaches students the behaviors and habits needed to succeed in college or life beyond high school does not seem feasible. Instead of creating a stand-alone course or courses that address college readiness, I believe Gilpin School District may be better served by embedding the behaviors, skills, and approaches within the existing curriculum. Based on the results of this study, along with the accompanying literature, the list of behaviors, skills, and approaches that aid in college readiness is large. Where does one begin?

Based on the results of this study, I believe self-discipline is the attribute that should first be implemented into all curricula. First, self-discipline seems to provide a bridge, albeit a weak bridge, connecting all three components found in the principal component analysis. Second, the act of teaching or modeling self-discipline incorporates many of the non-traditional and traditional concepts that are utilized to measure college readiness and college eligibility such as goal setting, identifying weaknesses and then creating a process to address those weaknesses (i.e. mental contrasting). Lastly, approaches to teaching or incorporating self-discipline, such as goal setting, tracking progress towards goals, creating a process or an approach to complete an assignment, identifying perceived weaknesses, and creating a process to address those weaknesses, lends itself to all curricula.

## **5.7 Implications**

### **5.7.1 Advanced Placement (AP) Courses and Testing**

Taking high level courses such as AP will aid students in not only college eligibility but also college readiness (Bromberg & Theokas, 2016; Geiser & Santelices, 2007; Wyatt, Wiley, Camara, & Proestler, 2011). In addition to the work of an AP course, an end of course exam is offered to all participants. The exam is scored on a one through five scale, with five being the highest score one can obtain. Unfortunately, the AP exam is not mandatory, which forces admission offices to rely on a student's grades to determine the level of performance in the class. Depending on the year, approximately one in three students participate in the AP exams, while the other 66 percent opt out of the assessment. It seems that for the majority of students, the reason for taking one or multiple AP courses is for the impact on GPA, not the opportunity to increase and communicate one's college readiness to admissions offices. Based on the results of this study and the body of literature dedicated to the topic, I believe that requiring students to take the AP exam at the end of course would provide additional data, which is standardized, for college admission offices to utilize when determining whether a student meets the criteria for entry into their respective post-secondary institutions.

Mandating that students take the AP exam has its challenges. The first challenge is that AP does not require a student's participation in the end of course exam, which means any type of requirement for participation in the exam would need to come from the local level via policy or graduation requirements. The second issue with requiring students to participate in the end of course AP exam is cost. AP exams are not free; the question of who will pay the exam fee becomes an issue. Gilpin High School has attempted to address this issue with a reimbursement plan, which



consists of a student paying the initial fee but being reimbursed the full amount if the student is able to score a three or above on the assessment. Unfortunately, the current inducement has had very little impact on the participation of the end of course exams for AP.

With the current inducement plan having little impact on student participation in the end of year AP exams, a different approach may be warranted. It seems that one of the major reasons students take one or multiple AP courses is for the weighted impact on their GPA. I would recommend that Gilpin High School mandate that students have to take the end of year AP exam in order to receive the weight that accompanies participation in the course. In addition to the end of course assessment requirement, the district should pay for the assessment without requiring students to spend their own money and a certain cut score for reimbursement. I hesitate to require a benchmark score for the weight and reimbursement due to the possible negative impact this requirement may have on prospective students signing up for the courses.

### **5.7.2 Annual Behavior Surveys**

I believe requiring seniors to complete an academic behavior survey will provide data for students not only going to college but will also provide a snapshot of the types of behaviors or attributes students are utilizing to navigate Gilpin High School. With evidence from this study and the literature suggesting that one of the contributing factors to the gap in college readiness is academic behaviors (Conley, 2007a; Duckworth, 2016; Lombardi, Conley, Seburn, & Downs, 2012), it would be prudent for educators to measure and evaluate these attributes. The results from these surveys could illustrate trends in how students navigate high school and be utilized when making programmatic changes and approaches at the secondary level.

