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The Effects of Secondary School Accountability Grades On College and University Transfer

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THE EFFECTS OF SECONDARY SCHOOL ACCOUNTABILITY GRADES ON COLLEGE AND UNIVERSITY TRANSFER

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ABSTRACT

Workforce projections indicate that a majority of jobs to be created in the U.S. economy will require some form of postsecondary education (Cappelli, 2015; Carnevale, Smith, & Strohl, 2010). At the same time, colleges and universities are being held accountable for completion and graduation of their students (The Commission, 2014) and secondary schools are being graded under changing accountability systems (Center for Education Policy, 2008; Dee & Jacobs, 2011, Figlio & Ladd, 2008). This study looked at the longer-term implications of high school accountability grades, A–F, and the impact on student transfer, associate's degree completion, and time to associate's degree among Twenty-First Century Scholars students who attended Ivy Tech Community College, Indiana's community college system. There were statistically significant differences in long-term education outcomes, earning associate's degrees in 11 elapsed terms from the first fall term of enrollment and in transferring out with or without a degree during the same time-period, based on the accountability grade of the high school from which the students came, using two separate chi square tests for independence. However, among graduates, there was no statistically significant difference in the time it took students to complete associate's degrees between students from A- and F-rated high schools, using an independent samples t-test.

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INTRODUCTION: EDUCATION AND THE WORKFORCE

Recent workforce projections indicate that by 2018, nearly two-thirds of all new jobs created in the United States will require some college (Carnevale, Smith, & Strohl, 2010). The United States may not be able to meet future workforce demands with its current production of college graduates, evidenced by the fact that "the last decade has witnessed the rapid growth of a globally integrated labour market. Competitive pressures are increasingly felt not just across countries but at the level of occupations and individual workers" (Bardhan, Hicks, & Jaffee, 2013, p. 1,239). In the United States, Indiana is behind the national average in its production of skilled workers who hold postsecondary workforce credentials and degrees (Lumina Foundation for Education, 2015b). Complicating this situation is the fact that, in both Indiana and across the nation, achievement gaps exist between White and African-American students and White and Latino students. The achievement gaps are problematic because a greater percentage of young people are African-American and Latino and represent student-population groups that historically do not graduate from postsecondary education at high rates (U.S. Census Bureau, 2012a). The U.S. Census Bureau (2012b) reported, "The non-Hispanic white population is projected to peak in 2024. . . . The U.S. is projected to become a majority-minority nation for the first time in 2043" (p. 2).

The Indiana Commission for Higher Education (ICHE) reported that the on-time completion rate for two-year college students is 6% for white students, 4% for Hispanic students, and 1% for black students (ICHE, 2014). For four-year students and institutions, the on-time completion rate for white students was 31%, 19% for Hispanic students, and 11% for African-American students (ICHE, 2014). The ICHE's completion rate is based on the percentage of first-time, full-time, degree-seeking students who start in the fall term and complete an associate's degree in two years or a baccalaureate degree in four years. The ICHE leaders use the on-time goal because "overcoming this challenge is essential to offering all Hoosiers a higher quality of life and providing the state with a stronger economy and workforce" (ICHE, 2014, p. 7).

With a goal of producing more credentialed workers to meet future workforce demands, Commission leaders set targets for Indiana's colleges and universities to improve on-time graduation rates (ICHE, 2014). Research indicated that the more quickly students are able to graduate, the faster they can enter the workforce, contributing to the economy in terms of individual and collective benefits (Abel & Deitz, 2014). From 1970 to 2013,

> Average wages for those with a college degree are far greater than average wages for those with only a high school diploma . . . Over the past four decades, those with a bachelor's degree have tended to earn 56 percent more than high school graduates while those with an associate's degree have tended to earn 21 percent more than high school graduates. (Abel & Deitz, 2014, p. 3)

Statement of the Problem

Both individuals and the local and state economies in Indiana realized the negative effects of an undereducated workforce. For example, in 2010, Indiana ranked 40th in the country

in per capita income. The state's ranking dropped during the past decades from 21st in 1950 to 30th in 1980 (Hicks, Devaraj, Faulk, Huepel & Canaday, 2013). Adults in Indiana also ranked in the lower quartiles on health and civic engagement indicators that are positively linked with higher levels of education (Mullholland, 2011). These individual indicators range from participating in the workforce, to having health insurance, to voting, and volunteering (Mullholland, 2011). The local and state impacts include tax revenue, use of public benefits, voter participation, and charitable engagement (Mullholland, 2011).

Student transfer in college or at the university lengthens the time to earn a postsecondary credential or degree, thus delaying the acquisition of postsecondary workforce credentials that may move workers into higher-paying, higher-skilled jobs (Carnevale et al., 2010; Cullinane, 2014). The longer time to graduation and delay in entering the workforce has implications for postsecondary outcomes and the state's ability to meet workforce demands. Two-thirds of the new jobs will require technical certificates or associate's degrees, and one-third of new jobs will require at least a bachelor's degree during the next decade (Carnevale et al., 2010). Currently, the higher-education system is not producing enough credentialed graduates to meet future employer demands for a skilled workforce (Carnevale et al., 2010; Lumina Foundation for Education, 2015a). Disrupted student attendance patterns in college, both within the same institution and between institutions, extend the time to degree and serve as barriers to completion and earning a credential (Cullinane, 2014; Lin & Purcell, 2015; Ninon, 2013).

The National Student Clearinghouse data indicated, "Only about 15 percent of all students who start at two-year public colleges earn a bachelor's degree within six years" (Crosta & Kopko, 2014, p. 1). Practitioners, policymakers, faculty, and the students themselves are working to identify barriers to earning a degree and solutions to help students overcome the

barriers (David, 2015). Despite community college reform efforts, student success rates are still low. At Ivy Tech Community College (Ivy Tech), three-year graduation rates for first-time, full-time, degree-seeking students is 14%, and the six-year graduation rate is 18.5% (Ivy Tech, 2017a). Six-year outcomes for students to complete either certificates or degrees for students who start at two-year public institutions nationally and finished at the same institution is 26.5% (Cahalan, Perna, Yamashita, Ruiz, & Franklin, 2017). Earlier research also indicated that the six-year graduation rate was 18.5%, and approximately 6% of Ivy Tech students in the same cohort earned a credential within six years but did so at another institution (Lin & Purcell, 2015). The transfer pattern likely contributes to the extended time to degree. This is not just an Indiana and Ivy Tech phenomenon, because in 2012, "among all students who started at a two-year public institution, 36.3 percent received a degree or certificate within six years, with 12.4 percent completing at a different institution" (Shapiro & Dundar, 2012, p. 6). By 2017, completion at among students at the same institution where they began grew to 49.9% within six years and 10% completion at a different two-year institution within six years (Shapiro, Dundar, & Huie, 2017).

The low completion rates and longer time to degree can be attributed to complicated policy (transfer) environments, unclear degree pathways, and proximity to a four-year institution; these are just a few problems that inhibit baccalaureate degree attainment and students earning an associate's degree prior to transfer. Research has shown "that earning an associate degree before transferring is associated positively with earning a bachelor's degree" (Crosta & Kopko, 2014, p. 33).

In 1983, a commission appointed by President Ronald Reagan published *A Nation at Risk* which was attributed as the start of the K-12 accountability movement (Deming & Figlio, 2016).

This report outlined the risk, “The world is indeed one global village. We live among determined, well-educated, and strongly motivated competitors” (U.S. Department of Education [USDOE], 1983, para. 7). The report cited the following examples of how global education, ingenuity, and efficiency were leaving the country behind: more efficient Japanese automobiles, more efficient steel mills in South Korea, and higher-quality German-made machine tools (USDOE, 1983). The report listed indicators of risk and lower performance by American students on standardized tests, rising rates of functional illiteracy, and the high cost of remedial education as evidence that the country was at continued risk of lagging behind other developing countries (USDOE, 1983).

> The report famously stated that “if an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war” and called for “more rigorous performance measurement, including nationwide standardized testing. (Deming & Figlio, 2016, p. 33)

Post-report, states and other countries began implementing accountability testing. “Although many states had already installed accountability systems by 2000, a central campaign theme of George W. Bush was to expand this to all states, something that became a reality with No Child Left Behind Act of 2001 (NCLB)” (Hanushek & Raymond, 2005, p. 297). NCLB required testing in English and math. In December 2015, Congress enacted a new law to replace NCLB with the Every Student Succeeds Act (ESSA) that outlined the following requirements of states, “student performance in English Language arts . . . and mathematics . . . growth in ELA and mathematics; progress in achieving English language proficiency; high school graduation rates; and at least one measure of school quality or student success” (Martin, Sargrad, & Batel,

2016, p.1). Within the requirements, the ESSA required disaggregation of data by population groups and application of "much greater weight to the combination of those indicators than to the measures of school quality or student success" (Martin et al., 2016, p. 1). As a result, all 50 states and the District of Columbia have accountability measures in place (Martin et al., 2016).

Prior to NCLB, in 1999, Florida adopted an A to F rating system for schools and as of November 2016, 16 states adopted versions of the system for their own (Tanner, 2016). Following *A Nation at Risk*, Indiana education leaders responded with a series of education reforms starting with the college preparatory diploma, Core 40 in 1994; the creation of the Education Roundtable, a bipartisan group of policy makers and business leaders that made policy recommendations and P-16 alignment in 1998; Public Law 221 and Public Law 146 that focused on expanded academic standards in 2001; and the current A – F accountability system adopted for the 2011-12 school year (Louis, Thomas, Gordon, & Febey, 2008; Ritz, n.d.). Although the current accountability system in Indiana is under review for revision or replacement, it measures the following: English language arts (ELA) and math achievement, closing achievement gaps, academic progress of the lowest academic performers, academic growth for high achieving students, end of course exams (high school), SAT and ACT scores, college level courses in high school (Advanced Placement, International Baccalaureate and dual enrollment/dual credit) participation and achievement, high school graduation rates, industry certifications, and a focus on student ethnic demographics and socioeconomic status (Howe & Murray, 2015; Indiana Code, 2015; Ritz, 2014).

Although existing literature contains a body of research on the elementary and secondary outcomes related to K-12 school accountability on academic outcomes in elementary and

secondary levels, a gap exists on research that focuses on postsecondary outcomes of school accountability grade (A – F) measures. Deming and Figlio (2016) wrote,

> We are aware of only one study that investigates the impact of K-12 school accountability on long-run outcomes. Deming, Cohodes, Jennings, and Jenks (forthcoming) find that accountability pressures in Texas high schools led to increases in college attainment and earnings for low-scoring students in low-scoring schools. (p. 40)

This study focused on school accountability grades and the impact on students' postsecondary behaviors and outcomes, specifically on graduation, transfer, and time to degree.

Purpose Statement

This study was a quantitative analysis of high school and college student-level data to determine if a relationship exists between K-12 school accountability grades and postsecondary transfer patterns and time to the completion of an associate degree. Although prior research focused on academic and institutional structural issues that served as barriers to students graduating (Community College Research Center, 2015; Complete College America, 2013), a study on student accountability scores and postsecondary outcomes, a gap in the research is present. This gap suggested the need for an analysis to determine if the school accountability grade measures, in this case A – F designation, has an impact on students' postsecondary outcomes.

Data for this study came from a statewide community college system in Indiana, Ivy Tech Community College. The investigation sought to determine if a relationship exists between the high school accountability grade and college transfer, thus extending the time to earn a credential or degree. To accomplish this, a chi-square model and *t* test was used on data of

Twenty-First Century Scholars who attended the community college system, controlling for income, to investigate if secondary school accountability measure is a predictor of college-level student transfer, and further, if the accountability measures are related to time to credential or earning a credential before transferring.

The Twenty-First Century Scholars Program is Indiana's needs-based state financial-aid program for low-income Hoosiers. This program, started in 1990 per legislative mandate, "seeks to increase high school graduation rates, the diversity of the college-going population, and the state's economic productivity" (Berumen, Zerquera & Smith, 2015, p. 27). Twenty-First Century Scholar students and their families receive "college preparation support . . . that includes college information, financial aid workshops, advising about the college preparatory courses in high school, and college visits" (Berumen et al., 2015, p. 28). The actual financial scholarship is a last-dollar scholarship that covers unmet expected family financial contributions after all other forms of financial aid are applied (Berumen et al., 2015).

This research adds to the body of knowledge about student behaviors and the impact of secondary school accountability measures. Identifying and understanding barriers that impact student success can help practitioners and policymakers better support students to graduation. The demographics of secondary students coming into postsecondary education are shifting (U.S. Census Bureau, 2012b) and include a growing number of students from populations that have not historically graduated at high rates (ICHE, 2014). To meet future workforce demands, these students will need gain necessary skills and earn postsecondary credentials (Carnevale, Rose, & Hanson, 2012).

Research Questions

Since 2015, all 50 states and the District of Columbia have adopted secondary school accountability measures (Martin et al., 2016). Indiana is one of 16 states that include an A – F rating system for K-12 schools (Howe & Murray, 2015). Students participating in and completing college-level course programs, college exams (SAT and ACT), and college and career readiness are part of the rubric the state uses to award schools an A – F grade (Howe & Murray, 2015; Ritz, n.d.). Transfer at the postsecondary level is when students attend a different college or university than the previous semester (Crisp & Nora, 2010; Crosta & Kopko, 2014; Cullinane, 2014; Grubb, 1991; Hossler et al., 2012). The relationships between school accountability grade and transfer, time to degree, and completion were investigated in this study through the following research questions:

- Is there a relationship between secondary school accountability rating (Grades A through F) and postsecondary transfer among Twenty-First Century Scholar students at Indiana's community college?
- Is there a relationship between secondary school accountability rating (Grades A through F) and graduating (earning an associate's degree within 11 semesters of enrolling) at the community college?
- Is there a relationship between secondary school accountability rating (Grade A or Grade F) and time to degree (number of elapsed semesters to earn an associate's degree)?

My directional hypothesis was that there was no relationship between secondary school accountability grade and transfer or associate degree attainment. An additional directional

hypothesis was that there was no difference in time to associate degree (within 11 months) among students who came from secondary schools with different accountability grades (A – F).

Significance of the Study

As community colleges and other postsecondary institutions are subject to state performance-funding models and as employer demands for credentialed and skilled workers grow, leaders increasingly need to target institutional resources toward problems and solutions that have the greatest impact on student completion. Student success, defined as completion of a certificate or degree, is a key policy topic in higher education (Complete College America, 2013; ICHE, 2013a; Lumina Foundation for Education, 2015a). This study built on the typology of a community college student and the characteristics and attributes that make up students studying at two-year institutions and adds to the body of information on characteristics of such students. Students will benefit from the increased, yet targeted resources to improve their chances of earning a credential or degree. By better understanding their resiliency patterns and behavior patterns, practitioners and policymakers can target interventions and services to students to help them best meet their completion goals and move them into the workforce.

Delimitations of the Study

The design of this study has both delimitations and limitations. "A delimitation is a systematic bias introduced into the study or instrument by the researcher. In other words, the research has control over a delimitation" (Price & Murnan, 2004, p. 66). My study includes the following delimitations:

I only focused on data from a single geographic region in the Midwest that was served by a large community college with a wide geographic area that served several employment

industries and sectors. This choice could have limited the ability to generalize results beyond the geographic region.

A second delimitation was that only students who experienced two-year college enrollment, not students who started at four-year institutions, were studied. Students who chose to start at a four-year institution or who transferred into a two-year institution after first attending a four-year institution may have displayed different resiliency patterns, for example.

The rationale for studying this two-year institution was that Ivy Tech served an entire state and provided an adequate number of students to sample. Additionally, because "community college students are more likely to attend part-time, to be minority, low-income and have lower high school grades and lower standardized test scores than students who enroll at a four-year institution" (Cullinane, 2014, p. 5), the students this college served are more representative of the growing pipeline of students coming from the K-12 educational system and more like the workers who will emerge to fill the skilled jobs over the next two decades (Carnevale et al., 2010; Carnevale et al., 2012). Finally, "overall, 15 percent of two-year starters completed a degree at a four-year institution during the study period . . . nearly two-thirds of these students did so without first obtaining a two-year degree" (Shapiro & Dundar, 2012, p. 9). Two year institutions serve as the starting point for a growing number of minority, low-income students who end up at baccalaureate-serving institutions (Shapiro & Dundar, 2012).

Limitations of the Study

Limitations are "systematic bias[es] that the researcher did not or could not control" (Price & Murnan, 2004, p. 66) in a research study. The following limitations existed as this study was designed.

The open-access nature of the college means that many students come underprepared. Under-preparation may have served as a factor in not persisting through to graduation, in addition to the transfer/mobility barrier. I controlled for this through study design, with the selection of Twenty-First Century Scholar students, which not only allows for a study of a student population moving through the education pipeline, whose needs and barriers are critical to study, it resulted in a sample of students who must maintain a 2.0 or 2.5 grade point average and were advised on the college preparatory curriculum and diploma in Indiana (Berumen et al., 2015, Twenty-First Century Scholars, 2014). Thus, using data from this population of students helped control for underprepared academic skills as a barrier.

Data availability was a second limitation. Data on high school of record for the students in this survey (students entering Ivy Tech in fall 2012 and fall 2013) were taken from unit record data that were self-reported and collected from the students' applications upon admission and enrollment to Ivy Tech. Self-reporting is less accurate than is unit record-matched longitudinal data. Several hundred students did not report a high school of record. In Indiana, there are four sets of public high schools with duplicate names, and because of the nature of the available data set, it was not possible to discern which school the student attended. Additionally, A through F school data began in 2011-12 in Indiana, and the criteria changed over time, but the criteria were applied the same to schools across the state. I used the secondary school grade in the year the student completed high school.

Student and school characteristics are a third limitation. Two of the poorest school districts in the state, for example, accounted for most the schools that performed so poorly that they were subject to state takeover (Hiller, DiTommaso, & Plucker, 2012). Characteristics such

as race, socioeconomic level, school readiness, and exposure to learning opportunities could also influence academic performance both in secondary and postsecondary education settings.

