

**COLLEGE DEGREE COMPLETION AS IT RELATES TO HIGH SCHOOL  
ACADEMIC PREPARATION PROGRAMS AND ACT COMPOSITE SCORES**

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## ABSTRACT

The purpose of this study was to compare high school graduates from the Blue Valley School District to determine whether a relationships existed between the graduates' ability to attain a baccalaureate degree within 5 years of graduation and the their chosen high school academic preparation program, their ACT composite score category, and a combination of academic preparation program and ACT composite score category. This quasi-experimental quantitative study took place in the Blue Valley USD 229 School District in Kansas. The sample included 626 Blue Valley District high school graduates from the class of 2004 who attended one of the six state universities in Kansas. Chi-square tests of independence were conducted for each research question and follow up analysis was conducted to provide more specificity to the results. Analysis of the data revealed that statistically significant relationships existed between college degree completion and the chosen high school academic preparation program, as well as the ACT composite score category. Additionally, the combination of the academic preparation program and both of the ACT composite score categories also were related to college degree completion. Recommendations for further research included increasing the scope of the study to include a greater variety of colleges, students from more than one graduating class, and a more diverse student sample. Another recommendation was for future studies to attempt to determine whether similar relationships exist across gender, ethnic, and socioeconomic categories. Finally, a study of the impact of various elementary and middle school curricular programs on subsequent enrollment in more rigorous high school courses should be considered.

## DEDICATION

This work is dedicated to the following people:

To my mom and dad, who are not only my parents, but were also my first teachers. They instilled in me an intense love of learning and a strong work ethic. They have encouraged me and supported me throughout each and every endeavor I have ever attempted. Thanks for providing such a terrific example for me. I love you.

To my wife, whose patience with me is infinite and who has sacrificed a great deal of time and energy in support of my education and career. It would not have been possible for me to accomplish this goal without her. Thanks for being such a wonderful wife, mother, and friend. I love you.

To my two boys, who sacrificed time with their dad so he could pursue a dream. Their encouragement and understanding throughout the process has been unbelievable. I am proud of the young men they are growing up to be, and I am hopeful that they have learned something by seeing me through this program. I love you.

To my friends and co-workers, who have motivated me and provided me with words of encouragement from start to finish. Thank you. I am proud to be your friend.

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A number of individuals in the Blue Valley School District have been instrumental in my completion of this program. First, I would like to acknowledge Dr. Mike Slagle for serving on my committee and for providing me with excellent learning opportunities during my directed field experiences. I appreciate your support and friendship. Next, I would like to thank Dr. Russ Kokoruda, who inspired me to pursue administration and who also has provided me with a wealth of growth opportunities. I am grateful for all you have done for me. It is also important that I acknowledge Elizabeth Parks and Stacy Smith for their assistance in the collection of my data. Finally, I must express my appreciation to the staff of Blue Valley High School for their encouragement and support. I'm so proud to be a Tiger!

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I save the final and most important acknowledgement for my wife Paula and my boys, Cooper and Peyton, who have taken every step of this journey with me. They have been patient with me, they have encouraged me, and they have sacrificed much so I could accomplish this goal. Thank you so much. I love you.

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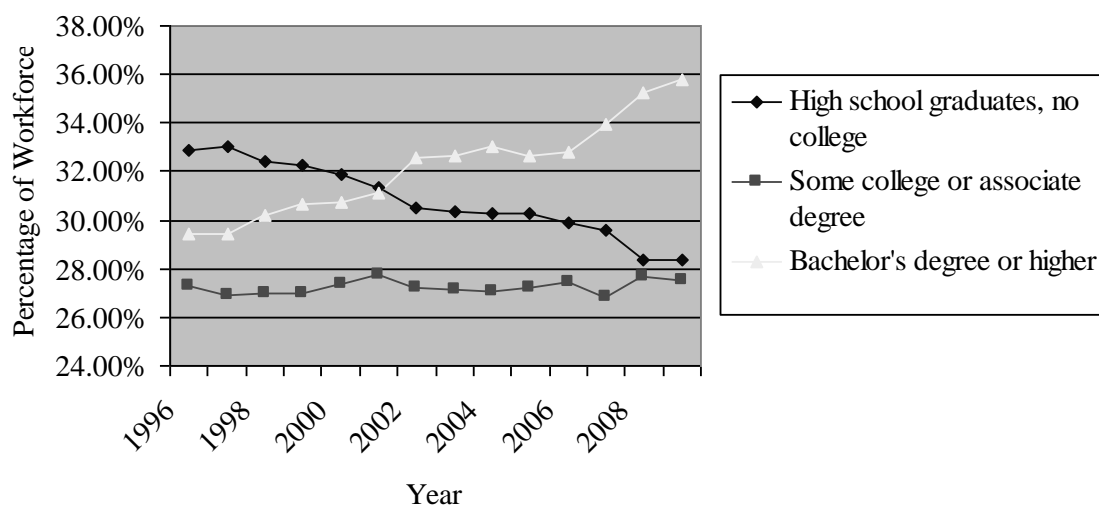
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## CHAPTER ONE

### INTRODUCTION AND RATIONALE

American high schools have an enormous responsibility. Their main purpose is to prepare all students academically and socially for a future which increasingly requires some level of post-secondary training. Data retrieved from the U.S. Bureau of Labor Statistics (2009) and displayed in Figure 1 illustrates the shift in the make up of the workforce by educational attainment. Since 1996, the percentage of jobs held by individuals with a bachelor's degree has climbed steadily from approximately 29% to nearly 36%. Almost the exact opposite has occurred for workers with no more than a high school diploma. That percentage has decreased steadily from approximately 33% to 28% while the percentage of workers with at least some college or an associates degree has remained relatively constant, hovering around 27% since 1996.



*Figure 1.* Percentage of workforce by educational attainment 1996-2009.

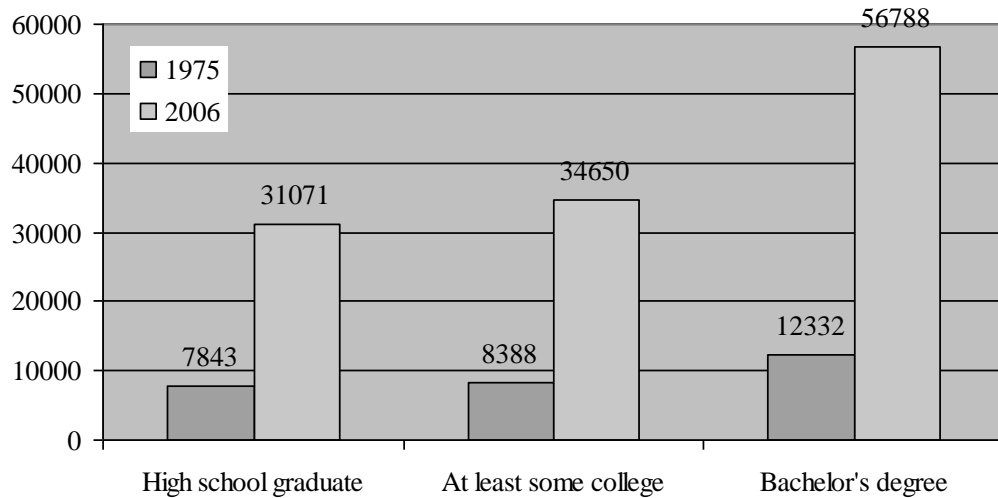
*Note.* From “Labor Force Statistics from the Current Population Survey,” 2009, by the U.S. Bureau of Labor Statistics, <http://www.bls.gov/cps/earnings.htm#education>

Additionally, the U.S. Department of Labor (2008) estimated 67.2% of the projected new jobs arising between 2006 and 2016 will likely require at least some post-secondary education. The Department of Labor indicated this trend toward a more educated workforce is closely related to the changes in the structure of the labor market, which has a higher demand for workers who can provide services that require professional, technical, and managerial skills.

Along with the shift in the types of jobs available in the workplace and the resultant demand for individuals with higher levels of training and education, an increasing gap has emerged between the earnings of individuals with a college degree and those without the degree. The mean individual earnings of workers by their educational attainment as reported by the U.S. Census Bureau (2008) appear in Figure 2. The figure shows that in 1975, the average worker with a bachelor's degree earned 36% more than a worker with a high school diploma and 32% more than a worker with at least some college credit. By 2006, the gap had increased to 46% more than a high school graduate and 39% more than a worker with at least some college.

Not surprisingly, due to the demand for a more educated workforce, increasing numbers of students are attending college in hopes of gaining the training and marketability associated with a post-secondary education. According to the National Center for Educational Statistics (2008), between 1995 and 2005, there was a 33% increase in the number of students enrolling in college, and in the fall of 2007, college enrollment figures hit a record 18 million students. Unfortunately, an alarming number of students enrolling in college are coming in unprepared. Between 1995 and 2000,

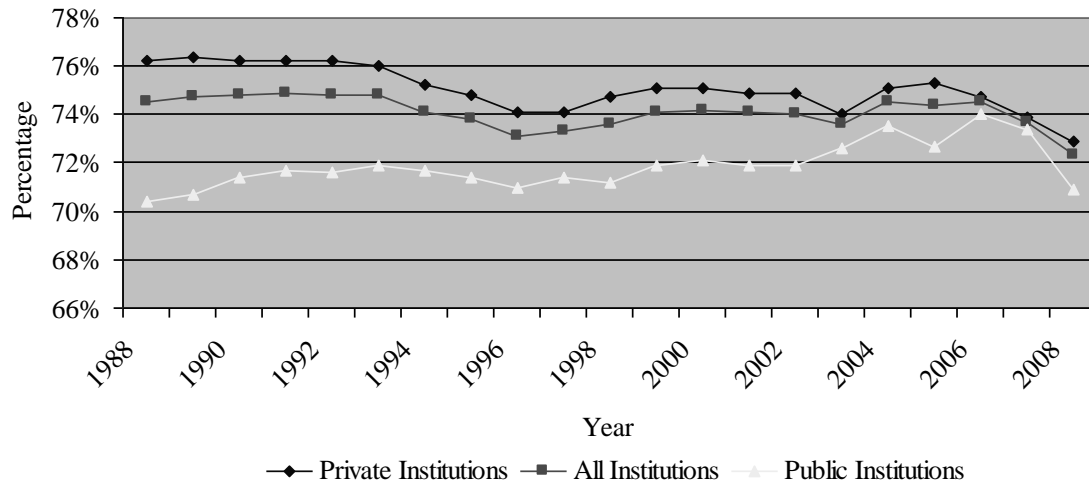
approximately 28% of college freshmen were required to take at least one remedial course in reading, writing, or math (Parsad & Lewis, 2003).



*Figure 2.* Mean annual earnings by educational attainment in dollars for 1975 and 2006.

*Note.* From “Median Earnings in the Past 12 months by Educational Attainment for the Population 25 Years and Over,” 2008, by the U.S. Census Bureau.

Another indicator of students entering college unprepared is failure to persist from year one of college to year two. According to the “Retention/Completion Summary Tables” (ACT, 2008a), more than a quarter of the students who enter a 4-year college do not return for a second year. Figure 3 illustrates this 21-year trend. Of concern is the decline in persistence over the last three years of the study and the all-time low of 72.3% persistence for all institutions in 2008.



*Figure 3.* Percentage of first-year students at 4-year colleges who return for a second year.

*Note.* From “2008 Retention/Completion Summary Tables,” 2008a, by ACT.  
[http://www.act.org/research/policymakers/pdf/retain\\_trends.pdf](http://www.act.org/research/policymakers/pdf/retain_trends.pdf)

Not only are many students struggling academically when they get to college, but also a large number of them are unable to complete degree programs. Approximately half the students attending 4-year colleges earn a bachelor’s degree within 5 years of entry (ACT, 2008a, p. 5). As shown in Figure 4, the percentage of students earning a degree within 5 years of entry to college has changed little in over 20 years, in spite of the afore-mentioned record numbers of students attending college. These numbers are alarming, especially for public institutions, where degree completion within 5 years has not exceeded 45% since 1995.

