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# The Relationship Between Advanced Academic Services And College Readiness Among Public High School Students In Rural Remote Appalachian Kentucky

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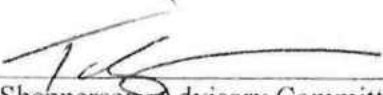
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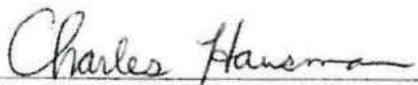
THE RELATIONSHIP BETWEEN ADVANCED ACADEMIC SERVICES AND COLLEGE  
READINESS AMONG PUBLIC HIGH SCHOOL STUDENTS IN RURAL REMOTE  
APPALACHIAN KENTUCKY

By

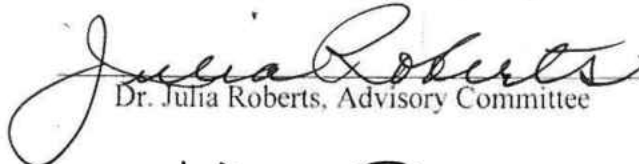
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THE RELATIONSHIP BETWEEN ADVANCED ACADEMIC SERVICES AND  
COLLEGE READINESS AMONG PUBLIC HIGH SCHOOL STUDENTS IN RURAL  
REMOTE APPALACHIAN KENTUCKY

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## ABSTRACT

The importance of college to the individual and society has prompted recent policies and accountability systems to emphasize college readiness as the primary benchmark for high school success. Advanced/honors courses, Advanced Placement (AP)/dual credit courses, and gifted programs are the most common advanced academic service options available in public schools to ensure college readiness. This study investigated 2014-2015 school year data associated with 2,792 students in five high schools in five different school districts in rural remote Appalachian Kentucky. The goal was to see which advanced academic service was most associated with college ready students. College readiness was measured in two ways: ACT composite scores and enrollment in college full-time immediately after high school. Findings from descriptive and comparative analyses indicated that participation in both AP and dual credit courses were associated with higher ACT composite scores and enrollment in college after graduation. Students who participated in gifted services had considerably higher ACT composite scores and attendance in college after graduation. Students who took advanced/honors courses demonstrated fairly low ACT composite scores and showed no greater attendance in college after graduation than the general population. These results raise questions about the effectiveness of advanced academic services to ensure college readiness, at least in rural remote schools. To better make use of limited funding and other support, findings from this study suggest that state and district policies and systems to account for student college readiness may need to (1) reconsider which advanced academic services best promote college readiness, and (2) ensure student records and accountability systems allow for better analysis of which services are most effective for students.

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## CHAPTER 1

### INTRODUCTION

#### **Problem Statement**

##### **College Readiness and Enrollment in Rural Remote Appalachian Kentucky**

Recent data show that ACT scores and attendance in college remain lower in rural remote regions of Kentucky. In 2014, the national average composite score on the ACT college readiness assessment was 21 (ACT, Inc., 2016a). Appalachian Kentucky schools had an average score of 18.1 (Kentucky Department of Education, 2015a). In 2013, the national college enrollment rate was 42% (National Center for Education Statistics, n.d.-a). In Kentucky, the statewide average was 56.6%. Yet, in rural remote districts, the rate was only 47.2% (Kentucky Department of Education, 2015a). The purpose of this study is to investigate advanced academic services that promote college readiness in rural remote districts of Kentucky. The goal is to provide suggestions on how best to utilize limited resources to best prepare students as college ready.

##### **Challenges for Rural Schools**

**Limited resources.** According to Stambaugh and Wood (2015), rural schools particularly have limited financial resources, have limited high-speed Internet, and are unable to provide adequate high quality, specialized teachers for advanced academic programs. In addition, rural schools are a part of funding cuts that are impacting all schools. *U.S. News and World Report* (2015) stated that over the last five years the U.S. Congress has cut federal funding for K-12 education by nearly 20%. This is five times more than overall spending cuts. Additionally, funding levels for K-12 education still lag behind those before the Great Recession in 2007 in thirty of forty-seven states analyzed.

Fourteen states have actually cut funding by more than 10%. During development of the Fiscal Year 2017 budget in Kentucky, the governor proposed a budget that would cut the Kentucky Department of Education by \$72 million over two years. This included a \$300,000 cut for programs for gifted students (Lexington Herald Leader, 2016).

**Special challenges for rural high potential students.** High potential students in rural areas experience many unique challenges. These include attitudes of their parents, lack of qualified teachers, limited resources available to their schools, poverty, and problems with school leadership (Chalker, 2002; Stambaugh and Wood, 2015). Often these rural students would be the first in their family to attend college, and in many cases may need to leave home to attend. Both financial and cultural barriers may limit even talented students from attending college.

### **Importance of College**

**Importance to the national interest.** The days when America's economic growth and prosperity are determined by manual labor performed by workers with little education are long gone (Levy, 2016). An educated workforce is vital for the modern knowledge economy. Girls and boys have the potential to discover life-saving treatments for diseases, to build great companies employing thousands of Americans, to invent things that will improve lives, to defend the country against terrorism and other foreign threats, and to serve the nation ably in government. Berger and Fisher (2013) found a relationship between growth in economic productivity and an increase in the number of adults with a college degree. A study by the Center on Education and the Workforce at Georgetown University asserts that over the next decade, America will be short eleven million skilled workers who, to be qualified need some education beyond high school.



California alone is projected to be shy one million college graduates of what the state's economy will require by 2025 (Katehi, 2016).

**Monetary importance to the individual.** Attending college is no longer an option but a necessity for most students. The cost to individuals without college readiness is significant. Barry and Dannenberg (2016) found that across all income levels and institutions of higher education more than one half million recent high school graduates spent an average of an extra \$3,000 and borrowed an extra \$750 to study high school level content in college. They also found that students who were not college ready were more likely to delay college completion or drop out of college.

Over one third (36%) of high school graduates find themselves living near or below the poverty level. Not only do non-college graduates earn less, they are far more likely to be unemployed at some time in their working life. In 2009, the mean annual earnings of 25- to 29-year-olds with a high school diploma were \$31,093 compared to \$49,551 for individuals with a bachelor's degree or more. The work-life earning for a typical college graduate has been found to be nearly twice that of a high school only graduate, \$1,420,000 compared to \$770,000. Even with the growing cost of college, attending college still creates a net payoff of \$550,000 (Pew Research Center, 2011).

**Other benefits to the individual.** College helps students to transition to become more independent, explore subjects in greater depth than in high school, discover new passions, and bond with new friends (College Board, 2016). Hyman and Jacobs (2009) described the diversity present on college campuses as having many benefits to students including expanding worldliness, enhancing social development, preparing students for work in a global society, increasing knowledge base, promoting creative thinking,

enhancing self-awareness, and providing multiple perspectives. These benefits are provided by diversity in terms of race, ethnicity, gender, religion, sexual orientation, socioeconomic status, and age.

**College readiness and policies, accountability systems, schools, and individuals.** Most commonly, a college ready student is defined as being academically prepared for postsecondary education without remedial coursework (Kang, n.d.). College readiness has become a high priority for many schools as parents, business leaders, and politicians emphasize its importance (Conley, 2008). The National Center for Public Policy and Higher Education and the Southern Regional Education Board (2010), asserted that the dire financial conditions of most states make cost-effective strategies to strengthen college readiness critical.

The U.S. Department of Education's 3.4 billion dollar *Race to the Top* program has made funds available to all states in Appalachia. This program lists four areas in which it seeks to advance reforms. The first area listed is adopting standards and assessments that prepare students to succeed in college (U.S. Department of Education, 2016). In Kentucky, the legislature specifically has made college and career readiness count 20% in the state's educational accountability system (Kentucky Legislature, n.d.-a). This becomes high stakes as failure to meet these goals can result in consequences such as rewriting school improvement plans, implementing a specific set of school improvement strategies, and receiving the assignment of a mentor for schools or districts (Kentucky Legislature, n.d.-b).

The College Board National Office for School Counselor Advocacy (2010) detailed several strategies that schools can and are using to promote college readiness.

These include establishing a college-going culture, extracurricular participation, encouraging college assessments, high school to college transition planning, and assisting students with college selection, financial planning, and admissions. Above all, a rigorous academic program was emphasized.

### **Importance of Excellence among High Potential Students**

**Importance for society.** Ritchotte, Matthews, and Flowers (2014) asserted that underachievement of high potential students represents a frustrating loss of capital for society. Ziegler, Zielger, and Stoeger (2012) agreed by saying that modern societies have a great need for high achievers and that talented persons have a right that their paths to accomplishment are at least not blocked by unnecessary external barriers. Norton and Hartwell-Hunnicuttt (1996) recalled the Marland Report presented in 1972 to the Congress of the United States by then U.S. Commissioner of Education Sidney P. Marshall in which the personal and social cost of not identifying and properly educating high potential children was emphasized.

**Importance for students.** Wood and Stambaugh (2015) assert that high potential students need appropriate services as part of an equitable education. Weisse (1990) explored suicide as a potential ultimate cost for high potential students. Suicidal behavior was said to come primarily from repeated stressful situations with which a person feels unable to cope. For the high potential student, these situations can arise from perfectionism, disappointments, insecurities, career identity issues, and depression.

### **Promoting Excellence in High Potential Students in Schools and the Inadequacies**

The National Association for Gifted Children and the Council of State Directors of Programs for the Gifted (2015) reported that the most prevalent models for delivering

advanced academic services to high potential students in high schools included Advanced Placement (AP) courses, dual college enrollment courses, and advanced/honors courses. However, the report *A Nation Deceived: How Schools Hold Back America's Brightest Students*, claimed that America's schools routinely avoided academic acceleration and AP courses. These were said to be the easiest and most effective ways to help highly capable students be more ambitious, feel academically challenged and socially accepted, and less likely to be bored (Colangelo, Assouline, & Gross, 2004).