### **5.7.3 Admission Gates**

Relying on traditional CRIs has consistently led to graduation rates for four-year schools in the 50 to 60 percent range and for two-year schools in the 20 to 30 percent range. I believe brief surveys could be added to the admissions application, which could provide insight into a student's approach to learning, studying, or self-discipline in order to provide admission offices with a clearer picture of how ready a student is for college and the possible gaps that are present and need to be addressed behaviorally.

### **5.7.4 College Remediation**

I believe the current iteration of remedial courses concentrates on specific content such as math or English but does little to address the possibility that students do not possess a deficiency in content but may possess a deficiency in skills and behaviors. Teaching students general study skills, a different orientation to learning which will be required for success in college, could be the key or one of the keys that helps increase the number of students who are successful in college.

## **5.8 Future Study**

Based on the result of the Principle Component Analysis, self-discipline is a possible indicator that predicts success in college. To further explore self-discipline and its possible link to success in college, students' secondary and post-secondary performance (i.e. grades and standardized assessment scores) would need to be tracked along with a survey or other method

that measures a student's level of self-discipline. Analysis of this data could provide a comparison with students who have the similar traditional CRI profile in regards to grades, number of high-level courses taken, and standardized assessment scores but differ in self-discipline. If students with higher self-discipline scores exhibited or outpaced their less self-disciplined counterparts, the results of the study could certainly add to the literature of college readiness, interventions at both the secondary and post-secondary levels, and admission criteria.

## **5.9 Conclusion**

College eligibility and college readiness are not consistently interchangeable terms. The skills, behaviors, and approaches students utilize to navigate high school are not the same types of skills, behaviors, and approaches needed for success in college. Based on the results of my study, students in high school rely on the teacher for the content that is important, what should be studied, the structure of notes, and time lines for assignments. High school students normally do not create a plan of how to/how often to study, schedule to complete assignments, and most of their work/studying is done the night before. The behaviors and approaches that lead to success at the high school level seem to fall short at the college level due to the different level of expectations, work load, and approaches to content. In closing, it seems that the disconnect between college readiness and college eligibility is a behavior and skills gap more than a content gap.

## **Appendix A Academic Competencies Survey**

Likert Scale 1-4

1-Almost Never

2-Sometimes

3-Usually

4-Always

### **Learning Skills**

1. What is the level of learning you need to make A's or B's in high school?
  - a. Remembering
  - b. Understanding
  - c. Applying
  - d. Analyzing
  - e. Evaluating
  - f. Creating
2. Teacher study guides provide the main source of information I use to study for tests, quizzes, and/or other assessments.
3. I try to determine what confuses me.
4. If a concept confuses me, I skip over the content and let the teacher explain the concept to me the next day.
5. I use learning strategies that have worked in the past on new material.
6. I think about what needs to be learned before I begin a new task.
7. I use different learning strategies depending on the situation.

8. When reading, examining, and/or learning new information, I am able to identify what is most important.
9. I change my approach when I fail to understand.
10. I analyze what I have to do before beginning to study.
11. I pause periodically to summarize or paraphrase what I've just studied.
12. I find it difficult to identify the main idea when reading, examining, and/or learning new information.

### **Study Skills**

1. I preview lecture material before I go to class.
2. I take my own notes in class.
3. I understand the lecture and classroom discussion while I am taking notes.
4. I review the text, homework, notes, and complete practice problems before the exam.
5. I ask myself questions about the material before I begin.
6. I periodically review on my own to help me understand important relationships within the content.
7. I summarize what I've learned after I finish learning new content
8. I create my own examples to make information more meaningful.
9. I make/take notes while I read.
10. I have a system/strategy for organizing my notes.
11. I write down questions I want to ask the instructor.
12. I look for connections between what I am studying right now and what I have studied in class or heard in the past.
13. I create outlines, concept maps, or organizational charts of how ideas fit together.