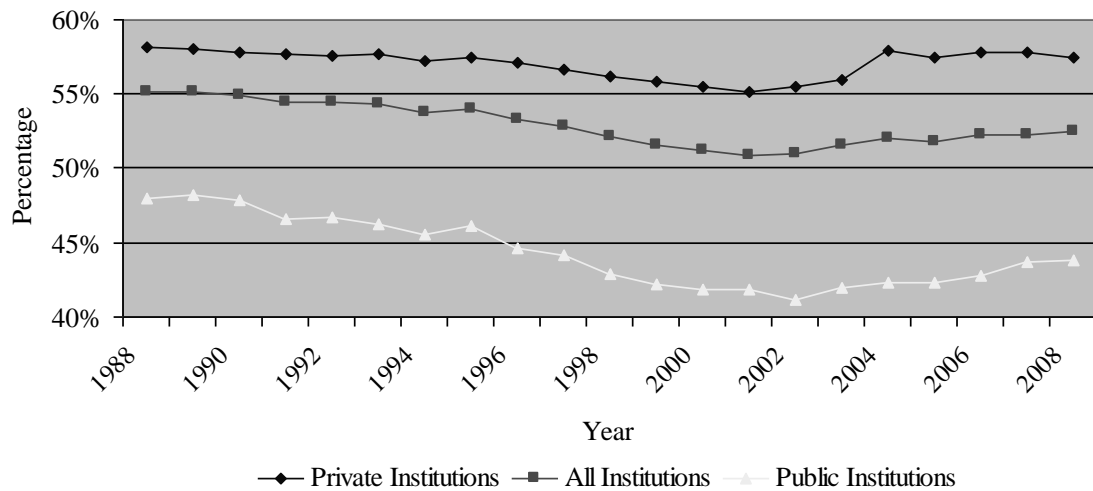


Figure 4. Percentage of students at 4-year colleges earning a degree within 5 years.

Note. From “2008 Retention/Completion Summary Tables,” 2008a, by ACT.  
[http://www.act.org/research/policymakers/pdf/retain\\_trends.pdf](http://www.act.org/research/policymakers/pdf/retain_trends.pdf)

The ability of students to persist through college and attain a degree is dependent on a multitude of academic and non-academic factors. Many of the factors, such as student gender, race, socio-economic status, and family dynamics, cannot be controlled. But some factors can be controlled. Given the increased importance of attaining a post-secondary degree to gaining a competitive edge in the modern job market, high schools must examine what they are doing to prepare their students for college and for success once they get there.

#### Problem Statement

In his book, *College Knowledge*, Conley (2005) indicated most high schools are designed to make students eligible for college admission rather than to prepare them for success in college. Additionally, he stated, “More and more students and parents are interested in the degree to which a high school program of instruction is oriented toward college admission, and increasingly, college success” (Conley, 2005, p. 9). Blue Valley



School District sends a large percentage of its graduates on to college, but it is unclear whether all of them are prepared to succeed. In his data essay for the U.S. Department of Education, Adelman (2006) indicated, in the years prior to college, nothing contributes more to the attainment of a bachelor's degree than the academic intensity of the student's high school curriculum. At this time, it is unclear whether Adelman's findings hold true for Blue Valley students.

Blue Valley has varying levels of academic preparation from which college-bound students can choose as they move through high school. Students can opt for a schedule that completes the basic Blue Valley graduation requirements. With a sufficient ACT score and GPA, these students can gain admission to many colleges and universities (*Blue Valley High Schools Course Description Guide*, 2009). A more rigorous college preparatory curriculum has been defined by the Kansas Board of Regents (KBOR). The Kansas Regents Qualified Admissions Curriculum (QAC) is very similar to the Blue Valley graduation requirements, but it specifies that the highest math course must be at least on the algebra 2 level, and that one science credit be either chemistry or physics (KBOR, n.d.). A third level of curricular intensity available to students in Blue Valley is the Kansas Scholars Curriculum (KSC). The KSC extends the QAC by requiring an additional year of math and two years of one foreign language (KBOR, n.d.). A comparison of the high school curricular levels available to Blue Valley Students can be found in Appendix A. The intent of this study was to determine if Blue Valley was adequately preparing its students for college success. An additional intent was to determine if a relationship exists between a chosen high school course of study and timely college degree completion.

### *Background*

The setting for this study was the Blue Valley Unified School District #229. Blue Valley is a suburban school district located in southeastern Johnson County, Kansas, approximately 25 miles south of downtown Kansas City, Missouri. The district is home to over 100,000 individuals, and the district has 21 elementary schools, eight middle schools, and four high schools. The district is known for its affluence. Over half of its households earn in excess of \$75,000 annually, and the majority of the single-family homes in Blue Valley hold an appraised value between \$200,000 and \$300,000 (*Blue Valley Enrollment Report, 2008*).

Blue Valley is one of only two major school districts in the Kansas City metropolitan area to experience enrollment increases every year since 1975. Since the 1984-85 school year, Blue Valley has averaged approximately 668 new students per year, a 7.1% average annual increase in enrollment. However, over the past 5 years, that growth trend has slowed to approximately 365 new students per year, with a 1.89% average annual increase in enrollment (*Blue Valley Enrollment Report, 2008*). Figures 5 and 6 illustrate these trends.

During the 2008 school year, 84.5% of all students in Blue Valley reported their ethnic background as White/Caucasian, 7.2% Asian/Pacific Islander descent, 3.2% African-American descent, and 2.0% Hispanic descent, and 0.2% Indian descent (Blue Valley School District, n.d.). Figure 6 shows the district's demographic information.

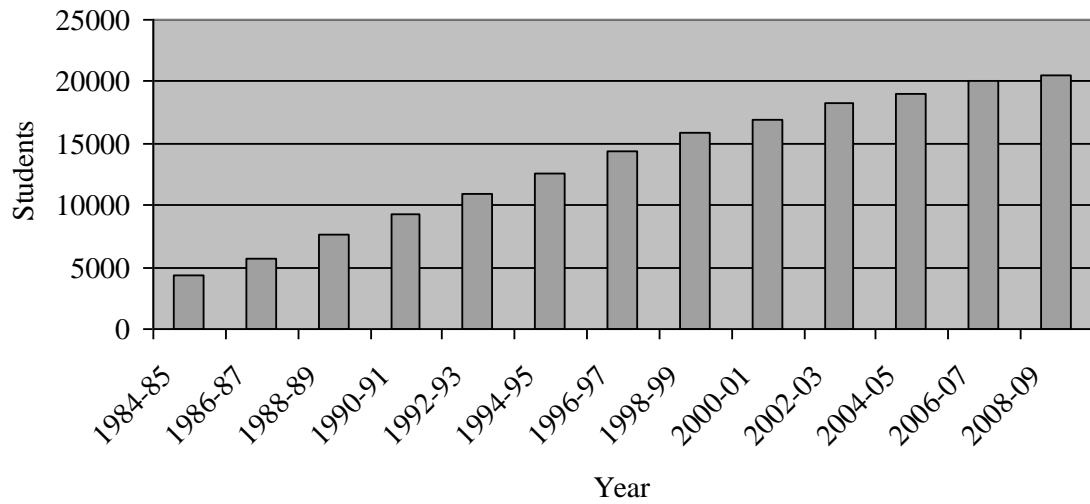


Figure 5. Blue Valley School District enrollment, 1984-2009.

Note. From *Blue Valley enrollment report: 2008-2009*, Blue Valley School District, Facilities and Operations Department.

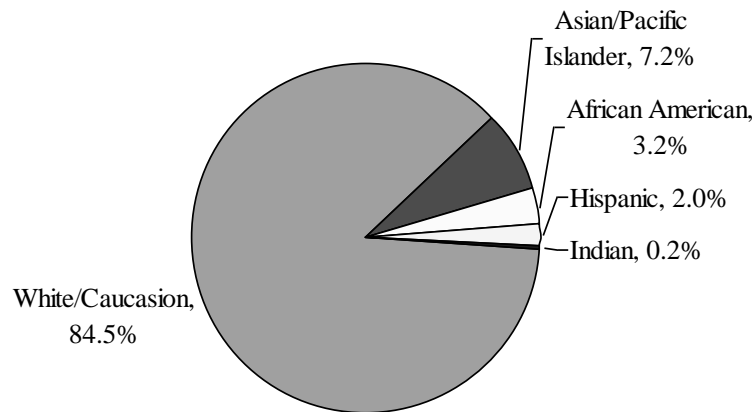


Figure 6. Blue Valley School District student ethnic background, 2007.

Note. From "About Us, General Information," n.d., by Blue Valley School District. Retrieved from <http://www.bluevalleyk12.org>

Blue Valley is also known for the high performance of its students. As shown in Table 1, the district has consistently outpaced the state in the percentage of students at or

above standard on the state assessments for reading and math. In 2008, 93.2% of Blue Valley students met standards or above on the Kansas Reading Assessment, and 95.3% met standards or above on the Kansas Math Assessment.

Table 1

*Percentage of Students At or Above Standard on Kansas Reading and Math Assessments*

| Year | Reading |          | Math  |          |
|------|---------|----------|-------|----------|
|      | State   | District | State | District |
| 2008 | 83.6    | 93.2     | 86.2  | 95.3     |
| 2007 | 81.9    | 92.8     | 84.4  | 92.0     |
| 2006 | 78.5    | 90.6     | 80.9  | 90.7     |

*Note.* From “USD #229 Report Card 2008-2009,” 2009, by Kansas State Department of Education, [http://online.ksde.org/rcard/district.aspx?org\\_no=D0229](http://online.ksde.org/rcard/district.aspx?org_no=D0229)

On the ACT, the students of Blue Valley have consistently scored higher than the national and state composite averages, achieving an all-time high of 24.4 in 2008. Table 2 displays a comparison of national, state, and district average ACT composite scores.

Table 2

*Comparison of Mean ACT Composite Scores 2008*

| Year | National | Kansas | Blue Valley Dist. |
|------|----------|--------|-------------------|
| 2008 | 21.1     | 22.0   | 24.4              |
| 2007 | 21.2     | 21.9   | 24.1              |
| 2006 | 21.1     | 21.8   | 23.9              |

*Note.* From *Report Comparing ACT Composite Score, 2009*, by Blue Valley School District

The district boasts a 98% graduation rate (Kansas State Department of Education [KSDE], 2009). Ninety-two percent of those graduates indicate on exit surveys that they plan to pursue a post-secondary degree (Blue Valley School District, n.d.). Pertinent to this study, of the Blue Valley students in the class of 2004 who ultimately went on to 4-year colleges, 48% attended one of the six state universities under the supervision of the Kansas Board of Regents (*Report Comparing ACT Composite Score, 2009*).

The Kansas Board of Regents (KBOR) is the governing body of several post-secondary institutions in the state of Kansas, including the six state universities (Kansas University, Kansas State University, Emporia State University, Fort Hays State University, Pittsburg State University, and Wichita State University). One of the Regent's functions is to establish and enforce admissions requirements for the state universities. Students from the state of Kansas must meet the KBOR qualified admissions requirements to be guaranteed admission to any of the six Kansas State Universities. Those requirements can be achieved in three ways: (a) Graduate from an accredited high school and achieve an ACT composite score of 21 or above, (b) Rank in

the top one-third of the high school graduating class, or (c) Complete the Qualified Admissions curriculum with at least a 2.0 cumulative grade point average on a 4.0 scale (Kansas Board of Regents [KBOR], n.d.).

### *Significance*

This study is significant to the Blue Valley School District, as it contributes valuable insight into the college readiness of its students as they advance into post-secondary life. Much is known about the performance of students while attending school in the district through the analysis of state assessment scores, ACT scores, performance on advanced placement exams, and graduation rates, but not much data has been collected and analyzed on the students after they graduate. With 92% of Blue Valley graduates aspiring to attend college, determining if performance in high school translates to college readiness and eventually to degree completion is critical.

This study could provide helpful information to the Blue Valley School District regarding the relationship between a chosen academic preparation program and the ability of a student to attain a baccalaureate degree. District officials could use information from the findings of this study to help with decisions about graduation requirements, about recommended courses of study, and to gauge the importance of content and rigor within high school curricula as it pertains to college readiness. The findings might also assist school counselors, administrators, and advisors as they work with students and parents on course selections and the development of 4-year plans of study. Parents and students will have more pertinent and specific information they could utilize to help make more informed decisions about the course of study the student chooses to pursue in high school. Also, the Kansas Board of Regents and their member

institutions could consider the findings of this study as they examine and evaluate their admissions criteria. Finally, this study contributes to the growing body of research into college preparation and college success.

