PUTTING TIME ON YOUR SIDE: A SYSTEM FOR GETTING ALL STUDENTS ON A COLLEGE READY TRAJECTORY

By

Amber K. Jaggers
B.A., University of Louisville, 2001
MAT, University of Louisville, 2003

Pamela M. Royster
B.A., Centre College, 1993
MAT, University of Louisville, 1995

A Dissertation
Submitted to the Faculty of the
College of Education and Human Development of the University of Louisville
In Partial Fulfillment of the Requirements
for the Degree of

Doctor of Education

Department of Leadership, Foundations & Human Resource Education
University of Louisville
Louisville, Kentucky

May 2012

PUTTING TIME ON YOUR SIDE: A SYSTEM FOR GETTING ALL STUDENTS ON A COLLEGE READY TRAJECTORY

By

Amber K. Jaggers
B.A., University of Louisville, 2001
MAT, University of Louisville, 2003

Pamela M. Royster
B.A., Centre College, 1993
MAT, University of Louisville, 1995

A Dissertation Approved on

April 20, 2012

by the following Dissertation Committee:

_____
Dissertation Director

_____

_____

_____

DEDICATION

This dissertation is dedicated to all current and future students in hopes of developing aspirations for college to enable the fulfillment of their academic potential, career goals, and lifelong success.

ACKNOWLEDGEMENTS

Amber Jaggers – My sincerest thanks and gratitude goes to Dr. Craig Hochbein for his unwavering support, advocacy, guidance, and inspiration throughout the entirety of my doctoral program. Thank you for instilling the lifelong values of research, curiosity, and inquiry. Thank you also for embracing my writing, my humor, and my family and allowing our cohort to become a part of your family. I would also like to thank Dr. Tom Tretter for teaching me the endless possibilities of logistic regression and that I am better than redundancy, inconsistency, and prose. In addition, I would like to thank Dr. Jacob Gross and Dr. Brian Shumate for supporting my research and keeping me focused. Thanks to Dr. Molly Sullivan for believing this cohort could provide valuable research to education. A very special thanks to my co-researcher, Pamela Royster, whose support, encouragement, and determination kept me on a doctoral trajectory. Thanks to the doctoral cohort for demonstrating how the power of numbers accomplishes incredible goals. Thanks to my mother, Debbie Faircloth, for always making me feel like I could achieve more than I ever thought possible. Thanks to my in-laws, David and Phyllis Jaggers, who provided extra care to my children so I could pursue my education and for initially influencing my decision to embark on this journey. Thank you to my late grandfather, Byron "Slim" Robison, who desperately fought to witness me finish my doctorate, but, in the end, promised he would proudly watch me persevere from above. Finally, I would like to thank my supportive husband, Matthew, and my beautiful

children, Samuel, Cooper, and Jenna, for their unconditional love, sacrifices, and encouragement. Matthew, thank you for always absorbing my frustrations and never letting me quit – we did it.

Pamela Royster: I proudly stand on the shoulders of these giants. Ardent appreciation goes to Drs. Hochbein, Tretter, Gross, and Shumate for their guidance, support, and thoughtful comments throughout the capstone process. In particular, I extend my gratitude to Dr. Jake Gross for his exceptional patience and for sharing his expertise in EHA to this time-obsessed student. In addition to the capstone year, Dr. Craig Hochbein's teaching has challenged my thinking, reignited my passion and belief in the power of education, and inspired me to new heights. Thanks to co-researcher, Amber Jaggers, and fellow cohortian, Trish Gallagher, for their care and tenacity through the difficult days. I feel fortunate to call you friends. I would never have made it to this point without the love and encouragement of my parents and family, in particular my mother and first teacher Mary Puddington. Finally, I'd like to thank my husband, John, for his encouragement, trust, patience, sacrifice, and love. From the beginning, he accepted more responsibility in exchange for less time together without complaint. I love you dearly.

ABSTRACT
PUTTING TIME ON YOUR SIDE: A SYSTEM FOR GETTING ALL STUDENTS ON A COLLEGE READY TRAJECTORY

Amber K. Jaggers
Pamela M. Royster

April 20, 2012

The dropout crisis has been the subject of a tremendous amount of research, but national trends and goals pushed beyond earning a high school diploma to raising the percentage of the population with postsecondary credentials. Previous research indicated 8th grade was the fulcrum point on the path towards college readiness. With a two pronged approach, this pair of studies examined a longitudinal cohort (*n*=6443) of students in Jefferson County Public Schools, Louisville, KY to explore how districts and communities can reduce the number of students not on the college ready trajectory by 8th grade as well as redirect off-track high school students. The first study used logistic regression to explore 3rd thru 7th grade early warning indicators of college readiness. Researchers examined the predictive power of attendance, behavior, course performance, and achievement on state standardized and national norm-referenced exams on the likelihood of students meeting 8th grade reading and math EXPLORE benchmarks. Findings revealed attendance above 95%, achievement on state standardized and norm-referenced exams, and no middle school course failures increased a student's likelihood of being on a college ready trajectory by 8th grade. The second study explored timing to first-time college readiness in English and math using Event History Analysis. Variables

under investigation included gender, first-generation college student status, college aspiration, and enrollment in college preparatory courses, and participation in organized, extracurricular, college preparatory activities. Results indicated a student's chances of being on the college ready trajectory were highest in the 8th grade. Findings also revealed a positive association between higher parent education levels and college preparatory course enrollment, particularly in math. Both studies concluded P-12 educators and policymakers should adjust practices and policies with the goal of producing college ready graduates.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF EQUATIONS

Equation PAGE

PUTTING TIME ON YOUR SIDE: A SYSTEM FOR GETTING ALL STUDENTS ON A COLLEGE READY TRAJECTORY

Introduction

The devaluation of a high school diploma has reignited the college and career readiness debate among policymakers and educators. Not only should the diploma prepare students for postsecondary education, but also for the demands of the workplace (Barth, 2004). Current graduation requirements no longer meet the demands of the 21st century job market (Achieve, 2004). Educators must work to ensure all students graduate ready to pursue postsecondary education on a pathway towards a career. Yet, current high school curriculum emphasizes course completion rather than skill and intellectual development (Conley, 2005a). Many college preparation efforts focus on admission, however, adequately preparing students for collegiate academics proves the more difficult challenge (Callan, Finney, Kirst, Usdan, & Venezia, 2006). According to G. Wiggins (2011) efforts to improve graduation rates prove meaningless if students enter postsecondary training lacking necessary skills for success.

Regardless of whether a student pursues a two-year or four-year college degree, the military, vocational training, or the workforce, success requires a set of general skills. In order to succeed in college or the workplace, graduates must demonstrate proficient reading and math knowledge and skills (ACT, 2011a). Individuals unequipped with such

knowledge and skills to attain jobs fail to assimilate into the mainstream culture and economy (Carnevale, 2008). Graduates must also be able to work in groups, communicate effectively, and solve problems (Murnane & Levy, 1996). The development of college ready skills must take place in schools prior to high school enrollment or students likely will not be college ready by graduation (ACT, 2008b). Districts must develop college focused P-12 aligned instructional systems (ACT, 2007b). According to a 2009 ACT report, students who did not meet college readiness benchmarks by the 8th grade, on average, did not meet readiness standards by high school graduation. As evidenced by the Common Core State Standards Initiative, college preparation must begin in preschool (Kentucky Department of Education, 2010).

Sparked by changes to the global market and fueled by accountability, a new era of educational policy, focused on college readiness and access, is the latest wave of reforms targeting success for all students (Roderick, Nagaoka, & Coca, 2009). For example, effective for the 2011-12 school year, lawmakers in Kentucky have added both the graduation rate and a measure of college and career readiness to the accountability index for public high schools. This increased focus on college and career readiness in accountability reflects general community goals. In 2007, the Kentucky Council on Postsecondary Education set a goal to *Double the Numbers*, a set of strategies geared to doubling the number of Kentucky residents with an Associate's or Bachelor's degree. In May 2010, business and civic leaders in Louisville, Kentucky's largest city, signed the Greater Louisville Education Commitment that set the goal of augmenting the number of adults with either an Associate's or Bachelor's degree by 55,000 by 2020. The *55,000*

Degrees initiative focuses on increasing adults returning to college as well as improving access and success of new graduates from the local P-12 systems.

With the community and accountability focus on college access and success, school systems must respond by preparing all students for postsecondary learning. This study will focus on academic college readiness as evidenced by ACT's Educational Planning and Assessment System (EPAS) benchmarks. ACT packages three assessments designed to measure academic progress towards college readiness, beginning with the EXPLORE test for 8th graders. By targeting students who display behaviors and characteristics incompatible with college readiness at an earlier age, educators will be able to intervene and guide students back into the college readiness pipeline. However, ACT research indicates 8th grade students may be too far behind to rejoin their peers without intense intervention (ACT, 2008b). Students have limited opportunities to re-enter the college readiness pipeline, therefore educators must be aware of factors beyond academic background that may influence student preparation for college.

Background

Since the common school movement the debate over the true purpose of schooling manifested in the cycles of school reform (Tyack & Cuban, 1995). At the turn of the 20th century, American educators shifted their view of education from the collective maintenance of our political structure to an individual pathway of success and mobility (Labaree, 2010). In the 1890's, an increase in jobs that required a high school diploma compelled business leaders, social activists, and politicians to create a public school system that developed the nations' workforce (Cuban, 2003). In a transitional period between the Common School Movement and the Progressive Era, the Committee

of Ten on Secondary School Studies recommended a standard curriculum for secondary schools (Tyack & Cuban, 1995). With a concern towards college preparation, the Committee of Ten suggested a prescribed, common course of study for all students. Considered elitist by many, the Committee's recommendation encouraged an education based on critical thinking and rigorous study over that of rote memorization (Bohan, 2003). However, the Committee of Ten's recommendations occurred at a time when less than 10% of the population graduated from high school (Tyack & Cuban, 1995).

At the turn of the 20th century, business leaders needed skilled workers to populate their assembly lines and factories. As more young people attended and graduated from high school, tracking became the common framework for managing students from different backgrounds and social class (Labaree, 2010). John Dewey and other progressive educators established a movement that supported students preparing for a skilled trade (Dewey, 1938). Educational historians acknowledge this debate between occupational and critical thinking skill development in the writings of Booker T. Washington and W.E.B. DuBois (Deil-Amen & DeLuca, 2010). In Washington's support for a vocational education as a means for Black Americans to prosper, Dubois foresaw the future educational enslavement to low-skill, low-wage jobs based on the lack of educational opportunity.

After World War II, large numbers of young people flooded American schools. This influx of students coincided with the development of psychological and educational testing (Zwick, 2007). In order to educate efficiently large numbers of students, educators began using IQ testing to segregate students into ability groups. Tracking students, a practice already entrenched into the "grammar of schooling" (Tyack & Cuban, 1995),

became a popular way to manage the baby boom generation and the desegregation of schools. In high schools, tracking typically manifested as two pathways: college preparatory and vocational programs (Rosenstock, 1991). Because many schools based pathway enrollment decisions on either actual or perceived aptitude, students with disadvantaged backgrounds did not have open access to rigorous college preparatory work (Tyack and Cuban, 1995).

In the late 1960's and 1970's, civil rights movements advocated for underserved populations in hopes of increasing educational access to various populations. The Elementary and Secondary Education Act (ESEA) of 1965 provided the legislative motivation to make these changes to the educational system. In the early 1980's, with less prepared young people entering the workforce, some business leaders believed the increase in inclusiveness led to the lowering of standards (Rosenstock, 1991). According to Cuban (2003), *A Nation at Risk* (1983) exposed the need to return to rigorous standards or be at risk of losing America's foothold as an economic powerhouse. In 2001, policymakers refocused on educational access for all with the reauthorization of ESEA, known as No Child Left Behind (NCLB). Adding the component of high stakes accountability, the crux of the legislation is to ensure all American children have access to rigorous, standardized education (NCLB, 2001). In the latest discussions of ESEA reauthorization, the Obama administration has added the "College for All" mantra to the education reform debate (US Department of Education, 2010).

Definition of College

For some, the word "college" conjures images of ivy lined brick facades, grassy campuses teaming with professors and students, and statues honoring great thinkers and

alumni. These images relate to a passé definition of college as a brick and mortar location where elite students seek the minimum of a Bachelor's degree. Now, many universities offer degrees in technical fields as well as arts and science. Additionally, technology allows for virtual classroom experiences making the concept of a campus obsolete for many. For the purposes of these studies, "college" represents any postsecondary, accredited learning institution that awards degree, certificates, or licenses. The breadth of institutions range from prestigious research universities to community colleges to online certificate programs. Each program has varying levels of entrance requirements. Though some institutions may have open admissions policies, programs leading to certification or licensure for mid-wage occupations typically maintain academic entrance requirements (Deil-Amen & DeLuca, 2010).

College for All

According to Balfanz and Fox (2009), 1.2 million students drop out of high school each year. Although the dropout crisis still plagues American schools, unprepared graduates upstage the dropout issue. According to Balfanz and Legters (2004), approximately 2,100 high schools across the nation were "dropout factories" where less than 50% of entering freshman graduate in four years. Dropouts cite boredom, lack of relevance in schoolwork, and lack of connection to others in school as rationale for dropping out (Mac Iver, Balfanz & Byrnes, 2009). Disengaged students undervalue a high school diploma leaving educators to fight against the lures of low-wage, low-skill jobs or criminal activity (Neild & Balfanz, 2006). Even students with high school diplomas struggle to find jobs with pay rates that support families because they lack the technical and social skills required (Bishaw & Semega, 2008). Only 25% of 2011

graduates who took the ACT demonstrated college readiness skills in all four subjects bridging the argument of high school completion and academic preparedness (ACT, 2011b). Further, disadvantaged students have less access to rigorous academic curriculum (Balfanz & Bridgeland, 2007; Cuban, 2003; and Mac Iver, Balfanz, & Byrnes, 2009).

The production of college ready graduates that successfully earn a degree, certificate or licensure will benefit individuals and communities alike. Though postsecondary education provides no guarantee of employment, some college experience increases the likelihood of employment. According to the US Bureau of Labor October 2011 report, the employment to population ratio for civilians with a Bachelor's degree or higher was 72.5 compared to 54.8 of high school graduates. As a capitalistic society, America thrives on an employed nation and citizens with disposable income. Businesses flourish and tax bases grow as more individuals become homeowners and consumers.

Individual access to this wage premium predominately depends to higher educational attainment. Bishaw & Semega (2008) showed that, on average, men with an Associate's degree or some college earned $41,035 annually compared to men with just a high school diploma who earned $32,435 annually. The wage premium increased exponentially with education levels. Though earning less than men, women also accrued average earnings with greater education attainment. The same report showed average earnings for women with a high school diploma differ from women with some college by approximately $6,000 annually (Bishaw & Semega, 2008).

Over the past decades, the gap between high school diploma workers and college-educated workers expanded. When comparing full-time, year-round workers, a 2002 US Census Bureau study showed that the differential between annual earnings of a worker

with a bachelor's degree and a worker with a high school diploma gained from a rate of 1.5 to 1.8 between 1975 and 1999 (Day & Newburger, 2002). During the same 24 years, the differential between a high school dropout and a worker with a diploma dropped from 0.9 to 0.7. The economic gap between a bachelor's degree or higher and a high school diploma or lower will continue to grow leaving America less competitive in the global market if the national education system does not adjust to the changing world.

Social mobility relies on education attainment but access to college begins with access to quality P-12 education systems (Bishaw & Semega, 2008). More than 40 years after President Johnson's declaration of the war on poverty and ESEA, many communities struggle with equitable education for all students. Housing patterns in many large, urban communities exacerbate the issue with concentrations of poverty in city centers and wealth in the suburbs (Schwartz, McCabe, Ellen, & Chellman, 2010) The most disadvantaged students have the least access to quality teachers, updated school buildings and equipment, positive peer influence, or challenging coursework (Carnevale, 2008; Balfanz & Letgers, 2005).

College Access to Success

Educators, policymakers, and researchers define college access in multiple ways, but for the purpose of these studies, we clarify access to college as an individual student's theoretical ability to enroll into college despite race, gender, economic background, or parent supports (Adelman, 2007). Success is defined as persistence to degree, certification, or licensure. 2.6 million first-time freshmen began college in 2004 illustrating college is more accessible now than at any other time (Adelman, 2007). With the number of proprietary colleges expanding and more virtual campuses, students have

greater access to institutions of higher learning (Carnevale, Rose, & Cheah, 2011). Shifting from Affirmative Action policies to diverse recruitment, colleges developed access programs and competed for federally funded TRIO programs (e.g., Student Support Services, Upward Bound, and Talent Search) to cultivate first-generation students for college admissions. First time college matriculation continues to rise with completion rates falling far behind (Bound, Lovenheim, & Turner, 2009). Though many factors influence college success, academic preparation remains widely accepted as the primary focus (Adelman, 2006; Cole, Kennedy, & Ben-Avie, 2009; Ishitani & Snider, 2006; Moore, Slate, Edmonson, Combs, Bustamante, & Onwuegbuzie, 2010; Noble, Roberts, & Sawyer, 2006; Puyosa, 2009; Reid & Moore, 2008; Sawyer, 2008).

The percentage of students requiring developmental coursework exponentially rises as colleges increase their enrollments. A 2011(b) report by ACT notes that nationwide, only 25% of students who took the ACT met all four of the college readiness benchmarks. In the state of Kentucky, where all juniors take the ACT as part of the state accountability system, only 16% of 2010 graduates met all four college readiness benchmarks. Table 1 provides a summary of Kentucky 2011 high school graduates meeting ACT college readiness benchmarks by subject and race. An exploration of reading benchmarks showed 43% of all Kentucky 2011 graduates met the readiness benchmark whereas only 19% of Black graduates met the readiness benchmarks in reading. Math readiness reports a grimmer picture. Twenty-eight percent of all 2011 Kentucky graduates met the readiness benchmarks whereas 10% of Blacks metreadiness benchmarks in math denoting readiness for college algebra (ACT, 2011b). Students requiring multiple developmental courses upon entering college were less likely to

matriculate into higher-level technical programs, transition to a four-year degree program, or complete a degree (Bahr, 2009; Bound et al., 2009; Calcagno, Crosta, Bailey, & Jenkins, 2007; Ishitani & Snider, 2006; Johnson, 2008; Palmer, Davis, Moore, & Hilton 2010; Reid & Moore, 2008; Roderick et al., 2009; Sawyer, 2008; Saxon & Boylan, 2001). Also, the accumulated costs of large numbers of students in developmental coursework not only affects student finances, but also long-term costs of accumulated student loan debt, use of financial aid, and time away from degree coursework.

Table 1

Percentage of Kentucky 2011 High School Graduates Meeting ACT College Readiness Benchmarks by Subject and Race

Race	Percent tested	English	Reading	Math	Science
Black	9	32	19	10	5
Asian	1	69	55	62	38
Hispanic	3	43	33	22	13
White	79	62	46	31	23
All	100	57	43	28	21

College Readiness

The current high school system focuses on students accessing college, but directs less concern on postsecondary success (Conley, 2005a). Earning a high school diploma only makes a student "college-eligible" rather than "college-ready" (Conley, 2005b), therefore, graduates might enter college lacking the necessary skills to succeed at the postsecondary level in the core academic classes (ACT, 2008b). Improving the college readiness of all students will provide a better foundation of knowledge and skills to allow future workers to adapt to the changing requirements of a more technologically sophisticated and internationally competitive working world (ACT, 2009). In addition,

recent population studies have found that unless states can improve the education of all students, the percentage of the U.S. workforce with a bachelor's degree will decrease over the next 15 years, with a corresponding drop in personal income per capita (Callan et al., 2006).

Clearly, the economic, social, and political value of a high school diploma must improve, beginning with producing cohorts of students who transition from high school to college prepared for postsecondary education. College-readiness must be the standard for all students, not just for a select group. College-readiness can be defined as "the level of preparation a student needs to enroll and succeed – without remediation – in a credit-bearing general education course at 2-year or 4-year institution, trade school, or technical school" (Moore et al., 2010; ACT, 2007a, Conley, 2007). Further, readiness also requires the developmental maturity to thrive in the increasingly independent worlds of postsecondary education and careers, the cultural knowledge to understand the expectations of the college environment and labor market, and the employer-desired skills to succeed in an innovation-based economy (Hooker & Brand, 2010).