A final limitation was an outgrowth of how I controlled for the first limitation—the analysis of only Twenty-First Century Scholar students. These students constituted a defined group and received college access support services during secondary school. Receiving these services may have impacted the students' choices and knowledge of how to successfully navigate and complete a postsecondary program. However, narrowing the study to this group enabled the model to control for poverty and to identify a set group of students with similar characteristics entering the analysis.

Definition of Terms

This section provided definitions and explanations of terms used in both secondary and postsecondary education research and literature.

A – F accountability systems are state-based accountability systems for elementary and secondary education that assign schools A – F letter grades based on a combination of student achievement and quality indicators (Adams, Forsyth, & Ware, 2016; Howe & Murray, 2015).

Lateral transfer is the practice of transferring credits between two-year institutions or between four-year institutions (Cullinane, 2014).

Resiliency is defined as "the ability to overcome obstacles by meeting challenges and finding alternative ways to accomplishment" (Martinez, Bilges, Shabazz, Miller, & Morote, 2012, p. 30).

Transfer at the postsecondary education level is defined as attending a different college or university than the previous semester (Crosta & Kopko, 2014; Cullinane, 2014; Grubb, 1991).

Twenty-First Century Scholar is a low-income student from Indiana who takes a pledge, while in middle school, to maintain a minimum grade point average and to stay out of trouble with the legal system, comply with mandated activities, and to receive tuition scholarship funds to pay to attend in-state undergraduate college or university (ICHE, 2013b).

Vertical transfer is the practice of transferring credits from a community college to a baccalaureate institution (Cullinane, 2014).

Summary

Postsecondary institutions are increasingly being held accountable for student success outcomes through performance funding models and accountability reports (ICHE, 2014). Leaders at these institutions seek ways to improve retention, transfer, and completion. Researchers have identified a typology of a community college student and policies, practices, and data to better serve them (Adelman, 2005a; Bahr, 2013; Hagedorn & Prather, 2005). The body of research included an analysis of secondary education outcomes such as grade point average, test scores, diploma types, and course rigor (Adelman, 2005a); student characteristics such as socioeconomic status and first-generation college status (Hagedorn & Prather, 2005); and student educational goals upon enrolling in a community college (Bahr, 2013). A research gap existed in determining if the accountability grade system in secondary education is a predictor of transfer and completion in postsecondary education.

This study was a quantitative analysis in which chi-square tests for independence was run to determine if secondary school accountability grades were related to postsecondary transfer and earning an associate degree at the college within 11 elapsed semesters (200% time to degree), and a *t* test for independent samples was run to determine if school accountability grades were related to the time it took students to earn an associate degree. Chapter 1 provides an overview

of the problem, the purpose of the research, and the research questions to be addressed. Chapter 2 includes a review of relevant literature in the areas of postsecondary transfer; accountability systems; two theories—resiliency and the typology of a community college student; and a specific population of students—Twenty-First Century Scholars. Chapter 3 documents the methodologies used in the analysis. Chapter 4 contains a data analysis, and findings and implications are found in Chapter 5.

CHAPTER 2

LITERATURE REVIEW

Background Information

Increasingly, higher education institutions, including community colleges, are being judged by policymakers, non-profit organization leaders, and the public on retention—continuous enrollment of students from semester to semester—and completion—student attainment of credentials and degrees (Adelman, 2005b; Bahr, 2013). In 2009, Lumina Foundation for Education, a leading higher education policy and philanthropy organization, released a strategic plan that called for 60% of American workers "to obtain high quality postsecondary credentials or degrees by 2025" (Lumina Foundation for Education, 2013, p. 2). This goal was aligned with economic projections on the number of skilled workers needed to fill future job demands (Lumina Foundation for Education, 2015b). Since the strategy launched, federal agencies, state agencies, educational associations, and higher-education institutions adopted some version of the 60% attainment goal (Lumina Foundation for Education, 2013).

In 2009, at the federal level, President Barack Obama announced the American Graduation Initiative that would help "the United States reclaim its status as the world's top producer of college graduates by 2020" (American Association of Community Colleges [AACC], 2009, p. 17). Sub-baccalaureate degrees and the community colleges that grant these degrees play a majority role in achieving these goals because they provide the credentials needed

to fill job demands (AACC, 2009; Carnevale et al., 2010; Lumina Foundation for Education, 2013; ICHE, 2010). In 2010, the ICHE, the state's public higher education coordinating agency, adopted the same 60% attainment goal for Indiana, with its strategic plan, Reaching Higher Achieving More (ICHE, 2010). The ICHE implemented performance funding for public higher-education institutions to help drive an increase in on-time college completions, earning an associate's degree within two years and a baccalaureate degree within four years (Association for the Study of Higher Education, 2013; ICHE, 2013b). In 2014, Ivy Tech also aligned its strategic plan to help fulfill the ICHE's goal for the state of Indiana (Ivy Tech, 2014).

Literature on the Problem at Hand

Competing literature exists on the higher-education-to-employment or workforce problem. Carnevale and Rose (2011) argued that a skills gap existed and not enough postsecondary-trained citizens were available to meet workforce demand (Carnevale, 2011; Carnevale et al., 2012). A second body of research identified a skills mismatch in the United States, as opposed to a skills gap (Cappelli, 2015). The skills mismatch refers to geographic misalignment of available jobs and skilled workers, inabilities to effectively recruit, a decreased focus on in-house corporate training to give credentialed workers the technical skills they need for a specific industry, and the general change in the economy and demands for specific industries (Cappelli, 2015). For those workers and prospective employees who seek to obtain the technical skills they need, a longer time to degree can mean that these persons accumulate additional debt from semester to semester and delay entering the workforce or moving up in the workforce to higher-paying jobs and careers (Jackson & Reynolds, 2013).

The Undereducated Workforce

The percentage of adults in Indiana who have an associate's degree or higher was 34.7% in 2013, up from 33.4% in 2008 (Lumina Foundation for Education, 2015a). Indiana fell below the national average of 40% postsecondary attainment in 2013 (Lumina Foundation for Education, 2015a). A longer time to degree impacts students' abilities to earn credentials to move into higher-skilled, higher-paying jobs, which impacts Indiana's economy. For example,

> On a per capita basis, Indiana ranks 40th across the states in 2010, with the average resident receiving $34,042 in income from all sources. This is a decline from 1980, when Indiana ranked 30th, which is itself a decline from 1950, when we ranked 21st in the nation. (Hicks et al., 2013, p. 2)

The state's per capita income declined each census from 1980 to 2010. Factors contributing to this decline included "urbanization, share of population with a four-year college degree, and the share of service sector employment [which are] positively correlated with higher levels of per capita income in the state" (Hicks et al., 2013, p. 8). An under-educated and under-skilled workforce impacts a geographic area's ability to attract high-skill, high-wage jobs. In turn, citizens and communities are more likely to experience lower economic outcomes.

Conversely, higher levels of educational attainment are positively associated with employment status, participation in the workforce, lower instances of obesity and smoking, and higher instances of exercising, eating a healthy diet, and having health insurance (Mulholland, 2011). On a community level, "more education is associated with much higher levels of civic engagement" (Mulholland, 2011, p. 6). Higher civic engagement includes behaviors such as voter participation in presidential and mid-term elections, donations to charitable organizations, and engagement in volunteer activities (Mulholland, 2011).

For decades, researchers, practitioners, and policymakers sought ways to improve educational attainment. A study of college graduates from 1992-93 showed varying postsecondary attendance patterns prior to graduation (McCormick, 2003). Within the study group of students earning a baccalaureate degree,

> Thirty-four percent attended at least three institutions before receiving their degree . . . This represents more than just transfer between institutions: even among students who graduated from the same institution where they began their college education, one in five had enrolled elsewhere during their college career. (McCormick, 2003, p. 16)

Credentialing Delays: Supply and Demand of Workers

In addition to earning wages and participating in the economy, the shortened time to degree completion also lowers the risk that students will accumulate high student-loan debt over time (Jackson & Reynolds, 2013). Two-thirds of the new jobs created from 2010 to 2018 that Carnevale et al. (2010) cited require workforce certificates or associate degrees, and the current American higher education system is not producing enough credentialed and degreed graduates to fill the demand. For example, the average time to degree completion for students at Indiana's community colleges has been steady at 18 elapsed terms, but only nine enrolled terms (Escue, 2015; Jackson & Reynolds, 2013). It takes students 18 terms or semesters (fall, spring, and summer) which is more than six years to earn an associate's degree, yet students are only enrolled for nine of those 18 semesters. Students stop out or transfer to another institution and then return to Ivy Tech to finish their credentials and degrees.

Some economists warn that a skills gap is hindering the American workforce with a shortage of up to 20 million credentialed and degreed workers (Carnevale & Rose, 2011). Not

all academically qualified high-school graduates go directly into postsecondary education institutions to earn a credential or degree. "More than half a million students graduate in the upper half of their high school graduating class who don't get either a two- or four-year degree" (Carnevale & Rose, 2011, p. 34). Carnevale and Rose (2011) described two adverse effects that the skills gap creates. "Without enough talent to meet demand, we are losing out on the productivity that more postsecondary-educated workers contribute to our economy. Moreover, scarcity has driven up the cost of postsecondary talent precipitously, exacerbating inequality" (Carnevale & Rose, 2011, p. 10).

Other economists question the notion of a skills gap and redefined the way in which industry leaders and economists discuss it. Cappelli (2015) documented a basic *skills gap* that relates to skills workers should acquire in K-12 education, *skills shortages* defined as job-related deficiencies that can be remedied through training, and *skills mismatches,* which are the actual over- or under-supply of credentialed and degreed workers within a country. He defined all three of these scenarios as skills problems.

Regardless of the definitions used, economists report that a skills mismatch or misalignment of credentialed workers existed with the employers who wanted to hire them (Cappelli, 2015; Carnevale et al., 2012). The misalignment is exacerbated for workers who come from low-income backgrounds and do not have the experience or knowledge of how to navigate the professional networks. What starts in the K-12 system with mobile families who "lack the social capital—the ability, through social ties to gain access to and make use of resources to effect change" (Sherrer, 2013, p. 3) may carry over to postsecondary levels and job seeking. Now,

> The responsibility for developing the skills that employers want has been transferred from the employer to the job seekers and schools . . . schools, at least as traditionally envisioned, are not suited to organizing work experience, the key attribute that employers want. Nor are they necessarily good at teaching work-based skills. (Cappelli, 2015, p. 281)

The impact of holding postsecondary institutions and the under-resourced students responsible for linking credentials and degrees to jobs comes with a cost. Students and families bear additional burden,

> Because the costs must be paid for up-front, individuals without the capital to pay the fees lose access to those skills, again in contrast to earlier periods when employers provided more opportunities for on-the-job learning and training. That shift in responsibility also pushes the risk onto students and their families. (Cappelli, 2015, p. 282)

Students are taking out loans on the hope that they will be hired if and when they earn a credential. Community colleges, such as Ivy Tech, the system that serves the state of Indiana, are often the entry point for low-income students to enter postsecondary journeys due to the proximity to home and the lower tuition costs (Crisp & Nora, 2010).

Additional Factors of Policies, Programs, and Proximity

Research on baccalaureate-degree completers is important in the community college context because these institutions serve as starting points for students' postsecondary journeys. More recent research indicated that 90% "of students who enroll at a community college intend to obtain a degree or certificate or transfer to a 4-year institution" (Crisp & Nora, 2010, p. 176). The actual transfer and completion rates, however, are lower than the aspirations. To combat

this behavior phenomena, researchers and educators have found that various interventions ranging from course re-design, to mentoring, to aligning workforce outcomes, to academic advising, improve retention, transfer, and completion rates (Community College Research Center, 2015; Complete College America, 2013). Policymakers have addressed low graduation rates and a lack of a skilled workforce with performance-funding models to incentivize institutions to increase graduation rates (ASHE, 2013; ICHE, 2013a) and with lofty goals established to return the United States to a number one status in the world (AACC, 2009). Higher education practitioners implemented effective practices in student retention and completion focused on academic course redesign and student services (Community College Research Center, 2015; Complete College America, 2013). Researchers focused on student inputs such as grade point average from high school, entrance exam scores, and high school curriculum choices (Adelman, 1999; Bahr, 2013). This study looked at a secondary school characteristic—accountability grade—and the impact on postsecondary outcomes.

Transfer

Although the national, state, and institutional goals for higher education are more focused on degree attainment, for decades, researchers and policymakers worked to identify patterns of behavior characteristics and predictors of student retention and completion. Adelman's 1999 study followed a nationwide cohort of students enrolled in the 10th grade in 1980 for 20 years. This study's timeframe gave the students more than a decade after high school to earn a baccalaureate degree. Adelman (1999) conducted a series of regression models to determine which characteristics were most likely to contribute to student success—earning a degree. This research helped define the "curricular content in the portfolios that everybody—but minority students in particular—bring forward from high school into higher education" (Adelman, 1999,

p. 20). In 2005, Adelman analyzed a second cohort of students and looked at impact on both associate's degrees and baccalaureate degrees (Adelman, 2005b). This research contributed to a new body of work that identified and defined characteristics of community college students and provided predictors of their success. Previous studies on characteristics of community college students and predictors of their success did not include analysis on the secondary schools from which they came and that impact on postsecondary behavior.

Indiana's rate of higher-educational attainment lags the national average (Lumina Foundation for Education, 2015a). According to 2012 census data, only 34.4% of working-age Hoosiers (25-64 years old) hold a two- or four-year college degree; the national average is 39.4% (Lumina Foundation for Education, 2015a). Indiana made the goal of 60% higher education attainment by 2025, a centerpiece of its higher-education policy, and data suggested that if Indiana does nothing, only 41% of Hoosiers will have a degree by 2025 (Lumina Foundation for Education, 2015a). For the past two decades, college and university stakeholders focused on student completion, earning a credential or degree, as the measure of success for students (Adelman, 1999). "Degree completion is the true bottom line for college administrators, state legislators, parents, and most importantly, students—not persistence to the second year, not persistence without a degree, but completion" (Adelman, 1999, p. 2).

College or university transfer is defined as attending a different college or university than in the previous semester (Crisp & Nora, 2010; Crosta & Kopko, 2014; Cullinane, 2014; Grubb, 1991; Hossler et al., 2012). The ICHE defined transfer similarly as "students who have enrolled for the first time at the reporting campus, but have received previous credit while enrolled at another campus" (Gross, 2008, p. 2). Other researchers described two types of transfer—lateral and vertical. Vertical transfer is the practice of transferring credits from a community college to

a baccalaureate institution (Cullinane, 2014; Hossler et al., 2012). Lateral transfer is the practice of transferring credits between two-year institutions or between four-year institutions (Cullinane, 2014; Hossler et al., 2012).

Of a national cohort of students entering college for the first time in the fall 2006 semester, one-third of the nearly 2.8 million students transferred at least once in five years (Hossler et al., 2012). Half of students who transferred from a four-year institution subsequently enrolled in a two-year institution, and 38% of two-year enrollees transferred to another two-year institution (Hossler et al., 2012). One quarter of transfer students crossed state lines (Hossler et al., 2012). Adelman (2005a) distinguished between "formal transfer from a community college to a four-year college and formal transfer from one four-year college to another were positively associated with degree completion, but wandering from one school to the other was not" (2005a, p. xxi). Ivy Tech reported more than 30,000 students enrolled in the spring 2014 term who did not return for classes in the fall 2014 term (Ninon, 2013). About one-third of these students graduated, about one-third transferred without a degree, and about one-third were not accounted for in the higher-educational system (Ninon, 2013). Transfer is a factor that increases the time to credential and degree attainment in both community colleges and baccalaureate degree-granting institutions (Adelman, 2005b; Cullinane, 2014; Ishitani, 2008). Cullinane (2014) found, "Transfer extends time to degree by almost one extra term, contributes to the accumulation of 7.6 excess credits at graduation, and decreases degree completion by approximately 17 percentage points for all transfer students" (p. 1).

In the 1990s, national data showed a decline in the number of transfer students going from community colleges to four-year institutions (Grubb, 1991). "In response, many programs to improve the articulation between two- and four-year colleges have developed, and

strengthening the transfer function has become one of the principal concerns of community college leaders and policy makers" (Grubb, 1991, p. 1). These articulation agreements were part of what Adelman (2005a) described as the formal transfer process, which has been shown to be more successful than the *wandering*. Student wandering, transferring that is not necessarily deliberate, is also referred to as *swirling* (Gross, 2008; Johnson & Muse, 2012). Earning an associate's degree and deliberately transferring is positively associated with earning a bachelor's degree (Crosta & Kopko, 2014).

> On a positive side, by swirling between institutions, students can lower their overall tuition costs or graduate from a more selective institution than they could have entered based on their high school performance alone. On a negative side, student transfer has been associated with longer time to complete degrees, larger student debt, and more financial aid spent on duplicate courses. (Johnson & Muse, 2012, p. 153)

Nearly two-thirds of students who did not return to Ivy Tech in the fall 2014 semester, either stopped out (were not present in the higher education system at any institution), transferred to a non-accredited institution (where accumulated credits will not transfer to traditional higher education institutions), or transferred without a credential (Ninon, 2013). The instability that transfer causes—loss of credits and *transfer shock*, a phenomenon that occurs when students who enter a new institution must adjust to the new culture, norms, policies, and practices—serves as a barrier to student success (Ishitani, 2008). Students may also see effects "in the form of a lower GPA when transitioning to a university, but this effect does not seem to persist" (Community College Research Center, 2015, p. 2).