Gifted Education, also referred to as Gifted and Talented Education (GATE) or Talented and Gifted (TAG), denotes the broad set of practices and theories used when teaching students who have been identified as gifted or talented. There is no universal definition of what it means to be a student who is gifted and talented, but the National Association for Gifted Children (NAGC) defines gifted children and youth as those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in the top ten percent or rarer) in one or more domains (Teach.com, 2016). Gentry (2006) asserted that gifted education exists today in the shadow of the effects of the No Child Left Behind Act of 2001 (NCLB). Gentry's support for this assertion came largely from the deficit-based nature of NCLB that encourages teaching to emphasize what is assessed on national tests. Although the main goal of NCLB is to aid disadvantaged students, Wood and Stambaugh (2015) point out that National Assessment of Educational Progress (NAEP) results showed very little gain in reading and math between high-achieving students from low socioeconomic families compared to those with higher socioeconomic status.

## **Summary**

ACT composite scores in rural remote Appalachian Kentucky are significantly lower than the national average. College enrollment rates in the region are significantly lower than the state average. These facts are the likely results of rural schools facing many unique challenges including those that impact high potential learners. These facts are concerning because college and college readiness is important to individuals and to the national interest. Also important is excellence among high potential students. This has all manifested itself in policy, accountability systems, and current advanced academic service practices in schools. Unfortunately, there are many inadequacies associated with schools' use of advanced academic services. As a result of all of this, more research is needed to impact educational practice by helping to determine which advanced academic services are effective and most effective in aiding rural high potential students to become ready for college.

## **Purpose Statement**

### **Adding to the Research Base**

One purpose of this study is to analyze the college readiness level of students in rural remote Appalachian Kentucky. Of particular interest in this analysis are students who receive certain advanced academic services—specifically advanced/honors courses, AP/dual credit courses, and gifted services. Another purpose is to determine which of these advanced academic services are most accompanied by statistically higher levels of college readiness. For the purpose of this study, college readiness is measured by ACT composite scores and full-time enrollment in college immediately after graduating from high school.

## **Call to Action**

If the results of this study suggest that current advanced academic services are ineffective or that some are significantly less effective than others, this study can hopefully function as a call to action to consider using the more effective advanced academic services and/or to take steps to improve the lesser effective services. Several organizations in Kentucky have the potential to answer this call including the Kentucky Department of Education (KDE), The Center for Gifted Studies at Western Kentucky University, and the Kentucky Association for Gifted Education (KAGE). Plucker (2012) gives advice to such organizations saying that the societal benefits of programming for high potential students should match the language that policy makers hear from other advocacy groups. It also fits well within the economic development (e.g., innovation, earning power, and equality of opportunity) mindsets that frame how the majority of policy makers approach legislation.

## **Research Questions**

Key questions guiding this study included:

1. To what extent do rural remote high school students in Appalachia receive advanced academic services—specifically a) advanced/honors courses; b) Advanced Placement/dual credit courses; and c) gifted services?
2. What is the college readiness level of the students, based on ACT composite scores and full-time enrollment in college immediately after graduating from high school, who receive the advanced academic services?
3. Which of the advanced academic services are accompanied by the statistically significantly highest levels of college readiness?

## **Methodology**

### **Measures of Independent Variable: Advanced Academic Services**

**High school advanced/honors courses.** Advanced or honors classes are tailored for high-achieving students who cover the same curriculum as in regular classes except with greater breadth and depth. Teachers need meet no special certifications or requirements, and the curriculum is typically determined by individual schools. Colleges often give extra points for advanced/honors courses, considering them to be college preparatory in nature, and generally helpful for college admissions (College Board, 2016).

**High school Advanced Placement courses.** Advanced Placement (AP) is a cooperative program between secondary and postsecondary schools in which high school students take college-level courses and earn college credit through national exams developed by the College Board. Kentucky has received funding to expand AP courses to minority and low-income students at 51 pilot high schools in rural and urban school districts. Some school also offer the International Baccalaureate (IB) Diploma Programme which is similar to AP in that it provides a demanding, two-year high school curriculum that leads to final exams and postsecondary credits that are accepted by universities worldwide. IB will not be a part of this study as there are no IB programs in the population (Kentucky Department of Education, 2012a).

**High school dual enrollment/dual credit courses.** Similar to AP, dual enrollment or dual credit programs offer college-level courses to high school students so they may satisfy high school graduation requirements while earning college credit. Dual credit course offerings vary greatly among states and districts. Some are taught by high

school instructors, some by college instructors, and some by both. Dual credit courses may be held on a high school campus, a college campus, or via distance education (National Conference of State Legislatures, 2014). In this study, AP and dual credit courses are combined as one category of advanced academic services.

**High school gifted education.** In Kentucky, students can be identified as gifted using a combination of formal and informal criteria in the areas of General Intellectual Ability (GIA), specific academic aptitude in a subject area, creativity, leadership, and/or visual and performing arts. Schools, with input from parents, must plan for multiple service delivery options. All school personnel working with gifted students are to be prepared through appropriate coursework or professional development (Kentucky Legislature, n.d.-c). Students are generally identified in elementary school. In high school, these students may take advanced/honors and AP/dual credit courses with other students and receive other services, but generally have received additional services throughout their years in school.

#### **Measures of Dependent Variables: College Readiness**

**ACT indicator of college readiness.** The ACT composite score is a commonly used indicator of college readiness. The ACT is the leading college readiness assessment in the United States with more than 1.9 million members of the U.S. high school Class of 2015 taking the test (Act, Inc., 2015). Eastern Kentucky University which serves the study region requires a 20 ACT composite score for full admission (Eastern Kentucky University, n. d.).

**Enrollment in college after graduation indicator of college readiness.** Enrolling in college full-time immediately after graduating from high school is another



commonly used indicator of college readiness. For many years, the state of Kentucky has had schools collect information about what their graduates are doing during the fall after their high school graduation.

### **Study Region**

School districts in the study are located in rural remote Appalachian Kentucky. These districts can largely be described as White, poor, having state accountability test scores slightly above state average, and having teachers near the state average of experience and education. A total of 16 districts were asked to participate, of these, five superintendents agreed. Of the five districts that agreed to participate, each district had one (9th-12th grade) high school.

### **Sample and Data Collection**

Records on 2,792 students from five high schools were eligible for this study. Of these, 1,123 students participated in one or more the advanced academic services. A total of 554 other students essentially acted as the control group. The control group included records of students who performed average or above in high school, but did not participate considerably in advanced academic services. All variables used in this study were collected from Kentucky's electronic student information system, Infinite Campus (IC). The data for this study were from the 2014-2015 school year. Exact names of the schools and districts are known only by the researcher and his dissertation advisor.

### **Research Design and Data Analysis**

**Data groups.** The research design for this study was a quantitative and comparative approach. The purpose was to determine the extent of the relationship between advanced academic services and college readiness (indicated by ACT scores and

enrollment in college after high school graduation). Treatment groups were formed based on records of students who received each of the three major advanced academic services (advanced/honors classes, AP/dual credit courses, or gifted services) and had measures of the indicators of college readiness available. The control group consisted of records of students who received few or no advanced academic services but were otherwise high ability/motivation students and had measures of the indicators of college readiness available.

**Data analyses.** The research questions sought to describe the extent to which students in the population receive advanced academic services as well as the college readiness level of students in the population who receive the various advanced academic services and to determine which of the services are most accompanied by statistically higher levels of college readiness in the population. Null, non-directional substantive, and directional substantive hypotheses guided the research. Descriptive statistics were used along with the inferential statistics methods of ANOVA, chi-square, and post hoc testing to test the hypotheses.

### **Theoretical Frameworks for the Study**

A theoretical framework consists of a theory that describes a particular problem in detail. The most concise statement of the problem addressed by this study has been presented to be that more research is needed to impact educational practice by helping to determine which advanced academic services are effective and most effective in aiding rural high potential students to become ready for college.

## **Critical Rural Theory**

Residents of any given community experience life that varies from those living in another community. Those in rural areas have experiences that often vary significantly from residents in urban areas. The differences sometimes go unnoticed as they only become apparent when an individual leaves and experiences another area. In rural areas, residents frequently face disadvantages due to distance to services. In Central Appalachia, disadvantage is also rooted in poverty. Some researchers argue that rural disadvantage seems less acute because it is less visible to the larger population, and seems more quaint or normal to those in the region, and therefore may be less likely to be addressed (Thomas, Lowe, Fulkerson, & Smith, 2011).

Critical theorists are inherently interested in issues of human domination and oppression. Critical Rural Theory acknowledges the differences and disadvantages associated with the rural experience as it attempts to bring together the concepts of structure, space, and culture in order to explain the relationship between rural communities and urban society. The theory holds that urban areas have a hegemonic relationship with rural areas and people. Central to this theme is the concept of urbanormativity: the cultural assumption of the dominance and superiority of urban communities and patterns of life. Urban areas are favored in the current global system and the structural forces in an urban society favor the interests of cities over those of the countryside. There is a generally exploitive relationship between the two. These cultural dynamics are reproduced from generation to generation (Thomas, Lowe, Fulkerson, & Smith, 2011). Critical Rural Theory serves as a theoretical framework for this study in

that the theory holds that rural areas are fundamentally different from other (urban or suburban) areas and this study deals specifically with rural areas.

The ultimate goal of the critical school is to emancipate the individual from the slavery of ideological control that they more often than not willingly accept and embrace. However, a major critique leveled against the critical school is that it has failed to package their liberating ideas in a way that is accessible to the lay person, using outlets such as academic journals that the public do not typically read (Thomas, Lowe, Fulkerson, & Smith, 2011).