High schools must develop college readiness curriculum aligned with college expectations. By setting rigorous and challenging standards, students can develop the necessary skills needed at the postsecondary level. However, states have created disjointed systems between high school and postsecondary institutions with separate standards, governing entities, and policies (Conley, 2007). As a result, policymakers also created unnecessary and detrimental barriers between high school and college that undermine students' aspirations and their abilities to succeed (Venezia, Callan, Finney,

Kirst, & Usdan, 2005). High school programs must create a level of intellectual and skill development that connects seamlessly with college expectations (Conley, 2005a).

High schools alone cannot carry the college and career readiness responsibility. According to ACT (2009),

> the level of academic achievement that students attain by 8th grade has a larger impact on their college and career readiness by the time they graduate from high school than anything that currently happens academically in the typical U.S. high school (p.6).

If students fail to meet college readiness benchmarks by the 8th grade EXPLORE measurement, the likelihood of becoming college ready in high school proves unlikely (ACT, 2008). Therefore, interventions and remediation must occur prior to the 8th grade. In 2010, Kentucky adopted the Common Core State Standards in English/Language Arts and Mathematics, known as Kentucky Core Academic Standards (KCAS), in an effort to connect P-12 curriculum so all students graduate prepared for success at the postsecondary level. By aligning content across all grade levels, students will receive college preparatory instruction beginning in the primary grades (Kentucky Department of Education, 2010). If districts postpone college preparatory training until high school, graduates become at risk of not meeting college readiness benchmarks.

To support the college readiness movement, educators must utilize data to identify college ready and non-college ready students. College readiness can be evaluated using ACT scores, which measures students' academic readiness for college in key content areas. Students must meet benchmarks established by ACT in order to reach college readiness status. ACT established benchmarks through empirical data of actual course

performance of college students. The ACT College Readiness Benchmarks institutes the minimum ACT test scores required for students to have a high probability of success in first-year, credit-bearing college courses (ACT, 2007a).

Significance of the 8th Grade Year

Presently, policies promote high schools to align college readiness to curriculum and graduation (Roderick et al., 2009). High schools must develop foundational skills such as writing, a variety of reading strategies, and a deep understanding of math to build the necessary college ready skills for success at the postsecondary level (Conley, 2008). High school students must cultivate academic behaviors such as, goal-setting, time management, and study skills (Conley, 2011). However, high school educators struggle to balance the pressure of improving state test scores and advancing college readiness. Students entering high school need prior exposure to college ready behaviors and expectations. The vast majority of high school students have not engaged in educational activities to prepare them to succeed in college (McCarthy & Kuh, 2006). Further, students who do not attain grade-level proficiencies in math and reading by the 8th grade usually will not reach college ready standards at the end of high school (Kuh, 2007). The P-12 system, not just high schools, fails to connect curriculum and academic expectations to colleges, resulting in many students not having the requisite skills to enter college without taking remedial course work (Venezia et al., 2005).

Academic achievement, the cognitive knowledge, skills, and abilities measured by achievement tests, plays a substantial role in the determination of student readiness for college and career (ACT, 2008b). The achievement test, EXPLORE, administered during students' 8th grade year, assesses student preparedness for further education and careers

(ACT, 2011c). The academic achievement at the 8th grade level has the most impact on college readiness (ACT, 2008b). Therefore, interventions must occur before students enter 8th grade or high school.

Early remediation of deficiencies in academic behaviors can be an effective strategy for improving later academic achievement (ACT, 2008b). A strong correlation exists between student dropouts and academic performance demonstrating that by improving academic achievement, students will less likely dropout and are on target to be college ready by the end of high school (Balfanz, Herzog, & Mac Iver, 2007). Rigorous academic standards must be employed at each grade level to ensure all students graduate from high school college ready (US Department of Education, 2010). However, the setting of ambitious standards requires educators, policymakers, and communities to focus on early intervention (Dougherty, Mellor, & Smith, 2006). According to the 2008 ACT report, fewer than two in ten 8th graders were on target to be ready for college-level work by the time they graduate from high school, which validates the need for intervention before high school.

In summary, these studies emphasize the importance of P-12 college preparation. The first study examines early warning indicators identifying students off the college readiness track prior to the 8th grade EXPLORE test. These warning indicators flag students who need intervention before entering the 8th grade. The second study explores the timing to college readiness as students progress through middle and high school. Understanding when students become college ready and the factors that influence readiness will help develop targeted interventions.

FINDING THE PATHWAY TO COLLEGE READINESS: EARLY WARNING INDICATORS PRIOR TO 8TH GRADE

In recent years, the value of a high school diploma has depreciated. The shift from an industrial economy to one based on service, information, and technology has dramatically increased the importance of advanced skills and credentials (Wimberly & Noeth, 2005) and a high school diploma no longer adequately prepares students for placement in the job market (Barth, 2003). In order to prepare students to take advantage of opportunities in the workplace, curriculum and instruction at the secondary level must focus on student college readiness (Dougherty et al., 2006). Educators must work to ensure all students graduate ready to pursue postsecondary education on a pathway towards a career to meet the evolving requirements of the internationally competitive workforce (ACT, 2009). Policymakers and educators need to develop academic standards to prepare students for the demands of the current and future workforce to continue the advancement of the U.S. economy (Gonzales et al., 2008; National Commission on Excellence in Education, 1983; OECD, 2000).

In 2010, The Civic Marshall Plan was developed to combat the dropout crisis in America (Balfanz, Bridgeland, Moore, & Fox, 2010a). The Plan recently extended its purpose to graduate every student ready for college and the 21st century workforce (Balfanz, Bridgeland, Bruce, & Fox, 2012). For over 40 years, educators have struggled

to graduate high school students on time and reduce the number of dropouts (Balfanz & Herzog, & Mac Iver, 2007), however, in 2009, nearly 25% of the nation's students dropped out of school, clearly highlighting the need to develop methods to graduate a higher percentage of students (Balfanz et al., 2012). In 2008, the graduation rate improved from 72% to 75%, a 3% increase since the implementation of NCLB in 2001, but the rate of progress will not meet the 90% graduation goal by 2020 at its current pace (Balfanz et al., 2010a). Although our nation clearly needs students to graduate from high school, solutions to reduce the number of dropouts seem insufficient if students graduate without the skills to succeed at the postsecondary level.

In an effort to target probable dropouts, Balfanz, Wang, and Byrnes (2010) developed an early warning indicator system for educators to identify potential dropouts. Early indicators reveal stress signals of students who will likely become disengaged and struggle to stay in school. Using the conceptual framework of Balfanz's work on dropout prevention, this study will examine early warning indicators of students who display characteristics of falling off the college ready trajectory prior to the 8th grade. Using the results of the EXPLORE exam as the outcome benchmark of schooling prior to high school, this study will examine predictor variables to develop a typology of students who likely will not meet college readiness standards by high school graduation. The EXPLORE exam measures a student's likelihood of being on a pathway to college readiness. Therefore, students displaying stress signals of falling off the college ready trajectory should be targeted prior to 8th grade to increase the odds of meeting EXPLORE benchmarks. By examining predictors of 8th graders likely to fall of the college ready trajectory, this study's goal is to contribute guidance on how to identify students for

college readiness interventions as early as 3rd grade. The purpose of this study is to identify early warning indicators of students who likely will not be on a college ready trajectory by the 8th grade. Specifically, this study will address the following research questions:

1. Does attendance and behavior associate with the likelihood of being on a college ready trajectory by 8th grade?
2. Do course failures in middle school associate with the likelihood of being on a college ready trajectory by 8th grade?
3. Do state standardized and national norm-referenced test scores in reading and math associate with the likelihood of being on a college ready trajectory by 8th grade?

Literature Review

Background

In 1983, authors of *A Nation at Risk*, discovered a 13% illiteracy rate among 17-year olds and an increased enrollment in remedial college courses. This report depicted perceived inadequacies and weaknesses of the American education system. Since this report exposed a United States' education crisis, states independently adopted their own standards-based education systems with intentions of promoting rigorous academic expectations and higher standards (NCLB, 2001). However, the high school graduation requirements of some state departments of education remain below college expectations (Conley, 2007). For example, in several states educational policy mandates students earn only two mathematics credits, typically not including Algebra II (ACT, 2007b). Under

such guidelines, high school students will not acquire adequate knowledge and skills for postsecondary success. Whether students aspire to enter college or the workforce, ACT (2008a) reports high school students will more likely be college and career ready by successfully completing four years of English, three years of math, three years of science, and three years of social studies.

Traditionally, school districts focused on the graduation of every student (Balfanz, et al, 2012). Educators and policymakers concentrated on improving graduation rates and grade promotion. However, graduation rates and dropout prevention appear irrelevant if students graduate from high school lacking postsecondary skills necessary for success in college or the workplace. A primary objective of our secondary education system often intends to provide all students with the necessary academic and cognitive skills to ensure postsecondary success through college or the workforce (Conley, 2010). Regardless of whether a student enters college or work, the skills needed for either pathway have converged (Barth, 2003). Students need cognitive reasoning, problem-solving, and behavioral skills in both college and the workplace (Carnevale & Desrochers, 2002). Additionally, both postsecondary pathways require strong reading, writing, and math skills (Barth, 2003).

Putting all students on a college ready trajectory requires equipping graduates with the necessary skills for success prior to high school graduation. Thus, college readiness refers to several different pathways a graduate can choose at the postsecondary level. College readiness can be defined as "the level of preparation a student needs to enroll and succeed – without remediation – in a credit-bearing general education course at 2-year or 4-year institution, trade school, or technical school" (ACT, 2007a; Conley,

2007; Moore et al., 2010). Although postsecondary institutions have varying admission requirements (i.e., 2 and 4-year institutions, trade schools, workforce) graduates need the same set of skills and knowledge to ensure success for all pathways (Barth, 2003; Chow, 2010; Haycock, 2010). High schools must develop college readiness standards aligned with postsecondary institutions to increase college completion, not just college access (Conley, 2003). By setting rigorous and challenging expectations, students develop the necessary skills needed at the postsecondary level. High school programs should create a level of intellectual and skill development that connects seamlessly with college expectations (Conley, 2005a). Graduating from high school lacking college or career ready skills decreases the value of the diploma and inadequately prepares students for college or the workforce (Achieve, 2004; Barth, 2004; Wiggins, G., 2011).

By 2018, America will experience a shortage of skilled workers and persons holding postsecondary degrees (Carnevale, Smith & Strohl, 2010). The global economy needs more Americans with postsecondary training to meet the needs of the technology-driven world, yet the percentage of workers with postsecondary credentials continue to decline (Kelly, 2005). The quality of American education requires improvement to replace the skills of the retiring baby boomers (Carnevale & Frye, 2001). Callan et al. (2006) state,

> We can improve college readiness and completion rates and thereby prepare the workforce for the economic and civic challenges of the next generation, or we can allow gaps in educational achievement to undermine our competitive edge and our communities' economic prosperity (p. 1).

Educators have to develop instructional strategies to foster college readiness or our nation will lose its position in the global arena. High schools have to produce college and career ready citizens if America stands a chance of competing with other countries.

The Insignificance of the High School Diploma

For many years, district leaders focused intervention efforts at the high school level to keep students on a graduation path. However, recent efforts have been implemented to extend into the middle grades. Balfanz et al (2007) developed an effective early warning indicator system to identify middle grade students at risk of dropping out using behavioral engagement. Such behavioral engagement includes a student's decision to miss school, misbehave, or to exhibit poor effort in the classroom indicating disengagement from school (Balfanz et al., 2007; Fredericks, Blumenfield, & Paris, 2004). Grade retention guided school policies and interventions rather than academic skill development (ACT, 2008a; Conley 2007). However, promoting students who do not obtain college ready skills hinders the success of students and fails to produce contributing members to the nation's workforce.

Students who receive a high school diploma have better odds of acquiring a full-time job than those who do not, but will earn $20,000 less than those with a Bachelor's degree (Barth, 2004). Those who only obtain a high school diploma enter a job market of low-skilled jobs with limited possibilities for growth and stability (Wimberly & Noeth, 2005). Students, as early as middle school, understand academic achievement connects to positive future outcomes such as a successful career (Schneider & Stevenson, 1999). Most students and their parents believe the high school curriculum prepares graduates for success in postsecondary education and will provide the skills to acquire a career

(Conley, 2005b). Thus, the high school diploma should convey a meaningful message regarding a person's skill and abilities rather than how many grade levels a student completes.

The Importance of Developing 21st Century Skills for the Future Workplace

Since the 1980s, a growing awareness has emerged regarding student preparation for the 21st century technology-driven job market (Barth, 2003; Haycock, 2010; National Commission on Excellence in Education, 1983). In 1991, the Secretary's Commission on the Achievement of Necessary Skills (SCANS) examined the demands of the future workforce and whether the nation's students could rise to the challenge. The commission found students leave school without the knowledge to find or sustain employment. Schools fail to teach 21st century skills such as critical thinking, problem solving, and communication (Chow, 2010). In 2009, an international project supported by Microsoft, Cisco, and Intel, Assessing and Teaching 21st Century Skills (ATC21s), stated the 21st century job market needs workers to be able to use a wide variety of knowledge and skills.

With the rapidly changing job market, workers must acquire a broad set of transferable skills and behaviors to succeed. When students enter the workforce, they should demonstrate the ability to learn and possess generic skills highly valued by employers (Barth, 2003). With the unpredictability of labor markets, skills, such as literacy, that assists with the obtainment of new skills will prove particularly valuable in the long run (Partnership for 21st Century Skills, 2008). Even manufacturing employers cite the need for strong reading abilities to understand technical manuals and empathize with other cultures (Barth, 2004). According to ACT (2006), workers need the same set

of skills as a first year college student to obtain a job that pays a salary to support a family of four above the poverty line. Regardless of career choice, graduates will need reading, writing, and basic math skills to sustain lifelong, successful employment.

President Obama's *Blueprint for Reform* (2009), states a good education is no longer a pathway to opportunity, but rather a pre-requisite. Students can no longer expect the same jobs those in the past obtained without college training due to a phenomenon called "upskilling" meaning that the 21st century workplace requires at least some postsecondary training (Carnevale & Desrochers, 2002). The new economy demands higher skills, therefore, high school graduates with no postsecondary training face declining economic prospects (Roderick et al., 2009). For our nation to remain competitive with the global workforce, graduates must receive adequate preparation to leave high school college and career ready. According to ACT (2006), schools must provide an education "that prepares all high school graduates for both credit-bearing entry-level college courses and workforce training programs associated with jobs that are likely to offer both a wage sufficient to support a small family and the potential for career advancement" (p. 8).

The 2006 ACT report also stated that regardless of whether students plan to enter the workforce or college, each pathway required comparable levels of readiness in reading and math to succeed and learn additional skills as graduates change jobs throughout their careers.

Identifying and Measuring College Readiness

As previously mentioned, college readiness includes the preparation students need to succeed at a postsecondary institution without remediation. In the 1990s, P-16

initiatives began to focus on creating programs that provide a seamless transition from pre-school to college (Krueger, 2006; Tinto & Pusser, 2006). In 2006, Secretary Margaret Spellings' Action Plan for Higher Education committed the U.S. Department of Education to strengthening K–12 preparation and aligning high school standards with college expectations (US Department of Education, 2006). With new programs and policies geared towards college readiness, the real challenge comes with identifying those who will need interventions and remediation to stay on the college ready pathway.

College and career readiness efforts for students often target the high school years. Many states and districts have raised high school graduation requirements, established achievement test requirements, expanded access to engage more students in college preparatory coursework such as Advanced Placement (AP), and aligned state curricular standards to college expectations (Achieve, 2004). However, these initiatives solely target high school students and fail to address the needs of middle grade students. Since education policies tend to focus on high schools, many middle school students underestimate what they will need to adequately prepare for college (Wimberly & Noeth, 2005). Many middle school students fall behind in their classes, lose academic confidence, and become disconnected from school, leading to academic and behavioral deficiencies in high school (Kay, 2009). The elementary and middle grades need to provide standards-based instruction to put all students on a pathway to college readiness (Balfanz, 2009).

Interventions for students off track for meeting college readiness standards often come too late, usually at the secondary level. According to ACT (2009), "students who are significantly off target for college and career readiness in eighth grade are far less

likely to become ready for college-level work during high school" (p. 6). If schools delay interventions or cannot target struggling students prior to eighth grade, students will likely need additional academic support to recover and enter the college ready trajectory. Becoming college ready does not suddenly happen when students graduate from high school, therefore, upper elementary and middle grades must develop rigorous instruction so every student enters high school with the skills to meet the demands of high school curriculum (ACT, 2008b). Students who take challenging courses in middle schools (i.e., Algebra I) tend to succeed in high school courses and demonstrate college readiness (Wimberly & Noeth, 2005). Districts and educators must intervene in the upper elementary grades and middle schools in order to get students on a college readiness trajectory (ACT, 2009).

Early Warning Indicators of College Readiness

An early warning indicator system can be helpful to identify students who are at risk of falling off the college readiness trajectory. Early warning indicators are a set of measurable indicators related to college readiness tracked regularly over time (Bryant & Walsh, 2004). According to Balfanz, Wang, and Byrnes (2010), indicators should be empirically created, simple and easily collected, include a few key variables, and capture the majority of students.

According to Adelman (2006), students who engage in rigorous high school courses will likely experience college success without remediation. However, putting students on a college readiness pathway begins before a student enters high school (ACT, 2008b). Current legislation guides P-16 education systems to identify indicators so all students can be successful in some form of postsecondary education regardless of race,

gender, or socioeconomic status (US Department of Education, 2006, 2010). Grades students earn in middle school math, as early as 6th grade, could indicate whether a high school graduate will need math remediation college courses (Hoffman, Vargas, Venezia, & Miller, 2007). The elementary grades should build foundational skills in reading, math, and science and the middle grades must develop deep content knowledge and proficiency of 21st century skills (Kay, 2009).

School districts understand the urgent need to challenge students with rigorous curriculum, yet 80% of 8th graders who enter high school do not demonstrate the math skills and knowledge to have eventual college success (ACT, 2008b). Further, ACT (2006) found middle school students who do not meet grade-level reading standards will likely never be on the college ready track. Students who do not attain grade-level proficiency in math and reading by the eighth grade are much less likely to be college ready at the end of high school (Kuh, 2007). Challenging, rigorous curriculum taught through effective instructional practices proves imperative so all students have the opportunity to remain on a college readiness pathway.

Performance on achievement tests can determine college readiness. ACT's EPAS measures college readiness beginning with the EXPLORE test administered during the 8th grade. Absent effective targeted interventions, the level of college readiness a student demonstrates on the EXPLORE exam in the 8th grade will likely remain unchanged through high school (ACT, 2008b). Identifying warning signals prior to the 8th grade of students who likely will not meet benchmarks on the EXPLORE exam could put those students back on the college ready track.

Contributing Variables to College Readiness

Many variables, such as achievement on standardized tests, rigorous coursework, and college aspirations, contribute to the college readiness goal. Even though many graduates lack academic preparedness, 80% of 10th graders, regardless of race, gender, or ethnicity, aspire to attend college (US Department of Education, 2004). College enrollments continue to rise for all racial and ethnic groups (Roderick et al., 2009). By 2015, the National Center for Education Statistics estimates four-year college enrollment will increase by approximately 16% (US Department of Education, 2008). Yet, many students who enter college do not have the skills to achieve success and this particularly affects minorities and the poor (Haskins & Kemple, 2009). Blacks and Hispanics have not substantially increased the number of earned college degrees (Roderick et al., 2009). Clearly, an achievement gap continues to exist for poor and minority students. However, Noble, Davenport, Schiel, and Pommerich (1999) found race and ethnicity accounted for no more than 1% to 2% of variance in ACT scores which suggests academic behaviors likely have a higher correlation to college readiness than demographic factors. If the nation ever intends to close the achievement gap, districts and educators must focus on developing pre-college academic and behavioral skills (Kuh, 2007).