Within transfer research, descriptive-analysis practices to define the cohort of students being analyzed, is a common method employed (Crosta & Kopka, 2014; Gross, 2008; Grubb, 1991; Hagedorn & Prather, 2005; Hossler et al., 2012b). In the creation of a community college student typology, some type of cluster analysis was generally used (Adelman, 2005a; Bahr, 2010; Hagedorn & Prather, 2005). Cullinane (2014) used multiple regression analysis to test the effects of transfer on higher education outcomes. The variables regressed were graduation, time to degree, and credit hours earned (Cullinane, 2014). Cullinane (2014) also used propensity-score-match techniques to match native (non-transfer) and transfer students based on existing individual demographic variables on a large sample of students from a single state. Crosta and Kopka (2014) also used propensity-score-match techniques to provide descriptive statistics on a large-statewide data set of students to examine the impact of earning an associate's degree prior to transferring to an institution to earn a baccalaureate degree. They created an odds ratio to determine the likelihood of earning a bachelor's degree within six years. Students who earned associate's degrees prior to transfer,

> transferred to institutions with higher graduation and retention rates as well as higher faculty salaries . . . AA/AS earners had higher bachelor's degree completion rates: earners had 7 percentage point advantage at public four-year schools, a 14.6 percentage point advantage at private four-year schools, and a 5-percentage point advantage at private for-profit schools. (Crosta & Kopka, 2014, p. 32)

Thus, completing an associate's degree increased the odds of earning a bachelor's degree, which is the educational goal (Community College Research Center, 2015; Crosta & Kopka, 2014). Students who transferred to a bachelor's degree institution from a community college

after earning a degree were "16 percentage points more likely to earn a bachelor's degree than students who transferred without one" (Community College Research Center, 2015, p. 3). This supported Adelman's theory (2005a) that a difference exists between strategic or deliberate transfer and wandering. Despite the increased likelihood of community college transfers earning bachelor's degrees if students earn associate's degrees prior to transfer, any transfer diminishes the chances of earning a degree. "About 44% of those who transferred to four-year institutions from two-year institutions graduated within 6 years, while 63% of native students did so" (Ishitani, 2008, p. 404).

Transfer diminishes the chances of earning a degree and is consistent with K-12 research negatively that indicates a mix of outcomes that school accountability scores and grades have on academic achievement (Carnoy & Loeb, 2002; Deming, Cohodes, Jennings, & Jencks, 2015; Tanner, 2016). Limitations of the data existed because much of the transfer research focuses on students moving between same-state institutions. The National Student Clearinghouse now tracks students across state lines, but for practitioners and policymakers "states must be able to distinguish between true non-persisters and out-of-system or out-of-state transfers" (Hossler et al., 2012, p. 48). Where transfer is the act of students moving between institutions at the postsecondary education level, mobility is the act of students moving between schools at the secondary level.

Secondary School Accountability Grade System

In the 1800s, New York state educators "used Regent examinations to test students' command of high school curriculum . . . The Iowa Test of Basic Skills has been given to 8th graders in Iowa since 1935. It was subsequently applied to many other states for students in many grades" (Carnoy & Loeb, 2002, p. 306). Despite a history of testing, assessing, and

holding schools accountable, the connection between assessment and accountability for schools is more closely aligned during the past few decades. From a *Nation at Risk*, which established an *education competitiveness crisis*, to NCLB, and now the ESSA that aims to improve school and teacher accountability and student performance, all 50 states and the District of Columbia adopted accountability systems to comply with the requirements of these federal education policies (Adams et al., 2016; Deming & Figlio, 2016; Hanushek & Raymond, 2005; Howe & Murray, 2015; Tanner, 2016). The Iowa Basic Skills test is still used to diagnose student learning and in the past, "How well students, classes or schools performed on the ITBS-type tests had few consequences" (Carnoy & Loeb, 2002, p. 306). Under NCLB and continuing with ESSA, each of the 50 states and their accountability assessments are high-stakes and come with consequences for the students and schools (Dee & Jacob, 2011). With acknowledgement of NCLB's flaws,

> the policy has been widely commended for exposing the depth and breadth of educational inequality in the United States. As states implement new accountability systems, there is growing concern that attention to achievement gaps and the performance of marginalized children has faded (Adams et al., 2016, p. 2).

Sixteen states adopted an A – F grade system for elementary and secondary schools with more states planning to adopt similar systems in the future using the rationale that the systems are simple and transparent (Tanner, 2016).

Florida Model: Data and Behavioral Changes

Tanner (2016) argued that the A – F accountability systems are neither simple nor transparent and "rules behind A – F appear simple on the surface but generate an inordinate

number of behind-the-scenes calculations and numerous additional rules that render the results unusable for informing change . . . the reduction to a single grade tends to downplay achievement gaps" (p. 2). In fact, Florida, the first state to adopt such a success, may not be as it appears. For this,

> [an] increase in the percentage of As being earned during the first few years of the Florida A – F system is frequently cited as evidence that the policy is an effective one…the majority of the difference was created through a change in the rules, not a change in the educational system" (Tanner, 2016, pp. 2-3).

Further, in A and F schools alike in Florida, researchers found that

> both A schools and F schools felt tremendous pressure . . . districts responded by providing significant amounts of additional resources to F school . . . the accountability results seemed to trigger new dynamics in the allocation of personnel . . . and the grading system has significant behavioral consequences for schools at the top of the grading distribution as well (Louis et al., 2008, p. 562)

The most researched of the accountability system models, Florida, shows data changes due to manipulation in the rules rather than educational changes and negative behavioral impacts on schools across the accountability spectrum.

Accountability and Student Outcomes

Since the implementation of NCLB, the continuation of ESSA, and the adoption of the state accountability models, researchers have studied the impact of the legislation and accountability tests on student outcomes at the K-12 level. In a 2005 analysis of student outcomes (fourth and eighth grade) from the National Assessment of Educational Progress (NAEP) exam that tests math and reading across several states, "we find that they [accountability

measures] have a positive impact on achievement" (Hanushek & Raymond, 2005, p. 321). Further, in the same study, "they find that the introduction of consequential accountability within a state was associated with statistically significant increases in the gain-score measures, particularly for Hispanic students and, to a lesser extend white students" (Dee & Jacob, 2011, p. 421). This study that examined the potential impact of NCLB and consequential assessment impacts also found that "the gains scores of black students were statistically insignificant, as were the estimated effects of report-card accountability" but still support the accountability requirements of the federal laws (Dee & Jacob, 2011, p. 421).

In contrast, researchers also looked at longitudinal, state-wide testing data and were skeptical of the impact. In Florida and other states, gains may be attributed to a changing accountability model or rules for assessment rather than actual educational changes (Dee & Jacob, 2011; Tanner, 2016). Further research indicated that growth in NAEP scores for fourth grade reading have not grown as sharply since the introduction of NCLB and math trends tracked the same growth before and after NCLB; schools in Chicago that were deemed proficient prior to NCLB remained proficient or above average, and schools at the bottom remain in a similar situation (Dee & Jacob, 2011).

Research on the impact of assessment on longer-term outcomes such as college enrollment, performance, graduation, and workforce is not readily available. In 2002, Carnoy and Loeb looked at the role of strong state accountability systems and their impact on both short-term and long-term education outcomes for students. After finding that states whose populations are made up "with lower achieving White students are more likely to implement strong [accountability] systems" (Carnoy & Loeb, 2002, p. 320). This study used a recursive model using the following variables: strength of accountability in the state, average fourth grade math

scores, proportion of African American and Latino students in the state, state population, proportion of school funds coming from the state and dollars per pupil change (Carnoy & Loeb, 2002). They found that there was a "positive and significant relationship between the strength of the state's accountability systems and math achievement gains at the 8th grade level across racial/ethnic groups . . . the long-term effects of stronger accountability are less clear" (Carnoy & Loeb, 2002, p. 320-321). These long-term effects included 9th grade retention and progression through senior year (Carnoy & Loeb, 2002). This study focused on the overall strength of the state accountability system and not the specific schools from which the students came.

Wong (2008) conducted a study to look at state accountability effects on education attainment and labor market outcomes. Using a regression model, she found that "the overall results suggest that accountability programs were successful in increasing the level of educational attainment and employment for blacks, but that these positive impacts do not have long-run impacts on earnings" (Wong, 2008, p. 1). The long-term variables were employment and wages. The accountability programs "were successful in encouraging blacks to increase their completed years of schooling. High school graduation rates increased for black students by 2.6 percentage points on average, while college enrollment rates for black students were on average unaffected" (Wong, 2008, p. 3).

> However, more than a decade after the passage of NCLB, we know very little about the impact of test based accountability on students' long-run life chances. Previous work has found large gains on high-stakes tests, with some evidence of smaller gains on low-stakes exams that is inconsistent across grades and subjects (Deming et al., 2015, p. 3)

Deming et al.'s (2015) study focused on secondary students in Texas and pass rates on high stakes testing to determine if the accountability pressure was related to attending and graduating from a four-year postsecondary institution and quarterly wage earnings after graduation from a college or university. In Texas, the researchers found,

> Schools respond to the risk of being rated Low-Performing by increasing student achievement on high-stakes exams. Years later, these students are more likely to have attended college and completed a four-year degree, and they have higher earnings at age 25. However, we find no overall impact of accountability pressure to achieve a higher rating, and large negative impacts on attainment and earnings for the lowest-scoring students (Deming et al., 2015, p. 1)

Not only is there a lack of research on the longer-term impacts of NCLB, despite the adoption of the A – F accountability grade systems in 16 states to comply with NCLB and ESSA, there is not research available on the postsecondary education impact of D and F graded schools versus schools that earn A and B grades. A working paper on the impact of the state-wide accountability grades for schools finds that reducing school performance to a single indexed measure provides little value in the form of transparency as "school grades deliver little informational value to teachers and administrators. They hide achievement differences, they cannot be disaggregated by content standards, and they do not measure student growth toward college, citizenship, and career ready expectations" (Adams et al., 2016, p. 24). Indiana is one state with the A – F school assessment system and includes college and career readiness standards as part of its formula.

Accountability in Indiana

In response to *A Nation at Risk,* Indiana's governor and superintendent of public instruction created an A+ system for the state in the 1980s. The A+ program "created a performance-based system of accreditation and awards, added five days to the school year, established the Indiana Principal Leadership Academy, and implemented the Indiana Statewide Testing for Educational Progress (ISTEP) standardized test" (Hiller, et, al, 2012, p. 1). In 1999, prior to NCLB, Indiana's General Assembly passed Public Laws 146 and 221. Public Law 146 established an Education Roundtable that was co-chaired by the superintendent of public instruction and the governor with members from business and labor industries, community leaders, postsecondary education, and K-12 education to make educational recommendations for the state, including on assessment and academic standards (Hiller et al., 2012). Public Law 221 "created a performance-based accountability system . . . the State Board, Department and Education Roundtable collaborated over the next two years to establish the administrative rules outlining the accountability system" (Indiana Department of Education [IDOE], 2009, p. 1). Under this accountability system, schools were assigned to one of the following categories by the 2005-06 school year: exemplary progress, commendable progress, academic progress, academic watch, or academic probation. The designations were based solely on student performance and progress on the state's ISTEP assessment exam (IDOE, 2009). The performance was based on "the percentage of all students who pass the state's English and math ISTEP+ tests (averaged across grade levels, improvement in the passing percentage of students passing ISTEP+ over a three-year period, and adequate yearly progress status" (IDOE, 2009, p. 1). The adequate yearly progress category was added to comply with NCLB, and schools that did not meet adequate yearly progress for two consecutive years went to the academic progress category. Schools and

districts were given up to six years to make adequate progress in the percentage of students passing the state's standardized exam or face management group intervention or take-over of operations. At the end of year six, only seven schools faced intervention—they were either in the Gary Community School Corporation or the Indianapolis Public School Corporation (Hiller et al., 2012).

In 2011, the state adopted an A – F school rating system to replace the progress designations given to schools.

> For the 2012 school year, the weights were distributed as follows: Performance = 60%, Graduation Rate = 30%, College & Career Readiness = 10%. These weights changed each year to increase the value and weight of College & Career Readiness and decrease the value of E/LA and Math. (IDOE, 2015, para. 6)

Once again, the rating system changed in Indiana. The 2014-15 school year was the last to use the A – F ratings and the Indiana Code IC 20-31-8-3 (2015) calls for the creation of performance categories for elementary and secondary schools. This code, in section three stated, "The state board shall establish several categories using an 'A' through 'F' grading scale, to designate performance based on the individual student academic performance and growth to proficiency in each school" (Indiana Code, 2015). All 50 states and the District of Columbia included pass rates in English language arts (ELA) and math in their accountability index. Additionally, 29 states, not including Indiana, counted some combination of science, writing, and social studies proficiency toward this accountability grade (Martin et al., 2016). Indiana does not include the following indicators: early warning such as attendance (18 states), and on track to graduate (five states), and English language acquisition (six states). Indiana does use persistence measures, four-year and five-year high school graduation rates, but does not track drop outs, drop out re-

engagement, and GED earnings (Martin et al., 2016). Twenty-six states track some type of college and career readiness—Indiana counts dual credit, International Baccalaureate, and Advanced Placement taking and earning as well as technical and industry certifications (Martin et al., 2016). Indiana does not count entrance exams and other college and career readiness indicators (Martin et al., 2016). Finally, six states count college enrollments in their formula, but Indiana is not one of them (Martin et al., 2016).

Student Success Theories

Bahr (2010), as well as Hagedorn and Prather (2005), built on Adelman's research that identified the nuances that community college students have compared to students who attend four-year higher education institutions, particularly residential institutions. Community college students often are older, have weaker academic backgrounds, and have goals other than obtaining a credential at the entering institution (Adelman, 2005a). Considering the high transfer rates among community college students (Hossler et al, 2012) and the emphasis on the accountability systems of secondary education, this research focused on the accountability grade of the school from which the student graduated prior to attending the community college.

Typology of a Community College Student

Adelman (2005a) created a typology of community college students via the metaphor of a town. He categorized community college students by age, institutional type, transfer activity, and education expectations (Adelman, 2005a). The residence-history portrait served as the model in which he likened the *homeowners* to students who earned the majority of their credit hours or a degree from the community college, the *tenants* who took a high number of credits from the community college prior to transferring, and the *visitors* who were guest students, taking only a few credits prior to transfer or to learn a new skill for job or enrichment reasons

(Adelman, 2005a). Despite the comprehensive look at the characteristics of the students, this analysis focused on "student academic history" (Adelman, 2005a, p. xiv) in the typology, but academic characteristics of the schools from which the students came was not included.

Other researchers built upon Adelman's work to expand the typologies of community college students by using descriptive summaries on transcripts and academic histories. One model placed community college students into categories based on their proximity to characteristics of traditional university undergraduate students—full-time, first-time, degree-seeking, academically prepared, financially prepared, and socially prepared students (Hagedorn & Prather, 2005). Hagedorn and Prather (2005) used descriptive characteristics and cluster analyses to group and analyze academic patterns of students based on previous academic performance, transfer intent, employment and employment goals, and ability to do college-level math upon entry (Hagedorn & Prather, 2005). Again, previous researchers, Adelman, Hagedorn, and Prather, did not use characteristics of the high schools, like accountability rating grades, to predict college behavior.

Building on this and other research, Bahr (2013) added to the body of literature on the typology of the community college student with additional cluster analysis "to discern types of student use by which community colleges may be classified" (p. 38). Bahr classified students by their use of community colleges—drop-in, experimental, noncredit, terminal vocational, transfer, and exploratory to clarify student use patterns. Bahr found, "Patterns of student use are primarily a result of community demand for a particular educational service, rather than institutional policies and practices, yet these patterns of use are associated systematically with a number of measures of institutional performance" (p. 457). The external-community demands in this research drive community college use, rather than unique characteristics of the student or

of the high school or college itself. This final example of community college typology does not address secondary school characteristics as influences on future educational outcomes.

It is important to look at factors beyond test scores and other traditional predictors of academic performance because the completion numbers are not moving quickly enough to meet workforce demands (Carnevale et al., 2010; Lumina Foundation for Education, 2015b). The accountability score of a high school may have an impact on the short-term academic outcomes for students (Carnoy & Loeb, 2002; Dee & Jacob, 2011; Hanushek & Raymond, 2005) but the longer-term effects are not widely available (Adams et al., 2016; Carnoy & Loeb, 2002; Wong, 2008). This study examined the relationship between the secondary school accountability characteristics and chance of transfer and graduation in the community college. Transfer in higher education is associated with credit loss and an extended time to earning a degree (Cullinane, 2014; Gross, 2008; Grubb, 1991). Specifically, transferring to a baccalaureate institution from a community college prior to earning an associate's degree also reduces the chances of earning a four-year degree (Crosta & Kopka, 2014; Ishitani, 2008).

This research adds to the literature by looking at the impact of secondary school accountability that has been tied to short-term academic impacts and has shown some correlation to longer-term attainment and earning outcomes (Wong, 2008). The typology model can be expanded by looking at secondary school characteristics, rather than just the student characteristics to determine if there is an academic impact in the postsecondary setting.

Resiliency

Despite possessing various demographic, behavioral, and secondary academic characteristics that may predict students' chances of completing degrees in a community college, some students overcome the types of adversity in their lives that may predict academic failure.

Predictive research models have employed the educational resiliency theories that focus on psychological behaviors and attitudes that may lead to students' academic success. Resiliency is defined as individuals' internal characteristics that allow people to achieve normally despite facing previous adverse conditions (Coskun, Garipagaoglu, & Tosun, 2014; Martinez et al., 2012; Ou & Reynolds, 2008). Adverse conditions, barriers, and obstacles "can include, but are not exclusive of: areas of finance, lack of academic college preparation, administrative frustrations, and social situations" (Miller, 2006, p. 9).

Environmental effects impact resiliency and peoples' abilities to bounce back from adversity, problem solve, cope, and focus on positive consequences (goals) as the achievement of normal behavior (Coskun et al., 2014). Recommendations gleaned from resiliency literature can add to the typology of a community college student and can help predict behaviors that will lead to increased credential and degree attainment. The process of resilience on behavior is complex and continues from childhood into adulthood (Ou & Reynolds, 2008). The idea of taking behaviors from childhood to adulthood has implications for this research, as it looks at the impact of one educational setting in childhood at the K-12 level, to another education system in adulthood, the postsecondary level. Secondary completion or in this case,

> educational attainment is an outcome resulting from interactions among factors, an individual's vulnerability, risk factors, and protective factors…a child who has a good extended support system that might help him/her through the difficulties and the protective factor might activate protective mechanisms to change the risk situation into a better outcome. (Ou & Reynolds, 2008, p. 203)

A group of students from a large, urban school district in the southeastern United States, who were aging out of the foster care system and transitioning into college reported that

resiliency for individuals emerged in the form of "resourcefulness, goal orientation, positive attitudes, optimism and the ability to make conscious changes based on the past mistakes . . . and future orientation" (Batsche, Hart, Orr, Armstrong, Strozier, & Hammer, 2014, p. 180). For the same students, family support and resiliency to overcome past instability came in the form of the ability to "form trusting relationships with individuals but biological parents or foster parents were rarely the source" (Batsche et al., 2014, p. 180). These students from unstable backgrounds report, "They longed to be role models for their siblings and their own children" (Batsche et al., 2014, p. 180).