The *Call to Action* section in this chapter detailed organizations that could use the results of this study to make change. This study will make the usual recommendations for further research and will make suggestions that would ideally help to get at the root causes of issues associated with college readiness. This study will also make practical recommendations for schools. As a result, it is hoped that this study will avoid some of the critique leveled at the critical school.

### **Gagné's Differentiated Model of Giftedness and Talent**

Although some educators define the terms differently or use them interchangeably, Gagné defines giftedness as a superior natural ability as compared to talent, which is an ability that has been exceptionally well developed. This perspective means that a talent implies a gift, but a gift does not automatically imply a talent. For example, a student may be musically gifted, but without training, this gift will not be realized and potentially not even noticed at all. This has become known as Gagné's Differentiated Model of Giftedness and Talent (DMGT). This model serves to illustrate

how gifted students can display differentiated school performance as a result of how the school functions to cultivate gifts (Digest of Gifted Research, 2011).

Gagné claims that gifts are developed into talents as a result of catalysts such as maturity, motivation, interests, chance, and environmental factors such as family and school. Gagné also notes that the development of gifts into talents is not an event, but rather an ongoing process. For example, mathematically gifted student in elementary school may react to catalysts that develop the gift and make them a talented mathematics student. If that same student loses or stops responding to catalysts, then by high school they may no longer be a talented mathematics student (Digest of Gifted Research, 2011). Gagné's Differentiated Model of Giftedness and Talent serves as a theoretical framework for the aspect of this study dealing with the effectiveness of advanced academic services with high potential students as the model says that high potential must be continually developed in order to be realized.

### **Scope and Limitations**

#### **Geography**

Geographically, the scope of this study was limited to schools in rural remote communities. This scope was further limited in that all of the schools studied are located in Appalachian counties in Kentucky. As mentioned previously, Stambaugh and Wood (2015) claim that rural communities tend to be very unique. As a result, the argument can be made that the scope was limited to the specific communities studied. To improve the generalizability of this study, the schools targeted were similar demographically in terms of diversity, socio-economics, and student enrollment.

### **Level and School Year**

The scope of this study was also limited in that it involves only high schools. Advanced academic services and indicators of college readiness do exist in earlier grades (College and Career Readiness and Success Center, 2013). The scope was also limited by a narrow timeframe. The data collected were associated with a single school year (2014-2015). This is a significant limitation in scope because, in addition to locally initiated changes, the national and state education systems can change radically at any time with single pieces of legislation. For example, in Kentucky in 2009 Senate Bill 1 was introduced and was solely responsible for major changes to curriculum, assessment, accountability, and goals (Kentucky Council on Postsecondary Education, 2011).

### **Data Sources, Poverty, and Ruralness**

The individual student data parameters involved in the study were obtained from IC. This limits the scope of the study in that there are other indicators of college readiness (College and Career Readiness and Success Center, 2013). Similarly, although the major advanced academic services available are the target of this study, schools undoubtedly provide other services that could be studied. Most pronounced in the fact that advanced academic services overlap each other. For example, most students who receive gifted services also take advanced or AP or dual credit courses. This means that the student record does not allow gifted services to be exclusively judged in isolation from other services. This limitation is lessened by the fact that gifted services, unlike the other advanced academic services, are typically provided to students over a long period of time, likely since fourth grade. The extent of these overlaps will be explored during data analysis. Lastly, a limitation of this study is the concern shared by Wood and

Stambaugh (2015) that because many students of poverty live in rural areas it is difficult to ascertain the relative impacts that poverty and rural life have on an entity being studied.

### **Assumptions**

The assumptions associated with this study involve characteristics of the schools and the students. It is also assumed that the recorded data provide more or less accurate information on advanced academic services taken, test scores, college enrollment, and other details about individual student's high school academics.

### **Data Reliability**

The advanced academic services offered by schools in the study need to have a reasonable degree of consistency. A particular school in the sample might have high expectations for students, hire the best teachers possible, and make efficient use of available resources. Another school might hold students to low standards, hire teachers for reasons other than who will do the best job, and squander precious resources. The student records from these two hypothetical schools would, therefore, likely show different outcomes despite providing the same services. The inclusion of different schools should mitigate inevitable differences. Also, there is an underlying assumption that districts will maintain IC databases in a consistent and accurate manner. Fortunately, the requirement that districts use specific IC data standards should help ensure relative accuracy.

### **Data Validity**

It is believed that information about student advanced academic services from IC was valid. For example, a student identified as gifted and flagged as such in IC should

have been given the appropriate advanced academic services as required by Kentucky guidelines. It was also important that courses identified as advanced or honors actually contained more rigorous content. Similarly, it was assumed that AP courses met the College Board requirements and that dual credit courses were taught at a postsecondary level as stipulated by cooperating colleges.

One final data validity issue involves the motivation levels of the students in the schools being studied. Motivation is a prerequisite for outstanding levels of performance (Phillips and Lindsay, 2006). Therefore, a student flagged as gifted in IC but who has poor motivation might not score well on measures of college readiness not because of poor advanced academic services, but because of poor motivation. The assumption was made that lack of motivation was not a significant issue for the high potential students, when considered as a whole group.

### **Summary**

The importance of college to the individual and society has prompted recent policies and accountability systems to emphasize college readiness as the primary benchmark for high school success. Rural schools and students are subject to several unique barriers to success largely due to increasingly limited resources. As a result, it is very important to understand the effectiveness of student advanced academic services in rural schools and which of these programs are the most beneficial.

### **Definitions**

1. *ACT Composite Score:* This ACT score is the average of the ACT English, mathematics, reading, and science scores rounded to the nearest whole number. The score can range from 1 (low) to 36 (high).



2. *Advanced Placement Course:* Also known as AP, this is a high school course that can lead to college credit based upon the results of a nationally standardized culminating exam.
3. *Critical Rural Theory:* A theory that holds that rural areas are fundamentally different from other (urban or suburban) areas.
4. *Dual Enrollment or Dual Credit Course:* These courses offer college-level courses to high school students so they can satisfy high school graduation requirements while earning college credit. Some are taught by high school instructors, some by college instructors, and some by both. Dual credit courses can take place on a high school campus, a college campus, or via distance education.
5. *Gagné's Differentiated Model of Giftedness and Talent:* A theory that holds that high potential in students must be developed in order to be realized.
6. *Gifted Education:* Also referred to as Gifted and Talented Education (GATE) or Talented and Gifted (TAG), this denotes the broad set of practices and theories used when teaching students who have been identified as gifted or talented. There is no universal definition of what it means to be a student who is gifted and/or talented, but the National Association for Gifted Children (NAGC) defines gifted children and youth as those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains.

7. *Infinite Campus*: Also known as IC, this is Kentucky's electronic student information system (SIS). IC is web-based and houses extensive and archived information about students. IC is the second largest SIS in the United States, housing information on 7.7 million students in 45 states.
8. *International Baccalaureate (IB) Diploma Programme*: Similar to AP, this provides a demanding, two-year high school curriculum that leads to final exams and postsecondary credits that are accepted by universities worldwide.
9. *IQ Tests*: This is an abbreviation for Intelligence Quotient test. This test seeks to indicate a person's mental abilities relative to others of approximately the same age.
10. *No Child Left Behind Act*: Commonly known as NCLB, this federal Act signed in 2001 required states to develop assessments in basic skills that had to be given to all students at select grade levels in order to receive federal school funding. Each individual state developed its own achievement standards. NCLB also expanded the federal role in public education through school report cards and teacher qualifications and has evolved somewhat since its conception.
11. *Rural, Remote*: This is a Locale Code established by the National Center for Education Statistics that denotes an area that is more than twenty-five miles from an urbanized area and more than ten miles from an urban cluster. The United States Census Bureau defines urbanized areas as containing at least fifty thousand people and urban clusters as containing at least twenty-five hundred people.

## CHAPTER 2

### LITERATURE REVIEW

#### **Introduction**

Factors used to limit this literature review included focusing on sources mainly dealing with high school, publications from 1985 or later, and rural materials on districts. Care was taken to show differing points of view and to highlight gaps in the research when they existed. The literature review begins with the history of advanced academic services for students and includes the indicators of college readiness and recent changes to advanced academic services. The rural Appalachian setting is described along with its challenges. Advanced academic services are then discussed in great detail. Finally, state policies and the finances of advanced academic services are discussed. Figure 2.1 (in Appendix A) is a conceptual map of the literature review.

#### **Advanced Academic Services for Students**

##### **History**

One of the earliest advanced academic processes for students began in response to the influx of immigrant children into American schools during the early twentieth century. After elementary school, students were assigned to academic, general, or vocational paths. The academic students were groomed for college while the vocational students were prepared to enter trades. The appearance of the IQ test and standardized achievement tests accelerated this practice and made it appear more scientific. By the mid-twentieth century, most secondary schools used this practice in some form. In the early 1970s, policymakers and educators feared that America was losing its competitive edge and began insisting that all students have access to a rigorous academic curriculum.

This led to minimum graduation standards. Today, having students assigned to significantly different curricular paths is rare. The practice is mainly manifested as grouping students by ability within subject areas. In each subject, students are enrolled in basic, regular, or advanced courses. Educational progressives assert that this practice disadvantages some students because they experience the weakest teachers, few academic role models, and a curriculum that very much lacks rigor (Hallinan, 2004).