### *Purpose Statement*

The purpose of this study was to compare Blue Valley graduates who completed courses of study in three different academic preparation programs (Blue Valley minimum graduation requirements, Kansas Regents Qualified Admissions Curriculum, and the Kansas Scholars Curriculum) to determine whether a relationship existed between the academic program selected and the graduates' ability to attain a baccalaureate degree from a Kansas Regents institution within 5 years of graduation. A second purpose was to compare the same Blue Valley graduates based on two ACT composite score categories (below 21 and 21 or above) to determine whether a relationship existed between the ACT composite score category and the graduates' ability to attain a baccalaureate degree from a Kansas Regents institution within 5 years of graduation. Finally, a comparison was made to determine whether a combination of the selected academic program along with the graduates' ACT composite score category was related to the graduates' ability to attain a baccalaureate degree from a Kansas Regents institution within 5 years of graduation.

### Delimitations

Lunenburg and Irby (2008) stated, "Delimitations are self-imposed boundaries set by the researcher on the purpose and scope of the study" (p. 134). The delimitations of this study specified the time and location of the study, as well as the composition of the sample.

The delimitations were:

1. This study took place from July 2009 to February 2010.
2. The location of the study was the school district of Blue Valley USD #229.
3. The sample of the study included Blue Valley high school graduates from the class of 2004 who, at some time, attended one of the six state universities under the supervision of the Kansas Board of Regents.
4. The attainment of a baccalaureate degree within 5 years of graduation indicated college success.

#### Assumptions

Roberts (2004) indicated that assumptions are the factors taken for granted in relation to a study. This study incorporated the following assumptions:

1. The data set received by the National Student Clearinghouse was accurate and up to date.
2. All data compiled from the Blue Valley District information system was accurate.
3. The data entry and coding process was completed accurately.
4. All 2004 Blue Valley graduates had an equal opportunity to complete a degree program within 5 years of high school graduation.



## Research Questions

The following research questions guided this study.

1. Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree?
2. Is there a relationship between the composite ACT score and the attainment of a baccalaureate degree?
3. Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored below a 21 composite ACT score?
4. Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored a 21 or above composite ACT score?

## Definition of Terms

For the purpose of clarity, the following key terms of this study are defined.

Those definitions not followed by a citation were developed by the researcher.

*Academic preparation program.* One of three possible courses of study available to high school students in Blue Valley: Blue Valley minimum graduation requirements, The Kansas Qualified Admissions Curriculum, The Kansas Scholar's Curriculum.

*ACT composite score.* The ACT consists of four tests: English, mathematics, reading, and science. The score range for each of the four tests is 1–36. The composite score, as reported by ACT, is the average of the four test scores earned during a single test administration, rounded to the nearest whole number (ACT, 2009).

*Baccalaureate degree within 5 years of graduation.* For the class of 2004, the degree must have been attained by the spring of 2009.

*Blue Valley minimum graduation requirements.* The minimum coursework needed to obtain a high school diploma in Blue Valley (See Appendix A).

*College success.* The attainment of a baccalaureate degree within 5 years of graduation.

*High school curriculum.* The type, level, and sequence of courses students choose to complete while advancing through high school.

*Kansas Regents qualified admissions curriculum.* The minimum coursework necessary to gain admission to a Kansas Regents University (KBOR, n.d.).

*Kansas Scholars Curriculum.* The Kansas Qualified Admissions Curriculum with the stipulations that one of the three science credits be chemistry or physics, an additional credit be earned in math that is above Algebra 2, and two credits be earned in one foreign language. Students who complete this curriculum will receive a certificate of completion and will be considered for the Kansas State Scholars Program (KBOR, n.d.).

*National Student Clearinghouse.* A non-profit organization that provides the service of post-secondary and secondary student degree, diploma and enrollment verification (National Student Clearinghouse, 2009).

### Overview of Methodology

The data collected for this study were compiled and analyzed during the 2009-2010 school year. Blue Valley students from the graduating class of 2004 who gained admittance to any of the six state universities supervised by the Kansas Board of Regents in any subsequent year after high school graduation were included in the study. College

of attendance and degree completion data were collected from the National Student Clearinghouse. Transcript data were obtained from the Blue Valley District data information system and used to retrieve each student's ACT composite score, as well as the program of study chosen during high school (minimum graduation requirements, QAC, or KSC). Other data collected from the transcript analysis included the students' gender, non-weighted high school GPA, number of high school credits, the number of math credits, the number of science credits, whether the student had any advanced placement credit, and whether the student had elected to take an early release during the senior year. The students were separated according to the following six criteria:

1. Below a 21 ACT and did not complete the QAC,
2. Below a 21 ACT and completed the QAC,
3. 21 ACT or above and did not complete the QAC,
4. 21 ACT or above and completed the QAC,
5. Below a 21 ACT and completed the KSC, and
6. 21 ACT or above and completed the KSC.

The number of students who attained their bachelor's degrees within 5 years was then calculated for each category, and chi-square tests of independence were conducted for each in order to determine whether a statistically significant relationship existed.

#### Organization of the Study

This clinical research study is presented in five chapters. Chapter 1 includes the introduction and rationale of the study, problem statement, background and conceptual framework, significance, purpose statement, delimitations, assumptions, research questions, definition of terms, and the overview of the methodology.

Chapter 2 provides a comprehensive review of the literature, which includes an overview of the history of high school curriculum, a discussion of the disconnect between K-12 education and postsecondary institutions, an overview of the history of the ACT, a discussion of various predictors of college success, and a summary of the benefits of taking a more rigorous high school curriculum. The methodology utilized for this clinical research study is in Chapter 3 and includes a description of the research design, population and sample, sampling procedures, instrumentation, measurement, data collection procedures, data analysis and hypothesis testing, and limitations of the study.

Chapter 4 contains the results of the study. It includes detailed discussion of descriptive statistics, hypothesis testing, and additional analyses. Finally, Chapter 5 provides the interpretation and recommendations through discussion of the findings related to the literature, and a conclusion with implications for action and recommendations for future research.

## CHAPTER TWO

### REVIEW OF THE LITERATURE

#### Introduction

This chapter provides a discussion of the literature pertaining to high school curriculum, the ACT Test, and college degree completion. The material reviewed consists of quantitative studies, reports, journal articles, and other current literature. This chapter is organized into five distinct sections. The first section explores a historical perspective of the last century of American high school curriculum as it pertains to college preparation. The second section examines the disconnect existing between K-12 education and postsecondary education regarding preparing students not only to get into college, but also to succeed once they get there.

Third, the review discusses the history and the development of the ACT test, as well as the additional services ACT, Inc. provides in the area of college readiness. Next, research regarding the value of high school GPA, ACT composite scores, and the level of high school curriculum as predictors for college degree completion is discussed. Finally, the review provides a thorough look at the benefits of a rigorous, college preparatory high school curriculum particularly the benefits of taking higher levels of mathematics and science.

#### Overview of the History of American High School Curriculum

The purpose of the American high school has been hotly debated for over a century. In 1892, the National Education Association appointed 10 respected academicians, consisting of five university presidents, a college professor, three high school principals, and the commissioner of education, to form The Committee on

Secondary School Studies. Known as The Committee of Ten, this group set out to bring order and commonality to the curricula of secondary schools across the country and to define the overall purpose of the American high school (Copa & Pease, 1992). After debating for over a year, the committee submitted a report in 1893. The report argued for the standardization of high school curricula, recommending a narrow scope of common course offerings for high school students including Latin, Greek, modern languages, mathematics, science, history, and geography. Additionally, the report stated that the overall purpose of high school was the intellectual preparation of students for college and/or life. The committee did not feel it necessary to differentiate among students who were headed for college and students who were headed into the workplace. In essence, the committee believed preparation for college is the same as preparation for work, and that all high school students should have access to and experience an intellectually rich curriculum that prepares them for either outcome (Copa & Pease, 1992; Lee & Ready, 2009).

By 1918, after two decades of criticism and debate over the role and purpose of the public high school, a movement contrary to the vision of The Committee of Ten was underway. Critics claimed that the Committee's recommendations were too narrow and focused on the interests of higher education. They believed it was the responsibility of the high school to shape students to social needs and interests in order to more efficiently prepare them for their place in a democratic society (Copa & Pease, 1992). In response to this line of thinking, the National Education Association once again assembled a group of educators with the purpose of reorganizing secondary education.

The Commission on the Reorganization of Secondary Education released its report, titled “The Cardinal Principles of Secondary Education” in 1918. With its social efficiency philosophy, the Cardinal Principles set out to change the curriculum of high schools from a narrow and focused, academic and intellectual set of courses to a more differentiated model in which coursework would be driven by the future work and/or educational plans of the students or by their innate ability and intellect. The Commission believed schools should offer a broader and more diffuse curriculum, providing vocational training as well as college preparatory tracks. The Cardinal Principles’ social efficiency model was the dominant organizational structure of public high schools for the first half of the 20<sup>th</sup> century (Lee & Ready, 2009).

After World War II, this philosophy was reaffirmed with the Prosser Resolution, which emerged from the efforts of a group of educators assembled by the Division of Vocational Education in Washington D.C. in 1945. The resolution expressed the belief of these educators that 20% of all youth could be prepared for skilled occupations by vocational schools and 20% could be prepared for college by high schools. They believed the remaining 60% would be in need of life adjustment training in areas such as citizenship, family life, and occupational adjustment before they could be capable of moving into skilled occupations or college. High schools would be asked to deliver that life adjustment training (Ravitch & Vinovskis, 1993).

The launch of Sputnik in 1957 signaled a potential crisis as the Soviet Union seemed to have technologically surpassed the United States in the areas of mathematics and science. The lack of rigorous and focused curriculum in American high schools was blamed for this reversal in superiority, and calls for reform soon followed (Wraga, 2000).

During the late 1950s, the focus and philosophy of high school curriculum began to shift from the social efficiency model touted in the Cardinal Principles to a curriculum with more emphasis on high quality math, science, and foreign language education and more rigorous academic standards. This movement was bolstered by the National Defense Education Act of 1958, which provided money to schools for the improvement of achievement in math, science, and foreign languages. This shift in thinking about secondary education continued through the early to mid 1960s (Ravitch & Vinovskis, 1993).

Social unrest and the civil rights movement of the 1960s seemed to cause the pendulum to swing back to a revival of the differentiated curriculum popular three decades earlier, but with even more flexible curricular tracks. These flexible tracks relied more on student choice rather than predetermination by aptitude. With an increase in number of appealing elective courses, this era gave students a wide variety of choices as they navigated high school. Choice-driven curriculum continued throughout the 1960s and 1970s. This differentiated, comprehensive curriculum allowed for varied academic experiences within the same school, with some students choosing college preparatory tracks and others choosing vocational or general education tracks (Lee & Ready, 2009; Ravitch & Vinovskis, 1993).

The decade of the 1980s brought increased scrutiny of comprehensive high schools due to the reduction of competitiveness of American business, industry, science, and technological innovation as compared other countries in global markets. With its 1983 report entitled *A Nation at Risk: The Imperative for Education Reform*, the National Commission on Excellence in Education strongly criticized the public education system,



accusing it of poor practice and low standards (Wraga, 2000). After high schools had spent years expanding the curriculum and providing more options and choice for students, they were now being directed to bring back a more narrow and focused curriculum consisting of a modern core.

This modern core, referred to as the New Basics Curriculum in the report, consisted of 4 years of English, and 3 years each of science, math, and social studies. Two years of foreign language was recommended for college bound students. The New Basics curriculum became the predominant model for high school curricular requirements over next 25 years (Hamilton, Stecher, & Yuan, 2008). By the late 1980s, many states and districts had responded to the report by implementing higher curricular standards, raising graduation requirements, and offering more advanced courses. Much like the Committee of Ten, the report recommended that all high school students take a similar set of academic courses, whether they intended to enter college or the workforce after high school (*A Nation at Risk: The Imperative for Educational Reform*, 1983).

The decade of the 1990s saw a continuation of the recommendations of *A Nation at Risk*, as well as an intensification of the standards-based reform movement. Two key pieces of legislation impacting high school curriculum, the *Goals 2000: Educate America Act* and the *Improving America's Schools Act*, were passed and signed by President Bill Clinton in 1994. Both documents contained objectives centered on high performance standards and emphasizing a rigorous high school curriculum (U.S. Department of Education, 1995). Even though these reforms sought to narrow the high school curriculum, the differentiated curriculum remained somewhat intact and persists today. However, due to federal mandate, the vocational or applied learning programs became

more integrated with the academic programs of high schools rather than isolated from them, as they had been in previous years (Husbands & Beese, 2001).