Mindset

Mindset interventions focus on growth concepts in which students believe that their minds will grow and expand as they engage in challenging and interesting work. The idea is that students learn and grow when challenged and work hard to accomplish academic goals and "that the struggle is an opportunity for growth, not a sign that a student is incapable of learning" (Paunesku, Walton, Romero, Smith, Yeager, & Dweck, 2015, p. 2). Students who received mind-set curriculum in college were challenged to deliver the same lessons to middle school students. "This experiment raised the college students' semester grade point averages (GPAs) . . . because growth-mind-set interventions help students understand challenges in school in a way that promotes learning and resilience, they may be most beneficial for underperforming students" (Paunesku et al.,2015 p. 2). A fixed mindset is based on the idea that intelligence is set or static, but growth mindset relies on the idea that intelligence can be developed (Dweck, 2006). The successes come by engaging others and learning from their successes, taking on challenges instead of avoiding them, moving forward to overcome obstacles instead of giving up on challenges, and learning from mistakes (Dweck, 2006).

Mindset growth may give students the tools they need to be resilient—to achieve despite the perceived and actual barriers that poverty and secondary school rating may put before a student (Coskun et al., 2014; Martinez et al., 2012; Ou & Reynolds, 2008). This type of intervention, mindset growth, or "self-transcendent purpose predicted or affected consequential educational behaviors, even among disengaged students or students attending urban public high schools" (Yeager et al., 2014, p. 574).

Student Characteristics

Students face academic, financial, and social/cultural barriers to success in postsecondary education.

> Thanks to extensive research, we know the obstacles to student success: poorly designed and delivered remedial courses, a culture that rewards enrollment rather than completion, broken credit transfer policies, overwhelming and unclear choices, and a system out of touch with the needs of students who must often balance work and family with their coursework. (Complete College America, 2013, p. 3)

School accountability grades and transfer may adversely affect an institution's performance ratings, but for family success in moving out of poverty or for economic success in eliminating skills gaps or skills mismatches, it is most important to follow "the student, not the institution, because it is the student's success that matters to families—and to the nation" (Adelman, 2005b, p. xvi). The research project focused on school accountability and its potential impact on student success in the postsecondary setting because a gap exists in the research and literature during a time where the accountability systems are under continued

scrutiny and community colleges in Indiana are honing in on predictors of success for their students.

Impact on Secondary Student Achievement

Researchers at the Center for Education Policy (2008) completed two studies on student achievement since the passage and implementation of NCLB. Although the research team found that

> it is not possible to directly relate changes in student achievement to NCLB . . . it is possible to learn much more about student achievement now than it was before 2002, when NCLB was enacted, because the law has greatly expanded student testing, accountability, and reporting of test scores in elementary and secondary schools. (Center for Education Policy, 2008, p. 1)

The research project included data from all 50 states (with the District of Columbia opting not to participate), and focused on the following questions: Did math and reading achievement increase since 2002, and did achievement gaps of subgroups of students narrow during the same time frame (Center for Education Policy, 2008). The researchers used student proficiency percentages throughout several years to determine trend lines for each state. Limitations of this approach include the fact that the exams, cut scores for proficiency, and definition of proficiency are different in each state. "To avoid some of the limitations . . . this study also analyzed an indicator called effect size…computed from two types of statistics . . . mean test scores and standard deviations" (Center for Education Policy, 2008, p. 13). This allowed the researchers to measure change in different ways. For example, if

> the average reading score for 4th graders increased by 0.19 of a standard deviation between 2002 and 2007 . . . one standard deviation above the mean corresponds to

> a percentile rank of 84 . . . is would constitute a huge leap in student performance (Center for Education Policy, 2008, p. 13)

from the 50th percentile in 2002 to the 84th percentile in 2007. The researchers looked at trend data during three year periods, excluded states who changed exam formats, and excluded small sub groups and groups of students with disabilities and limited English language proficiency. Through analysis, the researchers found that

> reading and math achievement on state tests has gone up in most states according to the percentage of students scoring at the proficient level . . . trends in reading and math achievement on NAEP have generally moved in the same positive direction as trends on state tests, gaps have narrowed more often than they have widened . . . since 2002, many different but interconnected policies and programs have been undertaken to raise achievement. (Center for Education Policy, 2008, p. 2)

Thus, it is impossible to directly link NCLB to the increase in performance.

The NAEP was also examined in a 2011 study (Dee & Jacob). The researchers acknowledged that since NCLB was implemented nation-wide in all 50 states and the District of Columbia, there is no natural control group to compare the intervention to that would show natural growth without the mandate. In this study, the researchers have shown statistically significant increases in math achievement of fourth grade students on NAEP using comparative interrupted time series evaluations (Dee & Jacob, 2011). Dee and Jacob (2011) cited Figlio and Ladd (2008) and three additional studies (Carnoy & Loeb, 2002; Jacob, 2005; Hanushek & Raymond, 2005) as methodologically sound research analyzing the achievement since the implementation of NCLB. In addition to the fourth-grade math achievement, particularly for

white, Hispanic, and subsidized lunch students, "NCLB led to more moderate and targeted improvement in the math achievement of eighth graders (Dee & Jacob, 2011, p. 419).

> The study by Carnoy and Loeb (2002), which was based on state-level achievement data from . . . NAEP found that the within-state growth in math performance between 1996 and 2000 was larger in states with higher values on an accountability index, particularly for black and Hispanic students in eighth grade . . . Jacob found that following the introduction of an accountability policy in math and reading, achievement increased in Chicago Public Schools . . . Hanushek and Raymond (2005) evaluated the impact of within-state variation in school accountability policies on state-level NAEP math and reading achievement growth . . . they find that the introduction of consequential accountability with a state was associated with statistically significant increases in the gain score measures, particularly for Hispanic students and to a lesser extent, white students. (Dee & Jacob, 2011, p. 421)

In 2008, Wong integrated identification strategy in which she assigned students an exposure time to state accountability systems—were students enrolled in elementary or secondary education under state-adopted accountability systems to determine if the amount of exposure to the systems has a longer-term effect on postsecondary training. The author made a few assumptions in the data, including the youngest compulsory age for dropping out of school for states is 15, so she assumed up to age 15 students received the treatment, or were exposed to the accountability system (Wong, 2008). Additionally, she used census data to determine the state that the student would most likely graduate from high school, and assigned proxy measures to college completion.

> Those that reported earning an associate's degree or finishing 1 to 3 years of college are coded as completing some college. Individuals with 4 or more years of college completed are counted as earning a bachelor's degree. The positive earnings outcome is a dummy variable and is equal to one if the amount of earnings in the past year reported by the individual is greater than zero. Hours worked measures the number of hours worked by the individual last year. (Wong, 2008, p. 8)

In conclusion, she found,

> The results suggest that the programs had a large degree of success in improving the educational attainment and labor market outcomes for Hispanic men and women. Average treatment effects also indicate accountability programs increased the probability of earning a bachelor's degree for white males and holding an associate's degree for Hispanic females, but failed to improve education-related outcomes for blacks and white females. Earnings and wages also increased for Hispanics, white men and black men, but again, did not have a significant impact on the labor outcomes for white and black women. (Wong, 2008, p. 27)

In postsecondary education, lower socioeconomic status has been positively associated with lower achievement outcomes for students. For example, at the end of the first six years of Indiana's A – F accountability grade system, students at only seven schools performed so poorly on standardized tests that they faced intervention from the state—schools from Gary Community School Corporation and Indianapolis Public Schools—two of the state's poorest districts (Hiller et al., 2012). For these low-income and minority students, successful transition to college may also be a challenge.

> Initial integration into the campus environment is imperative for student success, as attrition is most likely to happen during the students' first year. . .This dynamic is more salient for underrepresented students, who often experience challenges in successfully transitioning to college. (Berumen et al., 2015, p. 29)

The lower outcomes are also associated with lack of social capital and the barriers associated with not knowing how to navigate the institutional system. First-generation students come with a deficit in understanding the process of how college works.

> Cultural and social capital provide an important lens to understand the prevalence and depth of barriers presented to underrepresented students as they navigate the academic, social, and organizational differences between high school and college. . .opportunities and services, and steps for attending and succeeding in college. . .capital necessary to navigate the policies that shape the process of entering and transitioning onto a college campus. (Berumen et al., 2015, p. 29)

The ICHE compared performance of all high school graduates in Indiana to those of low-income graduates (2013b). Within the context of low-income students, the ICHE reported on Twenty-First Century Scholars and other low-income students (2013b). With the exception of entering college directly from high school, Twenty-First Century Scholars performed lower than the general student population of students but higher than the population of low-income students who did not take the Scholar Pledge, receive financial incentives, or participate in the designated college-readiness programs during secondary school. The descriptive statistics are found in Table 1.

Table 1

2013 Scholar Scorecard

Descriptive Statistics	21st Century Scholars	All Low-Income Students	All Indiana Students
College Access	78%	53%	66%
College Readiness	65%	58%	72%
College Retention	72%	64%	75%
College Performance	66%	69%	76%
College Completion	15%	9%	23%
College Completion Extended	33%	22%	42%

Note. Adapted from *2013 Scholar Scorecard*, p. 1, 2013, The Indiana Commission for Higher Education, retrieved from http://www.in.gov/che/3170.htm

As shown in the Commission's published scorecard, Twenty-First Century Scholars attend college at higher rates than their low-income peers, as well as the general population in Indiana, but once in college do not outperform the general population with regard to grade point average or completion (ICHE, 2013b). One solution is to prioritize transitional and academic services for scholars and students from low-income, first generation backgrounds, as well as to align resources to support the students from support services offered in high school to newly-created and aligned services offered in college and university settings. This student population faces specific challenges (academic, financial, and non-cognitive) different from most students and requires nuanced support to achieve their academic, professional, and personal goals, which will in turn benefit society (Berumen et al., 2015).

Twenty-First Century Scholars

Although research in elementary and secondary schools showed a correlation between socioeconomic status (and being in poverty) and the number of unanticipated or non-strategic moves (Adelman, 2005a), mixed research results exist that show any correlations between poverty and transfer in postsecondary education (Cullinane, 2014). To control for the effects of socioeconomic status, this study analyzed a cohort of Twenty-First Century Scholars in Indiana. This program is Indiana's signature college access program for low-income students. In Grades 7 and 8, students in Indiana can sign up for the program. Requirements of the Twenty-First Century Scholars program are as follows: Students must

- enroll in the Scholars program in seventh or eighth grade at eligible schools in Indiana. These schools must be publicly funded and accredited institutions. Foster children are the exception and may enroll after the eighth-grade year.
- be residents of Indiana and citizens or have eligible non-citizen status of the United States.
- sign and fulfill the Scholars Pledge, which includes avoiding arrest, avoiding the use of illegal drugs and alcohol, and maintaining at least a 2.5 grade point average (2.0 prior to the 2013-14 school year) (Twenty-First Century Scholars, 2014) in high school and college.
- graduate with a diploma from a school accredited in Indiana.
- apply to an Indiana-based college or university and file an on-time Free Application for Federal Student Aid (FAFSA) starting the students' senior year in high school and continuing each year in college.
- meet a family income status (considered low-income).

- earn 30 or more credit hours in a calendar year once enrolled in postsecondary education to maintain 100 percent of the scholarship funding. (Berumen et al., 2015; 2003; ICHE, 2013b; St. John, Musoba, & Simmons; Twenty-First Century Scholars, 2014)

In 2013, ICHE reported more than 6,700 Twenty-First Century Scholars enrolled in Indiana's public colleges and universities (ICHE, 2014). More than 1,700 of these students required remediation (ICHE, 2014), and nearly all of those students enrolled in Ivy Tech. Ivy Tech enrolled almost 2,000 new Scholar students in fall 2014. Specifically, this research looked the school accountability rating of the high schools from which Twenty-First Century Scholars at Indiana's community college came. Using the Scholars as the sample controlled for student socioeconomic level and financial-aid status, which have been predictors of success or failure in postsecondary education.

Previous research on Twenty-First Scholars is limited. Most of the research focused on the adequacy of the state aid model in providing access to postsecondary education (Berumen et al., 2015; St. John et al., 2003; St. John et al., 2004; Wandel, 2004). At the middle school age, low-income students are promised tuition to a public higher education institution in Indiana or its equivalent to use at one of Indiana's private institutions. Students and their parents or guardians also can participate in structured programming—academic, financial, and social/cultural—to help guide the students into college. This encouragement comes in the form of college visits, tutoring, financial literacy workshops, test preparation, and a focus on the college preparation curriculum/diploma the state offers (St. John et al., 2004; Wandel, 2004). Although scholars were more likely to attend college than their non-scholar, low-income student counterparts (ICHE, 2013b; St. John et al., 2003), lower-income students were not as likely to persist from

freshman to sophomore years in college (St. John et al., 2003). The study did not distinguish between a student leaving higher education altogether or transferring to another institution as the cause of not being retained to the sophomore year.

Prior research models that look at resiliency as a framework attempted to provide non-academic recommendations for policy and practice for institutions and legislatures to follow to improve student academic outcomes (Batsche et al., 2014; Ou & Reynolds, 2008). Research conducted on the impact of school accountability grades on postsecondary outcomes is limited. Deming et al. (2013) used data from the Texas Schools project, a longitudinal database on K-12 students in the state. By using logistic regression, the researchers identified the probability that students in population groups passed the 10th grade state exam, identified mean pass rates and their corresponding standard errors, and calculated the probability of a school receiving an A – F letter grade (Deming et al., 2013). The results indicated "students in schools at risk of being rated Low-Performing were more likely to pass the tenth-grade math exam on time, acquired more math credits in high school, and were more likely to graduate from high school on-time" (Deming et al., 2013, p. 860). In addition to the high school impacts, "in the long run, they had higher rates of postsecondary attainment and earnings" (Deming et al., 2013, p. 860). Despite the wide-spread adoption of the consequence-based accountability systems, and specifically, the A – F school accountability rating model, a gap in the literature exists. The analysis of the accountability grades and their impact on long-term academic outcomes in post-secondary education is an under-researched area. Students who transfer in postsecondary education, for example, demonstrate lower rates of academic success across a spectrum of measures from progression, to test scores, to completion and graduation. The more times students transfer in

postsecondary education, the greater the chances for credit loss and for interrupted enrollment patterns, both of which lengthen the time to earning a degree (Bahr, 2013; Cullinane, 2014).

Summary

As more jobs require postsecondary credentials (Carnevale et al., 2010) or as continued skills mismatches still exist (Cappelli, 2015), and as the pipeline of students coming out of K-12 into postsecondary education continues to change, practitioners and policymakers need to focus on new ways to support students to earn credentials and degrees to meet or align with workforce demands. The latest population study from the U. S. Census Bureau (2012b) showed an increasingly diverse population, especially in the younger demographic groups. These diverse students have historically been less successful in postsecondary education, which could pose a problem for the future workforce in the United States. "Student demographics in higher education are changing rapidly, Low-income individuals are attending college in increased numbers, and many are first-generation students. Minorities, single parents, and first-generation students share demographics that make them more likely to be low-income" (Wandel, 2004, p. 30).

Limitations in the data exist not only because past research has not included characteristics of the secondary schools from which students graduate in their descriptions and predictors of postsecondary success. The research focuses on school accountability generally looked at individual scores and elementary and secondary impacts. Two studies that did focus on longer-term outcomes addressed individual student accountability scores and not the schools from which they come. Although traditional research has focused on in-state transfer among institutions in multiple states accounted for more than 25% of all transfer activity (Hossler et al., 2012). This report starts to build out the definitions of student success and institutional

accountability by looking at student patterns beyond those traditionally reported by the institutions.

> The growing emphasis on holding institutions accountable for student success, to some extent, reinforced the traditional reporting paradigm in which the institution is the unit of analysis and the students are viewed as more or less uniform stream that simply enters and either completes a degree at the starting institution . . . a new view may prove to be useful. (Hossler et al., 2012, p. 8)

States and institutions are being held accountable for student transfer and completion outcomes yet lack the availability of information and technical resources to obtain a true measure of success.

The student outcomes, obtaining a credential or degree, are the indicator that workforce seeks when looking to fill its skilled jobs. "The day when people left high school to go to work in the local industry and then worked their way up is disappearing" (Carnevale et al., 2010, p. 111). Skilled work requires postsecondary training. The K-12 education pipeline increasingly is composed of minority, first-generation, and low-income students. These are students who are not traditionally served well by higher education, which create a workforce dilemma.

> Obtaining a good job—one capable of providing a family-sustaining wage—has become the ultimate standard for educational adequacy . . . . Experts might contest whether everyone needs some college education—but the labor market clearly has linked middle-class employability to postsecondary education and training. (Carnevale et al., 2010, p. 110)

Additionally, policies and processes need to be developed to train and credential workers and to align better the skills needed for the workforce with workers who have or can obtain the

skills. The students who lack the academic, financial, and social preparation to succeed in postsecondary education need targeted support in transitioning and navigating the postsecondary landscape and need to acquire the skills to find a workforce match and succeed in professional settings (Beruman et al., 2014). This study adds to the literature and the field by examining an additional characteristic for the typology of a community college student. It also addressed the correlation between secondary education school accountability characteristics and transfer in postsecondary education, as both have been found to be associated with lower education outcomes within the respective education sectors. What researchers have not done in the past was to examine a cross-sector behavior pattern that ultimately impacts time to degree in college and, in turn, the ability to participate fully in the workforce.