### **Advanced Placement**

At the midpoint of the twentieth century, the Ford Foundation responded to the need for a more educated population by funding two studies. These studies recommended that secondary schools and colleges collaborate to avoid repetition in coursework at the high school and college levels and to facilitate motivated students working at the height of their abilities and advancing as quickly as possible. The result was the Advanced Placement (AP) Program. In the 1960s, the program began a long term commitment to teacher training. In the 1970s and 1980s, many schools added AP courses to their offerings. In the 1990s, there was outreach to minority and low-income students to enroll in AP courses. By 2003, there were thirty-four different AP courses offered with more than one million students taking over 1.74 million AP exams (The College Board, 2003).

### **Dual Credit**

Conversations about closer connections between the secondary and post-secondary levels started in the 1920s, but structural challenges prevented any real progress. Discussions resurfaced in the 1970s. In 1973, Syracuse University's Project Advance became the first dual credit program. The courses were taught by high school

teachers after summer training at the university. Since that beginning, dual credit has rapidly gained support and now has programs in all fifty states (Tobolowsky & Allen, 2016).

### **Gifted Education**

The origins of gifted education date to 1868 when William Torrey Harris, superintendent of public schools for St. Lewis, instituted systematic efforts to educate gifted students. It was not until 1901 when the first special school for gifted students was opened in Worcester, Massachusetts. Work began in 1905 to use psychological testing to capture intelligence in a single numerical outcome. This work culminated in 1916 when Lewis Terman published the Stanford-Binet intelligence test. In 1921, Terman began what has remained the longest running longitudinal study of gifted children with an original sample of 1,500 subjects. His results were that gifted students were: (a) qualitatively different in school, (b) slightly better physically and emotionally in comparison to normal students, and (c) superior in academic subjects in comparison to average students.

Gifted services progressed in the second half of the 20<sup>th</sup> Century. In 1954, the National Association for Gifted Children (NAGC) was founded. Shortly thereafter, the Soviet Union launched Sputnik which sparked the United States to reexamine human capital and the quality of American schooling. As a result, substantial amounts of resources poured into identifying the brightest students who would best profit from advanced programming. In 1974, the Office of the Gifted and Talented housed within the United States Office of Education was given official status. In 1983, *A Nation at Risk* reported the scores of America's brightest students and their failure to compete with

international counterparts. In 1998, the NAGC published Pre-K-Grade 12 Gifted Program Standards to provide guidance in seven key areas for programs serving gifted and talented students. In 2004, the concerns from *A Nation at Risk* were deepened by *A Nation Deceived: How Schools Hold Back America's Brightest Students*, a national research-based report on acceleration strategies for advanced learners published by the Belin-Blank Center at the University of Iowa (National Association for Gifted Children, n.d.-a).

### **College Readiness and Advanced Academic Services**

College readiness has become a high priority for many schools as parents, business leaders, and politicians emphasize the importance of college (Conley, 2008). A college education is correlated with a higher socioeconomic class, lower unemployment, and higher earning potential. The U.S. Department of Education's \$3.4 billion *Race to the Top* program has made funds available to all states in Appalachia. This program lists four areas in which it seeks to advance reforms. The first area listed is adopting standards and assessments that prepare students to succeed in college (U.S. Department of Education, 2016).

### **Indicators of College Readiness**

The College and Career Readiness and Success Center (2013) found that predictors of college success include varied indicators in the early grades. These include: participation in child care and early education; high levels of attention span and classroom participation in elementary school; strong social skills; reading by the third grade; and less than 10% absenteeism. Middle grade predictors of success include: less than 20% absenteeism; remaining at the same school; receiving no unsatisfactory

behavior grades; meeting benchmarks on state exams and ACT EXPLORE; passing Algebra I; and taking rigorous coursework. In high school, predictors include: few school transfers between grades; taking the PSAT; less than 10% absenteeism; no more than one failure of ninth grade subjects; a GPA of 3.0 or above; passing state exams; and taking AP, IB, or dual enrollment courses, including receiving passing exam scores. In addition, students were more likely to be college ready if they completed the Free Application for Federal Student Aid (FAFSA) form, met benchmarks on college preparatory exams, and participated in high school to college transition programs.

The College and Career Readiness and Success Center (2013) also found that students fare better if they enrolled in college full-time immediately after graduating from high school. Additionally, a focus on school was important. This may include participating in orientation programs, having extracurricular involvement, and working less than fifteen hours per week. Monks (1997) also found that entering college soon after high school increased overall lifetime earnings.

### **National, State, and Population Statistics on Selected Indicators of College Readiness**

**College enrollment.** The National Center for Education Statistics (n.d.-a) found that the national college enrollment rate in 2013 was 42%. This rate was also available for the year 2000 and was not measurably different. This rate involved immediate enrollment in only four-year colleges, but did not make a distinction between part and full time enrollment. The Kentucky Department of Education (2015a) found that the state college enrollment rate in 2013 was 56.6%. The college enrollment rate for the population of this study was 47.2%. The lowest county college enrollment rate for the

population was 28.9% with the highest being 69.3%. This rate involved immediate enrollment full time in a four-year college.

**ACT scores.** ACT scores are a primary indicator of college readiness. ACT, Inc. (2016b) has established subject specific college readiness benchmarks for the ACT test and has released data regarding national and state attainment of these benchmarks. In addition, the Kentucky Council on Postsecondary Education (n.d.) has established subject specific college readiness benchmarks for the ACT test with the exception of science. Reports by ACT, Inc. (2016a) and the Kentucky Department of Education (2015a) indicate that while improving, many Kentucky students do not meet college readiness benchmarks set by the state (see Table 2.1).

Table 2.1

*ACT Benchmark Data from 2014*

	College Readiness Bench- mark- National	College Readiness Bench- mark- Kentucky	Percent- age Meeting National Bench- mark- National	Percent- age Meeting National Bench- mark- Kentucky	Percent- age Meeting Kentucky Bench- mark- Kentucky	Percent- age Meeting Kentucky Bench- mark- Study Popula- tion (min., max.)
ACT English	18	18	64	59	55.9	45.7 (39.4, 56.1)
ACT Math	22	19	43	31	43.5	33.5 (13.1, 45.7)



Table 2.1 (continued)

	College Readiness Bench- mark- National	College Readiness Bench- mark- Kentucky	Percent- age Meeting National Bench- mark- National	Percent- age Meeting National Bench- mark- Kentucky	Percent- age Meeting Kentucky Bench- mark- Kentucky	Percent- age Meeting Kentucky Bench- mark- Study Popula- tion (min., max.)
ACT Reading	22	20	44	37	47.1	37.9 (25.5, 45.7)
ACT Science	23	-	37	29	-	-

Source: ACT, Inc. (2016a). *2014 national and state scores: ACT college readiness benchmark attainment by state*. Retrieved from <https://forms.act.org/newsroom/data/2014/benchmarks.html>  
 Kentucky Department of Education. (2015a). *Kentucky school report card*. Retrieved from <http://applications.education.ky.gov/SRC>

A few gender differences have been found relative to ACT scores. Mo, Yang, Hu, Calaway, and Nickey (2011) found that young men are more likely to succeed in passing ACT mathematics and ACT science tests than are young women, but no gender difference was found on ACT reading and ACT social studies.

### **Kentucky and College Readiness**

Specifically in Kentucky, the legislature has made college and career readiness count 20% in the state’s educational accountability system (Kentucky Legislature, n.d.-a). This becomes high stakes as failure to meet the goals of the system can result in

consequences such as rewriting school improvement plans, implementing a specific set of school improvement strategies, and receiving the assignment of a mentor for schools or districts (Kentucky Legislature, n.d.-b).

### **Advanced Academic Coursework**

According to Conley (2008), best practices for schools attempting to increase the college readiness of their students include creating a college-going culture that advocates a schoolwide belief that all students can succeed in postsecondary education. Another best practice is for schools to design their curriculum to prepare students for college generally and for AP courses specifically. Between the years 1997 and 2012 there was a 1,590% increase in the number of high school students taking AP exams (Judson & Hobson, 2015). Most states now have dual credit strategies to broaden access and offer dual credit courses to traditionally underrepresented students such as students of color, low income students, first generation college students, and lower achieving students. Nevertheless, most dual credit participants are White and affluent (Tobolowsky & Allen, 2016).

In Kentucky, the AdvanceKentucky initiative of the Kentucky Science and Technology Corporation is a good example of how schools are seeking to get more students college ready by increasing the number of AP Qualifying Scores (Qs). The initiative reports a typical five-year QS gain of 413%. Also, Qs among minority and low income students quintupled in three years (Kentucky Science and Technology Corporation, 2013).

## **Current Gifted Services**

Emerging perspectives are that giftedness is dynamic, domain-specific, and socially mediated. This means that gifted identification must include many different sources of information and be ongoing. It also means that gifted services should be flexible and attached to differentiated programming options rather than individual students (Matthews & Dai, 2014).

Funding for gifted education is in flux. The only funding at the federal level for gifted education has come through the Jacob Javits Gifted and Talented Education Act which had peak funding in fiscal 2002 of \$11.25 million (Education Week, 2010). No new funds were allocated from fiscal 2011 through fiscal 2013. Five million dollars were allocated during fiscal 2014 and \$10 million were allocated during fiscal 2015 (U.S. Department of Education, 2015). During development of the fiscal 2017 budget in Kentucky, the governor proposed a budget that would cut the Kentucky Department of Education by \$72 million over two years. This included a \$300,000 cut for programs for gifted students (Lexington Herald Leader, 2016).

## **Ruralness and Barriers to Advanced Academic Services**

### **Appalachian Region**

The Appalachian Region is a 205,000-square-mile region that follows the spine of the Appalachian Mountains from southern New York to northern Mississippi. It includes all of West Virginia and parts of 12 other states: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia. The region's population is 42% rural, compared with 20% nationwide.