With standards come assessments. By the year 2000, nearly every state had adopted a system of accountability through the implementation of standards and assessments (Hamilton et al., 2008). The *No Child Left Behind Act of 2001* was designed to force schools to close the achievement gap for minority and disadvantaged students, ensure all students were mastering a rigorous academic curriculum, and achieve a 100% graduation rate for each high school (U.S. Department of Education, 2004). Many states extended accountability measures for high schools by requiring students to pass high school exit exams and/or end-of-course exams before receiving their diplomas (Hamilton et al., 2008).

For over a century, American high schools have adapted their curricular offerings to the desires of society. Historical events and social circumstances have caused the philosophy behind high school curriculum to swing like a pendulum from the Committee of Ten's recommendations of a focused, narrow, academic curriculum for all, and back to the Cardinal Principles' social efficiency ideals, which provided for a differentiated curriculum based on the future plans or abilities of students in order to meet the needs of society. Each time the pendulum swings, American high schools are asked to do more for students, be more for their communities, and provide more for America. As the demands of preparing students for the Information Age and graduating all students with 21<sup>st</sup> century skills loom large over them, American high schools will be forced yet again to adapt even more quickly.

### The Disconnect Between K-12 and Postsecondary Education

According to Conley (2005), about 75% of all postsecondary institutions admit all students who meet their admission requirements, but only about 33% of those students go on to earn a degree in 4 years. He pointed out the obvious: Most students know how to get into college, but they are not getting the message about what they need to do to succeed in college. This discrepancy is just one indicator of a disconnect between K-12 education and postsecondary education.

Conley (2005) claimed that one reason for this disconnect is that the current high school model is designed to graduate students and to make those who are college bound eligible for admission to college. Most are not designed to prepare students for postsecondary success. Additionally, due to accountability measures, high schools focus on preparing students to pass state tests and not on preparing students to be ready for the rigors of college. In most cases, state tests are not in alignment with postsecondary learning (Conley, 2006).

Kirst and Venezia (2004) supported this notion, indicating that once admitted to college, many students discover they are unprepared for college-level work and are subsequently forced to take remedial courses to gain the necessary skills. Remedial coursework is not credit-bearing, thus increasing the time to degree completion and decreasing the likelihood of persistence through college. Conley (2005) went on to say that for the skills and habits of mind necessary for college success to be developed and instilled in students, high schools would need to provide an intellectually coherent instructional program that spans all 4 years of high school. High schools will not be successful in doing this without the help of higher education. Colleges must

communicate what they expect students to know and be able to do to succeed in their entry level courses and avoid remediation in college (Conley, 2006).

All of this points to a need for K-16 curricular alignment. Several influential groups have called for this type of reform. The National Governor's Association and the Commission on the Future of Higher Education stated their support for increased K-16 curricular alignment (ACT, 2008d). Additionally, the National Commission on the High School Senior Year encouraged the two separate systems to develop a more seamless relationship in which standards, curriculum, and assessments are better aligned and integrated. The Commission advocated a new single system of P-16 education (National Commission on the High School Senior Year, 2001).

Conley (2005) urged K-12 educators and postsecondary educators to work together to create a system that is better aligned and focused on the same outcomes (Conley, 2005). He also advocated for clear standards that link high school to college and cited the *Knowledge and Skills for University Success Standards* as a potential resource. These standards identify specific knowledge, skills, and cognitive challenges, providing a much clearer picture of what students need to be able to do when they enter college. In his article, *High Schools at the Tipping Point*, Wise (2008) also stressed the need for alignment and emphasized it would benefit students, whether they choose to go to college or not. He stated that the demands and skills for college readiness and the workforce mirror one another and schools must align what they expect of students with these demands.

## Overview of the History of the ACT

Founded by E. F. Lindquist, American College Testing (ACT) entered the college admissions test market in 1959 and immediately became the chief competitor for the already well-established Scholastic Aptitude Test (SAT). The Iowa-based ACT, Inc. was an offshoot of Linquist's Iowa Testing Programs, which developed the Iowa Tests of Educational Development (Zwick, 2007). During its first decade of existence, the organization conducted a great deal of research and development designed to shape the ACT assessment into a useful college placement and academic advising tool (ACT, 2008a). According to ACT (2009), in the 1970s and 1980s, the organization experienced a great deal of growth and expansion. During these decades, ACT developed financial aid programs, assessment tools to assist community colleges with student placement, programs for 8<sup>th</sup> and 10<sup>th</sup> graders that would connect with each other and the ACT test, and workplace assessments.

The ACT influence continued to grow from the 1990s to the present, with ACT becoming more international and diverse in its services (ACT, 2009). One service provided by ACT is its College Readiness System, developed in 2006. Within this system, college readiness benchmarks and standards were developed to coincide with their standardized, normative comparison assessments. The college readiness benchmarks are minimum scores on the ACT English, mathematics, reading, and science tests. These benchmark scores indicate that a student who achieves them will have a 50% chance of earning a grade of B or higher, or at least a 75% chance of earning a grade of C or higher in entry-level, credit-bearing college English composition, college algebra, social science, and college biology. The college readiness standards are derived from

national curriculum surveys spanning from middle school to the second year of college (ACT, 2008b).

From the beginning, there were philosophical differences between the ACT and the SAT. The ACT originally had four sections: mathematics, English, social studies reading, and natural sciences reading. The SAT had only two sections: verbal and mathematics. The SAT was considered to be a better determinant of a student's aptitude for college work, while the ACT related more to instructional objectives and high school curriculum (Atkinson & Geiser, 2009; Zwick, 2007). Due to its Iowa roots, the original content of the ACT was based on Iowa's high school curriculum and was closely related to the Iowa Test of Educational Development. As it expanded to a more national test, the content became based more on national curriculum surveys and state K-12 instructional standards (Atkinson & Geiser, 2009).

According to Zwick (2007), the content of the ACT, as well as its scoring methodology, underwent major changes in 1989. At that time, the four subject area sections of the ACT were introduced, consisting of mathematics, English, reading, and science reasoning. Scores were given for each subject area and a composite score was derived from them. Additionally, two English, three mathematics, and two reading subscores were reported. An optional writing section of the ACT was added in 2002 in response to SAT adding a writing section. Students who take the writing section receive a writing test score as well as a combined English/writing score (Zwick, 2007). ACT scores are reported on a scale from 1 to 36 for each of the four sections (ACT, 2009).

In contrast to SAT, ACT uses questionnaires in its registration booklet to gain information about those who take the test. These questionnaires, along with a career

interest inventory, are designed to facilitate course placement and academic planning by identifying career and educational aspirations, extracurricular activities of interest, and the educational needs of students (Zwick, 2007). There is also an effort by the ACT to assist students, beginning in middle school, to get on and stay on track for college through the use of a diagnostic component they have developed (Atkinson & Geiser, 2009).

In its first 30 years of existence, the ACT was primarily utilized by Midwestern universities for admissions, while the use of the SAT was predominantly on the coasts. More recently, the ACT has become almost universally accepted nationwide. ACT claimed that about 45% of all 2009 high school graduates, nearly 1.5 million students, took the ACT during high school and that virtually all colleges accept ACT scores as a part of their admissions criteria (ACT, 2009).

Colleges and universities, depending on their selectivity, require certain minimum ACT composite scores for admission. Based on information received through the ACT Institutional Data Questionnaire, ACT, Inc., indicates that most highly selective institutions require a minimum composite score between 27 and 31, selective institutions accept a range from 22 to 27, traditional institutions require minimums ranging from 20 to 23, liberal institutions typically accept a range between 18 and 21, while institutions with open enrollment accept minimums ranging from 17 to 20 (ACT, 2005b).

#### Predictors of College Success

Colleges and universities promote their admissions requirements as predictors of postsecondary academic success. Various predictive pre-college tools, such as high school grade point average, high school class rank, rigor of curriculum taken in high

school, grades in higher level high school courses, and scores on admissions tests like the ACT provide these institutions with the necessary information regarding the probable success of incoming students (Hawkins & Lautz, 2005). The following is a discussion of three of these predictors: high school GPA, ACT Scores, and the rigor of high school curriculum.

#### *High School GPA as a Predictor*

When making admissions decisions, it behooves colleges to use metrics that are reliable predictors of college success. One such metric is the high school GPA. In their report for the National Association for College Admissions Counselors, Hawkins and Lautz (2005) found that 4-year institutions rate a student's high school GPA as the most important factor for them when making admissions decisions, ranking slightly ahead of admissions tests. One can infer from the importance placed high school GPA for admissions, that colleges view a student's performance record in high school as a strong predictor of success in college.

The findings of Atkinson and Geiser (2009) lent credence to the predictive ability of high school GPA. These researchers claimed that in study after study, when compared to standardized test scores, high school cumulative GPA in academic subjects is consistently a better predictor of college outcomes and performance (Atkinson & Geiser, 2009). Support for this claim can be found in the 2009 Student Outcome and Achievement Report (SOAR) compiled by the Maryland Higher Education Committee. In this study of Maryland high school graduates, high school GPA was found to be the strongest individual predictor of college performance as measured by first math grade in



college, first English grade in college, and college cumulative GPA ("College Performance of New Maryland High School Graduates," 2009).

Additionally, in a large-scale study conducted at the University of California, high school grades were found to be superior to standardized admissions tests when predicting 4-year graduation and cumulative college GPA (Geiser & Santelices, 2007).

#### *ACT as a Predictor*

Like high school GPA, ACT scores appear to be a solid predictor of academic success in college for a variety of academic success measures, such as first-year college grade point average, persistence from the first year to a second year of college, proficiency in math and writing in coursework beyond the first year of college, expected final college GPA, and ultimate degree attainment (ACT, 2008c).

ACT scores have been shown to be reliable and valid predictors of first year of college academic performance. According to ACT research, the higher a student's ACT score, the greater the likelihood the student will achieve a first-year college GPA above a 2.0 or above a 3.0 (ACT, 2008d). In a study of over 3,000 first-year college students, Gifford, Briceno-Perriott, and Mianzo (2006) also found the ACT composite score to be a significant predictor of first-year academic success as measured by end of first-year cumulative GPA.

ACT composite scores have been linked to the likelihood students will persist to year 2 of college. In a study and subsequent analysis of college enrollment status and retention data, Robbins, Allen, Casillas, Peterson, and Le (2006) found that ACT scores should be viewed as viable predictors of student persistence to sophomore year of

college. Additionally, Reason (2004) indicated ACT composite scores were a significant predictor of first-to-second year retention for college students.

Positive relationships have also been found between ACT composite scores and several other college success criteria, such as expected levels of academic proficiency in mathematics or writing beyond the first year of college, expected final GPA by college graduation, and ultimate degree attainment by the end of postsecondary education (ACT, 2008c). Based on the evidence presented above, it appears that students who score higher on the ACT assessment have a greater probability of possessing the knowledge and skills necessary to be successful in college, and therefore, a greater likelihood of earning a bachelor's degree.

#### *High School Curriculum as a Predictor*

In his study, *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment* (1999), Adelman discovered the best indicator of whether a high school graduate will go on to complete a bachelor's degree is the intensity and quality of that student's high school curriculum. These findings were supported by his 2006 follow-up study, *The Tool Box Re-visited: Paths to Degree Completion From High School to College*. In both studies, Adelman (1999, 2006) determined that, when degree completion is the standard, a student's academic background is a much better predictor than are high school GPA, class rank, or test scores, and is also more important than demographic variables such as gender, race/ethnicity, family composition, and socioeconomic status. Adelman (1999, 2006) defined a rigorous, college preparatory curriculum as one that includes 4 years of English, 4 years of mathematics (the highest course being calculus, precalculus, or trigonometry), 3 years of science (at least 2

including biology, chemistry, and/or physics), 2 or more years of a foreign language, and more than 1 advanced placement course.