Based on decades of research concerning college readiness and academic preparedness for postsecondary training, policymakers can create systems to track students who likely will not meet college ready standards by high school graduation. Creating early warning systems will ensure students receive academic services and remediation prior to the 8th grade, therefore, reducing the amount of students who finish 8th grade off the college ready trajectory. This study will use longitudinal data to examine

student characteristics to establish an early warning indicator system to identify students who likely will fall off the college ready trajectory by the 8th grade.

Methodology

Population and Sample

The population for this study consisted of nearly 100,000 students across 150 schools in Jefferson County Public Schools (JCPS), the 26th largest district in the United States. The student body consisted of 51% White, 36% African-American, and 13% Other, with approximately 61% who participated in the free and reduced lunch program. The sample from this population was restricted to 8th grade students who took the EXPLORE exam during the 2007-2008 school year in JCPS, maintained continuous enrollment in JCPS from grades 3-8, and acquired test data from 3rd thru 8th grade. This group of students represented the 2008 8th graders from JCPS who took the EXPLORE, PLAN, and ACT exams as part of ACT's EPAS. Table 2 provides demographic information for the 2007-2008 8th graders.

Table 2

Descriptive Statistics for the 2007-08 8th Grade Cohort

Characteristic	Sample Distribution			
	Total	%	FRL Total	FRL%
Gender				
Male	2262	50.2	1203	53.2
Female	2241	49.8	1181	52.7
Race/ethnicity				
White	2453	54.5	873	35.6
Black	1794	39.8	1366	76.1
Other	256	5.7	145	56.6

Measures

Dependent variable. For this study, the dependent variable was derived from EXPLORE scores from 8th graders in JCPS during the 2007-2008 school year. These scores were used to create a dichotomous variable that indicated students either met (1) or did not meet (0) EXPLORE benchmarks. EXPLORE benchmarks were separated into two categories of math and reading for separate analyses. Math and reading benchmarks were selected for this study's dependent variables because state accountability for Kentucky schools focus on state test scores in these core content areas and college readiness strongly correlates with math and reading achievement in middle and high school (Kuh, 2007). Furthermore, EXPLORE serves as the first measure of college readiness and strongly predicts a student's likelihood of becoming college ready by high school graduation. EXPLORE benchmarks were empirically established using course grade data in a nationally representative sample of postsecondary institutions (ACT, 2009). Students who meet ACT benchmarks had a 50% chance of earning a "B" in the respective college courses and a 75% chance of earning a "C" (Table 3).

Table 3

EPAS College Readiness Benchmarks

Subject Test	College Course	EXPLORE Test Score	PLAN Test Score	ACT Test Score
Math	College Algebra	17	19	22
Reading	College Social Sciences	15	17	21

Note. Adapted from "How Much Growth Toward College Readiness is Reasonable to Expect in High School?" by ACT (2009).

Predictor variables. As noted in the literature review, several variables appeared promising for serving as early warning indicators of college readiness, including but not limited to, race, gender, math and reading performance, attendance, and behavior. Similar

to Balfanz's work (2010) which created an early indicator warning system for dropout prevention, this study used the following methods to identify predictors associated with a student's likelihood of being on a college ready trajectory by 8th grade. Using the district's student information system (SIS), demographic and behavioral data were collected for each student in the sample. The predictor variables were selected based on the literature and accessibility. Balfanz , Herzog, and Mac Iver (2007) found attendance, behavior, and course performance were associated with a student's odds of dropping out of school. This study examined the same predictor variables as the Balfanz study, as well as state standardized and norm-referenced test scores, dating back to the cohort's 3rd grade year. State accountability test scores and scores from the Comprehensive Test of Basic Skills (CTBS) were used as predictor variables to examine the connection between early math and reading achievement to EXPLORE math and reading benchmarks

As mentioned in the literature review, race and gender account for a small percentage of variance for ACT performance and will be included as controls because these are not manipulable variables. Due to the collinearity of race and socioeconomic status, only race was used as a control variable. Predictor variables to be examined (Table 4) include: attendance 3rd thru 7th grade, suspensions 3rd thru 7th grade, course failures 6th and 7th grade, and state-mandated test scores 3rd thru 7th grade. 3rd thru 7th grade data were available for all predictor variables except for elementary course failures because SIS did not report elementary course performance for this cohort. Further, students did not take math and reading state standardized exams every year due to the Kentucky testing schedule, therefore, reading and math achievement could not be used for all grade levels.

Table 4

Description of Control and Predictor Variables

Type	Construct	Description	Value
Control Variables			
	Gender	Male or female	0= Male 1=Female
	Race	White, Black, or Other	1=White 2=Black 3=Other
Predictor Variables			
	Attendance (3rd thru 7th grade)	Days present/days enrolled per school year[a]	1=95-100% 2=90-94% 3=85-89% 4=80-84% 5=75-79% 6=70-74% 7=0-69%
	Suspensions (3rd thru 7th grade)	Number of days suspended per school year	0=0 Suspensions 1=1 Suspension 2=2 Suspensions 3=3 Suspensions 4=4 Suspensions 5= 5 or more suspensions
	Course Failures (6th and 7th grades only)[b]	Average number of course failures per semester[c]	0= 0 Course failures 1=1 Course failure 2=2Course failures 3=3Course failures 4=4 Course failures 5=5 or more course failures
	Standardized State Math Scores	Scores reported by performance level: Novice, Apprentice, Proficient, Distinguished[d]	0=Novice/Apprentice 1=Proficient/Distinguished
	Standardized State Reading Scores	Scores reported by performance level: Novice, Apprentice, Proficient, Distinguished	0=Novice/Apprentice 1=Proficient/Distinguished
	CTBS Math Scores[e]	Scores reported by percentiles[f]	0=Below 60th percentile 1=Above 60th percentile
	CTBS Reading Scores	Scores reported by percentiles	0=Below 60th percentile 1=Above 60th percentile

Note. [a]Student must be enrolled at least 100 consecutive days per school year to have continuous enrollment in JCPS.
[b]Course failures unavailable through SIS in elementary school.
[c]Course failures were reported by grading periods. Each semester has three grading periods.
[d]Schools receive credit only for Proficient and Distinguished scores which indicate students perform on or above grade level.
[e] CTBS is a norm-referenced test designed to measure student progress in Reading, Language, and Math.
[f]Scores >60 equate to KCCT Proficient/Distinguished scores. Scores <60 equate to Novice/Apprentice (Sinclair & Thacker, 2004)

Research Design

This study explored variables potentially serving as useful early warning indicators of students who likely will not meet college readiness standards by high school completion. A logistic regression model was used to determine predictions between the binary dependent variable and the predictors (Hosmer & Lemeshow, 2000). The cohortwas chosen because this group of students participated in all three exams (EXPLORE, PLAN, and ACT) of the EPAS and provided the necessary longitudinal data to examine an early warning system for college readiness. Although only the EXPLORE results were used in this study, the PLAN and ACT scores could be used for future analysis of this longitudinal cohort. The data supplied a comprehensive set of information concerning the cohort's academic and non-academic behaviors. By using a logistic regression model, we could explore how the chosen set of predictor variables might explain college readiness outcomes on a student's first measure of college readiness, the EXPLORE exam.

The data were entered into PASW Statistics 18.0 and descriptive statistics were conducted. The purpose for running the descriptive statistics was to determine the overall distribution of the population. Through the analysis, it was determined that of the sample (n=4503), 74.8% did not meet math EXPLORE benchmarks and 68.7% did not meet reading EXPLORE benchmarks. Through the descriptive statistics, attendance, course performance, and state standardized and norm-referenced test scores revealed significant predictive power on the dependent variable. Using Balfanz's conceptual framework for early warning indicators, cut points were established to determine the range at which a student becomes most at-risk for falling off the college ready trajectory by 8th grade. For

example, the comparison group for attendance became the 95-100% range because this group of students most consistently met EXPLORE benchmarks.

Logistic Regression Model

To reiterate, the goal of this analysis was to develop an early warning indicator system for college readiness which identified early warning indicators that were empirically created, were accessible to educators, consisted of a few variables, and captured the majority of students. Using the outcome variable of the 2007 EXPLORE results and controlling for gender and race, predictor variables were examined to flag potential students at-risk for falling off the college ready trajectory by the 8th grade. On the basis of the approach used by Maltese & Tai (2011), a progression of logistic regression models were created to assess predictor variables including attendance, suspensions, course performance, nationally norm-referenced exams, and state-mandated test scores while controlling for race and gender.

According to Maltese and Tai (2011), "Through regression, it is only possible to assess the relationships between indicator variables and the outcome measure—to determine whether any change in a given factor is associated with a significant change in the outcome variable" (p. 889). To determine the role each variable played at each grade level from 3rd thru 7th grade, information was entered into chronological blocks (Adelman, 2006). By using this method, we assessed which characteristics explained significant variance (i.e. attendance versus behavior) and at which grade level. The purpose in building the logistic model in chronological blocks was to examine when and how relationships develop between variables with significant predictive power and the dependent variable. By examining predictor variables at each grade level, schools can

properly identify students who display warning signals of not being on the college ready pathway by 8th grade and when particular variables affect the college readiness trajectory. To evaluate the predictor variables' effects on college readiness, the following blocks of predictor variables were entered into two logistic regression models, one for the binary outcome of reading EXPLORE (Table 5) and separately modeled for math EXPLORE (Table 6).

Table 5

Predictor Variables Entered By Chronological Steps for Reading EXPLORE

Step	Predictor Variables Used
Control	Race and gender (comparison group white males)
3rd grade	Attendance rates, suspensions, CTBS reading scores
4th grade	Attendance rates, suspensions, standardized state reading scores
5th grade[a]	Attendance rates, suspensions
6th grade	Attendance rates, suspensions, course failures, CTBS reading scores
7th grade	Attendance rates, suspensions, course failures, KCCT reading scores

Note. [a]Kentucky 5th graders do not take standardized state reading exams.

Table 6

Predictor Variables Entered By Chronological Steps for Math EXPLORE

Step	Predictor Variables Used
Control	Race and gender (comparison group white males)
3rd grade	Attendance rates, suspensions, CTBS reading scores
4th grade	Attendance rates, suspensions
5th grade[a]	Attendance rates, suspensions, standardized state math scores
6th grade	Attendance rates, suspensions, course failures, CTBS reading scores
7th grade	Attendance rates, suspensions, course failures, KCCT reading scores

Note. [a]Kentucky 4th graders do not take standardized state math exams.

An odds ratio was used to establish the association between predictor variables and the outcome measure. Odds ratios indicate how much more (or less) likely an outcome occurs based on the existence or absence of a given factor (Hosmer & Lemeshow, 2000). The odds ratio is the ratio of the odds of an event occurring in one

group (i.e., students with 95% attendance) to the odds of it occurring in another group (i.e., students with 80% attendance). An odds ratio of 1 indicates the condition or event under study is equally likely to occur in both groups (i.e., both groups of 8th graders likely remain on the college ready trajectory). An odds ratio greater than 1 signifies the condition is more likely to occur in the first group and an odds ratio less than 1 means the condition is less likely to occur in the first group. The odds ratio is not a percentage, but rather the relative odds of a student being in one category or the other (i.e., met EXPLORE benchmarks) based on a set of predictor variables (i.e., state reading scores). Results will also be reported using an Inverse Odds Ratio (IOR). IOR is used for negatively related coefficients which produces a negative beta (DesJardins, 2001). IOR is calculated by dividing 1 by the odds ratio (Exp β).

Results

Significance of Grade Level

Each grade level determined attendance, course performance, and state standardized and norm-referenced test scores significantly impacted the likelihood of a student being on a college ready trajectory by 8th grade. Using Hosmer and Lemeshow's test for goodness of fit, 3rd grade was the pivotal year at which the predictor variables most significantly determined the likelihood of a student being on a college ready trajectory by 8th grade at .996 (Reading) and .979 (Math) (Table 7).

Demographic Variables

The first block of variables entered into both models served as control variables. As determined by Nagelkerke R^2, this block demonstrated gender and race collectively

Table 7

Summary of Significance of Predictive Power at Each Grade Level for Reading and Math Models

Grade	Reading	Math
	Goodness of Fit[a]	Goodness of Fit
3rd grade	.996	.979
4th grade	.578	.395
5th grade	.505	.367
6th grade	.033	.662
7th grade	.214	.300

[a]*Note*. Significance determined by Hosmer and Lemeshow's test of goodness of fit.

have 11% variance on a student's likelihood of being on the college ready trajectory at 8th grade. At this stage, for both the math and reading models, there was a negative association between Black students and meeting EXPLORE benchmarks indicating white students were 3.7 times more likely than Black students to meet reading EXPLORE benchmarks and 4.4 times more likely to meet math EXPLORE benchmarks. Students of Other races were nonsignificant for both models. Gender was nonsignificant for the math model, but for the reading model, females were 1.3 times more likely to meet reading EXPLORE benchmarks. Though significance for gender was not found for math or for Other races in both reading and math EXPLORE, demographic variables were retained throughout the blocks. Table 8 summarizes the results of the demographic variables.

3rd Grade Variables

The next block of variables was a set of academic and non-academic variables at the 3rd grade level: attendance, suspensions, and CTBS scores. Attendance and CTBS scores positively correlated with meeting both math and reading EXPLORE benchmarks at 8th grade, indicating attendance rates and test scores likely put students on a college ready trajectory as early as 3rd grade. Specifically, in both the math and reading models,

attendance rates had significant predictive power when attendance rates fell within the 80%-94% range signifying the cut point where absences begin to negatively affect academic performance. For the math model, students who scored above the 60th percentile on the math CTBS were 10.2 times more likely to meet math EXPLORE benchmarks than students who scored below the 60th percentile. In the reading model, students who scored above the 60th percentile on the reading CTBS were 8.5 times more likely to meet reading EXPLORE benchmarks. Table 9 summarizes the results of the 3rd grade variables.

4th grade variables

The block including 4th grade data was entered into the model in an identical fashion as 3rd grade. 4th grade attendance and suspensions were entered for both models and state standardized reading scores were added to the reading model. In Kentucky, 4th graders did not take a state standardized math test, therefore, test scores did not serve as a predictor variable for the 4th grade math model. For both models, attendance significantly impacted the likelihood of a student meeting EXPLORE benchmarks. As with the 3rd grade variables, the attendance range between 80% and 94% was the point at which most students fell off the college ready trajectory. Both reading and math models revealed suspensions did not significantly influence a student's likelihood of meeting EXPLORE benchmarks. For the reading model, students who scored proficient or higher on the reading state standardized test were 13 times more likely to meet reading EXPLORE benchmarks than students who scored below proficient. Table 10 summarizes the results of the 4th grade variables.

Table 8

Summary of Logistic Regression Analysis Predicting Meeting Reading and Math EXPLORE Benchmarks: Demographic Variables

	Reading				Math			
Predictors	β	SE	Exp(β)	IOR[1]	β	SE	Exp(β)	IOR[1]
Female	.280***	.067	1.323***		-.134	.071	.874	1.144
Black	-1.318***	.076	.268***	3.731	-1.489***	.087	.226***	4.425
Other	-.162	.136	.850	1.176	-.085	.139	.918	1.089

Note. [1]Inverse Odds Ratio calculated for a negative log odds (β).
*** $p < .001$

Table 9

Summary of Selected Logistic Regression Analysis Predicting Meeting Reading and Math EXPLORE Benchmarks: 3rd Grade Variables

	Reading				Math			
Predictors	β	SE	Exp(β)	IOR	β	SE	Exp(β)	IOR
Attendance								
Attendance<95%	-.595***	.113	.552***	1.812	-.455***	.121	.635***	1.575
Attendance<90%	-.652*	.274	.521*	1.919	-.697*	.309	.498*	2.008
CTBS Read Score	-2.145***	.083	.117***	8.547				
CTBS Math Score					-2.328***	.104	.098***	10.204

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

5th grade variables

The next block of variables included 5th grade attendance and suspensions for both models. For the math model, state standardized math scores were also entered. In Kentucky, 5th graders did not take a state standardized reading test, therefore, test scores did not serve as a predictor variable for the 5th grade reading model. As with the prior grades, attendance significantly impacted the likelihood of a student meeting EXPLORE benchmarks at the 80%-94% range, indicating the majority of students who did not meet EXPLORE benchmarks fell within this range. Suspensions did not have a significant association to meeting EXPLORE benchmarks. In the math model, students who scored proficient or higher on the math KCCT were 14.7 times more likely to meet the math EXPLORE benchmark than students who scored below proficient. Table 11 summarizes the results of the 5th grade variables.

6th grade variables

For the 6th grade block, the same variables as the previous blocks were entered with the addition of course failures. Unlike the elementary grades, course failures were reported through the student information system in the middle grades which provided the data for this block of the model. As previously stated, the course performance variable is the total number of course failures per semester. For both models, attendance and course performance significantly impacted the likelihood of a student meeting EXPLORE benchmarks. For example, a student who averaged above 95% attendance was 3.2 times more likely to meet EXPLORE reading benchmarks than a student who fell below 80% attendance. For course failures, students who failed three or fewer courses, on average, were less likely to be on a college ready trajectory than students who did not fail a course

Table 10

Summary of Selected Logistic Regression Analysis Predicting Meeting Reading and Math EXPLORE Benchmarks: 4th Grade Variables

	Reading				Math			
Predictors	β	SE	Exp(β)	IOR	β	SE	Exp(β)	IOR
Attendance								
Attendance <95%	-.449***	.121	.638***	1.567	-1.035***	.133	.355***	2.817
Attendance <90%	-.546*	.223	.579*	1.727	- .605**	.217	.546**	1.832
KCCT Reading Score	-2.558***	.123	.077***	12.987				

Note. *p <.05, **p <.01, ***p <.001

Table 11

Summary of Selected Logistic Regression Analysis Predicting Meeting Reading and Math EXPLORE Benchmarks: 5th Grade Variables

	Reading				Math			
Predictors	β	SE	Exp(β)	IOR	β	SE	Exp(β)	IOR
Attendance								
Attendance <95%	.482***	.131	1.620***		-.617***	.140	.540***	1.852
Attendance <90%	-.240**	.162	.787**	1.271	-.786**	.318	.456**	2.193
KCCT Math Score					-2.686***	.109	.068***	14.706

Note. **p <.01, ***p <.001

either semester during the 6th grade. There was a positive association between students who scored above the 60th percentile on the math and reading CTBS. Students who scored above the 60th percentile in both reading and math were 9.3 (reading) and 16.4 (math) times more likely to meet EXPLORE benchmarks than students who fell below the 60th percentile. Table 12 summarizes the findings for the 6th grade variables.

7th grade variables

For the final block, in addition to the demographic control variables, attendance, suspensions, course performance, and math and reading state standardized scores were entered. For both models, there was a positive association between students who scored proficient or higher on the math and reading state standardized exams and meeting EXPLORE benchmarks. Students who scored above proficient on both reading and math state exams were 12.7 (reading) and 24.4 (math) times more likely to meet EXPLORE benchmarks than students who did not meet proficiency standards. As with the prior grades, attendance and course performance significantly impacted the likelihood of a student meeting EXPLORE benchmarks indicating students who fell below 95% attendance were less likely to meet EXPLORE benchmarks. Additionally, students who failed at least one 7th grade course were less likely to meet EXPLORE benchmarks in both math and reading than students who failed no courses. Table 13 summarizes the results for the 7th grade variables.