The Appalachian economy was once highly dependent on mining, forestry, agriculture, chemical industries, and heavy industry. The economy has become more diversified in recent times, however, and now includes manufacturing and professional service industries. Appalachia's poverty rate dropped from 31% in 1960 to 17% over the 2009–2013 period. The number of high-poverty counties, defined as those with poverty rates more than 1.5 times the U.S. average, declined from 295 in 1960 to 90 over the 2009–2013 period.

### **Central Appalachia and Kentucky**

Central Appalachia is a sub-region consisting of all Appalachian counties in Kentucky and several counties in West Virginia, Virginia, and Tennessee near the Kentucky border (Appalachian Regional Commission, n. d.). The central Appalachian poor are largely white, Anglo-Saxon ethnicity, Protestant, and have roots in America back many generations. Intact families are much more common in Central Appalachia than in other parts of the United States. The area is marked by substandard public schools, corrupt political institutions, limited infrastructure, geographical isolation, and a unique dialect. Northern and southern Appalachia have become considerably less poor over the past forty years while poverty has been more persistent in central Appalachia. This is thought to be due to civil rights era targeting of benefits and services to minorities. Distrust in government is common in Appalachia and is generally more centered on local rather than federal government. In central Appalachia this distrust is more likely to extend to all levels of government (Sarnoff, 2003). The counties in Kentucky in the Appalachian Region include Adair, Bath, Bell, Boyd, Breathitt, Carter, Casey, Clark, Clay, Clinton, Cumberland, Edmonson, Elliott, Estill, Fleming, Floyd,

Garrard, Green, Greenup, Harlan, Hart, Jackson, Johnson, Knott, Knox, Laurel, Lawrence, Lee, Leslie, Letcher, Lewis, Lincoln, McCreary, Madison, Magoffin, Martin, Menifee, Metcalfe, Monroe, Montgomery, Morgan, Nicholas, Owsley, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Russell, Wayne, Whitley, and Wolfe (Appalachian Regional Commission, n. d.).

### **Definition of Rural**

A popular definition of “rural” conjures up images of forests, farmland, quiet country roads, and small towns. With the exception of the District of Columbia, there are rural students in every state in the United States. They attend 29% of the nation’s schools and account for 18.7% of the nation’s students. Roughly one million of these students are believed to be gifted (Stambaugh & Wood, 2015). This variety has led to many different technical definitions of “rural”.

For example, the National Center for Education Statistics (2015) assigns a Locale Code to every school district in the nation. There are three distinct rural locale codes defined based upon their location relative to an urban area. Rural, Fringe areas are less than or equal to five miles from an urbanized area, as well as areas that are less than or equal to 2.5 miles from an urban cluster. Rural, Distant areas are more than five, but less than or equal to twenty-five miles from an urbanized area as well as areas that are more than 2.5 miles but less than or equal to ten miles from an urban cluster. Rural, Remote areas are more than twenty-five miles from an urbanized area and more than ten miles from an urban cluster. The United States Census Bureau (2015) defines urbanized areas as containing at least fifty thousand people and urban clusters as containing at least twenty-five hundred people. The National Rural Development Institute defines rural as

areas with a population density of less than 150 per square mile or counties where 60% or more of the population lives in communities of less than 5,000 (Jones & Southern, 1992).

Stambaugh and Wood (2015) present a more qualitative description of rural that includes a sense of place similar to the sketch that opened this section. Add to that a value placed on beauty, family, humor, independence, modesty, patriotism, pride, religion, and tradition. Quantitative and qualitative definitions and descriptions of rural are not just academic exercises. The rural experience embraces a significantly different set of values, beliefs, and cultural norms that are themselves varied by region.

### **Barriers to Advanced Academic Services for Rural Students**

Howley, Showalter, Klein, Sturgill, and Smith (2013) conjectured that inequities associated with rural place were more systemic, complex, and far less visible than those ascribed to individuals on the basis of their social class, background, skin color, sex, or place of residence.

**Human.** Academically advanced students in rural communities may be a barrier to themselves in that they are hesitant to stand out or excel when they are of the minority or in a community where social norms or expectations hinder their progress. The families of rural advanced students may not understand the value of advanced programming and discourage their children from going to college, knowing that those who can leave often do and that has implications for family solidarity. This issue is most prevalent with female students.

Recent research does demonstrate that parents of students in rural areas actually do hold high expectations for their children. However, the parents who do encourage higher education frequently do not understand how to help their children achieve this

goal and parents are often disappointed in the lack of support that they receive from rural schools.

The teachers of rural students may present a barrier to student advanced academic services in that only 43% of rural teaching staff has attained at least a master's degree compared with 49% of urban and 52% of suburban teachers. Also, teachers of rural students often lack access to job-specific professional development and struggle with limited access to cultural information and resources (Stambaugh & Wood, 2015). A significantly smaller proportion of teachers from rural areas take coursework in gifted education (Jones & Southern, 1992).

**Resources.** Rural schools often have limited financial resources, lack quality facilities, have limited high-speed Internet, lack school-to-work programs, and are unable to provide adequate high quality, specialized teachers for advanced programs perceived as benefitting only a few students (Stambaugh & Wood, 2015). Azano, Callahan, Missett, and Brunner (2014) found that rural gifted teachers often had mixed grade classrooms, classes that only met weekly or every other week, and classes in multiple schools separated by great distances. They also found that these teachers often had administrative duties in addition to their teaching and that they felt professionally isolated because many times they were the only gifted teacher in the district.

**Access.** Anderson and Chang (2011) found that graduates from rural high schools appeared to have had substantially less access to AP mathematics courses. Stambaugh and Wood (2015) add detail to this issue by stating that on average suburban and urban schools offer three to four more courses in advanced mathematics than rural schools.

Also, rural students taking AP courses are less often successful in obtaining final exam scores adequate for conferring college credit.

**Counseling.** Many rural schools have inadequate counseling services available to advanced students. These students are likely to have special counseling needs for several reasons. They may have gaps in their knowledge which may lead to difficulty in advanced courses. The lack of available role models can also lead to the need for counseling. Advanced students are often in need of special career counseling. Research on rural schools and counseling of advanced students is sparse as is the availability of professional development and resources. Rural counselors also often have to operate in isolation. One advantage that rural counselors have is that they may have more control over their small organizations (Stambaugh & Wood, 2015).

**Poverty.** The poverty typical in rural areas has the potential to negatively impact intrapersonal skills that contribute to talent development such as motivation, self-esteem, and social connections. Poverty and geographical isolation can also result in a lack of transportation to extracurricular activities that are often one of the only forms of advanced programming (Stambaugh & Wood, 2015).

**Leadership.** School boards in rural areas frequently include members that have no background in education, do not represent their constituents, do not agree on the major problems, do not know how to solve the school problems, and push their own agenda. School boards also receive pressure from outside special interest groups that lobby for their own agendas. If the parents of advanced students do not comprise one of these special interest groups, then board members are unlikely to give attention to advanced programming. Even if they do give attention to advanced programming, they are likely



not prepared to make a positive difference (Chalker, 2002). Howley, Showwalter, Klein, Sturgill, and Smith (2013) posited that an unhealthy accountability frenzy from leaders at the federal and state level is preventing rural schools from reimagining schooling with a rural purpose.

### **Advanced Academic Services for Students**

Three of the most common advanced academic services for high school students and those that are part of this study include advanced or honors courses, AP courses, dual credit courses, and gifted services.

#### **Advanced/Honors Courses**

It has been found that advanced course-taking is consistently associated with higher achievement (Leow, Marcus, Zanutto, & Boruch, 2004). Aughinbaugh (2012) found that, when controlling for unobserved differences between students and their families, a more rigorous high school math curriculum is associated with a higher probability of attending college and of attending a four-year college. Hargreaves, Homer, and Swinnerton (2008) described what subject areas were most covered by advanced courses: the most (37%) were in mathematics followed by 27% in science, 22% in English, 5% in history, 4% in economics, 3% in foreign languages, and 1% in both art and social studies. Daddone (2008) reported that increasing pressure to take AP courses may encourage students to forsake advanced electives.

Taking one or two advanced courses does not correlate to dramatically improved achievement. Brody and Benhow (1990) conducted two studies to determine the impact of advanced coursework. Using SAT mathematics scores, they concluded that advanced mathematics and science coursework taken over the long term (5 years, beginning in

middle school and extending through high school) was necessary to see real skill development. The largest gains were correlated to higher course scores, and gains were found not only in math but also verbal sections of the SAT.

Other research suggests the benefit of carefully constructed and long term access to advanced academics. Ozturk and Singh (2006) also found that rigorous learning needed to be continuous. Students who had previously achieved in mathematics, did not necessarily continue to do so without strong aspirations and self-concepts to be successful. Interestingly, this research also found no significant effect of socioeconomic status on advanced course taking. Crosnoe and Muller (2014) concluded somewhat differently that having college educated parents differentiated students' enrollment in advanced course work at the start of high school and that this initial disparity was stably maintained over subsequent years. Exposure to school-based peer groups characterized by higher levels of parent education appeared to amplify these course work disparities.

### **Advanced Placement Courses**

**College readiness.** A rigorous high school curriculum is one of the best predictors of college completion and the College Board's AP Program is considered a gold standard of such curriculum (Wood & Stambaugh, 2015). According to an investigation by Mo, Yang, Hu, Calaway, and Nickey (2001), taking an AP mathematics course and taking more AP courses translated into a positive impact on ACT scores. Mollison (2006) says that AP has changed from a way to help students get through college quickly to a way to help students get into college. Once in college, Shaw, Marini, and Mattern (2012) found that there is a positive correlation between students' average AP score and number of AP courses taken and GPA during the freshman year of college.