14. When I study I try to memorize as many facts as I can.

### **Self-Discipline**

1. I create academic goals for myself.
2. I track my progress towards my academic goals.
3. I take time to organize information/notes/work.
4. I have control over how well I learn.
5. I organize my time to best accomplish my goals.
6. I take breaks periodically to keep from getting too tired.
7. I remain aware of mood and energy levels during studying and respond appropriately if either becomes problematic.
8. I do whatever it takes to learn new material for class.
9. I prefer work that is challenging so I can learn new things.
10. When work is hard I either give up or study only the easy part or parts I feel comfortable with.
11. When study material is dull or uninteresting, I keep working until I finish.
12. I find that when the teacher is talking I think of other things and don't really listen to what is being said.
13. I work hard to get a good grade even when I do not like the class.

### **Sources:**

- Harford Community College Learning Center. (2014). *Metacognition Awareness Inventory (MAI)*. Retrieved from [http://learntbl.ca/wp-content/uploads/2016/01/MetaCog\\_Inventory.pdf](http://learntbl.ca/wp-content/uploads/2016/01/MetaCog_Inventory.pdf)
- Svinicki, M. D. (2004). *Learning and motivation in the postsecondary classroom*. Bolton, MA: Anker Publishing Co.
- Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33.

## Bibliography

- Admissions Decisions. (2017). Admissions Decisions: What Counts. Retrieved from <https://professionals.collegeboard.org/guidance/applications/decisions>
- Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: U.S. Department of Education.
- Adelman, C., Daniel, B., & Berkovits, I. (2003). *Postsecondary attainment, attendance, curriculum, and performance: Selected results from the NELS: 88/2000 Postsecondary Education Transcript Study (PETS), 2000*. Washington, DC: National Center for Education Statistics.
- Atkinson, R. C., & Geiser, S. (2009). Reflections on a century of college admissions tests. *Educational Researcher*, 38(9), 665-676.
- Austin, J. L., Lee, M. G., Thibeault, M. D., Carr, J. E., & Bailey, J. S. (2002). Effects of guided notes on university students' responding and recall of information. *Journal of Behavioral Education*, 11(4), 243-254.
- Barbarick, K. A., & Ippolito, J. A. (2003). Does the number of hours studied affect exam performance? *Journal of Natural Resources and Life Sciences Education*, 32(1), 32-35.
- Beale, A. V. (2012). The evolution of college admission requirements. *Journal of College Admission*, 214, 20-22.
- Bender, W. (2009). *Beyond the RTI pyramid: Implementation issues for the first five years*. Bloomington, IL: Solution Tree Press.
- Bettinger, E. P., Evans, B. J., & Pope, D. G. (2011). Improving college performance and retention the easy way: Unpacking the ACT exam. *American Economic Journal: Economic Policy*, 5(2), 26-52.
- Bettinger, E. P., & Long, B. T. (2009). Addressing the needs of underprepared students in higher education: Does college remediation work? *Journal of Human Resources*, 44(3), 736-771.
- Boylan, H. R., & White, Jr., W. G. (1987). Educating all the nation's people: The historical roots of developmental education, Part 1. *Review of Research in Developmental Education*, 4(4), 1-4.
- Boyle, J. R. (2011). Thinking strategically to record notes in content classes. *American Secondary Education*, 40(1), 51-66.
- Brazeau, G. A. (2006). Handouts in the classroom: Is note taking a lost skill? *American Journal of Pharmaceutical Education*, 70(2), 1-2.