CHAPTER 3

METHODOLOGY

This study consisted of both descriptive statistics and a quantitative inferential statistics model, using chi-square tests for independence and *t* tests to evaluate the impact of secondary accountability system ratings on the students' transfer in postsecondary education and the impact on students' time to earning a credential, if at all. The methodology chapter contains information on the research design and research questions, the study's hypotheses and significance, information about the population and sample from which the data were derived, data collection methods, the data analysis process, and a summary. According to the 2010 Health and Human Services Code of Federal Regulations, research is "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge" (as cited in Beins, 2014, p. 30). This study builds on existing knowledge about behavioral characteristics of community college students that predicts success or barriers to persistence and graduation. Quantitative research, in particular, is the process of "inferring evidence for a theory through measurement of variables that produce numeric outcomes" (Field, 2013, p. 882). This study identified any evidence of a numeric and significant relationship between the independent variables and the dependent variables.

Research Design

This study used the population of Twenty-First Century Scholar students at Ivy Tech Community College in Indiana to control for the effects of poverty and grade point average. Until the 2013-14 school year, by program requirement, Twenty-First Century Scholars come from low-income families and must maintain a 2.0 grade point average to remain in the program (Berumen et al., 2015; ICHE, 2013b; St. John et al., 2003). All participants were low-income, and all met a minimum grade point average threshold, higher than the 2.0 requirement, to remain in good standing at the college and with federal student aid requirements. Students entering college in the 2013-14 school year were required to meet a 2.5 grade point average requirement and earn 30 or more credits in a calendar year to maintain 100% funding for the Twenty-First Century Scholar program (Twenty-First Century Scholars, 2014). Using this group with either grade point average requirement eliminated the risk that the students left or transferred because they were forced to do so by not meeting the institution's or the federal government's grade point average requirements.

Quantitative research is conducted "to study relationships, causes and effect" (Ary, Cheser, Jacobs, & Sorensen, 2010, p. 25), and this population helped control for income and academic readiness via the grade point average. Further, non-experimental quantitative research is work that "the researcher identifies variables and may look for relationships among them but does not manipulate the variables" (Ary et al., 2010, p. 26). The research consisted of two chi-square tests for independence. "The chi-square test for independence uses the frequency data from a sample to evaluate the relationship between two variables in the population" (Gravetter & Wallnau, 2014, p. 618). This research also used a *t* test to estimate time to degree for students from A- and B-rated schools versus students from D- and F-rated schools. "The independent

measures *t* test uses data from two separate samples to test a hypothesis about the difference between two population means" (Gravetter & Wallnau, 2014, p. 767). In this case, the mean time to earning a credential or degree was compared.

Research Questions

The research questions were designed to evaluate the relationship between college and university transfer with secondary school accountability grades and earning a degree within the federal definition of "on time," which is three years for community college students. The research questions are as follows:

- Is there a relationship between secondary school accountability rating (Grades A through F) and postsecondary transfer among Twenty-First Century Scholar students at Indiana's community college?
- Is there a relationship between secondary school accountability rating (Grades A through F) and graduating (earning an associate's degree within 11 semesters of enrolling) at the community college?
- Is there a relationship between secondary school accountability rating (Grade A or Grade F) and time to degree (number of elapsed semesters to earn an associate's degree)?

Understanding the factors that lead students to transfer both before and after earning a credential can help community college practitioners target interventions to students to help them succeed. Additionally, as the state and education groups evaluate the A – F rating system in Indiana, this research contributes to the research on the long-term outcomes for students from such a system.

Hypotheses

A null hypothesis is the research hypothesis to be tested and declaratively states that a relationship between the variables is nonexistent (Ary et al., 2010). For this research study, the null hypotheses are as follows:

$H_0$1. There is no relationship between postsecondary transfer and secondary school accountability rating within the population of Twenty-First Century Scholars studied.

$H_0$2. There is no relationship between earning a credential or degree at the community college within three years of enrollment and secondary school accountability rating within the population of Twenty-First Century Scholars studied.

$H_0$3. There is no difference in the rate at which Twenty-First Century Scholars in this population earned a credential or degree between those who came from schools rated low versus schools rated high in Indiana's school accountability model.

Population and Sample

Each year, thousands of Twenty-First Century Scholar students enroll in the fall at Ivy Tech. Prior to 2013-14, one of the requirements to obtain the scholarship is to earn a 2.0 grade point average (Berumen et al., 2015; St. John et al., 2003; St. John et al., 2004) or a 2.5 grade point average starting in the 2013-14 school year. For the purposes of this study, the grade point average was not examined but was used to control for the fact that many students at the college do not remain in good financial aid standing (earning a 2.0 grade point average or higher and completing 66% of courses, and are, thus, ineligible to qualify for federal financial aid and must then drop out of school).

The sample was composed of Twenty-First Century Scholars students who enrolled at Ivy Tech in fall semesters 2010, 2011, 2012, and 2013. Students were tracked out 11 semesters

from the first fall semester of enrollment as a Twenty-First Century Scholar. The Decision Support (Institutional Research) department provided me with an unidentified data set of Twenty-First Century Scholars at the college. I used public record data from the IDOE to identify the high school accountability scores. The scores were matched to the high school of record for the year in which the scholar student first entered Ivy Tech. I submitted a data request to Decision Support at the College and to Ivy Tech's Internal Review Board and access to the unidentified data set was granted.

Data Collection Process

Ivy Tech's student system software platform was SunGard's Banner System and an enterprise data warehouse tool, NewT. I submitted a request for data to the Decision Support team and to the Internal Review Board at the College. Protocol was followed and access to the existing data set on the Twenty-First Century Scholars was granted. A Decision Support staffer provided unidentified reports to me. I used public records accessed through the IDOE website to determine the high school accountability grade for the unidentified students. The research analysis was conducted using IBM's SPSS software.

Data Collection Privacy

Ivy Tech complied with the Family Educational Rights and Privacy Act (FERPA) to protect access to and disclosure of student-level, identifiable data. Any school that accepts funds, including federal financial aid, from the USDOE must adhere to FERPA regulations that protect the privacy of individual student records (USDOE, 2016). School officials and researchers must have written permission from students or parents of students under age 18 unless the officials meet certain criteria that include the following: legitimate educational

interest; transfer data between schools, audit or evaluation functions, research/study on behalf of the school (USDOE, 2016).

This research was conducted by a former Ivy Tech official with an educational interest of the students (transfer), evaluating a process, and conducting a study that can help inform student success practices at the college. Additionally, the IDOE adheres to FERPA regulations, and researchers requesting student-level data for analysis must create and request a data sharing agreement with the department. Data elements included enrollment status, terms of enrollment, credentials or degrees earned, transfer status, transfer in (back) status, high schools of record, and grade point average. This practice was consistent with Ivy Tech data use.

> Approval for this project was processed through Indiana State University's IRB. Every college and university where research takes place is required to have an Institutional Review Board (IRB) that scrutinizes research proposals to see if there are potential adverse effects on participants. The IRB assesses the potential risks in light of the potential benefits. (Beins, 2014, p. 32)

Following approval from the Indiana State University IRB, the research project was submitted to Ivy Tech's IRB because the data were being collected at the college. This research project was an analysis of existing data and did not involve applying interventions/tests or interacting with individual people.

Study Variables

The independent variables were secondary school accountability scores. The categories were A, B, C, D, and F. The dependent variable was postsecondary transfer, or students enrolling in a different institution that occurred in the previous semester. Transfer is a dichotomous variable—the two categories that were used for this research were transferred prior

to earning an associate's degree within 11 elapsed semesters or transferred after earning an associate's degree within 11 elapsed semesters. The second independent variable was earning an associate's degree within an 11-semester time frame (starting with fall, spring, and summer). This variable was also dichotomous as it was answered as earned or not earned. The final independent variable was scale—time to degree. If a student did earn a credential or degree, what was the time to degree as measured by the number of elapsed semesters starting with the fall semester that the student was first enrolled as a Twenty-First Century Scholar through 11 semesters, including summer. The study did not look at semesters enrolled prior to the first Twenty-First Century Scholar semester because this indicated participation in dual credit courses that were not counted toward the official time to degree in college.

Data Analysis

This study contained both descriptive statistical summaries and quantitative, inferential statistical models, chi-square test for independence and *t* test for independence. "Descriptive statistics are statistical procedures used to summarize, organize, and simplify data" (Gravetter & Wallnau, 2014, p. 6). The descriptive statistic techniques took Twenty-First Century Scholar data at Ivy Tech and categorized the sample into transfer and non-transfer; graduate and non-graduate; and time to degree.

The first research question was, Is there a relationship between secondary student accountability grades and postsecondary transfer among Twenty-First Century Scholars students at Indiana's community college? The chi-square test for independence was used to determine if there was a relationship, not by chance, between secondary school accountability grades and postsecondary transfer. The second research question was, Is there a relationship between secondary school accountability grades and earning a postsecondary credential or degree within

three years of enrolling at the Community College? The chi-square test for independence was used again to determine if a relationship between secondary school accountability grades and earning an associate's degree exists. Table 2 provides a summary of how the letter grades were coded for transfer and graduation to run in SPSS.

Table 2

School Accountability Grade and Transfer

Student	Accountability Grade	Transfer
Twenty-First Century Scholar	A = 5, B = 4, C = 3, D = 2, F = 1	No = 0, Yes = 1
Anonymous ID	A = 5, B = 4, C = 3, D = 2, F = 1	No = 0, Yes = 1

Note. Descriptive data table. Numeric values assigned to each variable.

Table 3

School Accountability Grade and Credential/Degree

Student	Accountability Grade	Earned an associate's degree within 11 semesters
Twenty-First Century Scholar	A = 5, B = 4, C = 3, D = 2, F = 1	No = 0, Yes = 1
Anonymous ID	A = 5, B = 4, C = 3, D = 2, F = 1	No = 0, Yes = 1

Note. Descriptive data table. Numeric values assigned to each variable

The third research question was, Is there a relationship between secondary school accountability grade and time to earning an associate's degree? The *t* test for independent samples was used to determine if there was a significant difference in time to earning an associate's degree between students who attended A and B schools versus students who attended

D and F schools. The *t* test is used "If the samples come from the same population, then we expect their means to be roughly equal" (Field, 2013, p. 365). In this study, the samples came from students enrolled at Ivy Tech who were Twenty-First Century Scholars. The research question determined if the mean time to degree at the community college was the same among students who attended A and B schools versus students who attended D and F schools. The tests were run in IBM's SPSS.

Summary

The methodology chapter described the inferential statistical model, chi-square test for independence to determine the odds of a relationship between secondary school scores and transfer and secondary school scores and time to degree. This chapter described the research design, presented the research questions and study hypotheses, discussed data collection processes, and identified the population and sample from which the data will be taken. The study will help practitioners understand how students' behavior patterns in one education system may transfer or relate to students' behavior patterns in a subsequent education system. Chapter 4 presents the data and the results of the logistic regression model. Chapter 5 contains the discussion of the findings and implications for the education field, builds on the typology and literature related to characteristics and success patterns of community college students. Limitations of the research is also discussed in the final chapter, as well as recommendations for additional and future research.

CHAPTER 4

DATA ANALYSIS

This study was a quantitative analysis of high school- and college student-level data to determine if a relationship exists between K-12 school accountability grades and postsecondary transfer patterns and time to completion. Data for this study came from Ivy Tech, Indiana's community college system. The population used in the data set consisted of Twenty-First Century Scholar students who started at Ivy Tech in the fall semesters in 2010, 2011, 2012, and 2013. The students enrolled at schools changes from year to year, as did the criteria the state used to determine the accountability grades. Despite the changes, all of the schools were subject to the same criteria within a given academic year. For this reason, the school accountability grades were assigned to each school from 2010, 2011, 2012, and 2013 as awarded from the IDOE. To control for poverty and preparation, the population used came from the Twenty-First Century Scholars program. Students in the Twenty-First Century Scholars program were identified and enrolled because they were considered low-income. Using this population helped control for the effects poverty has on academic achievement and education outcomes because all of the students in the population and samples were identified as low-income. Using this population also helps control for two other factors—access to and exposure to college preparation resources and academic preparation. The Twenty-First Century Scholars program provides an array of college preparatory resources to students and their families and requires

students to maintain a minimum grade point average (ICHE, 2013b; St. John et al., 2003; St. John et al., 2004).

To ensure consistency within the student sample, students who started in the fall terms were included and students who started in the spring terms were excluded. Spring start indicated either a delayed entrance to college or starting at other institutions and transferring to Ivy Tech. Both scenarios would have created additional factors and variables. The population and samples excluded data from 50 schools, General Educational Development (GED) test, homeschooled students, and students whose high schools were not known or reported. Of the 50 schools whose data sets were excluded, 12 schools had duplicate names in the Ivy Tech system. The school grades for the duplicate names were not the same, and because the data set was anonymous and did not include location information, I could not accurately assign letter grades to the schools (IDOE, 2013, 2014). The remaining 38 schools did not appear on the IDOE school accountability reports and were not assigned grades for a variety of reasons, including having 100% of the population assigned as special education (IDOE, 2013, 2014).

This chapter provides a description of the data used and a quantitative analysis—a chi-square model and *t* test used data on Twenty-First Century Scholars who attended the community college system, controlling for income, to investigate if the secondary school accountability grade was a predictor of college-level student transfer, and further, if the accountability measures were related to earning an associate's degree and the elapsed number of semesters it took to earn the degree (up to 11 semesters). The research questions are as follows:

- Is there a relationship between secondary school accountability rating (Grades A through F) and postsecondary transfer among Twenty-First Century Scholar students at Indiana's community college?

- Is there a relationship between secondary school accountability rating (Grades A through F) and graduating (earning an associate's degree within 11 semesters of enrolling) at the community college?
- Is there a relationship between secondary school accountability rating (Grade A or Grade F) and time to degree (number of elapsed semesters to earn an associate's degree)?

Description of the Data

The data in this analysis came from two sources—first a data set on Twenty-First Century Scholars who first began at Ivy Tech (excluding dual credit enrollment) as full-time students in the fall semesters of 2010, 2011, 2012, and 2013 (Ivy Tech 2017b); and second, the 2013 and 2014 A – F school grade results from the IDOE (2013, 2014). Using these four years of data allowed me to look at 11 semesters (four full years of enrollment or 200% time). School accountability grades may change from year to year. The number of schools below was duplicated, meaning that schools could fall across the A to F assignments based on academic year—schools could appear one time by earning the same letter grade all four years or up to four times by earning different letter grades during the four years.

K-12 Schools

Data on the school accountability grades comes from the IDOE (2013, 2014) A – F school accountability reports. These reports contain data for academic years 2005 to 2014. Ivy Tech researchers gathered Twenty-First Century Scholar data available from 2010 to the present. The letter grade assigned to the school the year that the student first enrolled as a Twenty-First Century Scholar at the college was matched with the student record. Schools with model codes high school (HS) and combined—junior high and high schools (COMB) were used from the

INDOE data set. Throughout the four years, 2010, 2011, 2012, and 2013, there were 174 schools rated an F, 150 schools rated D, 253 schools rated C, 157 schools rated B, and 202 schools rated A. A school could appear in one, two, three, or four of the categories, as scores, as well as the criteria for the scores, changed annually. Schools included public, non-public, choice, and freeway non-choice.

Students

Students in all four cohorts, enrolled in the Twenty-First Century Scholars program in their seventh or eighth grade school years, had access to college preparatory services, stayed out of legal trouble, and demonstrated family financial need, determined by family income and size (Twenty-First Century Scholars, 2014). Starting with the 2013-14 academic year, scholars were required to maintain a 2.5 grade point average, up from a 2.0 grade point average.

Throughout the four years, there were 7,668 Twenty-First Century Scholars who first enrolled at Ivy Tech as Twenty-First Century Scholars in the fall term 2010, 2011, 2012, or 2013. The research excludes students who started in the spring, as the spring start could be an indication of additional variables—such as starting college at another institution or other barriers to enrolling in the semester directly after graduating high school. Of the scholars in the population, 1,386 (18%) of the students' high schools had an A rating the year they enrolled at Ivy tech; 1,129 (15%) attended B-rated schools; 2,449 (32%) attended C-rated schools; 1,003 (13%) attended D-rated schools; and 1,701 (22%) attended F-rated schools.

Graduation

Students who complete credentials—career certificates and technical certificates—and degrees at Ivy Tech are considered graduates. However, for the purposes of this research, only students who earned associate's degrees within 11 months of starting the fall term were deemed

graduates and, thus, included in the analysis as a graduate. Students who earn a certificate may stay enrolled at Ivy Tech to complete an associate's degree, as the certificates are designed to be "stackable" and can serve as benchmarks to degree attainment. Of the 7,668 students who were in the sample, 1,313 students earned associate's degrees within the 11-semester time frame and 6,355 did not. Table 4 is a summary of the number of graduates who attended schools graded A through F.

Table 4

Number of Graduates and Non-Graduates by School Letter Grade

Student Type	A	B	C	D	F	Total
Non-graduate	1,157	954	2,057	840	1,347	6,355
Graduate	229	175	392	163	354	1,313
Total	1,386	1,129	2,449	1,003	1,701	7,668

Note. Descriptive statistics data table. Count of graduates and non-graduates (defined as earning an associate's degree in 11 elapsed terms, by school accountability grade.

Time to Degree

Ivy Tech researchers captured completions and graduates based on earning a career certificate (fewer than 30 credit hours), a technical certificate (between 30 and 45 credit hours), and an associate's degree (60 credit hours or more). For the purposes of this research, graduates were identified as associate's degree holders within 11 terms of the first fall enrollment. Data were not available in the data set for the 2014 cohort beyond the spring 2016 academic term (eight elapsed terms), so students in all cohorts were analyzed based on 11 terms (including summer) which equated to four years or 200% time to graduation. Table 5 is a summary of

student enrollment during 11 elapsed terms, starting with the first semester of fall enrollment at Ivy Tech.