Burney (2010) added that the benefits from passing AP exams when compared with just taking AP courses include higher GPA in college, higher college graduation rates, and more credits earned. Thompson and Rust (2007) failed to find that college GPA was significantly higher for students who had taken AP courses when compared to other high achieving students. Santoli (2002) added that students who took AP courses in high school pursued more challenging majors in college and are more likely to graduate.

There are several advantages and disadvantages associated with taking AP courses. Santoli (2002) found that students who took AP courses benefited from high caliber and motivated teachers. Foust, Hertberg-Davis, and Callahan (2009) add that students taking AP courses reap benefits such as pride in completing more challenging work, forming bonds with other participants, better treatment from teachers, and better overall class atmosphere. Disadvantages included time spent in homogeneously grouped settings, social/emotional disadvantages associated with heavy workloads, negative feelings between those in and those not participating in AP, and negative stereotypes of AP students.

**Participation and access.** Participation, however, seems to fall along demographic lines. A study in Texas by Moore and Slate (2008) described unequal student participation in AP courses. More females (17%) were enrolled in AP courses, compared to 13% of male students. Almost 20% of white students were enrolled compared to just over 10% of the Hispanic and African American students. Enrollments for Limited English Proficient and students with special learning needs were very low. African American students experienced the least success in the courses with Hispanic students experiencing the most success.

There have been attempts to reform and increase equal access to AP. Schneider (2009) analyzing efforts at reforms found that AP has successfully branched out from private and suburban public schools and into schools with high percentages of minority and low income students. There is some evidence this has deluded the value of AP, and some high status schools no longer use AP. Katie Dredger (2008), a successful AP English Literature and Composition teacher in Maryland, described her journey from teaching AP courses of a dozen students who were white, four-year-college-bound, and middle class to more inclusive courses. These more inclusive courses resulted in a more than sevenfold increase in the number of students taking her AP course. Her course went from all or most students in her class also being identified as gifted to most being non-gifted.

**Kentucky and AP.** The increased access to AP is evident in Kentucky. AdvanceKentucky, an initiative of the Kentucky Science and Technology Corporation (2013) provides multiple resources to school districts in Kentucky to increase the number of AP Qualifying Scores (QSs). The initiative reports typical five-year QS gains of 413% overall, and a quintupling for low SES and minority students in three years. Jeong (2009) studied of programs like AdvanceKentucky and found that providing fee exemptions lead to more AP students taking AP exams, particularly the disadvantaged. There was little evidence, however, that AP exam performance improved. Mollison (2006) questioned the effectiveness of recent efforts at expanding access to AP saying that small rural schools and schools in poor neighborhoods remain much less likely than suburban schools to offer AP courses. Although increasingly, poverty is no longer a major factor in holding down the number of students taking AP courses or exams.

In September of 2016, it was reported that the number of AP test takers in Kentucky decreased slightly for the first time in recent years. At the same time, it was reported that Kentucky performed better overall in obtaining scores of three or higher, which is needed for students to earn college credit. The Kentucky Department of Education (KDE) also claimed that qualifying scores on AP exams saved Kentucky students more than \$23 million a year in college costs. KDE also reported that during the previous school year, a total of 7,466 students took advantage of the *AP for All* project that makes AP exams free to low income students. At the same time, the U.S. Department of Education announced that Kentucky has been granted nearly \$462,000 to continue to help low income students defray the costs of taking AP exams (Courier-Journal, 2016).

### **Dual Credit**

Dual credit courses are courses that earn both high school and college credit. States determine which courses can be offered for dual credit. In most cases, colleges and/or high schools approve the course content, textbooks, and/or exams. In some states, approval of the content rests with the state. This lack of standardization means that students taking the same subject may not cover the same material (Tobolowsky & Allen, 2016).

Taylor (2015) found that the proportion of high school students taking dual credit courses is increasing. Andrews (2000) adds that dual credit programs act to keep secondary school honor students challenged as they complete high school. Smith (2007) found that participation in dual credit programs had a significant positive relationship with educational aspirations. Delicath (1999) adds that participation in high school dual

credit programs significantly influenced students' ability to persist and graduate college. However, it was found that time required to graduate college was not affected. Taylor (2015) pointed out that a credit-only model of dual credit is unlikely to yield results that make any significant impact on disparities in educational outcomes with underserved students. This group of students will require more robust support.

### **Gifted Services**

Gifted education is not a topic that typically garners significant attention. In their textbook regarding exceptional learners; Hallahan, Kauffman, and Pullen (2009) devote just one of fifteen chapters to the topic. In that chapter, they write that there is much disagreement about the definition of a gifted student, but generally these students excel in some way compared to other students of the same age. Gifted students are further described as those who may develop intellectual abilities at a remarkably young age, possess exceptional aptitude in a specific area, or have extraordinary creativity. The origins of giftedness are identified as either genetic or social factors such as family, school, peer group, or community. Gifted students can be identified using IQ tests, standardized achievement test scores, evaluation of student work, or nominations from teachers, parents, peers, or even self-nominations. Enrichment (additional experiences) and acceleration (placing students ahead of their age peers) are presented as potential services for gifted students. The authors point out that gifted students are often underachievers in that there is a discrepancy between their potential and achievement. The authors also point out several issues associated with gifted education in rural areas including lack of resources and economic deprivation.

**Identification of rural gifted students.** Research on gifted identification specific to the rural context is scant; however, two specific difficulties have been found. First, gifted students in rural communities may be hesitant to stand out or excel when they are of the minority or in a community where social norms or expectations hinder their progress. Parents of rural gifted students are especially wary of their children entering gifted programs for fear that it will be perceived as elitist or promote their children eventually leaving their rural community. Second, many rural students may be gifted in practical areas that are not measured by paper and pencil tests typically used for identification of gifted students (Stambaugh & Wood, 2015).

**Socioeconomic status and rural gifted students.** Clearly, low socioeconomic status is prevalent in the population of this study. McBee's (2006) study of over 700,000 students in Georgia and the screening of gifted students found that the percentage of students paying for their lunches (wealthier) was more than four times that of students receiving free or reduced-price lunches (poorer). Also, students who paid for their lunches were five times as likely as free and reduced lunch students to have parents who requested gifted programming. Wood and Stambaugh (2015) contended that less than eight percent of gifted students come from backgrounds of impoverishment. This difference arises from a combination of identification and lower quality education.

**Current status of programming for rural gifted students.** Kentucky as a rural state is sometimes limited in providing gifted services, especially in rural localities. Rural schools often have limited financial resources, lacking quality facilities, high-speed Internet, school-to-work programs, or specialized teachers for gifted programs (Stambaugh & Wood, 2015). Azano, Callahan, Missett, and Brunner (2014) found that

rural gifted teachers often had mixed grade classrooms, classes that only met weekly or every other week, and classes in multiple schools separated by great distances. They also found that these teachers often had administrative duties in addition to their teaching and that they felt professionally isolated because many times they were the only gifted teacher in the district.

On the other hand, Stambaugh and Wood (2015) reported that Kentucky is unusual in that it required gifted education coursework for all preservice teachers. Unfortunately, they also reported that only 43% of rural teaching staff has attained at least a master's degree compared with 49% of urban and 52% of suburban teachers. Also, teachers of rural gifted students often lack access to job-specific professional development and struggle with limited access to cultural information and resources. Conversely, teachers in rural schools often have the advantage of knowing the students and each other well. Also, administrator preparation programs contain little if any focus on gifted programming. In general, a significantly smaller proportion of teachers from rural areas take coursework in gifted education (Jones & Southern, 1992).

**Aspirations of rural gifted students.** In *Hollowing Out the Middle*, Carr and Kefalas (2010) describe leaving their rural community as “mandatory” for the a highly talented group deemed “the achievers”. They went on to say that this group seldom, if ever, returns to small town life. This pattern is said to tremendously impact the social, economic and environmental future of rural communities. Petrin, Schafft, and Meece (2014) acknowledged this thinking, but found that the highest achieving rural students are among those with the greatest community attachment.



Chenoweth and Galliher (2004) conducted a very detailed study about the factors influencing college aspirations of rural West Virginia high school students. They found that slightly more females than males aspired to attend college. Prior academic success and preparation for college emerged as the most salient predictors of college aspirations. Also, students who aspired to college appeared to have been working toward that goal for most of their academic careers.

Schools typically encourage all gifted students to enroll in a college preparatory curriculum. However, to perform manual work well requires intellectual engagement; to perform it extraordinarily well involves a considerable amount of intellectual talent. As a result, many capable rural students simply prefer to enter the workplace early, to pursue jobs that allow them to work with their hands. Many desire to become entrepreneurs or to embrace life choices made on the basis of meaningfulness for family and community. Practical problem solving represents an asset in many rural communities (Stambaugh & Wood, 2015).

**Grade point average and ACT scores of gifted students.** Wood and Stambaugh (2015) assert that gifted students sometimes avoid advanced courses to minimize risk to their Grade Point Average. Colangelo, Kerr, Christensen, and Maxey (1993) compiled a comparison of gifted achievers and underachievers. In a large sample of gifted high school juniors and seniors, 30,347 students had a GPA at or above 3.75 on a 4.00 scale. These students were flagged as high achievers. Only 257 of the students had a GPA at or below 2.25. These students were flagged as underachievers. The high achievers had somewhat higher mean scores on the ACT English and mathematics

subtests as well as the ACT composite score. The underachievers actually had slightly higher scores on the social studies and natural science ACT subtests (see Table 2.2).

Table 2.2

*Mean ACT Scores of Gifted Students based on Literature Review*

ACT Test	Underachievers Mean	High Achievers Mean
English	25.837	26.611
Mathematics	26.949	29.874
Social Studies	28.961	28.723
Natural Sciences	31.588	31.268
Composite	28.514	29.276

Source: Colangelo, N., Kerr, B., Christensen, P., & Maxey, J. (1993). A comparison of gifted underachievers and gifted high achievers. *Gifted Child Quarterly*, 37(4), 155-160.