- Bridgeman, B., Pollack, J., & Burton, N. (2008). Predicting grades in college courses: A comparison of multiple regression and percent succeeding approaches. *Journal of College Admission*, 199, 19-25.
- Brier, E. (1984). Bridging the academic preparation gap: An historical view. *Journal of Developmental Education*, 8(1), 2-5.
- Bromberg, M., & Theokas, C. (2016). *Meandering toward graduation: Transcript outcomes of high school graduates*. Washington, DC: Education Trust.
- Broome, E. C. (1903). *A historical and critical discussion of college admission requirements*. New York, NY: College Entrance Examination Board.
- Cafarella, B. V. (2014). Developmental education: Then and now. *Research in Developmental Education*, 25(4), 1-5.
- Camara, W. J., & Echternacht, G. (2000). The SAT I and high school grades: Utility in predicting success in college (Research Notes RN-10). New York, NY: The College Board, Office of Research and Development. Retrieved from: <http://research.collegeboard.org/sites/default/files/publications/2012/7/researchnote-2000-10-sat-high-school-grades-predicting-success.pdf>
- Camara, W., & Michaelides, M. (2005). *AP use in admissions: A response to Geiser and Santelices*. New York, NY: College Board. Retrieved from <https://files.eric.ed.gov/fulltext/ED561051.pdf>
- Campitelli, G., & Gobet, F. (2011). Deliberate practice: Necessary but not sufficient. *Current Directions in Psychological Science*, 20(5), 280-285.
- Casazza, M. E. (1999). "Who are we and where did we come from?" *Journal of Developmental Education*, 23 (1), 2-7.
- Castelló, M., & Monereo, C. (2005). Students' note-taking as a knowledge-construction tool. *L1-Educational Studies in Language and Literature*, 5(3), 265-285.
- Commonwealth of Pennsylvania. (2008, August). *Vocational educational standards*. Retrieved from [https://www.pacode.com/secure/data/022/chapter339/022\\_0339.pdf](https://www.pacode.com/secure/data/022/chapter339/022_0339.pdf)
- Chen, P. H. (2013). The effects of college students' in-class and after-class lecture note-taking on academic performance. *The Asia-Pacific Education Researcher*, 22(2), 173-180. Retrieved from: <https://doi-org.pitt.idm.oclc.org/10.1007/s40299-012-0010-8>
- Chen, X., & Simone, S. (2016). *Remedial course taking at US public 2-and 4-Year institutions: Scope, experiences, and outcomes: Statistical analysis report*. Washington, DC: National Center for Education Statistics.
- Cline, Z., Bissell, J., Hafner, A., & Katz, M. L. (2007). Closing the college readiness gap. *Leadership*, 37(2), 30-33.



- Clinedinst, M., & Koranteng, A. M. (2017). *State of college admission*. Arlington, VA: National Association for College Admission Counseling.
- Cohen, A. M. (1998). *The shaping of American higher education: Emergence and growth of the contemporary system*. San Francisco, CA: Jossey-Bass.
- Coleman, J. S., & Hoffer, T. (1987). *Public and private high schools: The impact of communities* (Vol. 41). New York, NY: Basic Books.
- College Board (2018). PSAT/NMSQT: *Your summary score report*. Retrieved from <https://collegereadiness.collegeboard.org/pdf/sample-psat-nmsqt-score-report.pdf>
- Common Core State Standards Initiative. (2018). *Development process*. Retrieved from <http://www.corestandards.org/about-the-standards/development-process/>
- Complete College America. (2012). *Remediation: Higher education's bridge to nowhere*. Washington, DC: Author.
- Conley, D. T. (2007a). The challenge of college readiness. *Educational Leadership*, 64(7), 23-29.
- Conley, D. T. (2007b). *Redefining college readiness*. Eugene, OR: Educational Policy Improvement Center.
- Conley, D. T. (2008). Rethinking college readiness. *New Directions for Higher Education*, 2008 (144), 3-13.
- Conley, D. T. (2012). *A complete definition of college and career readiness*. (Report NJ1). Eugene, OR: Educational Policy Improvement Center.
- Conley, D. T. (2015, November). The emergence and operationalization of college and career readiness. Paper presented at the 40th Annual Meeting of the Association for the Study of Higher Education: Inequality & Higher Education, Denver, CO.
- Conley, D. T., & French, E. M. (2014). Student ownership of learning as a key component of college readiness. *American Behavioral Scientist*, 58(8), 1018-1034.
- Cyrenne, P., & Chan, A. (2012). High school grades and university performance: A case study. *Economics of Education Review*, 31(5), 524-542.
- Delaware Department of Education. (n.d.). High school graduation requirements and diplomas. Dover, DE: State of Delaware Department of Education. Retrieved from <http://regulations.delaware.gov/AdminCode/title14/500/505.shtml>
- District of Columbia Department of Education. (n.d.). Graduation excellence. Washington, DC: District of Columbia Public Schools. Retrieved from <https://dcps.dc.gov/graduation>
- Tennessee Department of Education. (n.d.). Graduation requirements. Retrieved from <https://www.tn.gov/education/instruction/graduation-requirements.html>