Discussion and Conclusions

This study identified significant associations between academic behaviors and meeting college readiness benchmarks at the first measure in the 8th grade. Although causality

Table 12

Summary of Selected Logistic Regression Analysis Predicting Meeting Reading and Math EXPLORE Benchmarks: 6th Grade Variables

	Reading				Math			
Predictors	β	SE	Exp(β)	IOR	β	SE	Exp(β)	IOR
Attendance								
Attendance <95%	-.411***	.126	.663***	1.508	-.626**	.139	.535**	1.869
Attendance <90%	-.510**	.208	.600**	1.667	-.587**	.230	.556**	1.799
Course Failures								
1 failure 1st Sem	-.428**	.143	.652**	1.534	-.454**	.157	.654**	1.529
1 failure 2nd Sem	-.621**	.148	.538**	1.859	-.514**	.166	.598**	1.672
CTBS Read Score	-2.235***	.090	.107***	9.346				
CTBS Math Score					2.801***	.132	.061***	16.393

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table 13

Summary of Selected Logistic Regression Analysis Predicting Meeting Reading and Math EXPLORE Benchmarks: 7th Grade Variables

	Reading				Math			
Predictors	β	SE	Exp(β)	IOR	β	SE	Exp(β)	IOR
Attendance								
Attendance <95%	-.287**	.110	.751**	1.332	-.454***	.125	.635***	1.575
Attendance <90%	-.039	.196	.962	1.040	-.847***	.250	.429***	2.331
Course Failures								
1 failure 1st Sem	-.658***	.131	.518***	3.534	-.521***	.152	.594***	1.684
1 failure 2nd Sem	-.465***	.133	.628***	1.592	-.136	.156	.872	1.147
KCCT Read Score	-2.542***	.149	.079***	12.658				
KCCT Math Score					-3.187***	.157	.041***	24.390

Note. $^{**}p < .01$, $^{***}p < .001$

cannot be established, the analysis of longitudinal data establishes a strong relationship between predictors and being on target for college readiness (Maltese & Tai,2001). This study supports the need for an early warning indicator system to track students at-risk of falling off the college ready trajectory. The logistic regression models demonstrated that, in addition to race and gender, attendance, course performance, and achievement on state standardized and norm-referenced exams significantly impact a student's likelihood of meeting standards on the 8th grade EXPLORE exam. As early as third grade, students who fell below 95% attendance increased their odds of falling off the college ready trajectory. This finding complements other research (Balfanz, Wang, & Byrnes, 2010) that shows attendance affects academic outcomes. The negative impact of poor attendance on college readiness illustrates substantial seat time in the classroom positively impacts student learning. With missing just 5% of the school year, students lose critical academic instruction which places them at a disadvantage in the college ready pipeline.

Unlike the dropout warning indicators, suspensions had no significant impact on a student's likelihood of being on a college ready trajectory. Poor conduct associates with student disengagement from school leading to the behavior of dropping out of school (Balfanz, Herzog, & MacIver, 2007). College readiness relates to academic performance where suspensions relate to student behaviors, such as choosing to drop out of school (Balfanz et al, 2007). In other words, a student likely to drop out of school may behave differently than a student who likely will fall off the college ready trajectory. Further, suspensions count as absences, therefore, suspension variance was absorbed by the attendance variable.

During the middle grades, students who failed just one course during the 6th or 7th grade were more likely to fall off the college ready trajectory. Although this study did not categorize the subjects failed, the finding that failing any course negatively impacted a student's college ready trajectory indicates the importance of academic performance in the classroom. Due to the calculation of academic marks in the middle grades, students and teachers have the opportunity to focus on semester grades rather than grading periods, distorting the actual ability level of students. Middle school grading practices and grade promotions allow students to develop a false sense of academic performance which places struggling middle school students at an academic disadvantage. The results suggest if students do not meet academic course standards as early as the 6th grade, the likelihood of falling off the college readiness trajectory significantly increases.

The most alarming finding of this study highlights the importance of achievement on state mandated and norm-referenced exams. As stated in the results section, students who did not meet standards on state standardized and norm-referenced exams were less likely to meet EXPLORE benchmarks by 8th grade, therefore, keeping them off the college ready trajectory. Achievement on state accountability exams can no longer serve as discrete academic measures, but should guide interventions and remediation for struggling learners.

Implications of an Early Warning Indicator System

Practitioners can utilize the findings from this study to establish an early warning indicator system to target students who likely will not be on a college ready trajectory by 8th grade. With an indicator system, it becomes possible to design targeted and effective interventions at the school, district, and state level. Educators should monitor student

progress through attendance, achievement on state standardized and norm-referenced exams, and course performance.

Attendance. As previously stated, students who fall in the 80-94% attendance range are more likely to fall off the college ready trajectory. This range captured the majority of students at risk of falling off the college ready trajectory by 8th grade. Practitioners should monitor student attendance and intervene when students show signs of a warning flag, indicating a student moving off track (Balfanz, Wang, & Byrnes, 2010). For example, the number of absences in which a student becomes at risk for falling off the trajectory ranges between 10 and 35 days. Therefore, when a student misses their tenth day, interventions should begin. Educators need to design a tiered intervention system for attendance where sequential steps occur to improve a student's attendance rate. The intervention system could entail parent contact, conferencing with the student, utilization of a truant officer, and so on. Regardless of the specific steps of the intervention system, truant students must be identified and must receive interventions as early as the third grade or the student's odds of falling off the college ready trajectory significantly increase.

Achievement on state standardized and norm-referenced exams. This study clearly demonstrated the positive relationship between achievement on state standardized and norm-referenced exams and the likelihood of being on a college ready trajectory. Educators should use test results to target students who demonstrate deficiency of learning expectations as measured by summative assessments. For example, a 3rd grader who does not meet standards on the CTBS reading exam should progress to the 4th grade. However, the student should recover the unmet 3rd grade reading standards through

remediation programs. Practitioners must have explicit guidelines and strategies for students who advance to the next grade but have not met academic standards from the previous grade level.

The results reveal the achievement gap between students who meet standards on both state standardized and norm-referenced exams and those who do not widens with each additional grade level. This finding supports literature on standards-based grading and student achievement which involves students achieving proficiency on specific course standards to expand their academic skills and knowledge (O'Conner, 2009). Students who do meet academic standards at each grade level struggle to master new content material as they continue through the school system. School and district practices and policies must require immediate remediation of core content standards for all students who do not meet standards on state standardized and norm-referenced exams (Ainsworth & Viegut, 2006).

Course Performance. As previously stated, this study found students who failed just one course in middle school increased their odds of falling off the college ready trajectory. Practitioners should use frequent formative assessments to flag students exhibiting warning signals of failing a course. If educators wait until a student has failed the course to intervene, it may place the student at risk of falling off the college ready trajectory. By tracking student progress through standards-based grading practices, educators can monitor students' academic abilities and target struggling students (Marzano, 2010; Stiggins, 2007; Stiggins & Dufour, 2009).

To build support for an early warning indicator system of college readiness, further research is needed to examine other factors, such as, student engagement, college

aspirations in the upper elementary grades, grading practices and the effects on student learning, and student mobility. However, this study provides useful and valuable information to guide educational policies and early interventions for students likely to fall off the college ready trajectory. Although some students will likely need interventions and remediation beyond 8th grade to develop college ready knowledge and skills, implementing an early warning indicator system to flag students at risk of falling off the college ready trajectory will reduce the number of unprepared students to finish 8th grade.

TIMING IS EVERYTHING: GETTING STUDENTS BACK ON TRACK TO COLLEGE READINESS IN HIGH SCHOOL

In his first address to the joint session of Congress, President Obama set forth a goal, known as the American Graduation Initiative, for America to have the highest proportion of college graduates in the world by 2020. In October 2007, the Kentucky Counsel on Postsecondary Education established the goal to *Double the Numbers* of Kentucky residents with a Bachelor's degree by 2020. With national, state, and community initiatives focused on increasing not only access to college but also degree attainment, college readiness became a top educational priority for community business leaders. This priority shifted emphasis from simply raising graduation rates to producing high school graduates ready for college and careers.

The increase in rigor and expectations for American youth stemmed from the need to compete in a global economic market and to propel our democratic society. Day and Newburger (2002) showed the probability of employment and higher annual salaries increased with greater postsecondary education attainment. Individual employment also aided the greater community as well as the individual. When more people worked, communities benefited from augmented tax revenues, reduced crime, and increased civic involvement (Bishaw & Semega, 2008).

Currently, 25 % of the national class of 2011 who took an ACT exam demonstrated college readiness in all four subjects (ACT, 2011b). In Kentucky, the state legislature required all juniors to take an ACT in the spring of their junior year beginning with the graduating class of 2008. Despite the change in the test-taking pool from college-bound to all students, the percentage of graduates meeting all four benchmarks dropped three percentage points from 18% in 2007 to 15% in 2009 (ACT, 2011b). With significant numbers of students failing to demonstrate college readiness, educators must find ways prepare large numbers of students to meet college readiness standards.

In addition, ACT researchers showed that, on average, students who do not demonstrate readiness in 8th grade might not be ready by graduation (ACT, 2008b). The research served as an admonition to educators as these results implied high school did not improve college readiness. Districts should update student intervention systems and school practices and policies to match the goal of all students being college ready by graduation. The purpose of this study is to explore the timing to college readiness in an urban school district in the midst of high school reform and answer these questions:

1. Over the course of the high school years, when do students enter the college ready trajectory in English?
2. Over the course of the high school years, when do students enter the college ready trajectory in math?
3. How do student demographics, beliefs, and behaviors influence the likelihood of entering the college ready trajectory in English?
4. How do student demographics, beliefs, and behaviors influence the likelihood of entering the college ready trajectory in math?

Background

College Readiness as a Process

Deeply entrenched into what Tyack and Cuban (1995) call the "grammar of schooling", the high school practice of issuing credits or Carnegie units prevailed as a measure of progress towards graduation (Bonous-Hammarth & Allen, 2005). Though the intent of the credit structure functioned to provide a common learning experience, no guarantee existed that teachers covered the same curriculum in similarly titled courses across the nation (ACT, 2011a). The Common Core State Standards Initiative (CCSSI) began in order to standardize the learning expectations at each grade level with the ultimate target of college readiness in mind (Porter, McMaken, Hwang, & Yang, 2011). The challenge for educators existed in managing students who do not progress at the prescribed rate. Special populations, on both ends of the spectrum, received attention, in part from advocacy group demands. Specialized pullout programs and ability grouping supported the specific needs of gifted and talented, special education, and English language learners. Large schools and districts utilized these systems as a necessary function of efficiency (Simonsen et al., 2010). Expected to progress through elementary and secondary schools at the prescribed rate, the majority of students did not qualify for specialized plans and services.

Districts struggled with differentiating learning experiences for students who leaked out of the educational pipeline (Welner, Burris, Wiley, & Murphy, 2008). To address this need for flexibility, districts employed tactics including modified calendars and school day schedules, Response to Intervention (RtI), and Supplemental Education Services (SES) that showed inconsistent results (Bellei, 2009; Fuchs, Fuchs, & Compton,

2010; Leroux, Vaughn, Roberts, & Fletcher, 2011; Munoz, Potter, & Ross, 2008; Pearlman, 2006). An example of extending time, Knowledge is Power Program (KIPP) schools not only extended the school day to eight or nine hours, but also extended the school week to include Saturday mornings and the school year to include summer sessions (Ross, McDonald, & Alberg, 2007). Not all students needed more time for learning, but can benefit from different organizations of time. The Talent Development Program used increased and concentrated time to accelerate learning as opposed to remediation, demonstrating a shift in semantics can make powerful changes in a student's beliefs. (Balfanz, Letgers, & Jordan, 2004).

Influences on Academic Preparation

Much like the education process, the development of college readiness followed a specific sequence of events and actions. Formal and informal factors influenced a student's progress through the college ready trajectory (Allen, Bonous-Hammarth, & Teranishi, 2005; Bonous-Hammarth & Allen, 2005). First, students must aspire to go to college. Acting appropriately on the initial hope to attend college included taking challenging course work with expectations aligned to college going. Participation in organized, extracurricular, college preparatory activities became an important step for first generation college students in particular as this group lacked access to college information compared to students with college-educated parents (Ishitani & Snider, 2006). One method of retrospectively evaluating a student's college readiness was to examine the student's ability to access college, persist and eventually graduate. Using regression models, Dickson (2011) found four characteristics associated with college retention: mastery of core subjects, a positive perspective on education, competency with

academic behaviors, and college knowledge. Several factors influenced a student's aspiration to attend college and ability to access college preparatory coursework.

Student characteristics. To increase the number of adults with postsecondary credentials, research on college enrollment, persistence, and graduation propelled the college readiness for all movement as students lacking college readiness skills were less likely to continue their education after graduating from high school (Balfanz et al., 2012). Over the past 20 years, college enrollment gaps between white and Black students decreased but gaps still exist between white and Hispanic students. (Hunt, Carruthers, Callan & Ewell, 2006; Louie, 2007; Noble et al., 2006).The number of high school graduates matriculating into college has been on the rise over the past 20 years, but the college graduation rate remains roughly the same (Bound et al., 2009). To bring attention to the college enrollment and attainment gap, several studies compared college going and completion across racial and socio-economic lines (Berger, Smith, & Coelen, 2004; Bound et al., 2009; Daire, LaMothe, & Fuller 2007; Louie, 2007; & Palmer et al., 2010). Research explaining college access focused on programs, practices, and policies that attempted to level the pre-collegiate circumstances for underserved students (Ascher & Maguire, 2011; Calaff, 2008; Daire et al., 2007; Furstenburg & Newmark, 2007; Lieber, 2009; Roderick et al., 2009).

The association between college retention and pre-collegiate academic preparation proved particularly strong in Black males (Palmer, et al., 2010). To overcome this barrier, Palmer et al. (2010) suggested improving P-12 teacher quality, decreasing the use of tracking, and changing funding policies for P-12 schools as possible solutions to improve college retention and success rates among Black males, particularly in STEM

degree programs. Ishitani (2003) established that first generation college students demonstrated a 71% higher risk of dropping out during their first year than students with college-educated parents. These results emphasized the need to prepare first generation college students differently. J. Wiggins (2011) depicted the challenges for first generation college students in addition to academic preparation including social assimilation. For many first generation college students, either the decision to attend college came too late in the process or students did not understand how to access supports to ensure academic readiness before applying or matriculating into college (Hambrick & Stage, 2004; Hossler, Schmit & Vesper, 1999; Perna, 2005, Roderick et al., 2009).

College preparatory course enrollment. The strongest connection between student demographic factors and college readiness existed between the access to college preparatory course work (Moore et al., 2010). Sawyer (2008) demonstrated that taking advanced core courses improved ACT scores with the greatest impact of this strategy found in students who met or exceeded the college readiness benchmark on the EXPLORE. While many school districts discontinued tracking policies, the practice of ability grouping continued to exist in many high schools under the auspices of choice and intervention. Upon entering high school, educators scheduled students into remedial courses if they demonstrated a lack of preparation for the college–preparatory track. In cases like the Talent Development Program, courses accelerated learning, as opposed to remediating, so students can join their peers in college-preparatory work (Balfanz et al., 2004). In other situations, students self-selected courses of higher rigor only to discover their underpreparedness (Sawyer, 2008). Without advocacy from more knowledgeable mentors, students enrolled in lower level courses or failed. Additionally, many teachers

held the belief that college was not for everyone, and therefore some students did not need to be college ready (Palmer et al., 2010; Roderick et al. 2009). This belief manifested in teaching and counseling behaviors that allowed some students to escape challenges and, ultimately, to fail (College Board, 2011).

In addition to academic behaviors, Conley (2003) described the problem of misaligned standards between high school and college showing more rigorous coursework and expectations improved student access to degree credit-bearing courses. Hafner, Joseph, and McCormick (2010) evaluated the Expository Reading and Writing Course (ERWC), professional development program designed to help teachers create content and expectation bridges between high school and college in language arts. Their study suggested that students in ERWC classrooms outperformed other students in both high school graduation rates and college placement test scores. The nation's governors called for the creation of the Common Core State Standards to better align high school curriculum and student outcomes to college level expectations in hopes of decreasing the curriculum shock between high school and college-level rigor and expectations (Porter et al., 2011).

Currently, much discussion and research centers around the two-track system seen in most high schools: college-preparatory and career/technical education (Rosenstock, 1991). Deli-Amen and DeLuca (2010) argued the existence of a third group who participated in neither track and lacked focus to their high school education. Students in this third group did not have access to rigorous academic work, nor the technical training to enter the workforce leaving them few options if they graduated from high school. Students with academic deficiencies when entering ninth grade did not typically have

access to rigorous college-preparatory work (Balfanz et al., 2004). This multi-track system existed despite the fact that parents hoped their children would go to college (Carnevale et al., 2011). As Carnevale (2008) states, "Right now, we have only one education track that works – the college track" (p.18).

Even if a student possessed the desire and preparation for the challenge of rigorous coursework, many schools did not have the capacity to offer such coursework. Schools with high concentrations of poverty struggled to attract and retain quality teachers (Balfanz, Legters, West & Weber, 2007). According to the College Board (2011), 50% of public schools offered Advanced Placement courses with 28% of the class of 2010 taking at least one AP Exam. Efforts to enact open admissions policies for Advanced Placement courses increased minority and low-income participation across schools. Like the college access to success story, increased enrollments have not translated to increases in exam scores (College Board, 2011).

College aspirations. Assuming no school-level restrictions to accessing college-preparatory work existed, student must have the desire to continue education after high school if taking the first step towards rigorous coursework. Without a career goal requiring postsecondary education, little hope existed for students taking classes that required extra work and removed them from their circle of friends (Bonous-Hammarth & Allen, 2005). Increases in the number students who intend to go to college complicated the aspiration construct. Based on his research using NELS data, Aldeman (2006) found an increase in 12th-grade college going self-expectation from 22.5 % in 1982 to 59.4 % in 1992. A recent study of students in the Louisville Metropolitan area showed that 96.3% of students polled saw the importance of a Bachelor's degree (IQS Research, 2010).

Interestingly, this study also highlighted a decrease in this belief over time. One hundred percent of students in the 7th through 10th grade noted the importance of earning a Bachelor's degree where 82.76% of juniors and 93.94% of seniors responded with high importance (IQS Research, 2010). Another important finding from this study reflected the importance of early exposure to college-going conversations. Of students who first heard about college in elementary school, 81.4 % responded that degree attainment proved extremely important compared to 69.4% of students first exposed to college in high school (IQS Research, 2010).

With no first-hand knowledge about academic resources and college expectations, parents without college experience allowed their children to choose less challenging pathways to high school graduation (Kuh, Cruce, Shoup, Kinzie & Gonyea, 2008; Lloyd, Leicht, & Sullivan, 2008). Either out of fear of lowering their GPA or social pressures, students did not actualize the aspiration of college matriculation with appropriate course choices (Hossler et al., 1999; Sawyer, 2008). In a qualitative study of first-generation, urban, college students Reid and Moore (2008) found that students wished they had taken advantage of the opportunities available to them in high school to be better prepared for the challenges of college.

Participation in organized extracurricular college preparatory activities. In order to avoid creating situations where students retrospectively wished they had used their high school years to more efficiently prepare for college (Reid & Moore, 2008), a multitude of government, non-profit, and education organizations aimed their efforts towards college-readiness. Funded with federal dollars, organized, extracurricular, college preparatory activities like Gaining Early Awareness and Readiness for

Undergraduate Programs (GEAR UP) and the TRIO Programs (e.g., Upward Bound, Talent Search, and Educational Opportunity Centers) have a long history of targeting underrepresented populations with the intent of nurturing them towards college matriculation. In a study of 4,445 first-time college freshman, Ishitani and Snider (2006) found that participation in pre-collegiate test preparation decreased the probability of dropping or stopping out by 42% in the second year and 55% in the third year of college. A study of Philadelphia high school students showed that students who participated in organized, extracurricular, college preparation activities demonstrated higher college going aspirations and expectations than their matched, non-participating peers (Furstenberg & Neumark, 2007). Furstenberg and Neumark (2007) established, however, that the association between higher expectations and program participation was not necessarily causal, but rather reflected actions to support their college going aspiration and goals.

Focus on English and Math

Because academic preparation proved vital to college success, the question became what academic skills and content were most important to master. Bettinger, Evans, and Pope (2011) explored the predictive power of subgroups of ACT subject scores. They found that a new composite score comprised of math and English had significant predictive power on college GPA and persistence compared to a new composite consisting of the reading and science scores when controlling for the ACT composite score. Where available, colleges and universities offered developmental courses in English and mathematics, with English courses usually consisting of both reading and writing components. The staggering cost of remediation taxed both students

and taxpayers. The Alliance for Excellent Education (2011), with estimates from the 2007-08 school year, showed the national, direct cost of remediation at $3.6 billion, double the cost from three years ago. Taking a developmental mathematics course, or worse, failing a developmental math course had a negative association with college success (Radcliffe, Huesman, & Kellogg, 2006). Regardless of the outcome measure, the common thread of the research established the importance of developing academic content, skills, and habits before matriculating into a postsecondary institution.