**Class rank of gifted students.** Other factors may impact students' success in academically challenging courses. Thijs, Verkuyten, and Helmond (2010) in a study in the Netherlands discussed the Big-Fish-Little Pond Effect (BFLPE). The BFLPE implies that students in courses where the average achievement is low will have a higher academic self-concept than equally achieving students in courses where the average achievement is high. The BFLPE is commonly used to describe the academic self-concept of gifted students in regular courses or schoolwide. It was found that perceived

position in class or class rank was a cause of the BFLPE. As a result, class rank influences academic self-concept and, according to Marsh and Craven (2006), academic self-concept effects achievement. This may particularly apply to gifted students who in a number of ways receive special treatment in school.

**Underachievement in gifted students.** Gifted underachievement may lie in feelings of strangeness and isolation, feeling guilty about effortless success, fear of envy and retaliation, and feeling like a failure due to perfectionism. A potential solution is some form of psychotherapy (Grobman, 2006). Colangelo, Kerr, Christensen, and Maxey (1993) provided details regarding the demographics of gifted underachievement. Analysis of their sample revealed that of the gifted underachievers 90.3% were male, 91.2% were White, 18.5% had family incomes below \$24,000 per year, and 88.7% were from high schools with fewer than 600 students.

**National standards in gifted and talented education.** The National Association for Gifted Children (n.d.-b) has developed national standards to guide high quality education for the nation's gifted students. The standards include Pre-K to Grade 12 Gifted Education Programming Standards, Knowledge and Skill Standards in Gifted and Talented Education for All Teachers, Teacher Preparation Standards in Gifted Education, and Advanced Standards in Gifted Education Teacher Training.

### **State Policies and Financial Impact of Advanced Academic Services**

Advanced academic services generally cost more. A study in a midsize eastern school district showed that the average salary for a teacher of a regular course was \$61,940 compared to \$70,283 for advanced courses and \$73,253 for AP courses. The per-pupil course costs were found to be \$739 for regular courses compared to \$1,300 for

advanced courses and \$1,660 for AP courses (Roza, 2009). For dual credit courses, according to Tobolowsky and Allen (2016), in some instances there are reduced or waived fees. Nationwide, in 44% of dual credit programs, secondary schools and districts bare costs entirely or partly, thus leaving some costs to families. In general, costs for students can vary from \$85 to \$600.

### **Kentucky Policies and Financial Impact of Advanced Academic Services**

Stephen Pruitt, Kentucky's Commissioner of Education, shared by email with all state school superintendents that the United States Department of Education recently announced a \$461,915 award to the state of Kentucky as part of the federal AP Test Fee Program. The purpose of this grant was reduction in fees for AP and I B exams taken in 2016 by low income students, defined as those eligible for free/reduced lunch. In 2016, this grant provided \$38 per test for low income students taking AP exams. The College Board reduced the test fee by \$30 for low income students. This left schools to pay \$15 per exam for low income students as a Kentucky Administrative Regulation (702 KAR 3:220) makes it illegal to charge students receiving free/reduced lunches for the remaining balance on their AP exams.

Unfortunately, the new Every Student Succeeds Act (ESSA) consolidated approximately 49 programs, including the AP Test Fee Program, into the new Title IV "block grant". This resulted in no individual grant program focused solely on AP fee reduction and as a result the state of Kentucky will be forced to apply for Title IV-Part A funding to subsidize the costs of tests for low income students. Consequently, beginning in May of 2017, schools will be paying \$53 for each AP exam for low income students. The College Board will be increasing fee reduction by \$1 to \$31 per exam. It was

pledged that the Kentucky Department of Education was aware of the resulting financial burden to schools and districts and was working to locate funding to help reduce this cost to districts (personal communication, October 3, 2016).

On July 24, 2016, Kentucky Governor Matthew G. Bevin established the Kentucky Dual Credit Scholarship Program that pays for up to two dual credit courses in one year with a maximum total of nine dual credit hours. Also, the program established a dual credit tuition rate ceiling for all dual credit coursework at participating postsecondary institutions (Kentucky Department of Education, 2016a). This will likely leave families of some students to cover additional tuition.

The state of Kentucky does provide some degree of funding to districts for gifted programming, 75% of which shall be used to employ properly certified personnel to provide direct instructional services (Kentucky Legislature, n.d.-c). As an example, one rural remote county has 295 students identified as gifted or in the primary talent pool and received \$39,290 for the 2015-2016 school year (National Center for Education Statistics, n.d.-b; Infinite Campus, n.d.; Kentucky Department of Education, 2015b). This would amount to \$133.19 in per pupil spending. Kettler, Russell, and Puryear (2015) found that in 685 rural schools in the state of Texas that \$32.33 was spent per gifted student. This accounted for less than 1% (0.41%) of schools' budgets and involved a mere 0.28% of the schools' faculty. For comparison, this study found that in 1,029 schools (city, suburb, town, and rural) in the entire state of Texas that \$35.43 was spent per gifted student which accounted for 0.52% of schools' budgets and involved 0.47% of the schools' faculty.

## **Summary**

There has been increased activity in the area of advanced academic services, largely due to a new focus on college readiness. There are many financial barriers associated with providing high quality advanced academic services. Rural areas also have a special set of barriers. A literature review indicates that advanced/honors courses, AP/dual credit courses, and gifted services are three major types of advanced academic services that are prevalent. There is relatively little research on which of the three is most effective in making students college ready, especially in rural remote school districts.

## CHAPTER 3

### METHODOLOGY

#### **Purpose Statement**

The overarching purpose of this study was to investigate college readiness of students in rural remote Appalachian Kentucky. Specifically, this study investigates the impact of advanced academic services on college readiness in a region where students are very much in need of academic preparedness and motivation to attend college. This study was a quantitative and comparative approach with a sample of 2,792 students to determine the extent of the relationship between advanced academic services and indicators of college readiness. Descriptive statistics were used along with the inferential statistics methods of ANOVA, chi-square, and post hoc testing to test the hypotheses. There were hopes to add to the research base about these educational programs and provide a call to action to expand those advanced academic services found to be effective, improve ineffective programs, and ultimately lead to better education that advances academic proficiency and college readiness.

#### **Research Questions**

Three questions guided this research:

1. To what extent do rural remote high school students in Appalachia receive advanced academic services—specifically a) advanced/honors courses; b) Advanced Placement/dual credit courses; and c) gifted services?
2. What is the college readiness level of the students, based on ACT composite scores and full-time enrollment in college immediately after graduating from high school, who receive the advanced academic services?

These first two research questions are descriptive. The third research question provides possible predictive answers.

3. Which of the advanced academic services are accompanied by the statistically significantly highest levels of college readiness?

The third question required inferential statistics.

### **Research Design and Methodology**

The research design for this study was quantitative, using comparative methods to determine the extent of the relationship between advanced academic services (advanced/honors courses, AP/dual credit courses, and gifted services) and indicators of college readiness and potential college success. The research focused on the extent of a relationship, did not investigate causes, and only suggests possible predictions for similar populations that might be expected to have similar outcomes.

### **The Study Population**

The population for this study is public high school students in rural remote Appalachian counties in Kentucky. This area is comprised by 19 Kentucky high schools in 16 school districts located in the southeastern part of the state and includes 10,579 students. This study focused on a sample from this population with the expectation that; although, the population is not exactly represented by the sample, the research would provide meaningful information relatable to the entire population.

The teachers and state accountability test scores in the population were found to be rather similar to those statewide; however, the students were found to be of somewhat lower socioeconomic status and less diverse and the schools were found to have somewhat lower per pupil spending. The average teacher in the study population had



12.7 years of experience compared to 11.9 years for the entire state of Kentucky. Only 13.77% of the teachers in the population had not earned at least a Master's Degree while 15.2% of teachers in the state had not done so (Kentucky Department of Education, 2015a).

The average school in the study population contained 557 students, 72.2% of which qualified for free/reduced lunches compared to 60% for the state and 97.9% of which were White compared to 79.0% for the state. The average spending per student for the schools in the population was \$9,006 compared to \$10,426 for the state. Each school in the study population received an Accountability Performance Overall Score for the 2013-2014 school year associated with the Kentucky's school accountability system. This system takes into account student achievement, performance gaps of certain demographic groups, student achievement growth, college/career readiness, and graduation rates. The average school score in the study population was 70.1 out of 100 while the statewide score was 68.7 (Kentucky Department of Education, 2015a). This background data provide a description of the human and fiscal resources and performance characteristics that schools in the population had to support advanced academic services compared to those of the state as a whole.

### **The Study Sample**

Districts that participated in the study are located within 16 districts in southeastern Kentucky and included small and larger sized schools. The superintendents of each of the 16 districts were contacted using email and invited to participate in the study. Five superintendents agreed, each with one high school in their district. This provided a sample consisting of 2,792 students from five high schools that, on average, served 503

students, 70.9% of which qualified for free/reduced lunches. Also, 98.2% of the students were White. Teachers in the study sample were generally well experienced with 11.7 years in schools. Of these teachers, 16.14% had not earned at least a master's degree. The average Accountability Performance Overall Score for the 2013-2014 school year for the schools in the study sample was 67.1 out of a 100 (Kentucky Department of Education, 2015a). The similarity of this information to that of the study population improves the generalizability of this study.

### **Data Sources and Collection**

In order to test for statistically significantly different indicators of college readiness between advanced academic services, treatment groups for each of the three advanced academic services were established. Also, a control group was established from students in each school of relatively high ability and motivation (according to test scores) but who had few or no advanced academic services. Comparisons between these groups offered somewhat reasonable comparisons of the value of taking advanced coursework.