- DiPerna, J. C., & Elliott, S. N. (2000). *Academic Competence Evaluation Scales*. San Antonio, TX: The Psychological Corporation.
- DiVesta, F. J., & Gray, G. S. (1973). Listening and note taking: Immediate and delayed recall as functional of variations in thematic continuity, notetaking, and length of listening–review intervals. *Journal of Educational Psychology*, 64(3), 278–287.
- Dooley, M. D., Payne, A. A., & Robb, A. L. (2012). Persistence and academic success in university. *Canadian Public Policy*, 38(3), 315-339.
- Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science*, 16(12), 939-944.
- Duckworth, A. L., Grant, H., Loew, B., Oettingen, G., & Gollwitzer, P. M. (2011). Self-regulation strategies improve self-discipline in adolescents: Benefits of mental contrasting and implementation intentions. *Educational Psychology*, 31(1), 17-26.
- Duckworth, A. (2016). *Grit: The power of passion and perseverance*. New York, NY: Scribner.
- Dweck, C. (2014). *The power of yet*. Retrieved from <https://www.youtube.com/watch?v=J-swZaKN2Ic>
- Dweck, C. S., Walton, G. M., & Cohen, G. L. (2014). *Academic tenacity: Mindsets and skills that promote long-term learning*. Seattle, WA: Bill & Melinda Gates Foundation.
- Emanuel, W. H. (1953). College-entrance requirements ten years after the eight-year study. *The School Review*, 61(9), 521-526.
- Ericsson, K. A. (2008). Deliberate practice and acquisition of expert performance: A general overview. *Academic Emergency Medicine*, 15(11), 988-994.
- Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100(3), 363-406.
- Erickson, B. L., & Strommer, D. W. (1991). *Teaching college freshmen*. San Francisco, CA: Jossey-Bass.
- Four Guiding Strategies. (December 1, 2013). Four guiding strategies and key questions. Retrieved from <http://static.pdesas.org/content/documents/Four%20Guiding%20Strategies%20and%20Key%20Questions%2012.1.2013.pdf>
- Geiser, S., & Santelices, V. (2006). *The role of advanced placement and honors courses in college admissions*. Berkeley, CA: Center for Studies in Higher Education.
- Gladwell, M. (2008). *Outliers*. New York, NY: Little, Brown.