The ACT as a Measure of Academic Readiness

Since the creation of the College Entrance Examination Board in 1900, college admission testing programs attempted to counterbalance the inconsistencies of grading practices and inflation by standardizing a measure of a student's college potential (Zwick, 2007). Two testing companies dominated the college admissions testing market: The College Board with the SAT and ACT, Inc. At their origins, these two companies created tests based upon different philosophies. The SAT was originally an aptitude test seeking to measure a student's critical thinking and reasoning skills. By contrast, the ACT measured instructional college preparatory objectives or academic achievement. Both tests underwent updates in test structure, scoring practices, and regulations on calculator use making them incomparable to previous iterations of each test. The SAT underwent the most significant changes in response to calls for the assessment to measure achievement more than aptitude.

Proponents of using non-cognitive variables in college admissions often cite the unfair representation of college potential reflected in the SAT more than ACT. In his work, Sedlacek (1974, 1987, 1999, & 2008) used SAT scores to show the incongruence

with college completion and test scores across racial and socio-economic lines and advocated for the use of non-cognitive measures for admissions decisions. Research sponsored by ACT, Inc showed on average students of color and lower socio-economic levels scored lower than their white or affluent peers (Noble et al., 2006). However, this study also explored the relationship between school-level characteristics and ACT scores. Using hierarchical linear modeling, Nobel et al. (2006) showed that the score disparity reflected the school students attended rather than the student level characteristics. Students of color and poverty who have access to higher performing schools or classrooms score on par with their white, affluent peers (Noble et al., 2006).

Noble et al. (2006) reinforced the philosophy inherent to ACT: the test should measure academic achievement. By extension, the series of tests that comprised the EPAS reflect progress through what ACT, Inc. considered the core content and skills needed for college and career success. In the past decade, ACT transformed their product line to reflect the changing needs of the college admissions market. Seeking earlier indicators of readiness, ACT, Inc. created the PLAN, originally called the P-ACT+, as a 10^{th} grade measure of educational progress. With a maximum score of 32, test creators scaled the PLAN differently from the ACT based on the anticipated progress expected in the 10^{th} grade (ACT, 2011d). In 1992, ACT, Inc. introduced the EXPLORE test to provide middle school students and educators information about college readiness progress and goals. Like the PLAN, the EXPLORE test is scaled differently to account for course content and skills 8^{th} grade students are expected to have mastered (ACT, 2011c).

To provide educators, students, and families meaningful feedback about the EPAS test scores, ACT, Inc. created the College Readiness Standards. Based on a review of the normative data and college admissions and placement, experts organized these standards in three-point score ranges common across each EPAS test (ACT, 2011c). Starting with the ACT, test specialists wrote the standards and matched them to score ranges through an iterative process of testing and revisions. An independent review confirmed the ACT standards and the refined 2001 standards for EXPLORE and PLAN. This association with score ranges and standards allowed stakeholders to know how to interpret these scores as a measure of progress towards college expectations.

ACT, Inc. also provided Course Placement Services to postsecondary institutions that in turn gave the educational research arm of the company data on first-year postsecondary performance. ACT, Inc. retrieved data from 98 institutions and over 90,000 students and established benchmarks associated with a high likelihood of successful performance in subject-equivalent postsecondary courses. The benchmarks reflected an approximate 50% chance of earning a B and 75% chance of earning a C in the matched college course (ACT, 2007a). To establish the EXPLORE and PLAN benchmarks, ACT researchers matched EXPLORE or PLAN test score that corresponded with a 50% probability of meeting an ACT benchmark. Table 14 presents the college readiness benchmarks and the corresponding college course.

In summary, the EPAS system describes students' academic college ready trajectory over time based on curricular standards focused on college readiness. As Kentucky requires all 8^{th}, 10^{th} and 11^{th} grade students to take each exam in the EPAS system, a wealth of information is now available not only about student academic college

readiness, but the self-reported perceptions about student preparation and aspiration for college going.

Table 14

ACT College Readiness Benchmarks and Corresponding College Courses

EPAS Subject Test	College Course	EXPLORE test score	PLAN test score	ACT test score
English	English Composition	13	15	18
Mathematics	College Algebra	17	19	22

Methodology

The purpose of this study was to explore the initial time to college readiness benchmarks within the high school years. This study demonstrated the influence on college readiness of factors such as student aspiration, academic planning, and participation in organized, extracurricular, college preparation activities as well as the non-alterable factors gender and parental college education level. Event history analysis (EHA) functions as an appropriate methodology to study time to an event (Singer & Willett, 2003). As some individuals in the sample never experienced college readiness benchmarks during the time of the study, standard statistical models such as complete case methodologies seemed inappropriate (Allison, 1984). In addition, standard statistical models did not allow for time-variant variables as standard models work under the assumption that variables remained constant over time or their effect contributed the same over time (Mills, 2011).

Methodological Features and Terminology of Event History Analysis

Singer and Willett (2003) discussed three features common to EHA: having a target event, determining the beginning of time for the study, and a specific way of measuring time during the study. This study examined academic college readiness as measured by ACT's Educational Planning and Assessment System (EPAS) scores. The target event in this study was meeting a college readiness benchmark on the state administration of the EXPLORE (grade 8), PLAN (grade 10), or ACT (grade 11) for the first time. At each measure of time, these benchmark scores divided the sample into two states: those who were college ready in a subject and those who were not.

The second feature of EHA revealed the demarcation of the beginning of time as the moment before any subject in the sample was eligible to experience the event (Singer & Willett, 1991). College readiness specified the event of interest and achieving benchmark scores on EPAS tests defined readiness. Enrollment in the eighth grade in fall, 2007 marked the beginning of time for this study. At that time, each student in the sample was eligible to take the EXPLORE test, the first in the EPAS series, in September. Since no previous measure of academic college readiness existed, this test served as the first opportunity for students to experience the event of academic college readiness. Of course, the path to college readiness began much earlier than 8th grade, but with this cohort, no tests existed to reliably measure progress towards college readiness.

A means for measuring time provided the third feature of EHA studies. Though individual students may theoretically experience college readiness at any moment in time, the measurement of academic readiness followed a particular testing schedule. Readiness was measured by EPAS exams that were administered to students at set moments in a

student's career. As college readiness was not specifically and continuously monitored, discrete-time models were appropriate for this analysis (Mills, 2011). Discrete-time models were robust against the problem of ties, when individuals experience the event at the same time, an issue when using continuous time models (Allison, 1984).

Standard terminology used in EHA presented a challenge when discussing methodology and findings as summarized in Table 15. Originally created for use in the fields of biology, engineering, and epidemiology, EHA terminology spoke to survival and hazard, words with positive and negative connotations respectively. However, a "survivor" in this study depicted a student who did not meet the readiness benchmark because they survived in the sense of still needing monitoring for future achievement of the benchmark. Whereas, those students who met benchmarks were considered no longer at risk. The risk set, students who have not yet experienced the event in a previous episode, consisted of students who have not met college readiness benchmarks in the subject under study. Although it is possible for students to transition in and out of the college ready trajectory throughout their high school career, for the purpose of this study, the researcher employed a single spell analysis in which individuals were removed from the risk set upon first experience of college readiness. In other words, after reaching college readiness benchmarks on the EPAS tests at 8^{th}, 10^{th}, and 11^{th} grade, students were removed from this analysis approach. The literature suggested students were on a positive college trajectory (ACT, 2008b). This single spell analysis was similar to the analysis in the *Forgotten Middle* (2008b) report where ACT researchers examined average scores of students in three categories. This study, however, explored individual changes across time rather than average changes.

Table 15

Definitions of EHA Key Terms

EHA Terms	Description in Study
Event	Meeting a college readiness benchmark
Survivor	A student who has not yet demonstrated academic college readiness
Hazard	Experiencing college readiness
Survival Rate	The conditional probability of not meeting college readiness benchmarks at a particular interval if not previously met
Hazard Rate	The conditional probability of meeting college readiness benchmarks at a particular interval if not previously met
Risk Set	Set of students who have not demonstrated academic college readiness in previous intervals and are eligible to demonstrate readiness in the current interval

Longitudinal Data Set

According to Singer and Willett (2003), longitudinal data sets must meet three essential assumptions to provide a valid analysis: multiple waves of data of at least three data points, a meaningful metric of time, and an outcome that changes over time. For this study, data snapshots were taken at three periods in the student's history: in September of the 8^{th} grade, in September of the 10^{th} grade, and March of the 11^{th} grade. These snapshots coincided with the administration of the state-mandated EXPLORE, PLAN, and ACT tests for accountability purposes. An academic level or grade in school were used as the clock for this data set because students must be in the 8^{th}, 10^{th}, and 11^{th} grade to be eligible for the EXPLORE, PLAN, and ACT test, respectively. The test results, or event outcome, changed over time with the goal of increasing the number of students

who were college ready at each administration. In this study, at each measurement, students who had not yet experienced the event of meeting the college readiness benchmark may undergo a change in status.

Descriptive Statistics

As noted above, traditional measures of central tendencies did not account for explaining populations who experienced events at different times. According to Singer and Willett (2003), "traditional statistical methods provide no ready way of simultaneously analyzing observed and censored event times" (p. 325). The analysis began by describing the risk associated with college readiness occurring at the 8^{th}, 10^{th} and 11^{th} grade. The hazard function, equation 1, estimated the probability of obtaining college readiness during interval *t*, after removing students who experienced the event in a previous interval where *T* is the event time.

$$h(t) = \Pr(T = t \mid T \geq t) \quad (1)$$

Because the pool of possible college ready students changed at each interval, the estimated survivor function was calculated indirectly using the hazard function depicted in equation 2 where *T* is the event time (Singer & Willett, 1993).

$$S(t) = \Pr(T > \mathrm{t} \mid \mathrm{T} \geq t) = 1 - h(\mathrm{t}) \quad (2)$$

The survivor function estimated the probability that a random individual would not be college ready at any given interval under study.

Models

When conducting an EHA, model selection reflected the data set. Also important to ensure the probability varied between zero and one, the logit or log-odds transformation provided a common link function. Logit transformation proved widely

used, appropriate for dichotomous event outcome, and non-parametric, or not assuming an underlying shape for the hazard function (Allison, 1984). The analysis began by calculating the baseline logit hazard function where the value of all explanatory variables was zero and $\alpha_8 D_8$ to $\alpha_{11} D_{11}$ represented each discrete-time period in the study. The baseline hazard provided a reference point against which to compare subsequent models controlling for additional factors hypothesized in this study to affect college readiness.

$$\text{Logit } h(t_j) = [\alpha_8 D_8 + \alpha_{10} D_{10} + \alpha_{11} D_{11}] \quad (3)$$

This transformation returned an odds ratio explaining the conditional likelihood of being college ready at any given interval (Mills, 2011). By setting all other variables to zero, time to event was independent of other factors' influence. Establishing the event varied over time affirmed the choice of EHA as the methodology to answer the research questions. After fitting a baseline logit hazard, the researcher assessed the influence of the control variables as a group by measuring the positive or negative difference between the control and baseline functions where $C_1 X_1$ represented the set of control variables entered as a block as shown in Equation 4. Gender and parent level of education comprised the control variables.

$$\text{Logit } h(t_j) = [\alpha_8 D_8 + \alpha_{10} D_{10} + \alpha_{11} D_{11}] + C_1 X_1 \quad (4)$$

This function returned a hazard ratio that demonstrated the odds change in experiencing college readiness by the factor explored (Mills, 2011). To examine the effects of each explanatory variable, another model was used adding variables as a block to statistically control for the other explanatory variables. Equation 5 expressed the logit hazard function where $\beta_1 X_1$ represented student aspirations, $\beta_2 X_2$ academic preparation, and $\beta_3 X_3$ participation in organized extracurricular college preparatory activities.

$$\text{Logit } h(t_j) = [\alpha_8 D_8 + \alpha_{10} D_{10} + \alpha_{11} D_{11}] + C_1 X_1 + [\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3] \quad (5)$$

Sample

This study examined a cohort of students (n = 6443)from Jefferson County Public Schools (JCPS) in Louisville, KY enrolled as 8th graders in September of 2007 and had an EXPLORE score. Two data samples, one describing readiness in English (n = 5030) and another describing readiness in math (n = 4415), were created from the cohort. The 2007 cohort as well as both the English and math readiness samples were described in Table 16. The study ended with the administration of the ACT in March 2011. Because the study ended in March of 2011, students who were retained in the 8th, 9th or 10th grade were eliminated from the study if they did not rejoin their cohort in time for the test administration. In other words, this cohort only contained students who progressed through high school on track and remained enrolled in the target district. The removal of students who did not progress with their cohort eliminated the possibility that factors outside the scope of the study such as other risk factors to academic preparation influenced results and removing unobserved heterogeneity. Information was collected from the local school district student information systems, as well as the data files provided by ACT for each administration of the EPAS tests.

When conducting EHA, event times were unknown for some individuals, a problem defined as censoring. A pivotal assumption of EHA studies included the independence of censoring and the experience of the event (Allison, 2005). With low college readiness rates described earlier, not all individuals experienced the event even if they remained in the cohort. These students with unknown event times were labeled censored observations (Bahr, 2009). Students who demonstrated readiness were excluded

Table 16

Descriptive Statistics for the 2007 Cohort and English and Math Samples

	English (n=5030)		Math (n=4415)		Cohort (n= 6443)	
Characteristic	Total	%	Total	%	Total	%
Race						
White	2896	57.6	2513	56.9	3519	54.6
Black	1753	34.9	1561	35.4	2445	37.9
Hispanic	177	3.5	164	3.7	233	3.6
Other	204	4.0	177	4.0	246	3.9
Lunch Status						
Free/Reduced	2886	57.4	2499	56.5	3948	61.3
Parent Level of Ed						
First-Generation	2490	49.5	2057	46.6	3476	54[a]
Bachelor's +	2540	50.5	2358	53.4	2934	45.5[a]
Gender						
Female	2542	50.5	2263	51.3	3154	49.0
Male	2488	49.5	2152	48.7	3289	51.0

Note. [a]33 students or .5% did not report parent education level at any point in the study.

from subsequent risk sets. For the purposes of this study, individuals who did not experience the event required all three of the EXPLORE, PLAN, and ACT test scores to remain in the study. This inclusion ensured censoring excluded factors outside of the risk factor, creating a non-informant, right censored data set. In other words, excluding students who have been retained, dropped out or transferred to other districts, minimized the influence of factors outside the scope of this study. Finally, by defining the beginning of time as the moment before the first event occurrence, the design ensured censoring did not occur before the study began, known as left censoring (Singer & Willet, 1993).

To describe each sample, life tables summarized the estimated hazard and survival probabilities at each time point. The estimated probability of college readiness, and the estimated probability of not having met college readiness benchmarks (Table 19). After estimating the probability of meeting college readiness benchmarks, the databases were organized as a person-period data set with each person/event as a separate row in

the database. Using the methodological techniques described by Singer and Willett (2003), time to event was coded on a continuous scale with meeting readiness benchmarks in the 8th grade coded as 1, 10th grade coded as 2, and 11th grade coded as 3 This organization facilitated the use of time-variant variables in logit models.

Dependent Variable

In discrete- time models the dependent variable was the conditional odds of experiencing the event (Mills, 2011). The events in question were meeting the college readiness benchmarks in English and, analyzed in a separate model, meeting the college readiness benchmarks in math. The dependent variable, therefore, was the conditional odds of being college ready at any time (T) as individuals who experienced the event were removed from the risk set (Mills, 2011).

Explanatory Variables

The research questions focused on three explanatory variables, presented in Table 17, shown in the literature to be antecedents of college readiness: student aspiration, academic planning choices, and participation in organized extracurricular college preparatory activities. Student responses in the student profile section (SPS) of each EPAS administration operationalized program and aspiration variables. The self-reported student information provided insight into non-academic factors that may affect college readiness. Students denoted their educational plans after high school by coding choices "A" through "J" ranging from "not planning to complete high school" (A) to "graduate or professional studies after 4-year degree" (H). For the purpose of this study, responses to this question were used to represented the student's college aspirations, which may change over time and were recorded at each period. The purpose of this study focuses on

college readiness, therefore the SPS question concerning post-graduation plans was transformed into a dichotomous variable depicting if a student aspired to attend college as previously defined. Students also reported their participation in organized, extracurricular, college preparatory activities such as GEAR UP, Upward Bound, and Talent Search, in the SPS at the 8th and 10th grade.

Table 17

Explanatory Variables

Construct	Source	Code	Time-variant
College Aspiration	EPAS Student Profile Section	0 = Not complete high school 0 = High school only 0 = Job training via Military 0 = Apprenticeship 1 = Career/Tech School 1 = Community College 1 = 4-year College 1 = Graduate or Professional 0 = Undecided 0 = Other	Yes
Academic Planning	Student Transcript (SIS)	0 = Other 1 = College Prep Courses	Yes
Extracurricular College Preparatory Activities	EPAS Student Profile Section	0 = No 1 = Yes	Yes

To address academic planning as the actualization of student aspiration, this study used information from the student transcript. JCPS coded core academic courses by level of rigor and expectation. Courses coded as Advance Program (gifted and talented), Advanced Placement, International Baccalaureate, Dual Credit, or Honors program were considered college preparatory for the purpose of this study. All other courses followed a pace, depth, or rigor not considered college preparatory. For the most part, students and

parents select the level of high school courses in consultation with school personnel. The rigor of English and mathematics courses were time-variant and recorded at each point in time: 8th grade, 10th grade, and 11th grade.

Control Variables

Because the research sought to answer questions of timing, controlling for student level variances proved important: gender and first generation college student status. Using Bloom's (1980) theoretical framework of alterable and non-alterable variables, each control variable, considered a non-alterable variable, were outside the control of districts or programs. Gender was coded as a dichotomous variable. Though more females enrolled in college than males, Ishitani (2003) found that females have a higher risk of leaving college in the third and fourth years. Additionally, Hyde and Mertz (2009) showed that females were culturally and socially less likely to believe in their math skills and pursue study in mathematics. Because race and socioeconomic measures were closely related to parent education level, first generation status served as a proxy for these traditional control variable (Bui, 2002; Deffendall, Khutson, & Sacks, 2011; Engle & Berneo, 2006; Lin, 2012; Lucas, 2001). In addition, parent education level was used in program eligibility as well as the subject of postsecondary studies. Using the definition of first generation status as having neither parent with a Bachelor's degree, student responses to parent education level were coded dichotomously using one for students with either parent with a Bachelor's degree.

Missing Data Analysis

Several variables were collected from voluntary student responses to a survey that preceded the administration of each EPAS assessment. In many instances, the survey was

completed in a separate session from the test administration with students. Students may have been absent on the day scheduled for the survey or may have chosen to not answer any or all of the questions on the survey. This situation created instances of missing data in the English and math samples. Frequency and cross tabulations analysis of the subgroup of missing data cases (Table 18) indicated the data were missing at random (MAR) and therefore ignorable (Allison, 2002). The subsamples of missing data cases in both English and math (Table 18) were representative of their overall sample (Table 16). Cases with missing data were listwise deleted from the sample as the analysis showed that the probability of missing explanatory and control variables was not dependent upon the event measure of being college ready in English or math respectively (Allison, 2002).