Table 5

Calculation of Elapsed Terms

Data Field	Year 1			Year 2			Year 3			Year 4	
Ivy Tech Banner Term Code	20	30	10	20	30	10	20	30	10	20	30
Actual Number of Terms	1	2	3	4	5	6	7	8	9	10	11

Note. Ivy Tech codes terms as 20 = fall, 30 = spring, 10 = summer. Students starting in fall 2010 have the code 201020, for example. Elapsed number of terms to transfer or degree were calculated by identifying the fall term in which the students started and following them through 11 elapsed terms, or summer term of the fourth year enrolled.

This study looked at time to earning associate's degrees from students who attended A- and F-rated schools. There was a total of 582 graduates during the four years of enrollment from schools in these two categories. Schools with an F rating had 353 graduates (M = 6.58, SD = 3.20) from 174 schools, and schools with an A rating had 229 graduates (M = 6.78, SD = 2.52) from 202 schools.

Transfer

Ivy Tech researchers obtained the transfer data from the National Student Clearinghouse (2017). The National Student Clearinghouse uses unit record data matched from data sets from participating colleges and universities to determine where students are enrolled from semester to

semester (Hossler et al., 2012). In 2012, The National Student Clearinghouse collected student record data on "93 percent of college enrollments across all postsecondary institutions nationwide, including all institution types—two- and four-year institutions, public and private institutions, and for-profit and non-profit institutions" (Hossler et al., 2012, p. 14), making it the largest database on student enrollment. Since 2012, the National Student Clearinghouse claimed to have information on 98% of all students enrolled in public and private higher education institutions in the United States (National Student Clearinghouse, 2017).

Ivy Tech researchers submitted cohort student records to the National Student Clearinghouse and if students were not enrolled at Ivy Tech and showed up as enrolled at another higher education institution via the data match, the students were deemed to be transfer students. Internal data were matched and indicated whether students transferred to other institutions before or after earning associate's degrees. This analysis included students who earned associate's degrees and then transferred versus students who did not. Students who earned certificates and then transferred were classified as not earning degrees prior to transfer in this study.

Table 6 provides a description of students who transferred—with and without earning associate's degrees—by school accountability grade. Of the total population of Twenty-First Century Scholars (N = 7,668) who first enrolled in fall terms 2010-2013 at Ivy Tech, 34% (n = 2,622) of them transferred within 11 months of the first enrollment. Of the transfer population, 634 students (19.5% of transfers) earned associate's degrees in 11 elapsed terms prior to transferring. The table also displays students who transferred with associate's degrees and without associate's degrees within the 11 elapsed terms by the letter grade of the high schools they attended. For example, there were 778 students from A-graded schools who transferred during the four years studied. Of these transfer students, 173 students earned an associate's

degree within the 11 elapsed terms (200% time) and 427 students did not earn an associate's degree during the same time frame. The students in the total population who did not transfer were either still enrolled at Ivy Tech or were deemed to drop out of college, as they did not appear as enrolled at other institutions through the National Student Clearinghouse data.

Table 6

Number of Transfer Students With and Without Degrees by School Letter Grade

Student Type	A	B	C	D	F	Total
Transfer with degree	173	121	37	88	215	634
Transfer without degree	427	351	930	351	563	2,662
Total	600	472	967	439	778	3,256

Note. Descriptive statistics. Transfers and non-transfers (within 11 elapsed terms) by school accountability grade.

Inferential Statistics Analysis and Findings

The research questions include:

- Is there a relationship between secondary school accountability rating (Grades A through F) and postsecondary transfer among Twenty-First Century Scholar students at Indiana's community college?
- Is there a relationship between secondary school accountability rating (Grades A through F) and graduating (earning an associate's degree within 11 semesters of enrolling) at the community college?
- Is there a relationship between secondary school accountability rating (Grade A or Grade F) and time to degree (number of elapsed semesters to earn an associate's degree)?

School Accountability Grades and Associate's Degrees

A chi-square test is a non-parametric inferential statistical test in which the hypothesis has few or no parameters placed around the population being tested (Gravetter & Wallnau, 2014). The variables used in the chi-square tests were nominal or ordinal scale data. In this test, graduation was nominal—*yes* graduated or *no* did not graduate. The school accountability grade was ordinal—the school accountability grades were assigned numbers, 1 through 5. Assumptions were met for the chi-square test for independence: (a) the variables had normal distribution, (b) the variable data came from interval or ration scale data, and (c) the variables were independent. After plotting an SPSS histogram graph, the variable distribution appeared normal. The dependent variable data were ordinal. Finally, the independent variable data were independent—meaning each individual student only appeared in one category—graduated or did not graduate.

To answer the graduation question, a chi-square test for independence was conducted to determine if there was a relationship between the school accountability grade and earning associate's degrees within 11 semesters (fall, spring, and summer) of first enrolling as a college student. Additionally, a correlation, Cramer's V, was run to determine the strength of the relationship (effect size). The hypotheses were

H_0. There is no relationship between graduation and school accountability grade.

H_1. There is a relationship between graduation and school accountability grade.

The degrees of freedom (*df*) were calculated using the formula $df = (2 - 1)(5 - 1) = 4$. The first variable, graduation within 11 semesters had two levels—*yes* and *no*. The second variable, school accountability grade, had five levels, A, B, C, D, and F. The test was run using a

significance level of .05 (5%)—meaning that there was 95% confidence that the statistical findings applied to the population analyzed.

After running the chi-square test for independence, a statistically significant relationship exists between students' graduation status (earning associate's degrees in 11 semesters) and the accountability grades of their high schools the year they first entered Ivy Tech, $\chi^2(4, N = 7{,}668) = 21.44$, $p < .001$. The null hypothesis was rejected because the p value was less than the significance level, $\alpha = .05$. Using Cramer's V, the effect size was calculated. The $df = 1$ (smaller of R - 1 or C - 1). The calculation found $V = .053$ indicating a small effect. Table 7 illustrates the output from the chi-square test for independence. The Pearson chi-square output numbers were used and analyzed to determine the significance of the test.

Table 7

Chi Square Test – Graduation

Test Output	Value	*df*	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.44	4	.000
Likelihood Ratio	20.71	4	.000
Linear – by - Linear Association	11.22	1	.001
N of Valid Cases	7,668		

Note. Chi square test for independence output

Table 8 provides the output summary from the chi-square test for independence analysis for effect size using the Cramer's V test to calculate the phi coefficient. Cramer's V is used when the variables in the test present a matrix larger than two categories by two categories (Gravetter & Wallnau, 2014). The variables in this matrix were two categories by five

categories, meaning there were two levels or categories for graduation—*yes* and *no*—and five levels or categories for school accountability grade—A, B, C, D, and F. The phi coefficient indicated the strength of the relationship between the two variables—graduation and school accountability grade. The output results from the chi-square test are reflected in Table 8.

Table 8

Symmetric Measures – Graduation

Test Output	Relationship Strength	Value	Approximate Sig.
Nominal by Nominal	Phi	.053	.000
	Cramer's V	.053	.000
N Valid Cases		7,668	

Note. Chi square test for independence output

The null hypothesis was rejected, and there was a statistically significant relationship found between students who graduated with associate's degrees within 11 elapsed semesters and the accountability grade assigned of the high school in the year they graduated from high school. Additionally, the Cramer's V test indicated that although the relationship was significant, the effect size was small. A similar process was repeated to determine if there was a relationship between transferring and school accountability letter grade.

School Accountability Grades and Transfer

To answer the transfer question, a second chi-square test for independence was conducted to determine if a relationship existed between students who earned associate's degrees in 11 elapsed terms prior to transfer or transferring prior to earning a degree. For the purposes of this study, even if students earned career certificates (generally 30 credit hours or less) or technical certificates (generally 45 credit hours or less) and then transferred, they were counted as not

earning a degree prior to transferring to another institution. Additionally, a correlation, Cramer's V, was run to determine the strength of the relationship (effect size). Assumptions for the chi-square test for independence were met. Based on a histogram run in SPSS, the distribution curve for the data was found to be normal. The variable data came from interval data—school accountability grades—A, B, C, D, and F. Finally, the independent variable data were independent—as each individual student appeared in only one category—transferred or did not transfer and then transferred with an associate's degree or transferred without an associate's degree. The test hypotheses were

H_0. There is no relationship between graduating with an associate's degree prior to transfer and school accountability grade.

H_1. There is a relationship between graduating with an associate's degree prior to transfer and school accountability grade

The degrees of freedom (*df*) was calculated using the formula $df = (2 - 1)(5 - 1) = 4$. The first variable, graduation within 11 semesters had two levels—*yes* and *no*. The second variable, school accountability grade had five levels—A, B, C, D, and F. The test was run using a significance level of .05 (5%) which indicated that the results were calculated with a 95% probability that the findings were true in the population analyzed. Although the graduation analysis used the population of Twenty-First Century Scholars, the transfer analysis was conducted only on students who transferred. Those who graduated and did not transfer, dropped out of school, or were still enrolled at Ivy Tech beyond the 11 semesters were excluded from the test.

After running the chi-square test for independence, a statistically significant relationship was found between students' earning associate's degrees prior to transferring status and the

accountability grade of their high school the year they first entered Ivy Tech, $\chi^2(4, n = 3{,}246) = 226.22$, $p < .001$. The null hypothesis was rejected because the *p* value was less than the significance level, $\alpha = .05$. Using Cramer's V, the effect size was calculated. The $df = 1$ (smaller of R - 1 or C -1). The calculation found $V = .264$ indicating a small effect. Table 8 illustrates the output from the chi-square test for independence run in SPSS. The Pearson chi square output numbers were used and analyzed to determine the significance of the test.

Table 9 provides the output summary from the chi-square test for independence analysis for effect size using the Cramer's V test to calculate the phi coefficient. The variables in this matrix were two by five, meaning there were two levels or categories for transfer—with a degree and without a degree—and five levels or categories for school accountability grade—A, B, C, D, and F. The phi coefficient indicated the strength of the relationship between the two variables—graduation and school accountability grade. The output results from the chi-square test are provided in Tables 9 and 10.

Table 9

Chi Square Test – Transfer

Test Output	Value	*df*	Asymptotic Sig. (2-sided)
Pearson Chi-Square	226.22[a]	4	.000
Likelihood Ratio	227.513	4	.000
Linear – by – Linear Association	.145	1	.70
n of Valid Cases	3,246		

Note. Chi square test for independence output.

Table 10

Symmetric Measures – Transfer

Test Output	Relationship Strength	Value	Approximate Sig.
Nominal by Nominal	Phi	.264	.000
	Cramer's V	.264	.000
N Valid Cases	3,246		

Note. Chi square test for independence output.

The null hypothesis was rejected and there was a statistically significant relationship found between students transferring with and without earning associate's degrees within 11 elapsed semesters and the accountability grade assigned to the high school in the year they graduated from high school. Additionally, the Cramer's V test indicated that although the relationship was significant, the effect size was small, Cramer's V = .26. The final inferential statistical test conducted in this study was an independent samples *t* test to analyze the time to degree among students who did graduate with associate's degrees within 11 elapsed semesters of the first fall enrollment.

Time to Degree

The final analysis was an independent samples *t* test to determine if there was a difference in time to earning associate's degrees (within the 11-month time frame) between students who attended A-rated schools versus F-rated schools. The population for this analysis was $n = 582$—the total number of students from A-rated and F-rated schools who earned associate's degrees. For A-rated schools ($n = 229$) graduates and the average time to degree was $M = 6.78$ with $SD = 2.52$. For F-rated schools ($n = 353$) graduates and the average time to

degree was $M = 6.58$ with $SD = 3.20$. The assumptions for an independent samples *t* test were met—(a) independence, (b) normal distribution of the populations, and (c) homogeneity of variance. First, each student appeared in only one category A- or F-graded school. The grade was attributed to each student record based on the first fall term they started at Ivy Tech. For example, if a student started in fall semester 2010, the grade the high school received in 2010 was attributed to the record. In Table 11, the descriptive statistics from the SPSS output for the independent samples *t* test is displayed.

Table 11

Descriptive Statistics for Time to Degree

School Grade	*n*	*M*	*SD*	Std. Error Mean
F	353	6.58	3.20	.17
A	229	6.78	2.52	.17

Note. Independent samples *t* test output; $n = 582$

Second, the two populations had normal distribution. Histograms were constructed in SPSS and displayed a normal distribution. Finally, homogeneity of variance was met. Homogeneity of variance meant that the two samples—A- and F-graded schools had equal variances. Although there were observed differences in the means and standard deviations, Levene's test for equality of variances indicated equal variances assumed. Table 12 provides output data for the homogeneity of variance assumption. Independent samples *t* tests are statistical analyses that compare the means of two independent samples or populations (Gravetter & Wallnau, 2014). The analysis indicates if the differences in the means are statistically significant or not (Gravetter & Wallnau, 2014).

Table 12

Levene's Test for Equal Variances

Variable	Test Output	*F*	Sig.	*t*	*df*
Time	Equal variances assumed	29.35	.000	-.79	580
	Equal variances not assumed			-.83	558.94

Note. T test for independent samples output.

Data are displayed under equal variances assumed, thus the assumption was met. The data were run in SPSS to determine if there was a statistically significant difference in the time to earning associate's degrees between students who attended A-rated high schools and F-rated high schools. The output is provided in Table 13.

Table 13

Independent Samples T Test: Time to Degree

Variable	Test Output	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Lower	95% Confidence Upper
Time	Equal variances assumed	.43	-.20	.25	-.69	.30
	Equal variances not assumed	.41	-.20	.24	-.66	.27

Note. Independent samples *t* test output.

After running the independent samples *t* test, the data were analyzed. As a result of the analysis, there was no statistically significant difference in the mean time to degree between students who attended schools with an A accountability grade ($M = 6.78$, $SD = 2.52$) and those with an F accountability grade ($M = 6.58$, $SD = 3.20$), $t(580) = -.76$, $p > .05$, Cohen's $d = .001$.

Summary

This chapter provided a description of the population data set used to answer the questions—Is there a relationship between school accountability grades and students earning associate's degrees within 11 elapsed terms? Is there a relationship between school accountability grades and students transferring with and without earning associate's degrees within 11 elapsed terms? Do students' time to degrees differ between A-rated school graduates and F-rated school graduates? Two chi-square tests for independence were run, assumptions for both tests were met, and the effect sizes were calculated using Cramer's V.

The first chi-square test for independence was run and showed a statistically significant relationship between school accountability grades and students earning associate's degrees within 11 elapsed terms. Of the total population of Twenty-First Century Scholars who started college in fall terms 2010, 2011, 2012, and 2013 at Ivy Tech (N = 7,668), nearly 21% of the students (n = 1,313) graduated within 11 elapsed terms. Starting with the 2011 fall semester cohort of first-time, full-time, degree-seeking students, Ivy Tech researchers and the Integrated Postsecondary Education System reported publicly on a 200%-time graduation rate. For Ivy Tech's general population cohort, the graduation rate was 16% compared to 21% of Twenty-First Century Scholars earning associate degrees within 200% time for the 2010, 2011, 2012, and 2013 cohorts combined (National Center for Education Statistics, 2017).

The second chi-square test for independence also indicated a statistically significant relationship between school accountability grades and students transferring with or without earning associate's degrees. Of the total population of Twenty-First Century Scholars who started college in fall terms 2010, 2011, 2012, and 2013 at Ivy Tech (N = 7,668), 42% of the students transferred either with or without earning associate's degrees within 11 elapsed terms of

first enrollment. In the sample, 29% of students from A-graded schools transferred with associate's degrees, 26% of students from B-graded schools transferred with associate's degrees, 4% of students from C-graded schools transferred with associate's degrees, 16% of students from D-graded schools transferred with associate's degrees, and 28% of students from F-graded schools transferred with associate's degrees. Even though the percentages varied by school grade, an F grade did not indicate the lowest associate's degree earning among the five population levels. Ivy Tech provides six-year cohort transfer data and annual transfer data, none of which match up with the analysis conducted on cohort activity within 200% time of first enrollment. The six-year analysis conducted on the 2008 fall cohort indicated that within six years, 27.9% of students transferred to another institution, compared to 42% of the Twenty-First Century Scholars analyzed from the 2010, 2011, 2012, and 2013 cohorts during a four-year period, or 11 elapsed terms (Lin & Purcell, 2015).

A *t* test for independent samples indicated there was no difference in time to degree between students from A-graded and F-graded schools. Although the first two relationships were found to be significant, further research should be conducted to explore this topic to determine a relationship between schools with other letter grades. School accountability grades in and of themselves are not universally accepted as accurate measures of quality of the school (Howe & Murray, 2015). Additionally, the complexity of the compilation of the indicators that go into the grades and the complexity of characteristics that make up the typology of community college students lends itself to additional analysis. The findings and additional research suggestions are discussed in Chapter 5.

CHAPTER 5

FINDINGS AND IMPLICATIONS FOR FUTURE RESEARCH

Economic projections indicate that requirements for workers filling new and existing jobs in the U.S. economy will increasingly require some college (Bardham et al., 2013; Carnevale et al., 2010). The Indiana economy is not excluded from this prediction, and yet the state lags behind other states and the nation on the production of workers with postsecondary credentials (Lumina Foundation for Education, 2015b, U.S. Census Bureau, 2012a). The changing demographics and increase in low-income, students of color compound the barriers to more students earning postsecondary credentials, as these population groups are historically underrepresented and underserved in higher education (David, 2015; ICHE, 2014). Colleges and universities in Indiana and across the country are being called upon to produce more skilled workers to fulfill these needs (Carnevale et al., 2010; Complete College America, 2013; Lumina Foundation for Education, 2015). The more quickly students can earn credentials and degrees, the more quickly they can enter the workforce, fill jobs that require postsecondary training, and reap benefits of a higher education, such as increased health and economic well-being (Mullholland, 2011).

At the same time, state policy-makers and educators work to address accountability, metrics, and quality in the K-12 system which serves as a pipeline to colleges and universities. Previous research on K-12 accountability and A – F grading systems focused on short-term

academic outcomes, with little emphasis on the longer-term education and workforce outcomes for students (Adams et al, 2017; Carnoy & Loeb, 2002; Deming et al., 2015; Wong, 2008). This study, a quantitative analysis, addressed the impact of high school accountability grades on student graduation and student transfer among a population of Twenty-First Century Scholar students at Indiana's community college system. Further, the study addressed the difference in time to degree between graduates from A-rated and F-rated schools.