In 2001, Horn and Kojaku investigated relationships between the rigor level of students' high school curricula and their subsequent persistence in postsecondary education. Their conclusions were consistent with Adelman's finding that 79% of students who completed a more rigorous level of high school curricula were continuously enrolled in college, while only 55% of their peers who completed a curriculum at the core level or below remained continuously enrolled. Additionally, Horn and Kojaku noted that for students who transferred to postsecondary institutions, those who completed a more rigorous high school curriculum were far more likely to stay on track to a bachelor's degree. The definition of a rigorous high school academic curriculum used in the current study was very similar to Adelman's. It included 4 years of English, 4 years of mathematics (including precalculus or higher), 3 years of a foreign language, 3 years of social studies, 3 years of science (including biology, chemistry, and physics), and at least 1 advanced placement course (Horn & Kojaku, 2001).

Research done by ACT supported these findings as well. ACT indicated that students who completed a rigorous core college preparatory curriculum in high school are more likely to stay in school, score higher on the ACT test, enroll in college, be prepared for credit-bearing college courses, and earn a college degree than are their classmates who do not complete a college preparatory course of study in high school. The ACT definition of a rigorous curriculum also describes a course of study that exceeds the general core curriculum of 4 years of English, and 3 years each of mathematics, science,

and social studies. ACT recommends coursework that goes beyond algebra II in mathematics, and that includes biology, chemistry, and physics in science (ACT, 2007).

In their study for the National Center for Educational Statistics, Warburton, Burgarin, and Nunez (2001) found a positive relationship between the academic rigor of students' high school curriculum and their subsequent level of college success. For the Warburton et al. study, the rigor of the high school curriculum was determined by using the New Basics curriculum of 4 years of English, and 3 years each of science, math, and social studies as the standard. College success was measured by multiple indicators, and high school courses taken had an impact on all of them. First, it was determined that students who exceeded the New Basics curriculum had higher post-secondary GPAs than those who did not exceed the New Basics curriculum. Second, it was found that students who took coursework above the New Basics curriculum were less likely to be required to take remedial coursework in college. Last, a student's ability to persist through college and, more importantly, to stay on track for a bachelor's degree was found to be positively related to the level of coursework the student took in high school (Warburton et al., 2001).

The findings of a study conducted by the Texas Higher Education Coordinating Board (2000) indicated students who take a more rigorous high school curriculum have greater success in college. This study compared various college outcomes with three levels of high school diplomas. Its data suggested that students who took more rigorous curricula in high school were (a) more likely to enroll in college after graduating, (b) more likely to aspire to a bachelor's degree, (c) more likely to have a higher first-year college GPA, (d) more likely to be retained from fall to fall, (e) more likely to persist

after 2 years of collegiate study, and (f) more likely to complete a bachelor's degree (Texas Higher Education Coordinating Board, 2000).

All five of these studies cited evidence that students are more likely to experience success in college and are more likely to attain bachelor's degrees if they complete a more rigorous high school curriculum. Additionally, they each defined a rigorous curriculum as one that goes beyond the recommended college preparatory New Basics curriculum recommended in *A Nation at Risk* and that reflects the minimum graduation requirements of most high schools and the minimum entrance requirements of most post-secondary institutions. In other words, each study essentially stated that what many high schools and colleges profess to be the college preparatory curriculum, in fact, might not adequately prepare many high school graduates for college.

#### Benefits of Taking More than Core

As described above, the research indicates a strong relationship between the academic preparation of students while in high school and their ability to complete a bachelor's degree. All three studies asserted that a high school curriculum offering courses beyond the traditional college preparatory core curriculum increases the likelihood of degree completion. Going beyond the traditional core in all three cases indicated strong benefits to taking higher levels of mathematics and science, and to a lesser degree, English and foreign language.

#### *Higher Levels of Mathematics*

Taking the highest level of mathematics possible in high school is a critical element of the rigorous college preparatory coursework associated with college success. Math preparation in high school, particularly at or above algebra II, seems to play a key

role in student college readiness and degree completion capability (ACT, 2005a; Adelman, 1999).

ACT indicated students who take advanced mathematics courses above algebra II have significantly higher average ACT mathematics test scores. Those same students have a much greater success rate at achieving the ACT benchmark for college algebra. These findings were consistent, even when researchers controlled for achievement level, taking into account student GPA and grade level (ACT, 2005a).

In 1999, Adelman indicated the most important aspect of high school preparation and the greatest predictor of college degree attainment was the level of mathematics a student completed. He reiterated the importance of high school math in relation to college degree completion in 2006 when he more specifically asserted that high school mathematics coursework above algebra II was a key component in providing momentum toward a bachelor's degree (Adelman, 2006). Kirst and Venezia (2004) also saw algebra II as a critical course. They indicated students who required math remediation in college were far less likely to achieve a degree. They found algebra II to be a crucial course for avoiding remediation and improving the chances of persistence through postsecondary education (Kirst & Venezia, 2004).

### *Higher Levels of Science*

Along with mathematics, taking more laboratory science coursework in high school is an important indicator of college readiness and a predictor of college success. Students who take coursework including chemistry and physics significantly improve their likelihood of meeting the ACT college readiness benchmark for college biology. They also have higher ACT science test scores. ACT found that high school physics, in

particular, has a strong value-added effect, and indicated that students who took physics, regardless of what other science courses they took in high school, scored 2.6 points higher on their ACT science test than did students who had not taken physics, thus greatly increasing the likelihood of those students achieving the ACT college readiness benchmark for science (ACT, 2005a).

Adelman (2006) found added value to completing the rigorous lab sciences of biology, chemistry, and physics. He determined taking the combination of biology, chemistry, and physics, along with getting beyond algebra II in math, was more critical to degree completion than taking three units of a foreign language or taking advanced placement courses.

It is clear that what students study while in high school and how much of it they study has a profound effect on the likelihood they will complete a degree. Adelman (2006) stated that 95% of the students who completed a high school curriculum at the highest levels of academic intensity earned a bachelor's degree. ACT (2005) concluded that additional advanced coursework in math and science, beyond the core curriculum, has the most benefit for all students and helps them to be likeliest of all to be college ready. These courses, when taken together, have the most positive influence on college readiness because they reinforce the skills and habits necessary for college success (ACT, 2005a). Horn and Kojaku (2001) took the benefits of a rigorous academic curriculum in high school a step further, indicating that negative factors such as low family income and parents with no college experience can be overcome by strong high school academic preparation.

## Summary

In chapter two, a historical perspective on American high school curriculum was discussed and its current disconnectedness with post-secondary institutions was reviewed and documented. A brief overview of the history of the ACT appeared, along with an overview of the components and uses of the ACT test. Examination of the value of high school GPA, the ACT, and high school curriculum as predictors for college success revealed their usefulness. Finally, discussion included the added value of a rigorous college preparatory curriculum in high school for students when it comes to bachelor's degree. The review featured a number of articles, studies, and reports.

The research revealed a disconnect between K-12 education and postsecondary education that is detrimental to student success in college. The research advocated a more coherent K-16 academic preparatory program that would increase the likelihood of degree completion for more students, indicating that both the ACT and the level of high school curriculum are useful predictors of student success in college. The level and intensity of the high school curriculum, particularly in the areas of math and science, were the greatest predictors of college degree completion. The next chapter provides a detailed overview of the methodology used in this research.



## CHAPTER THREE

### METHODS

The primary goal of this research was to determine whether relationships exist between the attainment of a bachelor's degree within 5 years of graduation and (a) the chosen high school academic preparation program, (b) the composite ACT score, and/or (c) a combination of the chosen academic preparation program and composite ACT score. The methodology utilized to determine these relationships is within this chapter. First is an outline of the research design, including a discussion of the population and sample, sampling procedures, and data collection procedures. Next, the methodology of the data analysis and hypothesis testing appear. Finally, the limitations to the study are discussed, followed by a brief summary of the chapter.

#### Research Design

The design of the current study was a quantitative, quasi-experimental research design with two independent variables. The first is the academic preparation program the students completed in high school: less than Qualified Admissions Curriculum, Qualified Admissions Curriculum (QAC), or Kansas Scholars Curriculum (KSC). The second independent variable is the category of ACT composite score: below 21, and 21 or above. The dependent variable for this research was whether the students in the study earned a bachelor's degree within 5 years of high school graduation.

#### *Population and Sample*

The target population for this study comprised the college-bound graduates from the four Blue Valley School District high schools. Because the primary method for categorizing the data used the Kansas Board of Regents Qualified Admissions

Curriculum and Criteria, only students who attended any of the six state universities under the supervision of the Kansas Board of Regents, at some time within 5 years after high school graduation, were the chosen sample for the study.

### *Sampling Procedures*

Accessing the National Clearinghouse data allowed the ability to use purposive sampling. This data lists the colleges of attendance for each Blue Valley class of 2004 high school graduate. All 626 students within the population who listed a Kansas Board of Regents state university as a college of attendance were selected for the study.

### *Data Collection and Coding Procedures*

A formal request to conduct research in the Blue Valley School district was submitted and approved in November 2009 (Appendix B). Subsequently, a proposal for research was submitted to the Baker University Institutional Review Board and approval was granted in December 2009 (Appendix C). The data for this study were collected in December of 2009. Student data from the National Clearinghouse was retrieved and utilized to select the appropriate students for the sample. Using the same data resource, an Excel spreadsheet was created containing the Blue Valley student ID numbers of all 626 members of the sample, as well as whether they had received a bachelor's degree within 5 years of high school graduation. The student data in the spreadsheet was cross-referenced with transcript data retrieved from the Blue Valley district database. The students' gender, category of high school curriculum chosen (less than QAC, QAC, or KSC), and ACT composite score category (below 21 or 21 or above) appeared in the spreadsheet. Additional variables collected and recorded were high school GPA, the number of credits earned in high school, the number of math courses taken in high

school, the number of science courses taken in high school, and whether students earned at least one credit in an advanced placement course. The Statistical Package for Social Sciences (SPSS) was the statistical software used to sort and analyze the data.

### Data Analysis and Hypothesis Testing

The following hypotheses addressed the research questions for this study. For each of the hypotheses, a chi-square test of independence was used to determine whether a relationship existed.

1. There is a statistically significant relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree.
2. There is a statistically significant relationship between a student's composite ACT score and the attainment of a baccalaureate degree.
3. There is a statistically significant relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored below a 21 composite ACT score.
4. There is a statistically significant relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored a 21 or above composite ACT score.

### Limitations

Roberts (2004) described limitations as the features of a study over which the researcher has no control and that might negatively affect the results or the ability to generalize (p. 146). The limitation for this study was that students in the study were subject to competing factors not related to a high school academic preparation program

that could have affected timely degree completion, such as pregnancy, health issues, finances, family issues, change of major, or transfer.

### Summary

In this chapter, the goal of this research was restated. Chapter information indicated the use of a quantitative, causal-comparison research design for the study. Descriptions of the population and the sample of the research, as well as detailed sampling and data collection procedures appeared. The methodology for the data analysis and hypothesis testing was presented, and the chapter concluded with identification of limitations to the research.

## CHAPTER FOUR

### RESULTS

#### Introduction

The purpose of this study was to determine whether relationships exist between the attainment of a bachelor's degree within 5 years of high school graduation and (a) the chosen high school academic preparation program, (b) the composite ACT score, and/or (c) a combination of the chosen academic preparation program and composite ACT score. Chi-square analysis addressed each of the four research hypotheses. This chapter presents a summary of the data collected, the statistical analyses, and the results of the hypothesis tests conducted to address the four stated research questions.

#### Descriptive Statistics

The target sample for this research was Blue Valley students from the graduating class of 2004 who gained admittance to any of the six state universities supervised by the Kansas Board of Regents in any subsequent year after high school graduation. The descriptive statistics used in this analysis appear in Tables 3 through 5.

#### *Gender*

More males were represented in the sample of students than females. Of the 626 students, 324 (51.8%) were male and 302 (48.3%) were female. Table 3 displays the gender distribution of the group.

Table 3

*Gender Distribution of Sample*

| Gender | <i>f</i> | %     |
|--------|----------|-------|
| Female | 302      | 48.2  |
| Male   | 324      | 51.8  |
| Total  | 626      | 100.0 |

*Chosen Academic Preparation Program*

Of the three levels of academic preparation programs, the majority of the students had chosen the Kansas Regents Qualified Admissions Curriculum (QAC), comprising 51.1% of the population. The students choosing the Kansas Scholars Curriculum (KSC) represented 36.9% of the population, and those selecting the Blue Valley basic graduation requirements (BG) made up 12% of the population. Chosen curriculum is in Table 4.