Table 18

Cross-tabulation of Missing Aspiration Cases with Race and Lunch Status

	English		Math	
	% of Missing (n = 374)	% of Total (n=5030)[a]	% of Missing (n = 321)	% of Total (n=4415)[a]
Race				
White	53.5	57.6	52.6	56.9
Black	39.0	34.9	39.9	35.4
Hispanic	3.5	3.5	3.7	3.7
Other	4.0	4.0	3.8	4.0
Lunch Status				
Free/Reduced	59.1	57.4	58.9	56.5
Gender				
Male	45.7	49.5	45.5	48.7

Note. [a]Total sample excludes the missing case data

Findings and Discussion

Empirical Results

The first two research questions focused on describing the timing to college readiness. To answer these questions, hazard and survival rates were analyzed. Life

Tables, as depicted in Table 19, summarized the number and proportion of students who survived at each grade level and thus experienced the hazard (Allison, 1984). Answering the first two research questions, the analysis showed not all students in the cohort met the college readiness benchmarks in English and in math by the 11th grade ACT. Hazard rates captured the likelihood of being college ready over time with students most likely to meet college readiness benchmarks in the 8th grade in English and math at a rate of 0.58 and 0.33 respectively. The survival rates demonstrated that students are least likely to be college ready at the 11th grade for English and 10th grade for math, conditional on not previously being college ready. Contrary to previous studies, students in this cohort were most likely to demonstrate college readiness in math in the 11th grade.

Table 19

Life Table Describing English and Math College Readiness

	Number of		Proportion of	
Grade	Students not meeting CR benchmarks	Students meeting CR benchmarks for the 1st time	Students not meeting CR benchmarks	Students meeting CR benchmarks for the 1st time
English				
8th Grade	5030	2928	.42	.58
10th Grade	2102	1089	.48	.52
11th Grade	1013	81	.85	.15
Math				
8th Grade	4415	1443	.67	.33
10th Grade	2972	271	.91	.09
11th Grade	2701	572	.65	.35

Note. CR stands for College Readiness

Figure 1, an example of a Kaplan-Meier survival function, depicted the difference in survival rates of college readiness between students with at least one parent with a Bachelor's degree and first-generation college students. Additionally, in both English and math, students with a parent who held a Bachelor's degree and white students

experienced college readiness for the first time at greater rates than their peers did across each period. The gap between white students and others was greater in English than math and appeared to grow over time particularly between the 8th and 10th grade in English and 10th and 11th in math. Similar gap patterns existed between non-first generation students and their first generation peers. Females experienced college readiness for the first time at higher rates in English but lower rates in math. Tests for the equality of survival functions indicated statistical significance between each group in both English and math with results summarized in Table 20.

Table 20

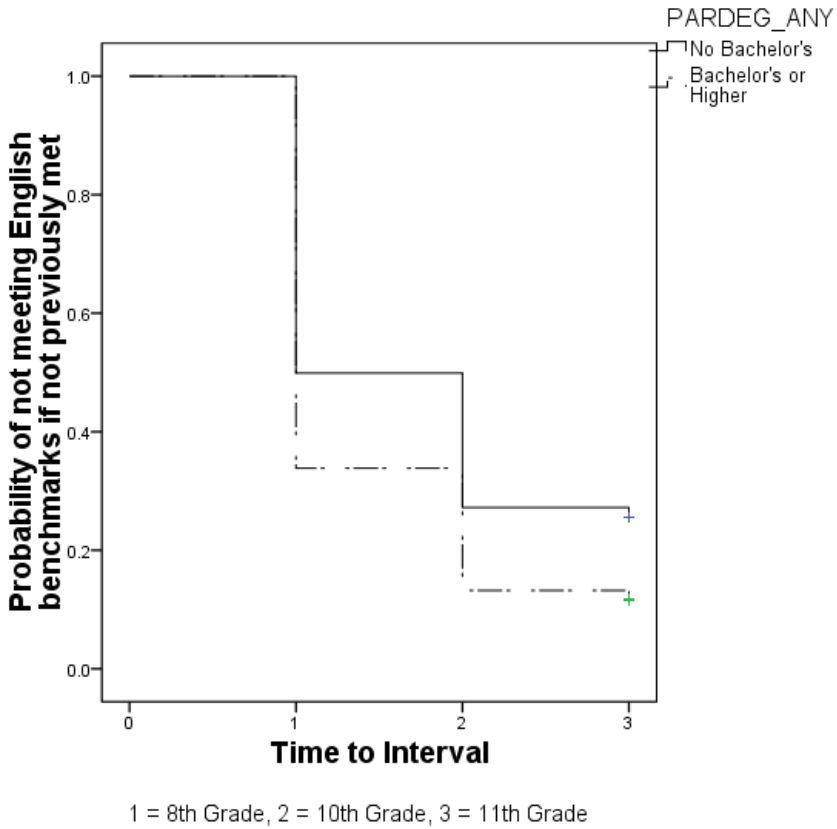
Summary of results from the tests of equality of survival distributions for between-group differences in KM Models

	English			Math		
Variables	Log-Rank	Wilcoxon	Tarone-Ware	Log-Rank	Wilcoxon	Tarone-Ware
Parent w/ Bachelor's Degree	192.100***	171.246***	184.579***	298.340***	266.579***	284.507***
Males	14.252***	27.249*	22.152*	10.876***	7.250***	8.968***
Race[a]	354.639***	366.251***	371.204***	212.980***	182.116***	198.646***
Lunch Status	577.315***	594.948***	598.318***	371.302***	294.568***	333.331***

Note. * $p < 0.05$; *** $p < 0.001$

[a]Race is operationalized dichotomously as white and other

Results from the logit models, summarized in Table 21, described the likelihood of being on the college ready trajectory considering various factors. Consistent with DesJardins (2001), negative odds-ratios were converted to Inverse Odds-Ratios (IOR) to aid interpretation. Time, as measured by grade in school, had a negative impact on college readiness. In the base model with all other variables set to zero, students were less likely to be college ready at each grade with an IOR of 1.14 in English and 1.16 in math. In other words, with each move from 8th to 10th and 10th 11th the likelihood of being



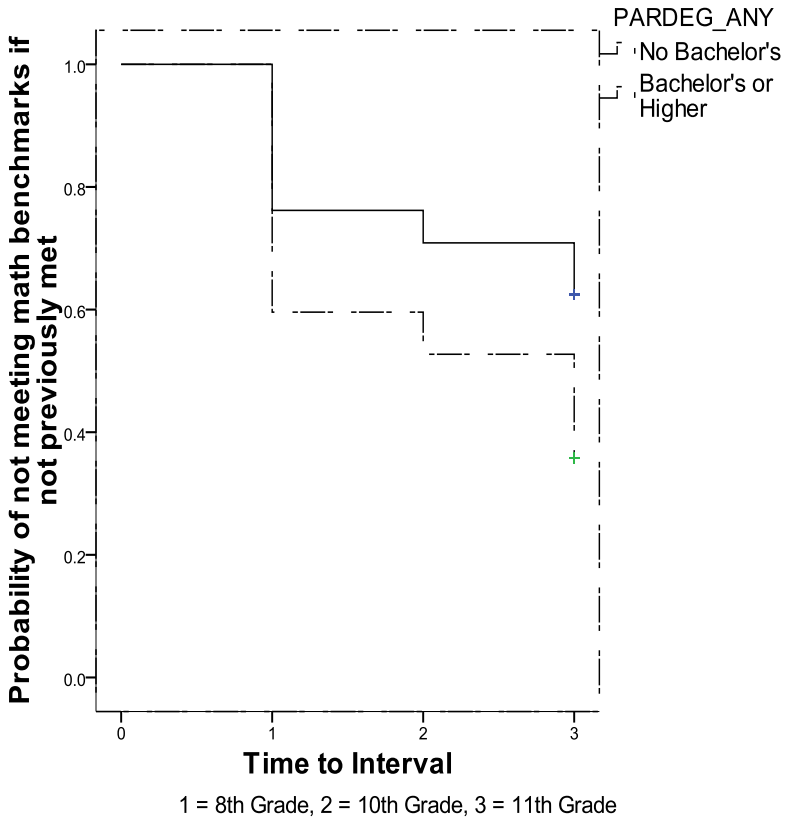


Figure 1. Survival functions comparing probability of not meeting college readiness benchmarks in English and math of students by level of parent education. The dashed line represents students with at least one parent with a Bachelor's degree where the solid line represents first-generation students.

college ready decreased in both subjects for students in the risk set.

The next block of variables explained the influence of control variables on college readiness. In both the English and math models, the level of parental education had a positive association with being college ready. After controlling for the effects of time, students who had at least one parent with a Bachelor's degree were 2.27 or 2.63 times more likely to be college ready in English and math respectively than their peers with no parental college experience. Gender influences varied between the English and math models. Females were 1.25 times more likely to be college ready in English than males, but males were 1.12 times more likely to be college ready in math than females, after controlling for the influences of time.

The final block of variables established the influence of the explanatory variables while controlling for time and the control variables. Student aspiration for college and college preparatory course taking were positively associated with college readiness, but participation in organized, extracurricular, college preparatory activities presented a negative association. Students who denoted college aspiration at the time of testing were 1.16 (English) and 1.65 (math) times more likely to demonstrate college readiness than students who did not aspire to attend college. Students who enrolled in college preparatory courses in the year and subject of the test were 1.80 (English) and 3.45 (math) times more likely to meet college readiness benchmarks than their peers in less rigorous courses. Lastly, students who did not participate in organized, extracurricular, college preparatory activities were 1.52 (English) and 1.55 (math) more likely to be academically college ready than their peers who participated in organized, extracurricular, college preparatory activities. Interestingly, when the explanatory

Table 21

Results of the EHA Models of English and Math College Readiness between 8th and 11th grades

	English				Math			
Variables	β	SE	Exp(β)	IOR[1]	β	SE	Exp(β)	IOR[1]
Block1								
Grade	-.134***	.023	.874***	1.144	-.152***	.024	.859***	1.164
Block 2								
Grade	-.168***	.024	.846***	1.182	-.159***	.025	.853***	1.172
Males	-.219***	.037	.803***	1.245	.117***	.040	1.124***	
Parent w/ Bachelor's	.821***	.037	2.272***		.966***	.042	2.629***	
Block 3								
Grade	-.302***	.026	.740***	1.351	-.379***	.028	.688***	1.453
Males	-.189***	.038	.828***	1.207	.188***	.042	1.206***	
Parent w/ Bachelor's	.717***	.038	2.048***		.731***	.044	2.078***	
College Aspiration	.149***	.057	1.160***		.501***	.062	1.651***	
College Prep Activities	-.420***	.057	.657***	1.522	-.440***	.081	.644***	1.553
College Prep Courses	.585***	.064	1.796***		1.237***	.044	3.445***	

Note. [1]IOR is the Inverse Odds Ratio that is calculated when the parameter estimate (β) is negative.

***p < .001

variables were added into the model, the influence of time increased, and the influence of parental education level decreased as demonstrated by the difference in odds ratios.

Discussion

These results reiterated findings in previous studies and emphasized the need for students to master college readiness skills earlier rather than later (ACT, 2008b; ACT, 2009; Ascher & Maguire, 2011; Balfanz et al., 2004; Sawyer, 2008). Analysis of English and math college readiness demonstrated similar results with a few notable exceptions. The fact that 10th grade students were least likely to be college ready in math may reflect academic programming in the target district. The majority of students followed a course sequence of Algebra 1 (9th grade), Geometry (10th), and Algebra 2 (11th). Many of the skills outlined in the college readiness standards were algebraic in nature. Additionally, the difference in the survival rates in English and math proved an interesting clue towards the effectiveness of new instructional practice in JCPS called Project Proficiency, a standards-based teaching and learning philosophies. This cohort of students were the first group of students to experience this practice in Algebra II and may explain the large number of students experiencing college readiness for the first time in mathematics in the 11th grade.

The influence of gender reflected similar results as other studies where females underperform their male counterparts in mathematics (Hill, Corbett, & St. Rose, 2010; Hyde & Mertz, 2009). In both subjects, participation in organized extracurricular college preparatory activities had a negative influence on meeting academic benchmarks. Many students who sought assistance with college going tended to be at high risk of not being college ready. Many organized extracurricular, college preparatory activities offered

tutoring assistance, however, more activities and assistance focused on other aspects of college readiness including the application process, financial assistance, and social/emotional aspects of college going – influences that would not have been captured by this study's measure of academic readiness.

Conclusions and Recommendations

Unlike the bleak outlook portrayed in ACT's *Forgotten Middle* (2008b) suggesting those not on the college ready trajectory by 8th grade would likely never be ready, this study showed that students could meet readiness benchmarks for the first time after the 8th grade if equipped with college aspirations and college preparatory coursework as shown in Table 21. For practitioners, preparing students for rigorous, college-preparatory coursework as early as 8th grade becomes paramount to meeting college readiness and success goals set forth by local communities, states, and the nation. The power of college preparatory coursework, defined here as honors, AP, IB, and gifted-talented courses, was most dramatic in mathematics, still considered a main gatekeeper course to not only high school graduation but also college persistence and completion (Bahr, 2009; Byrd & MacDonald, 2005; Conley, 2005b; Moore et.al. 2010). It becomes incumbent upon districts, particularly in large-urban communities, to ensure all students have access to rigorous coursework aligned to college readiness standards, and have safety nets for those who are not (Balfanz, 2009; Balfanz, Herzog, & Mac Iver, 2007; Cohen & Smerdon, 2009). Structural and curricular concepts that challenge the tradition view of schooling as Talent Development, KIPP, and SEED have proved using time differently, instilling college aspirations, and accelerating learning in preparation for rigorous, college-preparatory coursework supports the educational development of older

students (Balfanz et al., 2004; Bowles & Brand, 2009; Dillon, 2008; Henig, 2008; Macey, Decker, & Eckes, 2009; Pearlman, 2006).

School guidance counselors play a major role in developing student aspirations, encouraging rigorous course enrollment, and brokering extracurricular support services supporting students on the path towards college readiness (College Board, 2010). According to the recommendations of the American School Counselor Association (2005), model guidance service delivery plans support student academic, career, and personal/social development. Middle school counselors could use the results of the EXPLORE SPS to counselor students who without college aspirations, but also students with college aspirations who are not on the college ready trajectory. Counselors can also be brokers for extracurricular college preparatory support, referring students to programs like GEAR UP where they can get more intense assistance. With national counselor to student ratios nearing 450:1, it is imperative for school and district policymakers to consider other ways to support students getting back on track. Advisory structures, which partner students in small groups with an adult who meets with them regularly and provides direction and support for students, have shown to have positive influence on student achievement (Lieber, 2009).

In addition to structural and expectations changes, districts and states should examine the alignment of both curriculum and expectations throughout the educational continuum. The Common Core State Standards Initiative (CCSSI) developed a set of English Language Arts and mathematics standards with college as the end goal and backward mapped grade level standards and expectations from 1st grade through graduation (Porter et al., 2011). Adopting standards cannot be the last step in the district's

work, but curricular renovations also require creating a strong curriculum with end of course exams and other summative assessment directly connected to the expectations outlined in the standards (Bishop, 1998; Schmidt, Wang, & McKnight, 2005). As essential curriculum planning may be, if students do not have the ability to access rigorous coursework with success, all the work of adjusting structures and building curriculum is for not. This study showed that rigorous coursework could begin to mitigate the influence of parent level of education strengthening the argument for access for students of poverty and racial ethnic minority backgrounds. JCPS high school redesign efforts that focus on college and career readiness are beginning to show results when comparing this study's results with those found in the ACT's *Forgotten Middle* (2008b).

Finally, this study is one of many educational studies exploring time as a variable using EHA. As the nation moves towards a standardized set of expectations and measures, time becomes an important variable of the measure of progress. Additionally, districts would benefit from more research on the interaction of time with specific variables known to support a student's chances of being college ready. Questions still exist about issues such as when developing aspiration for college and starting college preparatory coursework has the most influence being on track for college readiness. This study explored one cohort's college readiness pipeline through three years. Extending the study to include a cohort's college placement testing, matriculation, and success could either validate ACT's benchmarks or help establish other operationalizations of academic college readiness that would be more valid for this sample.

EXECUTIVE SUMMARY

As of 2009, national estimates show nearly one in four students and two in five racial/ethnic minorities do not graduate high school with their class (Balfanz et al., 2012). Though dropout eligibility begins in many states at age 16, students disengage from school as early as the elementary years (Balfanz, Herzog, & Mac Iver, 2007). In addition to reducing the dropout crisis, a truly effective education requires more than simple graduation, but rather preparing all students for college and careers. District policies and practices should support keeping each student in school and on a college ready trajectory.

For many states, the first measure of students being on college ready trajectory occurs in the 8th grade with the EPAS EXPLORE exam. According to ACT (2008b), eight of ten students finish 8th grade lacking the skills and knowledge necessary for secondary success, much less displaying early signs of college readiness. Additionally, 8th graders who did not meet EXPLORE college readiness benchmarks, on average, never rejoin the college ready trajectory (ACT, 2009). In other words, 8th grade becomes the first pivot point of measurement to determine if students are on or off the college ready trajectory.

This pair of studies took a two-pronged approach to explore how districts and communities can reduce the number of students not on the college ready trajectory prior to 8th grade as well as provide extra supports for students off-track in high school. The

first of these two studies used logistic regression to examine early warning indicators which flag students, as early as 3rd grade, at risk of falling off the college ready trajectory by 8th grade. The second study used EHA to explore how an off-track college ready trajectory can be corrected to steer students back on track during their high school years. Although both studies do not establish causality, significant correlations between selected variables can determine the likelihood of a student entering a college ready trajectory.

Results

Using logistic regression, the first study examined the association between selected 3rd thru 7th grade predictor variables and 8th grade EXPLORE scores in math and reading of a longitudinal cohort (n = 4503). Results inform an early warning indicator system which could be established to target students as early as 3rd grade who demonstrate characteristics of falling off the college ready trajectory. The study used Balfanz's (2010) conceptual framework, which developed an early warning indicator system for dropout prevention. For 3rd thru 5th grades, logistic models examined the relationship between attendance, suspensions, state standardized scores, and norm-referenced exams with meeting EXPLORE benchmarks in 8th grade. Course performance was added to the models for 6th and 7th grades. Race and gender served as control variables.

The logistic models showed achievement on standardized and norm-referenced exams and high attendance positively influenced a student's likelihood of meeting EXPLORE benchmarks. In 3rd grade, a student who scored above the 60th percentile on the Comprehensive Test of Basic Skills (CTBS) was 8.5 (reading) and 10.2 (math) times more likely to meet EXPLORE benchmarks in the corresponding subjects than a student

who scored below the 60th percentile. In 7th grade, students take the state standardized test in reading and math. Students who scored proficient or above were 12.7 (reading) and 24.4 (math) times more likely to meet EXPLORE benchmarks than students who scored below proficient. A 3rd grader with 95% or higher attendance was 1.8 times more likely to meet reading EXPLORE benchmarks and 1.6 times more likely to meet math EXPLORE benchmarks than a student with lower attendance rates. In the middle grades, students who did not fail courses were, on average, 1.5 times more likely to meet EXPLORE benchmarks than students who failed one or more courses. Suspensions in 3rd thru 7th grades were not significant in predicting a student's likelihood of falling off the college ready trajectory by 8th grade.

In the second study, EHA used time as a variable to discover when students first meet college readiness benchmarks. Results indicated the highest rate of first meeting college readiness benchmarks occurred in the 8th grade in both English (58%) and math (33%), as compared to the average national EXPLORE rates of 63% and 34%, respectively. Time was negatively associated with meeting college readiness benchmarks with students not meeting benchmarks in the 11th grade in English and 10th grade in math. Comparing the hazard rates of student demographic populations revealed White and affluent students achieve first time benchmarks earlier and at higher rates than their peers. Additionally, females outperformed males in first time English college readiness benchmark rates, but males exceeded females in math.

Extending the *Forgotten Middle* (2008b) report, students did join the college ready trajectory after 8th grade. Students with at least one parent with a Bachelor's degree or higher were approximately 2 times more likely to be on the college ready trajectory in

both English and math when controlling for grade level than their first generation peers. Students with college aspirations at the time of the test were 1.2 (English) and 1.7 (math) times more likely to be on the college ready path than students with lower aspirations. Taking college preparatory courses improved student odds of being on the college ready path to 1.9 in English and 3.7 in math. Interestingly, high student aspiration and rigorous courses mitigate the effects of time, gender differences, and parent level of education.