- Hambrick, D. Z., Altmann, E. M., Oswald, F. L., Meinz, E. J., & Gobet, F. (2014). Facing facts about deliberate practice. *Frontiers in Psychology*, 5, 751.
- Harford Community College Learning Center. (2014). *Metacognition Awareness Inventory (MAI)*. Retrieved from [http://learntbl.ca/wp-content/uploads/2016/01/MetaCog\\_Inventory.pdf](http://learntbl.ca/wp-content/uploads/2016/01/MetaCog_Inventory.pdf)
- Heckman, J. J., & Rubinstein, Y. (2001). The importance of noncognitive skills: Lessons from the GED testing program. *American Economic Review*, 91(2), 145-149.
- Hodara, M., & Cox, M. (2016). Developmental education and college readiness at the University of Alaska. (REL 2016-123). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northwest. Retrieved from <http://ies.ed.gov/ncee/edlabs>
- Hurwitz, M., Smith, J., Niu, S., & Howell, J. (2015). The Maine question: How is 4-year college enrollment affected by mandatory college entrance exams? *Educational Evaluation and Policy Analysis*, 37(1), 138-159.
- Jimenez, L., Sargrad, S., Morales, J., & Thompson, M. (2016, September 28). *Remedial education*. Retrieved July 20, 2017, from <https://www.americanprogress.org/>
- Jung, K., Zhou, A. Q., & Lee, R. M. (2017). Self-efficacy, self-discipline and academic performance: Testing a context-specific mediation model. *Learning and Individual Differences*, 60, 33-39.
- Kids Count Data Center. (2018). Retrieved from <https://datacenter.kidscount.org>
- Kiewra, K. A. (1988). Cognitive aspects of autonomous note taking: Control processes, learning strategies, and prior knowledge. *Educational Psychologist*, 23(1), 39-56.
- Konrad, M. & Joseph, L. M. & Eveleigh, E. (2009). A meta-analytic review of guided notes. *Education and Treatment of Children*, 32(3), 421-444.
- Kraus, J. W. (1961). The development of a curriculum in the early American colleges. *History of Education Quarterly*, 1(2), 64-76.
- Klein, A. (2014). Historic summit fueled push for K-12 standards. *Education Week*, 34(5), 1.
- Kunal, D. S. (2008). Cultivating competence, self-efficacy and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, 4(3), 586-598.
- Lahmers, A. G., & Zulauf, C. R. (2000). Factors associated with academic time use and academic performance of college students: A recursive approach. *Journal of College Student Development*, 41(5), 544-556.
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.

- Library of Congress (2017). *Primary documents in American history: Morrill Act*. Retrieved from <https://www.loc.gov/rr/program/bib/ourdocs/Morrill.html>.
- Lipsky, M. S., & Cone, C. J. (2018). A review of mastery learning: The Roseman model as an illustrative case. *Education for Health*, 31(1), 39.
- Lombardi, A. R., Conley, D. T., Seburn, M. A., & Downs, A. M. (2013). College and career readiness assessment: Validation of the key cognitive strategies framework. *Assessment for Effective Intervention*, 38(3), 163-171.
- Mandlawitz, M. (2007). *What every teacher should know about IDEA 2004 laws and regulations*. Boston, MA: Pearson.
- Marker, C., Gnambs, T., & Appel, M. (2017). Active on Facebook and failing at school? Meta-analytic findings on the relationship between online social networking activities and academic achievement. *Educational Psychology Review*, 30(3), 65-677.
- Mattern, K., Burrus, J., Camara, W., O'Connor, R., Hansen, M. A., Gambrell, J., ... & Bobek, B. (2014). *Broadening the definition of college and career readiness: A holistic approach*. Retrieved from [http://www.act.org/content/dam/act/unsecured/documents/ACT\\_RR2014-5.pdf](http://www.act.org/content/dam/act/unsecured/documents/ACT_RR2014-5.pdf)
- Miller, L., & Mittleman, J. (2012). *High Schools That Work* and college preparedness: Measuring the model's impact on mathematics and science pipeline persistence. *Economics of Education Review*, 31, 1116-1135.
- Mirel, J. (2006). The traditional high school. *Education Next*, 6(1), 14-21.
- Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard: Advantages of longhand over laptop note taking. *Psychological Science*, 25(6), 1159-1168.
- Nagaoka, J., Farrington, C. A., Roderick, M., Allensworth, E., Keyes, T. S., Johnson, D. W., & Beechum, N. O. (2013). Readiness for college: The role of noncognitive factors and context. *Voices in Urban Education*, 38, 45-52.
- National Center for Education Statistics. (2018). *Fast facts: Graduation rates*. Washington, DC: Author. Retrieved from <https://nces.ed.gov/fastfacts/display.asp?id=40>
- National Center for Public Policy and Higher Education and Southern Regional Education Board. (2010). *Beyond the rhetoric: Improving college readiness through coherent state policy*. Retrieved from [http://www.highereducation.org/reports/college\\_readiness/](http://www.highereducation.org/reports/college_readiness/)
- Nonis, S. A., & Hudson, G. I. (2010). Performance of college students: Impact of study time and study habits. *Journal of Education for Business*, 85(4), 229-238.