Table 4

*Chosen Curriculum of Sample*

| Chosen Curriculum                      | <i>f</i> | %     |
|--|----------|-------|
| Kansas Qualified Admissions Curriculum | 320      | 51.1  |
| Kansas Scholars Curriculum             | 231      | 36.9  |
| Basic Graduation Requirements          | 75       | 12.0  |
| Total                                  | 626      | 100.0 |

### *ACT Composite Score and High School GPA*

ACT composite scores (ACT Comp) were obtained for 584 (93%) of the students, with a mean composite score of 23.57. The average high school GPA (HSGPA) of the students in the sample was 3.25 on a 4 point scale. Table 5 displays the ACT and GPA data.

Table 5

#### *ACT Composite and High School GPA of Sample*

|                 | <i>N</i> | Minimum | Maximum | <i>M</i> | <i>SD</i> |
|-----------------|----------|---------|---------|----------|-----------|
| ACT Comp        | 584      | 13.00   | 34.00   | 23.57    | 4.10      |
| High School GPA | 626      | 1.66    | 4.0     | 3.25     | .50       |

### *Degree Completion*

Within the population for the study, 62.1% of the students had earned a bachelor's degree within 5 years or less, while 37.9% had not. The degree completion data is displayed in Table 6.

Table 6

*Degree Completion of Sample*

| Bachelor's Degree | <i>f</i> | %     |
|-------------------|----------|-------|
| No                | 237      | 37.9  |
| Yes               | 389      | 62.1  |
| Total             | 626      | 100.0 |

## Hypothesis Testing

Chi-square ( $X^2$ ) tests and cross tabulations functioned to analyze the categorical data to determine whether a relationship existed among the variables specified in each of the research questions. Follow-up analysis of the residuals provided greater specificity to the results.

Research Question 1: Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree?

This research question examined the total number of students in each of the three curricular categories for chosen academic preparation programs, basic graduation requirements (BG), Qualified Admissions Curriculum (QAC), and Kansas Scholars Curriculum (KSC), who had earned and had not earned their bachelor's degree in 5 years or less. Of the 75 students who had taken the basic graduation requirements, 16 earned their bachelor's degree in 5 years or less. Of the 320 students who had taken the Qualified Admissions Curriculum, 191 had earned their bachelor's degree in 5 years or



less. Of the 231 students who had taken the Kansas Scholars Curriculum, 182 had earned their bachelor's degree in 5 years or less. The cross tabulation results appear in Table 7.

Table 7

*Cross-tabulation: Bachelor's Degree by High School Academic Program*

|                   |   | Curriculum |     |     | Total |
|-------------------|---|------------|-----|-----|-------|
|                   |   | BG         | QAC | KSC |       |
| Bachelor's Degree | N | 59         | 129 | 49  | 237   |
|                   | Y | 16         | 191 | 182 | 389   |
| Total             |   | 75         | 320 | 231 | 626   |

A chi-square test of independence addressed research question 1. The results of the test indicated a statistically significant relationship between the chosen academic preparation program and bachelor's degree attainment in 5 years or less ( $\chi^2 = 81.12$ ,  $df = 2$ ,  $p < .001$ ). A follow-up analysis of the standardized residuals indicated that more students in the basic graduation requirements category (59) than expected by chance (28) did not complete a bachelor's degree within 5 years or less. Of the students who took the Kansas Scholars Curriculum, more students (182) than expected by chance (144) earned their bachelor's degree within 5 years or less. The results of the chi-square test for research question 1 appear in Table 8.

Table 8

*Chosen Academic Program and Bachelor's Degree Attainment*

|                         | Value               | <i>df</i> | <i>p</i> value |
|-------------------------|---------------------|-----------|----------------|
| Pearson Chi-Square      | 81.117 <sup>a</sup> | 2         | < .001         |
| Likelihood Ratio        | 82.525              | 2         | < .001         |
| <i>N</i> of Valid Cases | 626                 |           |                |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 28.39.

Research Question 2: Is there a relationship between the composite ACT score and the attainment of a baccalaureate degree?

This research question examined the total number of students in each of the two ACT composite score categories (greater than or equal to 21 [GTE 21] and less than 21 [LT 21]) who had earned and had not earned their bachelor's degree in 5 years or less. Of the 446 students who had ACT composite scores of 21 or higher, 297 earned their bachelor's degree in 5 years or less. Of the 138 students who had ACT composite scores below 21, 65 had earned their bachelor's degree in 5 years or less. Forty-two students in the population had no ACT score recorded. The cross tabulation results are in Table 9.

Table 9

*Cross-tabulation: Bachelor's Degree by ACT Composite Category*

|                   |   | ACT   |      | Total |
|-------------------|---|-------|------|-------|
|                   |   | GTE21 | LT21 |       |
| Bachelor's Degree | N | 149   | 73   | 222   |
|                   | Y | 297   | 65   | 362   |
| Total             |   | 446   | 138  | 584   |

A chi-square test of independence tested research question 2. The results of the test indicated a statistically significant relationship between the ACT composite score category and bachelor's degree attainment in 5 years or less ( $X^2 = 16.99$ ,  $df = 2$ ,  $p < .001$ ). A follow-up analysis of the standardized residuals indicated that more students in the less than 21 ACT composite score category (73) than expected by chance (52) did not complete a bachelor's degree within 5 years or less. The results of the chi-square test for research question 2 are in Table 10.

Table 10

*ACT Composite Score and Bachelor's Degree Attainment*

|                                    | Value               | <i>df</i> | <i>p</i> value |
|------------------------------------|---------------------|-----------|----------------|
| Pearson Chi-Square                 | 16.991 <sup>a</sup> | 1         | < .001         |
| Continuity Correction <sup>b</sup> | 16.174              | 1         | < .001         |
| Likelihood Ratio                   | 16.629              | 1         | < .001         |
| <i>N</i> of Valid Cases            | 584                 |           |                |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 52.46.

b. Computed only for a 2x2 table

Research Question 3: Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored below a 21 composite ACT score?

This research question examined the total number of students with an ACT composite score less than 21 in each of the three curricular categories for chosen academic preparation programs, basic graduation requirements (BG), Qualified Admissions Curriculum (QAC), and Kansas Scholars Curriculum (KSC) who had earned and had not earned their bachelor's degree in 5 years or less. Of the 34 students who had taken the basic graduation requirements, four earned their bachelor's degree in 5 years or less. Of the 90 students who had taken the Qualified Admissions Curriculum, 49 had earned their bachelor's degree in 5 years or less. Of the 14 students who had taken the Kansas Scholars Curriculum, 12 had earned their bachelor's degree in 5 years or less. The cross tabulation results are in Table 11.

Table 11

*Cross-tabulation: Bachelor's Degree by High School Academic Program for Students with ACT Composite Score Under 21*

|                   |   | Curriculum |     |     | Total |
|-------------------|---|------------|-----|-----|-------|
|                   |   | BG         | QAC | KSC |       |
| Bachelor's Degree | N | 30         | 41  | 2   | 73    |
|                   | Y | 4          | 49  | 12  | 65    |
| Total             |   | 34         | 90  | 14  | 138   |

A chi-square test of independence tested research question 3. The results of the test indicated a statistically significant relationship between the high school academic preparation program for high school graduates with less than a 21 ACT composite score and bachelor's degree attainment in 5 years or less ( $\chi^2 = 27.37, df = 2, p < .001$ ). A follow-up analysis of the standardized residuals indicated that more students in the basic graduation requirements category (30) than expected by chance (18) did not complete a bachelor's degree within 5 years or less. Of the students who took the Qualified Admissions Curriculum, more students (49) than expected by chance (42) earned their bachelor's degree within 5 years or less. The results of the chi-square test are in Table 12.

Table 12

*High School Academic Program with ACT Composite Score Less Than 21 and Bachelor's Degree Attainment*

|                    | Value               | df | p value |
|--------------------|---------------------|----|---------|
| Pearson Chi-Square | 27.365 <sup>a</sup> | 2  | < .001  |
| Likelihood Ratio   | 30.677              | 2  | < .001  |
| N of Valid Cases   | 138                 |    |         |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.59.

Research Question 4: Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored a 21 or above composite ACT score?

This research question examined the total number of students with an ACT composite score of 21 or higher in each of the three curricular categories for chosen academic preparation programs, basic graduation requirements (BG), Qualified Admissions Curriculum (QAC), and Kansas Scholars Curriculum (KSC) who had earned and had not earned their bachelor's degree in 5 years or less. Of the 27 students who had taken the basic graduation requirements, eight earned their bachelor's degree in 5 years or less. Of the 212 students who had taken the Qualified Admissions Curriculum, 129 had earned their bachelor's degree in 5 years or less. Of the 207 students who had taken the Kansas Scholars Curriculum, 160 had earned their bachelor's degree in 5 years or less. The results are in Table 13.

Table 13

*Cross-tabulation: Bachelor's Degree by High School Academic Program with ACT Composite Score 21 or Higher*

|                   |   | Curriculum |     |     | Total |
|-------------------|---|------------|-----|-----|-------|
|                   |   | BG         | QAC | KSC |       |
| Bachelor's Degree | N | 19         | 83  | 47  | 149   |
|                   | Y | 8          | 129 | 160 | 297   |
| Total             |   | 27         | 212 | 207 | 446   |

A chi-square test of independence tested research question 4. The results of the test indicated a statistically significant relationship between the high school academic preparation program for high school graduates with a 21 ACT composite score or higher and bachelor's degree attainment in 5 years or less ( $\chi^2 = 30.38$ ,  $df = 2$ ,  $p < .001$ ). A follow-up analysis of the standardized residuals indicated that more students in the basic graduation requirements category (19) than expected by chance (9) did not complete a bachelor's degree within 5 years or less. Of the students who took the Kansas Scholars Curriculum, more students (160) than expected by chance (138) earned their bachelor's degree within 5 years or less. The results of the chi-square test are in Table 14.

Table 14

*High School Academic Program with ACT Composite Score of 21 or Higher and Bachelor's Degree Attainment*

|                         | Value               | <i>df</i> | <i>p</i> value |
|-------------------------|---------------------|-----------|----------------|
| Pearson Chi-Square      | 30.382 <sup>a</sup> | 2         | < .001         |
| Likelihood Ratio        | 29.807              | 2         | < .001         |
| <i>N</i> of Valid Cases | 446                 |           |                |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.02.

### Summary

This chapter contained an introduction to the results of the study. A discussion of the descriptive statistics of the sample followed the introduction, including study sample break-downs of gender, chosen academic preparation programs, ACT composite score categories, high school GPA, and degree completion totals. Review and analysis of the four research questions followed.

Results from this study, tested through chi-square tests of independence, revealed statistically significant relationships for each of the research questions. First, a statistically significant relationship was found to exist between the chosen academic preparation program and the completion of a bachelor's degree in 5 years or less. Second, a statistically significant relationship was found to exist between the ACT composite score and the completion of a bachelor's degree in 5 years or less. Finally, a statistically significant relationship was found to exist between the chosen academic program for students who had an ACT composite score below 21, as well as for students



who had an ACT composite score greater than or equal to 21 and the attainment of a bachelor's degree in five years or less.

Chapter five presents a summary of the study, an overview of the problem, and reviews of the research questions and methodology, as well as the major findings of the study. Discussion relates the findings to the literature and provides implications for action. Chapter five concludes with recommendations for future research in this area.

## CHAPTER FIVE

### INTERPRETATION AND RECOMMENDATIONS

#### Introduction

The purpose of this study was to determine whether a relationships exist among the attainment of a bachelor's degree within 5 years of graduation and (a) the chosen high school academic preparation program, (b) the composite ACT score, and/or (c) a combination of the chosen academic preparation program and composite ACT score. This chapter features a summary of the main points provided in chapters one through four. It includes a study summary, an overview of the problem, a review of the research questions, a review of the methodology, a review of the major findings, a discussion of the findings as they relate to the literature, implications for action, and recommendations for future research. It concludes with a chapter summary.