These results indicate as early as 3rd grade and as late as 11th grade, educators can target students at risk of falling off the college ready trajectory. Prior to the 8th grade, educators can use student data, specifically attendance, state standardized and national norm-referenced test scores, and course performance, to identify students at risk of being off the college ready trajectory before the EXPLORE exam. Through effective use of an early warning indicator system for guiding strategic implementation of targeted support initiatives, districts can ensure academic preparedness of more students for the challenges of high school and beyond. By reducing the number of students entering 9th grade off the college ready trajectory, high schools can manage interventions to support those still off track with a smaller population of students. However, some students will still require more time to join the college ready trajectory after 8th grade, regardless of intervention improvements. By developing college aspirations and increasing college preparatory course enrollments, larger portions of students will graduate college ready.

Implications for Practitioners and Policymakers

Charged with developing college-going cultures, school-level educators must amend current educational practices and policies in order to meet the revised global college readiness goals established by community expectations, state accountability

models, and national economic drivers. As these findings indicated, districts should consider organizing longitudinal district supports and professional development supporting college readiness across all grade levels. Incorporation of an early warning (grades 3-7) indicator system ensures students receive targeted instruction and services to alleviate the effects of poor attendance, low test scores, and course failures on a student's college ready trajectory. Identifying early warning indicators of students likely to fall off the college ready trajectory prior to 8th grade fails if educators do not operationalize effective interventions (Balfanz, Wang, & Byrnes, 2010). Additionally, once identified, further assessment of targeted students requires evaluation to assess progress after implemented interventions. Intervening at each grade level prior to the 8th grade will reduce the number of students who fail to meet EXPLORE benchmarks and increase success for high school freshmen (ACT, 2008b)

School educators should use state standardized and national norm-referenced test results to target unmet core content standards for individual students. Realistically, students should not be retained due to poor performance on achievement tests. Rather, students need remediation to recover academic standards in an effort to remain on the college ready trajectory. If schools disregard poor performance on achievement exams, students will continue to fall further behind their peers and place them at a disadvantage throughout their academic career.

A possible two-fold solution involves interventions both before and after summative assessments. First, if teachers shift from traditional grading practices to a standards-based grading system, teachers can intervene prior to the administration of achievement exams. Armed with specific data describing individual academic

deficiencies, targeted interventions will increase a student's odds of demonstrating mastery on achievement exams (Stiggins, Arter, Chappuis, & Chappuis, 2004). Second, effective instructional practices and intentional remediation must occur immediately following the receipt of test scores to recover standards (Ainsworth & Viegut, 2006). This two-fold approach reinforces the college readiness goal by setting the minimum academic expectation for all students.

Standards-based grading systems require educators to align instructional practices with a common core curriculum. In doing so, students must demonstrate mastery of a key set of standards through formative and summative assessments (Stiggins & Dufour, 2009). Educators use data to track student mastery of each standard which assigns value to an academic letter grade instead of an arbitrary collection of points that leads to a subjective percentage (Marzano, 2010). Not only does this process allow educators to understand precisely what students know, it also invites students to become an active participant in the learning process (Stiggins, 2007). Learning develops collaboration between the student and teacher rather than the academic process being solely guided by the educator. Standards-based grading allows teachers to use data to monitor student progress and highlights struggling students prior to the administration of achievement exams and grade promotion.

Beyond interventions and standards-based grading practices lies the underlying issue of inadequate teaching practices. Achievement on state standardized and norm-referenced exams positively correlated with a student's odds of being on a college ready trajectory, indicating the need for effective teaching practices in core content areas, particularly math and language arts (Darling-Hammond, 1999). Whether teachers require

improved pedagogical practices or a deeper understanding of content remains unclear, however, students need rigorous course instruction to develop their knowledge and skills (Hill, Rowan, & Ball, 2005).

More than content providers, teachers, counselors, support staff, and principals should also develop student aspirations and self-efficacy. When educators instill college aspirations and set the expectation that all students will apply to a college, student attitudes towards college change (Elliott, 2009; IQS Research, 2010; Lloyd, Leicht, & Sullivan, 2008; Roderick et al., 2009). In many schools, guidance counselors lead the charge in setting the college-going expectations through their comprehensive guidance plans (College Board, 2010). Counselors at the elementary and middle school levels could use the early warning indicator system to target students for supplemental services and participation in community extracurricular programs. Additionally, counselors serve in a unique position to provide training and support to students to develop their career goals and establish college aspirations. At each level, however, counselors need to encourage students to challenge themselves with the most rigorous coursework available to them and help broker supports for students as needed (College Board, 2010). However, with national counselor to student ratios hovering near 450:1, school and district administrators should consider additional advisement structures that connect students to adults, enabling adult-mediated conversations about struggles and plans (Lieber, 2009).

Districts and states can influence and support student college ready trajectories by establishing educational policies aimed at ensuring all students have access to rigorous coursework and expectations. Adoption of the Common Core Standards provides the first step towards establishing a district and statewide college going culture (Porter et al.,

2011). With college readiness as the overarching goal, the Common Core Standards establish early student aspiration for postsecondary work as the norm rather than the exception in many cultures (Porter et al., 2001). Common standards must be accompanied by an accountability system that measure progress towards college readiness (Bishop, 1998; Schmidt et al., 2005). Currently, 12 states provide EPAS exams for all students, with many using those results for school accountability to increase the percentage of college ready graduates.

In Kentucky, 25% of the middle school and 20% of the high school accountability score depends on the percentage of students meeting college readiness benchmarks on EXPLORE (8^{th} grade) and ACT (11^{th}) (ACT, 2011b). These milestones pressure districts to identify students off the college ready trajectory as early as 3^{rd} grade and develop strategies to redirect student college ready trajectories. Additionally, growth from PLAN to ACT and graduation rates each contribute 20% of the high school accountability score, instilling the need for school-level educators to ensure all students graduate college ready(Kentucky Department of Education, 2011).

In addition to curricular and accountability decisions, districts and states should enact policies that ensure equal student access to rigorous courses and expectations. Equal access manifests itself in many forms and can include policies on teacher and student assignment, grading and promotional practices, and professional development. Districts and states can loosen the grammar of schooling via policy change supporting innovative uses of time and resources (Tyack & Cuban, 1995). Recently, the Kentucky legislature amended laws regulating high school credit awards to include performance-based learning opportunities allowing districts to alleviate the constraints of time on

learning. In addition to policy development, districts and states can support school-level educators by establishing relationships and coordinating family, community, and business partnerships.

Through proper identification of at-risk students, school leaders and policymakers should efficiently allocate resources to support the majority of students who fall from the college ready trajectory. For example, high attendance rates and achievement on state standardized and norm-referenced exams positively impact a student's likelihood of being on a college ready trajectory by 8th grade, therefore, districts should invest in more truancy officers to improve attendance rates increasing classroom seat time.

Students spend a small percentage of their young lives in school (Bowles & Brand, 2009). This fact means districts must form partnerships with families and community and business entities to provide out of school time services. According to these studies, these partnerships should focus on removing barriers to student attendance as well as academic supports for students off the college readiness trajectory. In addition, these studies show the need to focus on college going outcomes as early as 3rd grade. Extracurricular college preparation activities should be available to younger students with hopes of instilling college going aspirations and developing academic skills prior to the 8th grade. Programs like GEAR UP, ETS, and AVID begin cohorts of participants as early as the 6th grade (Daire et al., 2007; Furstenburg & Neumark, 2007; Louie, 2007; Roderick et al., 2009).Results also suggest that extracurricular college preparatory activities should include a mixture of students where current practice targets specific populations who are typically underrepresented in college (Furstenburg &Neumark, 2007). By joining students of varying levels of college aspiration and academic college

preparation regardless of gender, race, and socioeconomic status, students can become peer models for each other, increasing the likelihood of being college ready (Daire et al., 2007; Louie, 2007).

To improve the percentage of students graduating college and career ready, educators will need more research focused on student college ready trajectories. Nationally, states and districts must work towards improving data systems enabling longitudinal study. Kentucky leads the nation with their work towards a P-20 data system that provides essential feedback to districts concerning student success and struggles in the state's degree-issuing colleges and universities. Missing, however, are data on students in trade, vocational, and proprietary schools. Kentucky, among other states, participates in the National Student Clearinghouse data collection service who reports college enrollment and completion data for each state's, districts', or schools' high school graduates. Closer to being able to track individual students through college, schools and districts personnel can perform more longitudinal studies opening the possibility of studying the influence of many factors including attendance, test performance, aspirations, and demographic factors on college readiness and success over time.

These two studies examined college readiness with a whole system approach in mind. Because education is a process where all students achieve at different rates, educators and policy makers must understand what influences college readiness. Effects over time can help educators develop academic and socio-emotional skills with the largest impact, and policymakers can support those efforts with the scaffolding necessary to instill the college readiness for all expectation. First, educators can flag students as early as 3rd grade for interventions getting students back on the college ready trajectory.

Second, 8th grade achievement does not ultimately determine high school college readiness. With college aspirations and rigorous coursework, students can overcome the presumed destiny of their ascribed status and open doors to a successful future.

REFERENCES

Achieve, Inc. (2004). *Ready or not: Creating a high school diploma that counts.* Washington DC.

ACT. (2006). *Ready for college and ready for work: Same or different.* Iowa City, IA. Retrieved from ACT: http://www.act.org

ACT. (2007a). *ACT technical manual.* Iowa City, IA: Author.

ACT. (2007b). *Rigor at risk: Reaffirming quality in the high school core curriculum.* Iowa City, IA: Author.

ACT. (2008a). ACT's college readiness system: Meeting the challenge of a changing world. Iowa City, IA: Author.

ACT. (2008b). *The forgotten middle: Ensuring that all students are on target for college and career readiness before high school.* Iowa City, IA: Author.

ACT. (2009). *How much growth towards college readiness is reasonable to expect in high school?*. Iowa City, IA: Author.

ACT. (2011a). *Affirming the goal*. Iowa City, IA: Author.

ACT. (2011b). *Condition of college and career readiness 2011.* Iowa City, IA: Author. Retrieved from the ACT website: http://www.act.org

ACT. (2011c). *EXPLORE technical manual.* Iowa City, IA: Author. Retrieved from the ACT website: http://www.act.org

ACT. (2011d). *PLAN technical manual.* Iowa City, IA: Author. Retrieved from the ACT website: http://www.act.org

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. Washington, DC: US Department of Education.

Adelman, C. (2007). Do we really have a college access problem. *Change, 39*(4), 48-51.

Ainsworth, L., & Viegut, D. (2006). *Common formative assessments: How to connect standards based instruction and assessment.* Thousand Oaks, CA: Corwin Press

Allen, W. R., Bonous-Hammarth, M., & Teranishi, R. T. (2005). Obstacles to diversity: Examining the educational pipeline. *Higher Education in a Global Society: Achieving Diversity, Equity and Excellence, 5*, 127-129.

Alliance for Excellent Education. (2011). *Saving now and saving later: How high school reform can reduce the nation's wasted remediation dollars*. Washington, DC: Author. Retrieved from http://www.all4ed.org

Allison, P. D. (1984). *Event history analysis: Regression for longitudinal event data*. Newbury Park, CA: Sage.

Allison, P.D., (2002). *Missing data.* Newbury Park, CA: Sage

Allison, P.D. (2005). Survival analysis. In G. Hancock, R. Mueller (Eds.), *The reviewer's guide to quantitative methods in the social sciences.* (pp. 413-424). Retrieved from http://www.statisticalhorizons.com

The American School Counselor Association. (2003). *The ASCA national model: A framework for school counseling programs.* Herndon, VA: ASCA Publications.

Ascher, C., & Maguire, C. (2011). Beating the odds: How thirteen NYC schools bring low-performing 9th graders to timely graduation and college enrollment. *Education Digest, 76*(5), 13-20.

Assessing and Teaching 21st Century Skills (ATC21s). (2009). *What are 21st century skills?* Retrieved from http://atc21s.org

Bahr, P. (2009). Educational attainment as process: Using hierarchical discrete-time event history analysis to model rate of progress. *Research in Higher Education, 50*(7), 691-714. doi: 10.1007/s11162-009-9135-x

Balfanz, R. (2009). Putting middle grades students on the graduation path: Retrieved from National Middle School Association website: www.nmsa.org.

Balfanz, R., & Bridgeland, J. (2007). A plan to fix 'dropout factories'. *Christian Science Monitor, November, 23*, 2007.

Balfanz, R., Bridgeland, J., Bruce, M., & Fox, J.H., (2012). *Building a grad nation: Progress and challenge in engaging the high school dropout epidemic.* Washington, DC. Retrieved from the America's Promise website:www.americaspromise.org.

Balfanz, R., Bridgeland, J., Moore, L., & Fox, J.H. (2010). *Building a grad nation: Progress and challenge in ending the high school dropout epidemic.* Washington, DC. Retrieved from the America's Promise website:www.americaspromise.org

Balfanz, R. & Fox, J.H. (2009). *Grad nation: A guidebook to help communities tackle the dropout crisis.* Washington, DC. Retrieved from the America's Promise website:www.americaspromise.org

Balfanz, R., Herzog, L., & Mac Iver, D. (2007). Preventing student disengagement and keeping students on the graduation track in high-poverty middle-grades schools: Early identification and effective interventions. *Educational Psychologist, 42*(4), 223-235.

Balfanz, R., & Legters, N. (2004). *Locating the dropout crisis: Which high schools produce the nation's dropouts? Where are they located? Who attends them*. Baltimore, MD: Center for Social Organization of Schools, Johns Hopkins University.

Balfanz, R., & Legters, N.(2005). *No child left behind and reforming the nation's lowest performing high schools: Help, hindrance, or unrealized potential.* Baltimore, MD: Center for Social Organization of Schools, Johns Hopkins University.

Balfanz, R., Legters, N., & Jordan, W. (2004). Catching up: Effect of the talent development ninth-grade instructional interventions in reading and mathematics in high-poverty high schools. *NASSP Bulletin, 88*(641), 3.

Balfanz, R., Legters, N., West, T. C., & Weber, L. M. (2007). Are NCLB's measures, incentives, and improvement strategies the right ones for the nation's low-performing high schools. *American Educational Research Journal, 44*(3), 559.

Balfanz, R., Wang, A., & Byrnes, V. (2010). Early warning indicator analysis: Tennessee. Baltimore, MD: Johns Hopkins University.

Barth, P. (2003). A new core curriculum for all: Aiming high for other's people's children. Thinking K-16. *The Education Trust*, 7(1), 1-19.

Barth, P. (2004). A common core curriculum for the new century. *The Journal for Vocational Special Needs Education*, *26*(2), 17-35.

Bellei, C. (2009). Does lengthening the school day increase students' academic achievement? Results from a natural experiment in Chile. *Economics of Education Review, 28*(5), 629-640. doi: 10.1016/j.econedurev.2009.01.008

Berger, J. B., Smith, S. M., & Coelen, S. P. (2004). *Race and the metropolitan origins of postsecondary access to four year colleges: The case of greater Boston*. Retrieved from The Civil Rights Project at Harvard University website: http://www.centerforeducationstrategies.com

Bettinger, E. P., Evans, B. J., & Pope, D. G. (2011). *Improving college performance and retention the easy way: Unpacking the ACT exam.* Cambridge, MA: National Bureau of Economic Research.

Bishaw, A., & Semega, J. (2008). Income, earnings, and poverty data from the 2007 American community survey. *American Community Survey Reports*. Washington, DC: US Census Bureau.

Bishop, J. H. (1998). The effect of curriculum-based external exit exam systems on student achievement. *The Journal of Economic Education, 29*(2), 171-182.

Bloom, B. S. (1980). The new direction in educational research: Alterable variables. *Journal of Negro Education, 49*(3), 337-349.

Bohan, C. H. (2003). Early Vanguards of Progressive Education: The Committee of Ten, the Committee of Seven, and Social Education. *Journal of Curriculum and Supervision, 19*(1), 73-94.

Bonous-Hammarth, M., & Allen, W. R. (2005). A dream deferred: The critical factor of timing in college preparation and outreach. In W. Tierney, Z. Corwin & J. Colyar (Eds.), *Preparing for college: Nine elements of effective outreach* (pp. 155-172). Albany, NY: State University Press.

Bound, J., Lovenheim, M., & Turner, S. (2009). *Why have college completion rates declined? An analysis of changing student preparation and collegiate resources.* (Working Paper No. 15566). Retrieved from National Bureau of Economic Research website: http://www.nber.org

Bowles, A. & Brand, B. (2009) *Learning around the clock: Benefits of expanding learning opportunities for older youth.* Washington, DC: American Youth Policy Forum.

Bryant, E. & Walsh, K. (2004). *Identifying school readiness indicators to stimulate policy action*. Retrieved from http://www.hfrp.org/

Bui, K.V.T. (2002). First-generation college students at a four-year university: Background characteristics, reasons for pursuing higher education, and first-year experiences. *College Student Journal, 36*(1), 3-11.

Byrd, K.L. & MacDonald, G. (2005). Defining college readiness from the inside out: First-generation college student perspectives. *Community College Review, 33*(1), 22-37.

Calaff, K. P. (2008). Supportive schooling: Practices that support culturally and linguistically diverse students' preparation for college. *NASSP Bulletin, 92*(2), 95-110.

Calcagno, J., Crosta, P., Bailey, T., & Jenkins, D. (2007). Stepping stones to a degree: The impact of enrollment pathways and milestones on community college student outcomes. *Research in Higher Education, 48*(7), 775-801. doi: 10.1007/s11162-007-9053-8

Callan, P., Finney, J., Kirst, M., Usdan, M. & Venezia, A. (2006). *Claiming common ground: State policymaking for improving college readiness and success*. (National Center Report #06-1). Retrieved from http://www.highereducation.org

Carnevale, A. P. (2008). College for all. *Change, 40*(1), 22-31.

Carnevale, A.P., & Desrochers, D.M. (2002). The missing middle: Aligning education and the knowledge economy. *The Journal for Vocational Special Needs Education, 25*(1), 3-23.

Carnevale, A. P., & Frye, R. A. (2001). *The economic and demographic roots of education and training*. Washington, DC: Center for Workforce Success, National Association of Manufacturers.

Carnevale, A. P., Rose, S. J., & Cheah, B. (2011). *The college payoff: Education, occupations, and lifetime earnings*. Washington, DC: Georgetown University Center on Education and the Workforce.

Carnevale, A.P., Smith, N., Strohl, J. (2010). *Help wanted: Projection of jobs and education requirements through 2018,* Washington, D.C.: Georgetown University Center on Education and the Workforce. Retrieved from http://www.georgetown.edu

Chow, B. (2010, October 6). Rigorous and deeper learning. *Education Week*, pp. 1-2.

Cohen, J. S., & Smerdon, B. A. (2009). Tightening the Dropout Tourniquet: Easing the Transition From Middle to High School. *Preventing School Failure, 53*(3), 177-184.

Cole, J. S., Kennedy, M., & Ben-Avie, M. (2009). The role of precollege data in assessing and understanding student engagement in college. *New Directions for Institutional Research, 2009*(141), 55-69. doi: 10.1002/ir.286

College Board (2010). *Eight Components of College and Career Readiness Counseling,* New York, NY; Retrieved from the College Board website: http://media.collegeboard.org

College Board. (2011). *7th annual report to the nation.* New York, NY: Author. Retrieved from the College Board website: http://apreport.collegeboard.org/

Conley, D. T. (2003). Connecting the dots: Linking high schools and postsecodnary education to increase student success. *Peer Review, 5*(2), 9-12.

Conley, D. T. (2005a). Align high school with college for greater student success. *Education Digest, 71*(2), 4-12.

Conley, D. (2005b). *College knowledge: What it really takes for students to succeed and what we can do to get them ready.* San Francisco, CA: Jossey-Bass.

Conley, D. T. (2007). *Redefining college readiness* (vol. 3). Retrieved from the Educational Policy Improvement Center website: https://www.epiconline.org/

Conley, D. T. (2008). Rethinking college readiness. *New Directions for Higher Education, 2008*(144), 3-13.

Conley, D.T. (2010). *College and career ready: Helping all students succeed beyond high school,* San Francisco, CA*:* Jossey-Bass.