This research examined at the relationship between the high school accountability grade during the students' senior years in high school and students' transfer, graduation with associate's degrees, and time to earning the associate's degrees at Ivy Tech Community College in Indiana. The students in the population were Twenty-First Century Scholar students who all came from low-income homes and had some level of academic and college readiness preparation available to them during high school by virtue of participation in the program. The students analyzed started at Ivy Tech as new to the college in the fall semesters 2010, 2011, 2012, and 2013. Student progress was analyzed for 11 consecutive terms from the term of first enrollment.

Findings

The quantitative analysis addressed the following research questions:

- Is there a relationship between secondary school accountability rating (Grades A through F) and postsecondary transfer among Twenty-First Century Scholar students at Indiana's community college?
- Is there a relationship between secondary school accountability rating (Grades A through F) and graduating (earning an associate's degree within 11 semesters of enrolling) at the community college?
- Is there a relationship between secondary school accountability rating (Grade A or

Grade F) and time to degree (number of elapsed semesters to earn an associate's degree)?

Two separate chi square tests for independence concluded that there was a relationship between secondary school accountability grades and postsecondary transfer. Additionally, there was a relationship between secondary school accountability grades and earning associate's degrees within 11 semesters of fall term enrollment at Ivy Tech. However, an independent samples *t* test indicated that there was no relationship between students who attended A- and F-graded schools and the number of elapsed semesters it took for graduates to earn associate's degrees.

Conclusions

The research indicated statistically significant differences in the longer-term education outcomes, earning associate's degrees in 11 elapsed terms from the first fall term of enrollment at Ivy Tech and statistically significant differences transferring with and without earning associate's degrees in the 11 elapsed terms among Twenty-First Century Scholar students based on the school accountability grade of the high school from which they came. Students attending F-rated high schools had higher graduation rates than students who attended high schools with ratings A through D. Students from F-rated high schools graduated four to five percentage points higher than students from A through D schools and compared to the group overall. Further research should be conducted to determine if the results are generalizable across other populations of students but are one indicator that F-rated schools, may not, in fact, be failing their students, specifically in terms of longer-term impacts. Table 14 takes the graduation cross-tabulations and adds graduation rates.

Table 14

Graduation Rates (Using Cross-Tabulations)

Count	A	B	C	D	F	Total
Non-graduate	1,157	954	2,057	840	1,347	6,355
Graduate	229	175	392	163	354	1,313
Graduation Rate	17%	16%	16%	16%	21%	17%
Total	1,386	1,129	2,449	1,003	1,701	7,668

Note: Descriptive statistics in the SPSS chi-square test for independence; total population N = 7,668; n = 1,313. Graduation Rate is based on students completing associate's degrees within 11 elapsed terms of the first fall term of enrollment at Ivy Tech, Fall 2010, 2011, 2012, and 2013. Eleven elapsed terms are roughly four academic years (including summer terms).

However, among graduates, those students who completed an associate's degree within the 11-semester timeframe, there was no statistically significant difference in the time it took them to complete. For both A- and F-rated schools, the mean times fell between six and seven semesters, or just more than two full academic years. This finding has implications because colleges and universities are under pressure to graduate students "on time" which is defined by the ICHE as two years and by the federal government as three years (ICHE, 2013a; National Center for Education Statistics, 2017). Twenty-First Century Scholar graduates exceeded the federal parameters and are close to meeting the state's parameters.

Transfer results and the percentage of students transferring after earning associate's degrees also varies. Only 4% of students from C-rated high schools transfer with an associate's degree while students from A, B, C, and F schools transfer with a degree rates are 20% or higher. Table 15 provides this information and is also the transfer cross-tabulation table with the transfer rates included.

Table 15

Transfer With Associate's Degrees (Using Cross-Tabulations)

Count	A	B	C	D	F	Total
Transfer with degree	173	121	37	88	215	634
Transfer without degree	427	351	930	351	563	2,662
Transfer with degree rate	29%	26%	4%	20%	28%	19%
Total	600	472	967	439	778	3,256

Note. Descriptive statistics in the SPSS chi-square test for independence; total population N = 7,668; n = 3,256. Transfer With Degree Rate is based on students completing associate's degrees within 11 elapsed terms of the first fall term of enrollment at Ivy Tech, Fall 2010, 2011, 2012, and 2013 and then transferring. Eleven elapsed terms are roughly four academic years (including summer terms).

In an analysis of school report cards, Howe and Murray (2015) "examine whether or not A – F systems are valid as a democratic framework. That is, how well do these systems align with the broader goals of educating students for democratic citizenship" (p. i). Earning a degree and entering the workforce may be indicators of participating in democratic citizenship after postsecondary education. The impact of school accountability grades on graduation and transfer is a small effect. The research rejected the hypothesis that school accountability grade impacts the time it takes students to earn associate's degrees, which aligned with Howe and Murray's (2015) notion that "schools that are granted 'A' letter grades in existing accountability systems could fail to meet these democratic educational ends, while schools given 'F' letter grades might well meet them" (ii).

Implications

Although the population was limited to one geographic region, the reach was broad. The data set contained more than 7,600 students from hundreds of high schools across the state. The Twenty-First Century Scholars receive services during middle school and high school with a goal of successfully transitioning and completing postsecondary education. The results yielded information at the high school-level, college-level, and for expanding student success theories already used in the field.

High Schools

At the high school level, steps can be taken to help graduate and continue to a college or university that meets students' career aspirations. These steps may include career exploration and matching those careers to the appropriate postsecondary institution and program and providing greater opportunity for college-level credits in high school. A 2017 report looked at participation and outcome gaps among different racial groups in higher education in the United States (Cahalan et al., 2017). The first equity indicator was the cohort college continuation rates by family income quartile. In 2015, the income quartiles were as follows:

Lowest quartile: Less than $37,679

Second quartile: $37,679 to $68,494

Third quartile: $68,494 to $119,765

Highest quartile: $119,765 and above (Cahalan et al., 2017, p. 23)

Historically, Twenty-First Century Scholars' families fell in the lowest quartile, and depending on family size, the lower end of the second quartile (Twenty-First Century Scholars, 2014). "For high school graduates in the lowest quartile, the college continuation rate was 61 percent, up from 48 percent in 1990 and 46 percent in 1970" (Cahalan et al., 2017, p. 26). Despite the

increases from 1970, the high school graduates from the highest income quartile continued directly to college at a rate of 86% in 2015 compared to the 61% for students from the lowest family quartile (Cahalan et al., 2017).

A second equity indicator was college continuation by race/ethnicity. In 2015, "76 percent of Asian and 61 percent of White high school leavers enrolled in college immediately after high school, compared with 52 percent of Hispanics and 50 percent of Blacks (Cahalan, et al., 2017). In 2011 and 2012, the IDOE started working with third-parties and schools that historically had failing grades (Hiller et al., 2012). The first of these schools were from Gary Community School Corporation and Indianapolis Public Schools, both systems have majority low-income and majority Black student populations (IDOE, 2017).

A third equity indicator was college choice. In 2015, 57% of low-income students (Pell grant recipients) and other federal aid recipients (low- and middle-income students) who were first-time undergraduates attended a baccalaureate institution (rather than a two-year or community college) compared to 75% of undergraduates who did not use federal student financial aid (Cahalan et al., 2017). Students who transfer, for any reason, diminish their chances of earning a baccalaureate degree (Carnoy & Loeb, 2002; Deming et al., 2015; Tanner, 2016). However, the research also indicated that completing associate's degrees prior to transfer increased the odds of earning a bachelor's degree for students (Community College Research Center, 2015; Crosta & Kopka, 2014). There was a statistically significant relationship between high school accountability grade and transfer with or without associate's degrees in this study.

The K-12 accountability system in Indiana is being overhauled. However, the current system in place does include College and Career Readiness standards, dual or concurrent enrollment, Advanced Placement scores, and International Baccalaureate participation as

measures toward the letter grade success (Howe & Murray, 2015). Additional information on the long-term outcomes for accountability grades and information on the students the grades impact could help shape policy and the implementation of policies in the future. In addition to future research discussed in the next section, policy-makers and practitioners should consider long-term student outcomes and how schools are performing against them. The results of this study indicate that schools deemed "failing" or F-rated in a particular year are out-performing higher rated schools in terms of graduates completing associate's degrees and completing degrees prior to transferring— at least among Twenty-first Century Scholars in Indiana's state-wide community college system.

Colleges

At the postsecondary level, colleges can help ensure students have college and career plans and that they understand the sequence of courses that lead to a degree and to the appropriate transfer program. Students who start at other institutions and transfer to another institution, and students who start at an institution, transfer to another institution and come back to complete are more likely to lose credits and extend the time to degree by almost one extra term (Cullinane, 2014; Johnson & Muse, 2010). If transfer is done sequentially, and along a career pathway, students can benefit from transferring. Students who transfer after earning associate's of arts or associate's of science degrees prior to transferring to baccalaureate-level institutions increase their chances of earning a four-year degree (Crosta & Kopka, 2014). The need to take remedial courses can delay students' time to degree. Colleges can work on better ways to place students and move them through to remediation.

A recent report from the National Student Clearinghouse showed differences in completion at both two- and four-year public institutions by race/ethnicity, gender, and age

(Shapiro et al., 2017). The researchers looked at the educational attainment of nearly 1.1 million students who first started at two-year public institutions (Shapiro et al., 2017). Of these students, 26.5% finished certificates or associate's degrees within six years of first enrollment. This study does not provide a good comparison, as the research found that 17% of students earned associate's degrees within 11 elapsed terms or during a four-year time frame. The National Student Clearinghouse study does highlight differences in graduation rates among racial/ethnic groups, 27.9% of Asians completing, 18% of Blacks completing, 23.9% of Hispanics completing, and 30.3% of Whites completing in the six-year timeframe. The study does disaggregate the findings by age, and shows that there are differences in completion among students who started and were age 20 or younger, which was the best comparison to the Twenty-First Century Scholars population. Among this age group, the 29.1% of Asians, 16.4% of Blacks, 24.3% of Hispanics, and 29.9% of Whites completed certifications and degrees within six-years of first entering the two-year institution.

Going out an additional two years in the current study may glean different results for both completion and transfer as the outcomes relate to the accountability grade of the high school from which the Twenty-First Century Scholars came. Additionally, the inclusion of technical certificates as an indicator of graduation may also yield different results. Data disaggregated by race/ethnicity was not requested for the purposes of this study, although the findings would be useful in recruiting and serving students coming to the college.

Student Success Theories

This study can add to student success theories, specifically around the typology of a community college student. Adelman (2005a) first created the typology to differentiate community college students from those who attend four-year institutions—including entering

college as an older student, attending as a commuter, transferring in to the college, and establishing academic expectations that were tied to careers. Since 2005, researchers added to the characteristics that composed the typology that included academic preparation, financial preparation, social preparation, transfer intent, employment goals, and ability to do college math upon entering college (Hagedorn & Prather, 2005). This research adds the accountability grade of the high school from which the student came to the characteristics that may impact academic achievement at a community college.

Low-income students are less likely to attend college at a two- or four-year institution than their high-income counterparts (Cahalan et al., 2017). Despite this statistic, 7,668 low-income students in Indiana enrolled in community college in the fall semesters following their high school graduations from 2010-2013. Of these students enrolled, more than 1,300 of them graduated with associate's degrees within a four-year time frame, exceeding the graduation rate of the general population (National Center for Education Statistics, 2017). Despite possessing characteristics that may predict higher likelihood of student failure, some students persist and achieve their goals. Resiliency is the ability to do just this (Coskun et al., 2014; Martinez et al., 2012; Ou & Reynolds, 2008). Students who have good support systems—and in this case, access to college preparation and the promise of full-tuition scholarships—may be the extended support students need to overcome financial and academic barriers to achieve success (Ou & Reynolds, 2008). Additionally, students who do enroll in college despite obstacles, may benefit from mindset growth and the idea that success comes from taking on challenges instead of avoiding them (Dweck, 2006).

This study lends itself to further research, as the quantitative data could be disaggregated and analyzed in several different ways to tell a more robust story. Additionally, analysis on

graduation including credentials in addition to associate's degrees, analysis on race/ethnicity and gender, and analysis on schools that changed letter grades from year to year as one population, and schools that kept the same letter grade from year to year as another population could add to the literature. From a qualitative approach, research with students who succeeded about factors that led to their success could expand both the resiliency and mindset literature on student achievement. In fact, in 2012, Dweck presented information on mindset growth at Ivy Tech (Dweck, 2012) and in 2013, the college adopted a pilot cohort to participate in mindset growth activities. Data on these students were not available in the data set, nor was the cohort large enough to be significant under the parameters of fall-start Twenty-First Century Scholars.

Recommendations for Future Research

The findings from this study lead to additional research questions. Potential research areas include high-school level analysis, Twenty-First Century Scholar cohort and program analysis, and postsecondary analysis. Future quantitative research may include the following questions:

1. Are students high school accountability grades related to the need for remediation?
2. Is there a difference in transfer, graduation, and time to degree outcomes at high schools that change accountability grades annually?
3. Are students high school accountability grades related to graduation and time to degree for other credentials?
4. Are college level courses offered equally among schools with different accountability grades?
5. Is there a difference in student performance based on different criteria used to award A – F letter grades?

6. Are students performing differently in postsecondary education after the start of A – F letter grades?
7. For students from consistently low-performing secondary schools who achieve, are there specific characteristics or variables that predict success?
8. Can this research be used as a predictive indicator of postsecondary success by conducting a logistic regression model using the same data sets? Can we include other factors such as high school mobility? School accountability grade of students within the same school that earns a different letter grade in a subsequent year?
9. Is this research applicable to the general population of in-coming students, not just Twenty-First Century Scholars? Is it applicable to Twenty-First Century Scholars and other students entering first entering college at a four-year institution?

The research results also lend themselves to qualitative follow up with students. Building on Question 7 in the proposed future quantitative research, what do student respondents who succeeded and failed in postsecondary education say about their experiences? What activities, programs, and courses of study were helpful or provided barriers? Although the quantitative analyses show significance, information specific to human behavior and experience may only be gleaned through qualitative studies that accompany the data and data analysis.

Summary

This study examined at the relationship between school accountability grades from Twenty-First Century Scholars who first enrolled at Ivy Tech in the fall terms 2010-2013 and students who earned associate's degrees within 11 elapsed semesters or transferred within the same time frame. Additionally, the study addressed differences, if any, in time to degree for students who attended A-graded and F-graded schools. The analysis found that there was a

statistically significant difference in students earning associate's degrees within 200% time based on school accountability grade. There was a statistically significant difference in students transferring prior to earning associate's degrees based on school accountability grade. The results indicate that F-rated schools are out-performing other schools in terms of the percentage of students who graduate with associate's degrees at Ivy Tech and who earn degrees prior to transfer. However, there was no statistically significant difference in the time it took students from A-rated and F-rated schools to earn associate's degrees in 11 elapsed semesters from first the first fall term of enrollment. The mean time for students from F-rated schools was observationally shorter. Research on the value and impact of school accountability and the A – F accountability system varied from some or positive impact (Burke & Ladner, 2010; Deming & Figlio, 2017) to little or negative impact (Adams et al, 2016; Howe & Murray, 2015; Tanner, 2016) and mixed impact (Carnoy & Loeb, 2011; Dee & Jacob, 2011; Deming & Figlio, 2016: Hanushek & Raymond, 2005; Wong, 2008). As Indiana's policy makers and educators look at changes to the school accountability system, they should consider the value of such systems as well as the long-term impact outcomes they seek for students who participate in schools governed by the process. High schools should analyze the demographics of their students and the outcomes across the board, by race/ethnicity, gender, and college-going behaviors.

REFERENCES

Abel, J. R., & Deitz, R. (2014). Do the benefits of college still outweigh the costs? *Federal Reserve Bank of New York: Current Issues in Economics and Finance, 20*(3), 1–12. Retrieved from https://www.newyorkfed.org/medialibrary/media/research/current_issues/ci20-3.pdf

Adams, C. M., Forsyth, P. B., & Ware, J. K. (2016). *The informational significance of A – F school accountability grades*. Norman, OK: University of Oklahoma, Center for Educational Policy. Retrieved from http://captulsa.org/wp/wp-content/uploads/2015/03/Informational-Significance-of-A – F-Accountabiity-Grades-Final.pdf

Adelman, C. (1999). *Answers in the tool box: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: U.S. Department of Education. Retrieved from http://files.eric.ed.gov/fulltext/ED431363.pdf

Adelman, C. (2005a). *Moving into town and moving on: The community college in the lives of traditional-age students*. Washington, DC: U.S. Department of Education. Retrieved from http://files.eric.ed.gov/fulltext/ED496111.pdf

Adelman, C. (2005b). *The toolbox revisited: Paths to degree completion from high school through college*. Washington, DC: U.S. Department of Education. Retrieved from http://www.avid.org/dl/res_research/research_thetoolboxrevisited.pdf

American Association of Community Colleges. (2009). Turning President Obama's American Graduation Initiative into Legislation. Retrieved from: http://slideplayer.com/slide/4237816/

American Association of Community Colleges. (2017). American graduation initiative. *Community College Journal, 80*(2), 16–21. Retrieved from http://www.aacc.nche.edu/Advocacy/aginitiative/Pages/default.aspx

Association for the Study of Higher Education. (2013). Performance funding for higher education: What are the mechanisms? What are the impacts? *ASHE Higher Education Report, 39*(2), 1–134. doi:10.1002/aehe.20008

Ary, D., Cheser Jacobs, L., & Sorensen, C. (2010). *Introduction to research in education* (8th ed.). Belmont, CA: Wadsworth, Cengage Learning.