#### Study Summary

This study took place in the Blue Valley USD 229 school district in Overland Park, Kansas. The sample consisted of 626 high school graduates from the Blue Valley district in the class of 2004 who attended any of the six state universities in Kansas after high school graduation. The study examined the bachelor's degree completion status of the graduates as well as the type of academic preparation program they took in high school and their ACT composite scores. Chi-square tests of independence determined if statistically significant relationships existed among the variables.

#### *Overview of the Problem*

In today's job market, it is increasingly difficult to find an occupation that does not require post-secondary training. High schools must prepare students for success in

post-secondary education, particularly college. It is important to know whether high school academic preparation prepares students for college success.

### *Purpose Statement and Research Questions*

The purpose of this study was to determine whether a relationships exist between the attainment of a bachelor's degree within 5 years of high school graduation and (a) the chosen high school academic preparation program, (b) the composite ACT score, and/or (c) a combination of the chosen academic preparation program and composite ACT score for the students in the sample. The following research questions guided the study:

1. Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree?
2. Is there a relationship between the composite ACT score and the attainment of a baccalaureate degree?
3. Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored below a 21 composite ACT score?
4. Is there a relationship between a chosen high school academic preparation program and the attainment of a baccalaureate degree for graduates who scored a 21 or above composite ACT score?

### *Review of the Methodology*

The sample for this study included 626 students within the target population who listed a Kansas Board of Regents state university as a college of attendance. Whether students had attained their bachelor's degree within 5 years of high school graduation was determined by analysis of the National Student Clearinghouse data. The high school

transcripts of the graduates provided data to collect and record the category of the student's high school curriculum and ACT composite score category. Other variables collected included gender, high school GPA, number of credits earned in high school, number of science and math courses taken in high school, and whether the students had chosen to take an advanced placement course. Four hypotheses addressed the four research questions. For each hypothesis, a chi-square test of independence determined whether a relationship existed.

### *Major Findings*

Results from this study tested through chi-square tests ( $X^2$ ) of independence determined that a statistically significant relationship existed between the variables in each of the four research questions. A summary of the specific findings for each of the research questions is below.

For research question 1, the chi-square test revealed a statistically significant relationship between the chosen academic preparation program and bachelor's degree attainment in 5 years or less. Follow-up analysis indicated that more students than expected by chance who took the least rigorous, basic graduation requirements (BG) curriculum did not complete their bachelor's degree in 5 years or less. Additionally, more students than expected by chance who took the more rigorous Kansas Scholars Curriculum (KSC) completed their bachelor's degree in 5 years or less.

For research question 2, the results of the chi-square test indicated a statistically significant relationship existed between the ACT composite score category and bachelor's degree attainment in 5 years or less. Follow-up analysis indicated more

students than would be expected by chance who had an ACT composite score of less than 21 did not complete a bachelor's degree in 5 years or less.

The results of the chi-square test for research question 3 showed a statistically significant relationship existed between the chosen academic preparation program and the attainment of a baccalaureate degree for graduates who scored below a 21 composite ACT score. The follow-up analysis of this question indicated more students who took the basic graduation requirements (BG) and also scored below a 21 composite ACT score failed to earn a bachelor's degree in 5 years or less. Additionally, more students in this ACT composite score category who took the Qualified Admissions Curriculum (QAC) earned their bachelor's degree within 5 years or less.

A statistically significant relationship between the chosen academic preparation program and the attainment of a baccalaureate degree for graduates who scored a 21 or higher composite ACT score was revealed by the chi-square test for research question four. The follow-up analysis of the results for this question revealed more students than expected by chance in this ACT composite category who took the basic graduation requirements (BG), failed to earn a bachelor's degree in 5 years or less. Also, the results showed more students in this ACT composite category than would be expected by chance who took the Kansas Scholars Curriculum earned their bachelor's degree in 5 years or less.

#### Findings Related to the Literature

The findings of this study were very similar to the findings throughout the literature reviewed. This section links the results of the current study to previous studies

investigating the relationships between college success and high school academic preparation programs, curricular rigor, and standardized test scores.

In this study, a statistically significant relationship was found to exist between the chosen high school academic preparation program and bachelor's degree attainment in 5 years or less. This result was consistent with the results in both of Adelman's (1999, 2006) longitudinal studies, which determined that in the years prior to college, the intensity of a student's high school curriculum contributed more than anything else to the attainment of a bachelor's degree. In another longitudinal study, Horn and Kojaku (2001) investigated the relationship between high school academic curricula and students' persistence path over the course of the first 3 years of college. They found that as the difficulty level of high school academic curricula increased, so did the proportion of college students who stayed on track to earning a bachelor's degree.

The current study demonstrated that a statistically significant relationship existed between ACT composite scores and college success. This finding is consistent with previous studies (Gifford et al., 2006; Noble & Sawyer, 2001) where higher ACT composite scores were linked with higher first-year college GPA. Other studies (Reason, 2004; Robbins et al., 2006) found positive relationships between ACT composite scores and the likelihood of student persistence from the first to a second year of college. In a 2008 analysis of the predictive validity of ACT scores and high school grades in making college admissions decisions, ACT, Inc., linked both the expected final college GPA for students and ultimate degree attainment to ACT composite scores of high school students (ACT, 2008c).

Finally, this study determined that a statistically significant relationship existed between the chosen high school academic preparation program and bachelor's degree attainment for students who scored below a composite ACT score of 21, as well as for students who scored a 21 or higher composite ACT score. No previous studies were found that considered the relationship between the combination of ACT composite score and level of high school curriculum and bachelor's degree attainment.

#### Implications for Action

The findings of this study have strong implications for schools, particularly those in the Blue Valley School District. This study identified a statistically significant relationship between the curriculum that students take in high school and subsequent timely bachelor's degree completion. For elementary and middle schools, these findings reinforce the importance of providing students with the academic preparation and guidance necessary for them to be ready and willing to take more rigorous courses when they get to high school. For students to have this option, they must have the knowledge and skills necessary to be prepared for those courses and the foresight and confidence to enroll in them.

High school counselors, administrators, and teachers can use data from this research to support the importance of a more intense high school curriculum. As they work with parents and students on 4-year plans of study and course selections, these professionals can help students make more informed, research-based curricular decisions, better preparing them for the challenges of college. This research alerts high school teachers to the importance of rigor, and it emphasizes the importance of teaching, using, and practicing the skills required by upper-level courses.

On the district level, the findings of this study will be useful to reinforce and guide professional development in the area of teaching and reinforcing college readiness skills across the curriculum. Results of this research provide information district officials could utilize to make decisions regarding graduation requirements, recommended courses of study, and high school curriculum. Finally, this study provides direct positive reinforcement for the Qualified Admissions Criteria to the Kansas Board of Regents. These criteria include their ACT composite score requirements as well as the Qualified Admissions and the Kansas Scholars Curricula.

#### Recommendations for Future Research

The goal of this research was to determine if a relationship existed between a chosen high school academic preparation program and bachelor's degree completion. The categorical data of this study underwent analysis for each of the four research questions related to this goal, and statistically significant findings resulted for each. As the results of this study were analyzed, with thoughtful reflection and consideration given to the findings, some recommendations for further research emerged. These recommendations should be considered by other researchers who wish to link high school preparation to college success.

The sample used in this study was quite small. This research took place using data from one group of high school graduates from one graduating class in one high-performing, suburban district and who attended state universities in Kansas. Future studies should consider a broader and more comprehensive population, perhaps exploring data for multiple graduating classes or utilizing a population of students who attended a greater variety of colleges. Additionally, no analysis of data pertaining to the social



demographics of students took place. It would strengthen the results if future studies were able to determine whether similar relationships exist across gender, ethnic, and socioeconomic categories.

This study examined only three categories of high school curricula. Future researchers should consider doing a more in-depth study examining specific courses, such as honors and advanced placement courses, or courses in specific elective areas, and their relationship with college degree completion. If the intensity of a high school curriculum is a statistically significant pre-college factor related to bachelor's degree attainment, then future research should explore the relationships of elementary and middle level academic preparation with high school course selection. A longitudinal study of the impact of various elementary and middle school curricular and programmatic decisions on subsequent enrollment in more rigorous high school courses over time would be of great benefit.

#### Concluding Remarks

As was documented in chapter one of this study, a shift in the types of jobs available in the workplace has created greater demand for individuals with higher levels of education. It is clear that future career opportunities and earning potential for today's students will most likely be limited by their educational attainment. Armed with this knowledge, K-12 educators have a responsibility to prepare students adequately for success in the post-secondary world. Based on the relationships identified in this study, educators can accomplish such preparation by creating an environment in which all students are prepared for and guided to engage in the rigorous courses of study that make them ready for success in college or post-secondary training. Further research in this area

is imperative so that all students are afforded the opportunities higher levels of education provide.

## REFERENCES

- ACT. (2005a). *Crisis at the core: Preparing all students for college and work*. Iowa City, IA: Author. Retrieved from ERIC database. (Doc. No. ED493181)
- ACT. (2005b). *National collegiate retention and persistence to degree rates*. Available at [http://www.act.org/research/policymakers/pdf/retain\\_2005.pdf](http://www.act.org/research/policymakers/pdf/retain_2005.pdf)
- ACT. (2007). *The role of nonacademic factors in college readiness and success: Issues in college success*. Iowa City, IA: Author. Retrieved from EBSCOhost database. (Doc. No. ED501273)
- ACT. (2008a). *2008 Retention/completion summary tables*. Iowa City, IA: Author. Retrieved September 6, 2009, from [http://www.act.org/research/policymakers/pdf/retain\\_trends.pdf](http://www.act.org/research/policymakers/pdf/retain_trends.pdf)
- ACT. (2008b). *ACT's college readiness system: Meeting the challenge of a changing world*. Iowa City, IA: Author. (Doc. No. ED504652) Retrieved from EBSCOhost database. (Doc. No. ED504652)
- ACT. (2008c). *The relative predictive validity of ACT scores and high school grades in making college admission decisions*. Iowa City, IA: Author. Retrieved March 17, 2010, from <http://www.act.org/research/policymakers/pdf/PredictiveValidity.pdf>
- ACT. (2008d). *What we know about college success: Using ACT data to inform educational issues*. Iowa City, IA: Author. Retrieved from EBSCOhost database. (Doc. No. ED5012574)
- ACT. (2009). *The condition of college readiness, 2009*. Iowa City, IA: Author. Retrieved from ERIC database. (Doc. No. ED506751)

- Adelman, C. (1999). *Answers in the toolbox: Academic intensity, attendance patterns, and bachelor's degree attainment*. Washington, DC: U.S. Department of Education.
- Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college* (U.S. Department of Education publication). Jessup, MD: Office of Vocational & Adult Education. (ERIC Doc. No. ED490195)
- Atkinson, R. C., & Geiser, S. (2009). *Reflections on a century of college admissions tests. Research & Occasional Paper Series: CSHE.4.09*. Berkeley, CA: Center for Studies in Higher Education. Retrieved from ERIC database. (Doc. No. ED507062)
- Blue Valley enrollment report: 2008-2009*. (2008). Unpublished report. Blue Valley School District, Facilities and Operations Department.
- Blue Valley High Schools course description guide*. (2009). Blue Valley School District. Retrieved August 1, 2009, from <http://www.bluevalleyk12.org/education/components/docmgr/default.php?sectiondetailid=7867&>
- Blue Valley School District. (n.d.). About us, general information. Retrieved September 10, 2009, from <http://www.bluevalleyk12.org/education/dept/dept.php?sectionid=157>
- College performance of new Maryland high school graduates: Student outcome and achievement report*. (2009). Annapolis, MD: Maryland Higher Education Commission. Retrieved from ERIC database. (Doc. No. ED505904)
- Conley, D. T. (2005). *College knowledge: What it really takes for students to succeed and what we can do to get them ready*. San Francisco: Jossey-Bass. Retrieved from EBSCOhost database. (Doc. No. ED496372)