Conley, D. T. (2011). Building on the common core. *Educational Leadership, 68*(6), 16-20.

Cuban, L. (2003). *Why is it so hard to get good schools.* New York, NY: Teachers College.

Daire, A. P., LaMothe, S., & Fuller, D. P. (2007). Differences between black/African American and white college students regarding influences on high school completion, college attendance, and career choice. *Career Development Quarterly, 55*(3), 275-279.

Darling-Hammond, L. (1999). *Teacher quality and student achievement: A review of state policy evidence*. Retrieved from the Center for the Study of Teaching and Policy website: http://www.ctpweb.org

Day, J. C. & Newburger, E. C. (2002). *The big payoff: Educational attainment and synthetic estimates of work-life earnings*. US Dept. of Commerce, Economics and Statistics Administration, US Census Bureau.

Deffendall, M., Knutson, N. & Sacks, D. (2011). A Profile on first-generation college students at the University of Kentucky: A focus on retention efforts. Lexington, KY: University of Kentucky Press.

Deil-Amen, R., & DeLuca, S. (2010). The underserved third: How our educational structures populate an educational underclass. *Journal of Education for Students Placed at Risk, 15*(1/2), 27-50. doi: 10.1080/10824661003634948

DesJardins, S.L. (2001). A comment on interpreting odds-ratios when logistic regression coefficients are negative. *The Association for Institutional Research for Management Reseearch, Policy, Analysis, and Planning Professional File.* 81.

Dewey, J. (1998). *Experience and education*. Indianapolis, IN: Kappa Delta Pi (Original work published 1938).

Dickson, A. H. (2011). *First steps on the ladder to college success: Understanding the secondary school level factors that determine the college enrollment and retention outcomes of high school graduates in Massachusetts* (Unpublished doctoral dissertation, Northeastern University). Retrieved from http://iris.lib.neu.edu/

Dillon, N. (2008). The KIPP Phenomenon. *American School Board Journal*, *195*(11), 38-39.

Dougherty, C., Mellor, L., & Smith, N. (2006, May). *Identifying appropriate college-readiness standards for all students* (Issue Brief No.2). Austin, TX: National Center for Educational Accountability.

Education Commission of the States. (2010). *Access to kindergarten: Age issues in state statutes.* Denver, CO: Author. Retrieved from http://mb2.ecs.org/

Elliott, W. (2009). Children's college aspirations and expectations: The potential role of children's development accounts (CDAs). *Children and Youth Services Review, 31*(2), 274-283. doi:10.1016/j.childyouth.2008.07.020

Engle, J. & Bermeo, A. (2006). Straight from the source: What works for first-generation college students. *Pell Institute for the Study of Opportunity in Higher Education.* Washington, DC: Author.

Fredericks, J.A., Blumenfeld, P.C., & Paris, A.H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research,* 74, 59-109.

Fuchs, L. S., Fuchs, D., & Compton, D. L. (2010). Rethinking response to intervention at middle and high school. *School Psychology Review, 39*(1), 22-28.

Furstenberg, F. F., & Neumark, D. (2007). Encouraging education in an urban school district: Evidence from the Philadelphia educational longitudinal study. *Education Economics, 15*(2), 135-157. doi: 10.1080/09645290701263054

Gonzales, P., Williams, T., Jocelyn, L., Roey, S., Kastberg, D., and Brenwald, S. (2008). *Highlights From TIMSS 2007: Mathematics and Science Achievement of U.S. Fourth- and Eighth-Grade Students in an International Context* (NCES 2009–001Revised). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC: NCESIES.

Hafner, A., Joseph, R., & McCormick, J. (2010). College readiness for all: Assessing the impact of English professional development on teaching practice and student learning. *Urban Learning, Teaching, and Research, 6*, 15-30.

Hambrick, F. A., & Stage, F. K. (2004). College predisposition at high-minority enrollment, low-income schools. *Review of Higher Education, 27*(2), 151-168.

Haskins, R., & Kemple, J. (2009). A new goal for America's high schools: College preparation for all. *The Future of Children*, *19*(1), 1-7.

Haycock, K. (2010). Building common college-ready standards. *Change*, July/August, 14-19.

Henig, J.R. (2008). What do we know about the outcomes of KIPP schools?. *The great lakes center for education research & practice education policy brief.* Retrieved from http://www.greatlakescenter.org

Hill, C., Corbett, C., & St Rose, A. (2010). Why So Few? Women in Science, Technology, Engineering, and Mathematics: American Association of University Women. Washington, DC Retrieved from: http://www.aauw.org

Hill, H.C., Rowan, B., & Ball, D.L. (2005). Effects of teachers' mathematical knowledge for teaching on student achievement. *American Educational Research Journal, 42*(2), 371-406.

Hoffman, N., Vargas, J., Venezia, A. & Miller, M. (2007). *Minding the gap: Why integrating high school with college makes sense and how to do it.* Cambridge, MA: Harvard Education Press.

Hooker, S., & Brand, B. (2010). College knowledge: A critical component of college and career readiness. *New Directions for Youth Development, 2010*(127), 75-85. doi: 10.1002/yd.364

Hosmer, D. W., & Lemeshow, S. (2000). Applied logistic regression (2nd ed.). New York, NY: Wiley.

Hossler, D., Schmit, J. L., & Vesper, N. (1999). *Going to college: How social, economic, and educational factors influence the decisions students make*. Baltimore, MD: Johns Hopkins University Press.

Hunt, J. B., Jr., Carruthers, G., Callan, P. M., & Ewell, P. T. (2006). *Measuring up, 2006. The National Report Card on Higher Education*. San Jose, CA: National Center for Public Policy and Higher Education.

Hyde, J. S., & Mertz, J. E. (2009). Gender, culture, and mathematics performance. *Proceedings of the National Academy of Sciences, 106*(22), 8801.

IQS Research. (2010). Community perceptions in higher education in Louisville. Louisville, KY: Author. Retrieved from http://www.55000degrees.com/

Ishitani, T. T. (2003). A longitudinal approach to assessing attrition behavior among first-generation students: Time-varying effects of pre-college characteristics. *Research in Higher Education, 44*(4), 433.

Ishitani, T. T., & Snider, K. G. (2006, May). *Longitudinal effects of college preparation programs on college retention*. Paper presented at the 44th annual forum of the Association for Institutional Research, Boston, MA. Retrieved from http://eric.ed.gov/

Johnson, I. (2008). Enrollment, persistence and graduation of in-state students at a public research university: Does high school matter. *Research in Higher Education, 49*(8), 776-793. doi: 10.1007/s11162-008-9105-8

Kay, K. (2009). Middle schools preparing young people for 21st century life and work. *Middle School Journal. 40*(5), 40-45.

Kelly, P. (2005). *As America becomes more diverse: The impact of state higher education inequality*. National Center for Higher Education Management Systems: Boulder, CO.

Kentucky Council on Postsecondary Education. (2007). *Double the numbers: Kentucky's plan to increase college graduates.* Retrieved from the Kentucky Council on Postsecondary Education website: http://cpe.ky.gov/

Kentucky Department of Education. (2010). *Kentucky Core Academic Standards.* Retrieved from the Kentucky Department of Education website: http://www.education.ky.gov/

Kentucky Department of Education. (2011). *Next-generation learners proposed accountability model.* Retrieved from the Kentucky Department of Education website: http://www.education.ky.gov/

Kleinbaum, D.G. and Klein, M. (2005). *Survival Analysis.* 2nd edition. New York, NY: Springer.

Krueger, C. (2006). *The progress of P-16 collaboration in the states*. ESC Policy brief. Retrieved from http://www.ecs.org.

Kuh, G.D. (2007). What student engagement data tell us about college readiness. *Association of American Colleges and Universities, 9*(1), 4-8.

Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J., & Gonyea, R. M. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. *Journal of Higher Education, 79*(5), 540-563.

Labaree, D. F. (2010). *Someone has to fail: The zero-sum game of public schooling*. Cambridge, MA: Harvard University Press.

Leroux, A., Vaughn, S., Roberts, G., & Fletcher, J. (2011). Findings from a three year treatment within a response to intervention framework for students in grades 6 with reading difficulties. *Society for Research on Educational Effectiveness*, 8.

Lieber, C. M. (2009). *Increasing college access through school-based models of postsecondary preparation, planning, and support*. Cambridge, MA: Educators for Social Responsibility.

Lin, M.M. (2012). *Intersections of race, SES, and first-generation college student status in understanding the factors affecting undergraduate academic persistence: A psychosociocultural approach.*(Doctoral dissertation). Retrieved from Proquest. (AAT 3488638).

Lloyd, K. M., Leicht, K. T., & Sullivan, T. A. (2008). Minority college aspirations, expectations and applications under the Texas top 10% law. *Social Forces, 86*(3), 1105-1137.

Louie, V. (2007). Who makes the transition to college? Why we should care, what we know, and what we need to do. *The Teachers College Record, 109*, 2222-2251.

Lucas, S.R. (2001). Effectively maintained inequality: Education transitions, track mobility, and social background effects. *American Journal of Sociology, 106*(6), 1642-1690.

Macey, E., Decker, J., & Eckes, S. (2009). The Knowledge is Power Program (KIPP): An analysis of one model's efforts to promote achievement in underserved Communities. *Journal of School Choice*, *3*(3), 212-241.

Mac Iver, M. A., Balfanz, R., & Byrnes, V. (2009). *Advancing the "Colorado graduates" agenda: Understanding the dropout problem and mobilizing to meet the graduation challenge*. Baltimore, MD: The Center for Social Organization of Schools, John Hopkins University.

Maltese, A.V., & Tai, R.H. (2011). Pipeline persistence: Examining the association of educational experiences with earned degrees in STEM among U.S. students. *Science Education Policy*. doi: 10.1002/sce.20441

Marzano, R. J. (2010). *Formative assessment & standards-based grading*. Bloomington, IN: Marzano Research Laboratory.

McCarthy, M., & Kuh, G.D. (2006). Are students ready for college: What student engagement data say. *Phi Delta Kappan*, *87*(9), 664-669.

Mills, M. (2011). *Introducing survival and event history analysis*. Thousand Oaks, CA: SAGE Publications.

Moore, G. W., Slate, J. R., Edmonson, S. L., Combs, J. P., Bustamante, R., & Onwuegbuzie, A. J. (2010). High school students and their lack of preparedness for college: A statewide study. *Education and Urban Society,* 42, 817-838. doi: 10.1177/0013124510379619

Muñoz, M. A., Potter, A. P., & Ross, S. M. (2008). Supplemental educational services as a consequence of the NCLB legislation: Evaluating its impact on student achievement in a large urban district. *Journal of Education for Students Placed at Risk (JESPAR), 13*(1), 1-25.

Murnane, R., & Levy, F. (1996). *Teaching the new basic skills: Principles for educating children to thrive in a changing economy*. New York, NY: The Free Press.

National Commission on Excellence in Education. (1983). *A nation at risk.* Washington, DC: Government Printing Office.

Neild, R., & Balfanz, R. (2006). An extreme degree of difficulty: The educational demographics of urban neighborhood high schools. *Journal of Education for Students Placed at Risk (JESPAR), 11*(2), 123-141.

No Child Left Behind Act of 2001, 20 U.S.C § 6319 (2008).

Noble, J., Davenport, M., Schiel, J., & Pommerich, M. (1999). *High school academic and noncognitive variables related to the ACT scores of racial/ethnic and gender groups.* Retrieved from ACT: http://www.act.org

Noble, J., Roberts, W. L., & Sawyer, R. (2006). *Student achievement, behavior, perceptions, and other factors affecting ACT scores*. Iowa City, IA: ACT.

O'Conner, K. (2009). *How to grade for learning: Linking grades to standards* (3rd ed.). Thousand Oaks, CA: Corwin Press.

OECD (2010), *PISA 2009 at a Glance*, OECD Publishing.

Palmer, R. T., Davis, R. J., Moore, J. L., & Hilton, A. A. (2010). A nation at risk: Increasing college participation and persistence among African American males to stimulate US global competitiveness. *Journal of African American Males in Education (JAAME), 1*(2), 105-124.

Partnership for 21st Century Skills. (2008). *21st century skills, education, & competitiveness: A resource and policy guide*. Tucson, AZ.

Pearlman, B. (2006). Twenty-first century learning in schools: A case study of New Technology High School in Napa, California. *New Directions for Youth Development, 2006*(110), 101-112. doi: 10.1002/yd.170

Perna, L. (2005). The key to college access: Rigorous academic preparation. In W. Tierney, Z. Corwin & J. Colyar (Eds.), *Preparing for college: Nine elements of effective outreach* (pp. 113-134). Albany, NY: State University Press.

Porter, A., McMaken, J., Hwang, J., & Yang, R. (2011). Common Core Standards. *Educational Researcher, 40*(3), 103-116. doi: 10.3102/0013189x11405038

Puyosa, I. M. (2009). *Assessing the impact of academic preparation, finances and social capital on postsecondary education enrollment* (Doctoral Dissertation). Retrieved from http://deepblue.lib.umich.edu

Radcliffe, P., Huesman, R., & Kellogg, J. (2006, November). *Modeling the incidence and timing of student attrition: A survival analysis approach to retention analysis*. Paper presented at the conference of AIRUM, Bloomington, MN.

Reid, M. J., & Moore, J. L. (2008). College readiness and academic preparation for postsecondary education. *Urban Education, 43*(2), 240-261. doi: 10.1177/0042085907312346

Roderick, M., Nagaoka, J., & Coca, V. (2009). College readiness for all: The challenge for urban high schools. *The Future of Children, 19*(1), 185-210.

Rosenstock, L. (1991). The walls come down: The overdue reunification of vocational and academic education. *The Phi Delta Kappan, 72*(6), 434-436.

Ross, S.M., McDonald, A.J., Alberg, M., (2007). Achievement and climate outcomes for the Knowledge is Power Program in an inner-city middle school. *Journal of Education for Students Placed at Risk,* 12(2), 137-165.

Sawyer, R. (2008). *Benefits of additional high school course work and improved course performance in preparing students for college.* Iowa City, IA:ACT.

Saxon, D. P., & Boylan, H. R. (2001). The cost of remedial education in higher education. *Journal of Developmental Education, 25*(2), 2-9.

Schmidt, W. H., Wang, H. C., & McKnight, C. C. (2005). Curriculum coherence: An examination of US mathematics and science content standards from an international perspective. *Journal of Curriculum Studies, 37*(5), 525-559.

Schneider, B., & Stevenson, D. (1999). *The ambitious generation: America's teenagers motivated but directionless*. New Haven, CT: Yale University Press.

Schwartz, A. E., McCabe, B. J., Ellen, I.G., & Chellman, C. C. (2010). Public schools, public housing: The education of children living in public housing. *Urban Affairs Review, 46*(1), 68.

Secretary's Commission on the Achieving of Necessary Skills (SCANS) Commission. (1991). *What work requires of schools: A SCANS report for America 2000*. The Secretary's Commission on Achieving Necessary Skills U.S. Department of Labor.

Sedlacek, W. E. (1974). Issues in predicting black student success in higher education. *The Journal of Negro Education, 43*(4), 512-516.

Sedlacek, W. E. (1987). Evaluating student support services. *New Directions for Institutional Research, 1987*(56), 49-57.

Sedlacek, W. E. (1999). Black students on White campuses: 20 years of research. *Journal of College Student Development, 40*, 538-550.

Sedlacek, W. E. (2008, August). *Using noncognitive variables in k-12 and higher education.* Paper presented at the summit on college outreach and academic success, Ann Arbor, Michigan.

Simonsen, B., Shaw, S. F., Faggella-Luby, M., Sugai, G., Coyne, M. D., Rhein, B., . . . Alfano, M. (2010). A model for service delivery. *Remedial and Special Education, 31*(1), 17-23. doi: 10.1177/0741932508324396

Singer, J. D., & Willett, J. B. (1991). Modeling the days of our lives: Using survival analysis when designing and analyzing longitudinal. *Psychological Bulletin, 110*(2), 268.

Singer, J. D., & Willett, J. B. (1993). It's about time: Using discrete-time survival analysis to study duration and the timing of events. *Journal of Educational and Behavioral Statistics, 18*(2), 155-195. doi: 10.3102/10769986018002155

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence.* New York, NY: Oxford University Press.

Stiggins, R. J. (2007). Assessment through the student's eyes. *Educational Leadership, 64*(8), 22-26.

Stiggins, R. J., & DuFour, R. (2009). Maximizing the power of formative assessments. *PhiDelta Kappan, 90*(9), 640-644.

Stiggins, R. J., Arter, J. A., Chappuis, J., & Chappuis, S. (2004). *Classroom assessment for student learning: Doing it right—using it well.* Portland, OR: Assessment Training Institute.

Tinto, V. & Pusser, B. (2006). *Moving from theory to action: Building a model of institutional action for student success*. National Postsecondary Education Cooperative (NPEC). Retrieved from http://nces.ed.gov/npec/

Tyack, D. B., & Cuban, L. (1995). *Tinkering toward utopia: A century of public school reform*. Boston, MA: Harvard University Press.

US Department of Education. (2004). *The condition of education 2004.* Washington, DC: National Center for Education Statistics.

U.S. Department of Education. (2006). *Action plan for higher education: Improving accessibility, affordability, and accountability.* Washington, DC.

US Department of Education. (2008). *The condition of education 2008.* Washington, DC: National Center for Education Statistics.

US Department of Education. (2010). *ESEA blueprint for reform.* Alexandria, VA: Education Publication Center.

Venezia, A., Callan, P., Finney, J., Kirst, M., & Usdan, M. (2005). *The governance divide: A report on a four-state study on improving college readiness and success.* (National Center Report #05-3). Retrieved from http://www.highereducation.org

Welner, K., Burris, C., Wiley, E., & Murphy, J. (2008). Accountability, rigor, and detracking: Achievement effects of embracing a challenging curriculum as a universal good for all students. *The Teachers College Record, 110*(3), 571-607.

Wiggins, G. (2011). A diploma worth having. *Educational Leadership, 68*(6), 28-33.

Wiggins, J. (2011). Faculty and first-generation college students: Bridging the classroom gap together. *New Directions for Teaching and Learning, 2011*(127), 1-4. doi: 10.1002/tl.451

Wimberly, G.L., & Noeth, R.J. (2005). *College readiness begins in middle school.* Retrieved from ACT: *www.act.org*

Zwick, R. (2007). *College admission testing.* Arlington, VA: National Association for College Admission Counseling. Retrieved from http://education.ucsb.edu

CURRICULUM VITAE

NAME: Amber Kaye Jaggers

ADDRESS: 9600 Old Six Mile Ln.
Louisville, KY 40299

DOB: Louisville, Kentucky- May 21, 1979

EDUCATION
& TRAINING: B.A., Psychology
University of Louisville
1997-2001

MAT, Secondary Education
University of Louisville
2002-2003

MEETING PRESENTATIONS:

Kentucky Council for the Social Studies, September 2010
Topic: Standards-Based Grading and Instruction

NOTABLE WORKS:

2010 Urban Redesign Challenge, University of Louisville
(www.dc.gov/DCPS/Parents+and+Community/Urban+Education+
Redesign+Challenge)

CURRICULUM VITAE

NAME: Pamela Mullis Royster

ADDRESS: VanHoose Education Center
3332 Newburg Road
Louisville, KY 40218

DOB: Fort Hood, Texas – February 21, 1971

EDUCATION
& TRAINING: B.A., French
Centre College
1989-1993

MAT, Secondary Education
University of Louisville
1994-1995

AWARDS: 2010 College Board CollegeKeys Compact Southeast Innovation Award
Effective Practice for Improving College Access

2010 Gheens Institute for Innovation Award
Community and Business Partnership: Close the Deal

SELECTED PRESENTATIONS:

America's Promise Dropout Summit, August 2008
Topic: Developing Growth in Advanced Placement Course in JCPS

Education Northwest: National Conference, June 2011
Topic: Using College Access Time to Promote a College-Going Culture

Kentucky ACT Council Educational Summit, November 2011
Topic: Using Data to Improve Your College-Going Culture
Topic: Defining College and Career Readiness