Bahr, P. R. (2010). The bird's eye view of community colleges: A behavioral typology of first-time students based on cluster analytic classifications. *Research in Higher Education, 51*, 724–749. doi:10.1007/s11162-010-9180-5

Bahr, P. R. (2013). Classifying community colleges based on students' patterns of use. *Research in Higher Education, 54*, 433–460. doi:10.1007/s11162-012-9272-5

Bardhan, A., Hicks, D. L., & Jaffee, D. (2013). How responsive is higher education? The linkages between higher education and the labour market. *Applied Economics, 45*(10), 1239–1256.

Batsche, C., Hart, S., Ort, R., Armstrong, M., Strozier, A., & Hummer, V. (2014). Post-secondary transitions of youth emancipated from foster care. *Child & Family Social Work, 19*(2), 174–184. doi:10.1111/j.1365-2206-2012.00891.x

Beins, B. C. (2014). *Successful research projects: Step-by-step guide. The essential guide to developing, performing, analyzing, and reporting your research*. Los Angeles, CA: Sage.

Berumen, J. G., Zerquera, D. D., & Smith, J. S. (2015). More than access: The role of supportive services in the transitional experiences of underrepresented students in a statewide access program. *Journal of Student Financial Aid, 45*(1), 26–44. Retrieved from http://publications.nasfaa.org/cgi/viewcontent.cgi?article=1554&context=jsfa

Burke, L., & Ladner, M. (2010). *Closing the racial achievement gap: Learning from the Florida reforms*. Washington, DC: Heritage Foundation. Retrieved from http://www.heritage.org/education/report/closing-the-racial-achievement-gap-learning-floridas-reforms

Cahalan, M., Perna, L.W., Yamashita, M., Ruiz, R., & Franklin, K. (2017). *Indicators of higher education equity in the United States: 2017 trend report*. Washington, DC: Pell Institute for the Study of Higher Education, Council for Education Opportunity, and Alliance for Higher Education and Democracy of the University of Pennsylvania. Retrieved from http://pellinstitute.org/indicators/

Cappelli, P. H. (2015). Skills gaps, skills shortages, and skills mismatches: Evidence and arguments for the United States. *Industrial & Labor Relations Review, 68,* 251–290. doi:10.1177/0019793914564961

Carnevale, A. P., & Rose, S. J. (2011). *The undereducated workforce.* Washington, DC: Center on Education and the Workforce at Georgetown University.

Carnevale, A. P., Rose, S. J., & Hanson, A. R. (2012). *Certificates: Gateway to gainful employment and college degrees.* Washington, D.C.: Center on Education and the Workforce at Georgetown University. Retrieved from https://cew.georgetown.edu/cew-reports/certificates/

Carnevale, A. P., Smith, N., & Strohl, J. (2010). *Help wanted: Projections of jobs and education requirements through 2018*. Retrieved from https://georgetown.app.box.com/s/ursjbxaym2np1v8mgrv7

Carnoy, M. & Loeb, S. (2002). Does external accountability affect student outcomes? A cross-state analysis. *Educational Evaluation and Policy Analysis, 24*, 305–331. doi:10.3102/01623737024004305

Center for Education Policy (2008). *Has student achievement increased since 2002?* Washington, DC: Author. Retrieved from https://www.cep-dc.org/cfcontent_file.cfm?Attachment=CEP_Report_StudentAchievement_053107.pdf

Community College Research Center. (2015). *What we know about transfer.* New York, NY: Teacher's College at Columbia University.

Complete College America. (2013). *The game changers: Are states implementing the best reforms to get more college graduates?* (Research Report). Retrieved from http://completecollege.org/resources/

Coskun, Y. D., Garipagaoglu, C., & Tosun, U. (2013). Analysis of the relationship between resiliency level and problem solving skills of university students. *Social and Behavioral Sciences, 114*, 673–680. doi:10.1016/j.sbspro.2013.12.766

Crisp, G., & Nora, A. (2010). Hispanic student success: Factors influencing the persistence and transfer decisions of Latino community college students enrolled in developmental education. Research in Higher Education, *51*(2), 175–194. doi:10.1007/s11162-009-9151-x

Crosta, P. M., & Kopko, E. M. (2014). *Should community college students earn an associate degree before transferring to a four-year institution?* (Research Report). New York, NY: Community College Research Center at Teacher's College, Columbia University.

Cullinane, J. (2014). *Transfer and time to degree: A quasi-experimental study of credits, preparation, and pace* (Working Paper). Retrieved from https://appam.confex.com/appam/2014/webprogram/Paper10130.html

David, K. M. (2015). Promoting completion through organizational development and process improvement. *Community College Journal of Research and Practice, 39(11),* 1074–1078. doi:10.1080/10668926.2014.985400

Dee, T. S., & Jacob, B. (2011). The impact of No Child Left Behind on student achievement. *Journal of Policy Analysis and Management, 30,* 418–446. doi:10.1002/pam.20586

Deming, D. J., Cohodes, S., Jennings, J., & Jencks, C. (2015). *School accountability, postsecondary attainment and earnings* (NBER Working Paper No. 19444). Cambridge, MA: National Bureau of Economic Research. doi:10.3386/w19444

Deming, D., & Figlio, D. (2016). Accountability in US education: Applying lessons from K-12 experience to higher education. *Journal of Economic Perspectives, 30*(3*),* 33–56. doi:10.1257.jep.30.3.33

Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York, NY: Random House.

Dweck, C. S. (2012). *Mindset presentation to Ivy Tech*. Retrieved from https://www.scribd.com/presentation/110067623/Mindset-Presentation-Ivy-Tech-2012

Escue, T. (2015). *2013-14 graduate profile and trend report*. Indianapolis, IN: Ivy Tech Community College. Retrieved from https://www.ivytech.edu/files/13-14-Graduate-Profile-Trend-Report.pdf

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed). Los Angeles, CA: Sage.

Figlio, D., & Ladd, H. F. (2008). School accountability and student achievement. In H. L. Ladd & E. B. Fiske (Eds.), *Handbook of research in education finance and policy* (pp. 166–182). New York, NY: Routledge.

Gravetter, F., & Wallnau, L. (2014). *Essentials of statistics for the behavioral sciences* (8th ed.). Belmont, CA: Wadsworth.

Gross, J. P. K. (2008). *Second report: Characteristics and destinations of students who transfer across Indiana's public colleges and universities* (Policy Brief). Bloomington, IN: Indiana Project on Academic Success at Indiana University. Retrieved from http://pas.indiana.edu/pdf/IPAS%20Second%20Statewide%20Transfer%20Report.pdf

Grubb, W. N. (1991). The decline of community college transfer rates: Evidence from national longitudinal surveys. *The Journal of Higher Education, 62,* 194–222. doi:10.2307/1982145

Hagedorn, L. S., & Prather, G. (2005). *The community college solar system: If university students are from Venus community college students must be from Mars*. San Diego, CA: Association of Institutional Research Annual Forum. Retrieved from http://www.academia.edu/4794808/The_Community_College_Solar_System_If_University_students_are_from_Venus_Community_College_Students_Must_be_from_Mars

Hanushek, E. A., & Raymond, M. E. (2005). Does school accountability lead to improved school performance? *Journal of Policy Analysis and Management, 24*, 297–327. Retrieved from http://hanushek.stanford.edu/sites/default/files/publications/hanushek%2Braymond.2005%20jpam%2024-2.pdf

Hicks, M. J., Devaraj, S., Faulk, D., Huepel, D., & Canaday, S. (2013). *The causes of state differences in per capita income: How does Indiana fare?* (Economic Study). Muncie, IN: Ball State Center for Business and Economic Research.

Hiller, S. C., DiTommaso, A., & Plucker, J. A. (2012). The evolution of Indiana's school accountability system. *Education Policy Brief, 10*(5), 1–16. Retrieved from http://ceep.indiana.edu/pdf/PB_V10N5_2012_EPB.pdf

Hossler, D., Shapiro, D., Dundar, A., Zuskin, M., Chen, J., Zerquera, D., & Torres, V. (2012). *Transfer & mobility: A national view of pre-degree student movement in postsecondary institutions* (Signature Report). Washington, DC: National Student Clearinghouse Research Center. Retrieved from http://pas.indiana.edu/pdf/NSC_Signature_Report_2.pdf

Howe, K., & Murray, K. (2015). *Why school report cards merit a failing grade*. Boulder, CO: University of Colorado, National Education Policy Center. Retrieved from http://nepc.colorado.edu/publication/why-school-report-cards-fail

Indiana Code. IC 20-31-8-3. (2015). *Establishment of categories of performance*. Retrieved from http://iga.in.gov/static-documents/5/1/5/b/515b3917/TITLE20_AR31_ch8.pdf

Indiana Commission for Higher Education (2010). *Reaching higher, achieving more: Success agenda for higher education in Indiana.* Retrieved from: http://www.in.gov/che/files/2012_RHAM_4_26_12.pdf

Indiana Commission for Higher Education. (2013a). *White paper: History of performance funding in Indiana.* Retrieved from http://www.in.gov/che/files/PBOF_White_Paper_2-22-13_A.pdf

Indiana Commission for Higher Education. (2013b). *2013 scholar scorecard*. Retrieved from http://www.in.gov/che/3170.htm

Indiana Commission for Higher Education (2014). *College completion report.* Retrieved from www.in.gov/che/files/2014_Completion_Report_Full_Report.pdf

Indiana Department of Education. (2009). *Public Law 221 fact sheet*. Retrieved from http://www.doe.in.gov/sites/default/files/turnaround/pl-221-fact-sheet.pdf

Indiana Department of Education. (2013). *2013 A – F school grade results*. Retrieved from http://www.doe.in.gov/accountability/find-school-and-corporation-data-reports

Indiana Department of Education. (2014). *2014 A – F school grade results*. Retrieved from http://www.doe.in.gov/accountability/find-school-and-corporation-data-reports

Indiana Department of Education (2015). *History of Indiana's accountability system*. Retrieved from http://www.doe.in.gov/accountability/history-indiana%E2%80%99s-accountability-system

Indiana Department of Education (2017). *Enrollment*. Retrieved from http://www.doe.in.gov/accountability/history-indiana%E2%80%99s-accountability-system

Ishitani, T. T. (2008). How do transfers survive after "transfer shock"? A longitudinal study of transfer student departure at a four-year institution. *Research in Higher Education, 49,* 403–419. doi:10.1007/s11162-008-9091-x

Ivy Tech Community College. (2014). *Focused on student success strategic plan*. Indianapolis, IN.

Ivy Tech Community College (2017a). *Thought Leader PowerPoint*. Indianapolis: IN.

Ivy Tech Community College. (2017b). *Decision support report #17067 Jill Kramer Dissertation Anonymous*. Indianapolis, IN: Author.

Jackson, B. A., & Reynolds, J. R. (2013). The price of opportunity: Race, student loan debt, and college achievement. *Sociology Inquiry, 83,* 335–368. doi:10.1111/soin.12012

Johnson, I. Y., & Muse, W. (2012). Student swirl at a single institution: The role of timing and student characteristics. *Research in Higher Education, 53,* 152–181. doi:10.1007/s11162-011-9253-0

Lin, W., & Purcell, E. (2015). Analysis *of six-year outcomes Fall 2008 cohort: Transfer rates college-wide and by region* (Institutional Research Report). Indianapolis, IN: Ivy Tech Community College of Indiana.

Louis, K. S.; Thomas, E., Gordon, M. F., & Febey, K. S. (2008). State leadership for school improvement: An analysis of three states. *Education Administration Quarterly, 44,* 562–592. doi:10.1177/0013161X08323858

Lumina Foundation for Education. (2013). *Strategic plan 2013–2016*. Retrieved from http://www.luminafoundation.org/goal_2025

Lumina Foundation for Education. (2015a). A *stronger nation*. Retrieved from http://strongernation.luminafoundation.org/report/

Lumina Foundation for Education. (2015b). *Goal 2025.* Retrieved from www.luminafoundation.org/goal_2025

Martin, C., Sargrad, S., & Batel, S. (2016). *Making the grade: A 50-state analysis of school accountability systems.* Retrieved from https://cdn.americanprogress.org/wp-content/uploads/2016/05/17094420/AccountabilityLandscape-report2.pdf

Martinez, E. F., Bilges, D. C., Shabazz, S. T., Miller, R., & Morote, E. S. (2012). To work or not to work: Student employment, resiliency, and institutional engagement of low-income, first-generation college students. *Journal of Student Financial Aid, 42*(1), 28–39. Retrieved from http://publications.nasfaa.org/cgi/viewcontent.cgi?article=1040&context=jsfa

McCormick, A. C. (2003). Swirling and double-dipping: Patterns of student attendance and their implications for higher education. *New Directions for Higher Education, 2003*(121), 13–24. doi:10.1002/he.98

Miller, R. (2006). *The association of family history knowledge and cultural change with persistence among undergraduate low-income first-generation college students* (Doctoral dissertation). Retrieved from Proquest Dissertations and Theses database. (UMI No. 3213869)

Mulholland, Z. J. (2011). *The value of education: A comprehensive look at the benefits associated with higher education* (Report 11-C16). Indianapolis, IN: Indiana University Public Policy Institute.

National Center for Education Statistics. (2017). *Graduation data*. Retrieved from https://nces.ed.gov/collegenavigator/?q=ivy+tech&s=all&id=150987

National Student Clearinghouse. (2017). *About.* Retrieved from http://www.studentclearinghouse.org/about/

Ninon, S. (2013). *Non-returning students survey results* (Institutional Research Report). Indianapolis, IN: Ivy Tech Community College of Indiana.

Ou, S., & Reynolds, A. J. (2008). Predictors of educational attainment in the Chicago longitudinal study. *School Psychology Quarterly, 23,* 199–229. doi:10.1037/1045-3830.23.2.199

Paunesku, D., Walton, G. M., Romero, C., Smith, E. N., Yeager, D. S., & Dweck, C. S. (2015). Mind-set interventions are a scalable treatment for academic underachievement. *Psychological Science OnlineFirst.* Retrieved from https://www.perts.net/static/documents/paunesku_2015.pdf

Price, J. H., & Murnan, J. (2004). Research limitations and the necessity of reporting them. *The Journal of Health Education, 35*(2), 66–67. doi:10.1080/10325037.2004.10603611

Ritz, G. (n.d.). *Indiana accountability A–F review: Growth metric*. Indianapolis, IN: Indiana Department of Education. Retrieved from http://www.in.gov/sboe/files/DOE_Analysis_Summary-Growth.pdf

Ritz, G. (2014*). Resolution affirming A – F accountability system growth domain*. Indianapolis, IN: Indiana Department of Education. Retrieved from: http://www.in.gov/sboe/files/A – F_RecommendationResolution_Growth_Domain_October.pdf

Shapiro, D., & Dundar, A. (2012). *Completing college: A national view of student attainment rates* (Signature Report). Washington, DC: National Student Clearinghouse Research Center. Retrieved from https://nscresearchcenter.org/signaturereport10/

Shapiro, D., Dundar, A., & Huie, F. (2017). *Signature 12 supplement: Completing college: A national view of student attainment rates by race and ethnicity – fall 2010 cohort*. Washington, DC: The National Student Clearinghouse. Retrieved from https://nscresearchcenter.org/signaturereport12-supplement-2/

Sherrer, J. (2013). The negative effects of student mobility: Mobility as a predictor, mobility as a mediator. *International Journal of Education Policy & Leadership, 8*(1), 1–14. Retrieved from http://journals.sfu.ca/ijepl/index.php/ijepl/article/view/400/125

St. John, E. P., Musoba, G. D., & Simmons, A. B. (2003). Keeping the promise: The impact of Indiana's twenty-first century scholars program. *The Review of Higher Education, 27*(1), 103–123. Retrieved from https://muse.jhu.edu/article/46606

St. John, E. P., Musoba, G. D., Simmons, A., Chung, C., Schmit, J., & Peng, C. J. (2004). Meeting the access challenge: An examination of Indiana's twenty-first century scholars program. *Research in Higher Education, 45*, 829–871. Retrieved from http://www.jstor.org/stable/40197368

Tanner, J. (2016). *The A – F accountability mistake.* Austin, TX: The Texas Association of School Administrators. Retrieved from https://www.tasanet.org/cms/lib07/TX01923126/Centricity/Domain/393/A – F-Essay.pdf

Twenty-First Century Scholars in Indiana. (2014). *College credit completion requirements for 21st century scholars.* Retrieved from https://www.purdue.edu/studentsuccess/documents/PurduePromise/2013_Cohort_Credit_Hour_Requirements.pdf

U. S. Census Bureau. (2012a). *Educational attainment by race and Hispanic origin: 1970 to 2010* (Table 229). Retrieved from http://www.census.gov/compendia/statab/2012/tables/12s0229.pdf

U.S. Census Bureau, Public Information Office. (2012b). *U.S. Census Bureau projections show a slower growing older, more diverse nation a half century from now* (Press Release). Retrieved from www.census.gov/newsroom/releases/archives/population/cb12-243.html

U.S. Department of Education. (1983). *A nation at risk.* Retrieved from https://www2.ed.gov/pubs/NatAtRisk/risk.html

U.S. Department of Education. (2016). *Family educational rights and privacy act*. Retrieved from: https://ed.gov/policy/gen/guid/fpco/ferpa/index.html

Wandel, T. (2004). Indiana's twenty-first century scholars program. *Planning for Higher Education, 32(2),* 30–36. Retrieved from http://www.scup.org/page/phe?path%5B%5D=phe

Wong, K. N. (2008). *Looking beyond test score gains: State accountability's effect on educational attainment and labor market outcomes*. Irvine, CA: University of California, Irvine. Retrieved from http://www.educationeconomics.uzh.ch/dam/jcr:00000000-5b2d-ab7b-ffff-fffffed11435/Wong.pdf

Yeager, D. S., Henderson, M. D., Paunesku, D., Walton, G. M., D'Mello, S., Spitzer, B., & Duckworth, A. L. (2014). Boring but important: A self-transcendent purpose for learning fosters academic self-regulation. *Journal of Personality and Social Psychology, 107,* 559–580. Retrieved from https://www.perts.net/static/documents/yeager_2014.pdf