- Conley, D. T. (2006). What we must do to create a system that prepares students for college success. *Policy Perspectives*. San Francisco, CA: WestEd. Retrieved from EBSCOhost database (Doc. No. ED493061)
- Copa, G. H., & Pease, V. H. (1992). The comprehensive high school: An historical perspective. In *New designs for the comprehensive high school. Vol. 2, Working papers*. Retrieved from ERIC database. (Doc. No. ED352520)
- Geiser, S., & Santelices, M. V. (2007). Validity of high-school grades in predicting student success beyond the freshman year: High-school record vs. standardized tests as indicators of four-year college outcomes. *Research & Occasional Paper Series: CSHE.6.07*. Berkeley, CA: Center for Studies in Higher Education. Retrieved from ERIC database. (Doc. No. ED502858)
- Gifford, D. D., Briceno-Perriott, J., & Mianzo, F. (2006). Locus of control: Academic achievement and retention in a sample of university first-year students. *Journal of College Admission, 191*, 18-25. Retrieved from ERIC database. (Doc. No. EJ741521)
- Hamilton, L. S., Stecher, B. M., & Yuan, K. (2008). *Standards-based reform in the United States: History, research, and future directions*. Washington, DC: Center on Education Policy. Retrieved from ERIC database. (Doc. No. ED503897)
- Hawkins, D. A., & Lautz, J. (2005). *State of college admission*. Alexandria, VA: National Association for College Admission Counseling. Retrieved from ERIC database. (Doc. No. ED489862)
- Horn, L., & Kojaku, L. K. (2001). *High school academic curriculum and the persistence path through college: Persistence and transfer behavior of undergraduates 3*

*years after entering 4-year institutions* (NCES 2001-163). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. Retrieved September 30, 2003, from <http://nces.ed.gov/pubs2002/quarterly/fall/q4-1.asp>

Husbands, J., & Beese, S. (2001, July). *Review of selected high school reform strategies*. Paper presented at the Aspen Program on Education, Aspen, CO. Retrieved from ERIC database. (Doc. No. ED476306)

Kansas Board of Regents. (n.d.). *Qualified admissions*. Topeka, KS: Author. Retrieved September 10, 2009, from <http://www.kansasregents.org/qa/standards.html>

Kansas State Department of Education. (2009). *USD #229 Report Card 2009-2009*. Retrieved August 1, 2009, from [http://online.ksde.org/rcard/district.aspx?org\\_no=D0229](http://online.ksde.org/rcard/district.aspx?org_no=D0229).

Kirst, M. W., & Venezia, A. (2004). *From high school to college: Improving opportunities for success in postsecondary education*. San Francisco, CA: Jossey-Bass. Retrieved from EBSCOhost database (Doc. No. ED496375)

Lee, V. E., & Ready, D. D. (2009). U.S. high school curriculum: Three phases of contemporary research and reform. *Future of Children*, 19(1), 135-156. Retrieved from EBSCOhost database (Doc. No. EJ842066)

Lunenburg, F. C., Irby, B. (2008). *Writing a successful thesis or dissertation: Tips and strategies for students in the social and behavioral sciences*. Thousand Oaks, CA: Corwin Press.

A nation at risk: The imperative for educational reform. (1983). *Elementary School Journal*, 84(2), 113-30.

National Center for Education Statistics. (2008). *Digest of education statistics: 2007*

(NCES 2008-022). Retrieved May 4, 2008, from

<http://nces.ed.gov/programs/digest/d07/>

National Commission on the High School Senior Year. (2001). *Raising our sights: No*

*high school senior left behind. Final report, National Commission on the High*

*School Senior Year*. Princeton, NJ: Woodrow Wilson National Fellowship

Foundation. Retrieved from ERIC database. (Doc. No. ED459516)

National Student Clearinghouse. (n.d.). <http://www.studentclearinghouse.org/>

Parsad, B., & Lewis, L. (2003). *Remedial education at degree-granting post-secondary*

*institutions in fall 2000*. (NCES 2004-010). Retrieved May 6, 2008, from

<http://nces.gov/programs/coe/2004/section5/table.asp?tableID=83>

Ravitch, D., & Vinovskis, M. (1993). *Historical perspectives on the current education*

*reforms*. Washington, DC: Office of Educational Research and Improvement.

Retrieved from EBSCOhost database (Doc. No. ED359623)

Reason, R. D. (2004). Using an ACT-based merit-index to predict between-year

retention. *Journal of College Student Retention*, 5(1), 71-87.

*Report comparing ACT composite score means to state and national means*. (2009).

Unpublished report. Blue Valley School District, Office of Assessment.

Robbins, S. B., Allen, J., Casillas, A., Peterson, C. H., & Le, H. (2006). Unraveling the

differential effects of motivational and skills, social, and self-management measures

from traditional predictors of college outcomes. *Journal of Educational Psychology*,

98, 598-616.

- Roberts, C. M. (2004). *The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation*. Thousand Oaks, CA: Corwin Press.
- Texas Higher Education Coordinating Board. (2000). *Report on alternative admissions criteria study*. Retrieved March 17, 2010, from <http://www.theccb.state.tx.us/reports/pdf/0314.pdf>
- U.S. Bureau of Labor Statistics. (2009). *Labor force statistics from the current population survey*. Retrieved August 13, 2009, from <http://www.bls.gov/cps/earnings.htm#education>
- U.S. Census Bureau. (2008). *Median earnings in the past 12 months by educational attainment for the population 25 years and over*. Retrieved May 4, 2008, from [http://factfinder.census.gov/servlet/DTTable?\\_bm=y&-geo\\_id=01000US&-ds\\_name=ACS\\_2006\\_EST\\_G00\\_&-mt\\_name=ACS\\_2006\\_EST\\_G2000\\_B20004](http://factfinder.census.gov/servlet/DTTable?_bm=y&-geo_id=01000US&-ds_name=ACS_2006_EST_G00_&-mt_name=ACS_2006_EST_G2000_B20004)
- U.S. Department of Education. (1995). *Forming new partnerships for educating all students to high standards: An idea book. 1994 federal educational legislation*. Retrieved from ERIC database. (Doc. No. ED392280)
- U.S. Department of Education. (2004). Executive summary. Retrieved March 20, 2010, from <http://www2.ed.gov/nclb/overview/intro/execsumm.html>
- U.S. Department of Labor. (2008). *America's dynamic workforce: 2008*. Retrieved August 13, 2009, from <http://www.dol.gov/asp/archive/reports/Workforce2008/index.htm>
- Warburton, E. C., Bugarin, R., & Nunez, A. (2001). Bridging the gap: Academic preparation and postsecondary success of first-generation students. *Education*



*Statistics Quarterly*. (NCES No. 2001-153). Retrieved from ERIC database. (Doc. No. ED456168)

Wise, B. (2008). High schools at the tipping point. *Educational Leadership*, 65(8), 8-13.

Wraga, W. G. (2000). *The comprehensive high school in the United States: A historical perspective*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA. Retrieved from EBSCOhost database (Doc. No. ED443170)

Zwick, R. (2007). *College admission testing*. [Commissioned paper]. National Association for College Admission Counseling. Retrieved from [http://bulletin.nacacnet.org/NR/rdonlyres/21062AE7-F087-4CF8-A5BA-E5C3474F07C4/0/WhitePaper\\_Zwick\\_Feb07.pdf](http://bulletin.nacacnet.org/NR/rdonlyres/21062AE7-F087-4CF8-A5BA-E5C3474F07C4/0/WhitePaper_Zwick_Feb07.pdf)

## APPENDIX A: CURRICULUM COMPARISON

| Blue Valley Graduation Requirements   | Kansas Regents Qualified Admissions Curriculum   | Kansas Scholar's Curriculum  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• 4 Credits Communication Arts</li> <li>• 3 Credits Social Studies (1 World, 1 US, ½ Gov., ½ SS elective)</li> <li>• 3 Credits Lab Science (1 Life, 1 Physical Science, 1 Additional)</li> <li>• 3 Credits Math</li> <li>• 1 Credit Computer Technology</li> <li>• 1 Credit Phys Ed</li> <li>• ½ Credit Health and Wellness</li> <li>• 1 Credit Fine Arts</li> <li>• 7 ½ Credits of Electives</li> </ul> <p>Total = 24 Credits</p> | <ul style="list-style-type: none"> <li>• Same</li> <li>• Same</li> <li>• Same but at least one of the science courses must be chemistry or physics</li> <li>• 3 credits with the last being at least Algebra 2 level</li> <li>• Same but cannot use Word Processing</li> <li>• N/A</li> <li>• N/A</li> <li>• N/A</li> <li>• N/A</li> </ul> | <ul style="list-style-type: none"> <li>• Same</li> <li>• Same</li> <li>• 1 credit each of biology, chemistry, and physics</li> <li>• 4 credits of math with the 4<sup>th</sup> being higher than Algebra 2</li> <li>• Same as QAC</li> <li>• N/A</li> <li>• N/A</li> <li>• N/A</li> <li>• N/A</li> </ul> <p><u>Additional Courses:</u></p> <ul style="list-style-type: none"> <li>• 2 years of 1 foreign language</li> </ul> |

*Note. From Blue Valley High Schools Course Description Guide, 2009, by Blue Valley School District.*

## APPENDIX B: PERMISSION TO CONDUCT RESEARCH

Request to Conduct Research in Blue Valley Schools

November 11, 2009

Researcher: Brett D. Potts  
 Address: 10613 W. 144<sup>th</sup> Street, Overland Park, KS 66221  
 Phone: (H) 913-402-9990, (W) 913-239-4814, (C) 913-485-9043  
 Email: [bpotts@bluevalleyk12.org](mailto:bpotts@bluevalleyk12.org)  
 Advisor: Dr. Brad Tate, Baker University [Brad.Tate@bakeru.edu](mailto:Brad.Tate@bakeru.edu)  
 Blue Valley Staff Consulted: Elizabeth Parks, Mike Slagle, Bo Yan, Verneda Edwards  
 Schools Involved in Study: All four Blue Valley High Schools

## Description of Study:

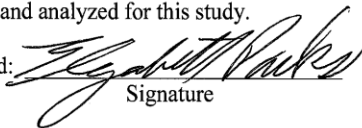
In order to fulfill the requirements for the clinical research study in my doctoral program through Baker University, I am requesting access to the following three forms of academic data specific to Blue Valley District high school graduates from the classes of 2002, 2003, and/or 2004 who attended college after graduation at any of the seven public universities supervised by the Kansas Board of Regents: 1) College degree completion data for these specific students through the National Clearinghouse, 2) Individual Blue Valley graduate transcripts and, 3) Individual graduate ACT composite scores.

The data for this study will need to be obtained during the fall of 2009 which is the estimated timeframe for my IRB approval. Data analysis will tentatively be completed by January of 2010, and the final CRS document will be submitted and defended in the Spring of 2010.

The data will be used to determine whether a relationship exists between the academic course of study chosen by a student in high school and the student's ability to complete a bachelor's degree in a timely fashion. Additionally, the students will be sorted by ACT composite scores and by gender. The student transcript data will be used to divide the graduates into 3 categories: 1) Students who simply took courses leading to the Blue Valley minimum graduation requirements, 2) Students who completed the Kansas Regents Qualified Admissions Curriculum in high school, and 3) Students who completed the Kansas Scholar's Curriculum in high school. Students in each of the three categories will then be subdivided by two ACT score ranges (21 or above and 20 or below). The percentages of students in each sub-category who obtained a college degree in 5 years or less based on the clearinghouse data will then be calculated and compared using a two-sample chi square analysis.

At no time in the research or in the subsequent publication of the study will any student names or identifying information be released or published. The names of the four existing Blue Valley High Schools will only be mentioned in the background information. Comparisons of the data from the four high schools will not be conducted. Additionally, the same confidentiality measures required of me as an assistant principal at Blue Valley High School will be employed at all times as the data is being collected, handled, and analyzed for this study.

Approved:

  
Signature

11/11/2009  
Date

APPENDIX C: BAKER IRB APPROVAL

11 December 2009

Brett Potts  
10613 W 144<sup>th</sup> St  
Overland Park, KS 66221

Dear Mr. Potts:

The Baker University IRB has reviewed your research project application (M-0077-1209-1211) and approved this project under Exempt Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

The Baker University IRB requires that your consent form must include the date of approval and expiration date (one year from today). Please be aware of the following:

1. At designated intervals (usually annually) until the project is completed, a Project Status Report must be returned to the IRB.
2. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
3. Notify the OIR about any new investigators not named in original application.
4. Any injury to a subject because of the research procedure must be reported to the IRB Chair or representative immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform Office of Institutional Research (OIR) or myself when this project is terminated. As noted above, you must also provide OIR with an annual status report and receive approval for maintaining your status. If your project receives funding which requests an annual update approval, you must request this from the IRB one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Marc L Carter, PhD  
Chair, Baker University IRB

CC: Brad Tate