- Pennsylvania Department of Education. (2013, December 1). *Four guiding strategies for LEAs*. Retrieved from <http://static.pdesas.org/content/documents/Four%20Guiding%20Strategies%20and%20Key%20Questions%2012.1.2013.pdf>
- Peverly, S. T., Ramaswamy, V., Brown, C., Sumowski, J., Alidoost, M., & Garner, J. (2007). What predicts skill in lecture note taking? *Journal of Educational Psychology*, 99(1), 167.
- Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.
- Plant, E. A., Ericsson, K. A., Hill, L., & Asberg, K. (2005). Why study time does not predict grade point average across college students: Implications of deliberate practice for academic performance. *Contemporary Educational Psychology*, 30(1), 96-116.
- Platz, F., Kopiez, R., Lehmann, A. C., & Wolf, A. (2014). The influence of deliberate practice on musical achievement: a meta-analysis. *Frontiers in Psychology*, 5, 646.
- Proctor, B. E., Prevatt, F., Adams, K., Hurst, A., & Petscher, Y. (2006). Study skills profiles of normal-achieving and academically-struggling college students. *Journal of College Student Development*, 47(1), 37-51.
- Svinicki, M. D. (2004). *Learning and motivation in the postsecondary classroom*. Bolton, MA: Anker Publishing Co.
- Raver, S. A., & Maydosz, A. S. (2010). Impact of the provision and timing of instructor-provided notes on university students' learning. *Active Learning in Higher Education*, 11(3), 189-200.
- Ravitch, D. (1985). *The troubled crusade: American education 1945-1980*. New York, NY: Basic Books.
- Rouis, S. (2012). Impact of cognitive absorption on Facebook on students' achievement. *Cyberpsychology, Behavior, and Social Networking*, 15(6), 296-303.
- Royster, P., Gross, J., & Hochbein, C. (2015). Timing is everything: Getting students back on track to college readiness in high school. *The High School Journal*, 98(3), 208-225.
- Rudolph, F. (1990). *The American college and university: A history*. Athens, GA: University of Georgia Press.
- Tuân, N. P., & Tũ, N. T. (2013). The impact of online social networking on students' study (VNU University of Economics and Business). *VNU Journal of Education Research*, 29(1), 1-13.
- Understanding PSAT Scores. (2018). *PSAT 10: Understanding scores*. Retrieved from <https://collegereadiness.collegeboard.org/pdf/psat-10-understanding-scores.pdf>

- Ukpong, D. E., & George, I. N. (2013). Length of study-time behaviour and academic achievement of social studies education students in the University of Uyo. *International Education Studies*, 6(3), 172.
- Villarreal, V., & Martinez, A. (2018). Assessing study skills in college students: A review of three measures. *Journal of College Student Development*, 59(5), 629-635.
- Westrick, P. A., Le, H., Robbins, S. B., Radunzel, J. M., & Schmidt, F. L. (2015). College performance and retention: A meta-analysis of the predictive validities of ACT® scores, high school grades, and SES. *Educational Assessment*, 20(1), 23-45.
- Wiley, A., Wyatt, J., & Camara, W. J. (2011). *The development of a multidimensional college readiness index*. (Research Report 2010-3). New York, NY: College Board.
- Woods, C. S., Park, T., Hu, S., & Bertrand Jones, T. (2018). How high school coursework predicts introductory college-level course success. *Community College Review*, 46(2), 176-196.
- Wyatt, J., Kobrin, J., Wiley, A., Camara, W. J., & Proestler, N. (2011). *Development of a college readiness benchmark and its relationship to secondary and postsecondary school performance* (No. 2011-5). New York, NY: College Board.
- Zhao, N., Wardeska, J. G., McGuire, S. Y., & Cook, E. (2014). Metacognition: An effective tool to promote success in college science learning. *Journal of College Science Teaching*, 43(4), 48-54.
- Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement. *Contemporary Educational Psychology*, 39(2), 145-155.