### **Data Sources**

**Student data.** Student level data used to form the groups and measure all variables were obtained from Kentucky's electronic student information system, Infinite Campus (IC). IC is a cloud based database that is used by teachers and administrators to store and manage an extensive array of information about students. All public school districts in Kentucky are required by the Kentucky Department of Education to use this tool according to established data standards.

**District and school data.** The Kentucky Schools Directory (Kentucky Department of Education Division of Communication, 2014) provides a list of the public schools in each county in Kentucky and the number of students in those schools. The National Center for Education Statistics (n.d.-c) maintains a list of most public schools in the United States along with their Locale Code. That information was used to determine which Kentucky schools in Appalachia are rural remote. Details about the schools were obtained through The Kentucky Department of Education's Kentucky School Report Cards (Kentucky Department of Education, 2015a). The reports cards contain a wide variety of information about Kentucky schools including number of students, free/reduced lunch percentages, student demographics, teacher experience, teacher education levels, per pupil spending, and school performance. Information from a particular school year is available in the School Report Cards after a period of time. The information available at the time of this study was for the 2013-2014 school year.

### **Data Collection**

**Institutional Review Board approval.** Expedited approval was obtained from the Eastern Kentucky University Institutional Review Board (IRB) based on the fact that the research involved materials (data, records) that had previously been collected by school systems and that no individually identifiable data were included. Approval from the superintendents was provided in written form prior to the IRB approval and collection of data.

**Ad hoc reports from Infinite Campus.** Ad hoc reports were developed within IC that extracted as Microsoft Excel files all data associated with the variables for this study. Student names, birthdates, social security numbers, and State Student

Identification Numbers (SSIDs) were not extracted. Instead, the Globally Unique Identifier (GUID) available for all students in IC was extracted and used to distinguish between students during data analysis. The GUID bears no resemblance to any Personally Identifiable Information (PII) and is seldom used outside of IC for data work. An example GUID would be 82A45E76-CEB0-4EF5-8F4F-A4FB0B9B3F49. Participating school districts also had the option to request that the GUID be replaced with a randomly generated number. One district did make this request.

**Raw data cleanup.** The raw Microsoft Excel data files were plagued with repeated and extraneous data. The application of filters and Visual Basic macros within Microsoft Excel was used to transform the data files so that the information associated with the variables of this study was contained in a single row for each student in the sample. The macros and filter steps were tested to ensure proper functioning by completing strategic pieces of the data cleanup manually and then comparing the results to those produced by the macros and filters.

**Collaboration with school districts.** The process of collecting data in the cooperating districts consisted of the superintendent requesting that a district IC system administrator give the researcher temporary access to their IC account to setup and run the ad hoc reports then save the resulting files to a password protected USB drive. The system administrator observed the process to ensure that no additional data were accessed. The entire process generally took about fifteen minutes.

### **District and School Permissions**

Only the researcher and dissertation chair know the true identities of participating schools. Each school superintendent in charge of a district with a school in the

population was contacted by email to solicit their participation in this study. In this communication, there is a concise explanation of the purpose of this study, specifically what data were needed in order for the school(s) in their district to participate, how the data would be accessed, and how long the process would take. In addition, superintendents were assured of the confidentiality of student data and that the anonymity of their districts would be ensured. Lastly, there is an offer to answer any questions that they still had.

Data were requested for the 2014-2015 school year. The offer was made to provide participating superintendents with a copy of the dissertation when it is available or a version of the data analysis from the school(s) in their district along with a concise and easy-to-understand commentary. Five school districts each containing one high school agreed to participate. This supplied data on 2,792 total students.

### **Variables**

Advanced academic services associated with this study included those most commonly found nationwide: advanced/honors courses, AP/dual credit courses, and gifted services. Measures of college readiness used for this study included composite ACT scores and full-time enrollment in college immediately after graduating from high school. The Independent Variable (IV) was the type of advanced academic service. The Dependent Variables (DV) were the indicators of college readiness.

#### **Independent Variable**

The categorical independent variable (IV) will be the type of advanced academic service provided to students.

**Advanced/honors courses.** The first category of service was advanced/honors courses. All courses taught in Kentucky high schools must correspond to one of the courses described in the Academic Course Code List maintained by the Kentucky Department of Education (Kentucky Department of Education, 2016b). Although terms such as “advanced” or “honors” are sometimes used in course names, these are not the only courses that contain advanced content. Detailed criteria were developed to determine which courses would be considered advanced for the purpose of this study (see below).

- Required courses (e.g., English 1) will not be considered advanced.
- “Advanced” or “Honors” versions of required courses will be considered advanced.
- Pre-AP and IB courses will be considered advanced.
- Independent study courses will be considered advanced.
- Electives will be considered advanced if their course descriptions suggest rigorous content (e.g., world literature).
- According to Rupport (2006), studying the arts contributes to student academic achievement and success. As a result, courses in the arts will be considered advanced unless another criteria directs otherwise.
- According to Olsen and Brown (1992), high school students who studied a foreign language consistently scored higher on ACT English and mathematics components than did students who did not study a foreign language in high school. The Kentucky Department of Education (2012b) believes that everyone can learn a language. As a result, first year foreign language courses will not be

considered advanced, but additional foreign language courses will be considered advanced.

- ESL and Spanish for Native Speakers courses will not be considered advanced as they are geared toward English Language Learners.
- Teacher Aide, Peer Tutoring, and School Defined courses have no defined content and will not be considered advanced.
- Experience Based Learning courses are not geared toward college and will not be considered advanced.
- Special education and any courses that are clearly remedial in nature (e.g., reading intervention) will not be considered advanced.
- ROTC courses are geared toward the military and will not be considered advanced.
- Career & Technical Education courses (agriculture, business, and family & consumer sciences) will not be considered advanced because they are more geared toward careers and technical college as opposed to 4-year colleges.
- Area Technology Center courses will not be part of this study in order to maintain focus on courses taught in public high schools.

There were scenarios in which a course may be considered advanced at one school and not advanced, but rather a required course, at another school. Chemistry 1 is a common example. This potential issue was easy to detect during the study because it had the effect of making the control group very small or the treatment group taking advanced/honors courses very large for a particular school. The solution to this issue was

to adjust the criterion for selecting advanced courses for a particular school by ensuring that no required courses were considered advanced.

**Advanced Placement/dual credit courses.** The second category of advanced academic service was AP courses. Due to their similarity of containing college level content, dual credit courses were also placed into this category. Courses in this category are easily identified as they have a special flag within IC.

**Gifted services.** The third and final category of advanced academic service was gifted services. There are twenty-five specific services that are possible for students identified as gifted in Kentucky (see below).

- Various Acceleration Options
  - Early Exit from Primary
  - Grade Skipping
  - Subject Area Higher Grade Level
  - Dual Enrollment Courses
  - Dual Credit Courses
  - Early Exit from High School
- Advanced Placement and Honors Courses
- Collaborative Teaching and Consultation Courses
- Special Counseling Services
- Differentiated Study Experiences in the Classroom
  - Differentiated Individual Study
  - Differentiated for Cluster Groups
- Distance Learning



- Kentucky Virtual High School Courses
- Video Courses
- Other Online Course
- Enrichment Services (School Day)
- Independent Study
- Mentorships
- Resources Services
  - Pull-out Setting
  - Appropriate Instructional Setting
  - Consortium
- Seminars
- Travel Study Options
- Special Schools (4-12)
- Self-Contained Classrooms (4-12)

It should be noted that possible specific services include advanced, AP, and dual credit courses suggesting the likelihood of carry-over between independent variable categories. Helping to make the gifted services category distinct from the others is the fact that Kentucky gifted students are required to be provided at least two specific services. This category also differs from the other advanced academic services in that gifted services are usually longer term services that can begin in the fourth grade (Kentucky Department of Education, 2014a). The extent of this carryover is part of the data analysis for this study. The specific gifted services received by the students in the sample were part of the data collected for this study.

## **Dependent Variables**

The dependent variables (DV) will be the indicators of college readiness and potential college success.

**ACT composite scores.** The first of these indicators is the composite ACT score obtained from IC for each student in the treatment and control groups in the sample. Because students may take the ACT multiple times, the composite score from the required 11<sup>th</sup> grade administration of the test was used for the purpose of this study. ACT is the most prevalent United States college admissions test, designed to determine academic readiness for college (ACT, Inc., 2016c).

**Enrollment in post-secondary education.** The second indicator of potential college success is categorical and simply whether or not twelfth grade students in the sample enrolled full-time in college immediately after high school graduation. The College and Career Readiness and Success Center (2013) asserted that enrolling full-time in college immediately after high school graduation is a strong predictor of postsecondary success. This indicator was obtained from students' graduation records in IC. The information in IC is obtained from students or reliable sources and entered into IC by school staff by November 1<sup>st</sup> following the students' high school graduation. The data consist of eight possible statuses. Statuses coded as "successful" in the IC database include College in KY (at least 12 semester units) and College out of KY (at least 12 semester units). For the purpose of this study, these two statuses are the indicators of enrolling full-time in college immediately after high school graduation. Also coded as "successful" is Vocational/Technical/Special School (full-time) which, for the purpose of this study, was not considered full-time college enrollment because the advanced

academic services under study are not largely intended for this type of college experience.

Other “successful” statuses in IC include Military Service (full-time at least 30 hours per week), Employment (at least 30 hours per week), and Work-School Combination (at least 30 hours per week combined). For the purpose of this study, the Work-School Combination status was not considered full-time college enrollment because the amount of time spent in school is not clearly defined and could involve a vocational/technical/special school. Any other status is simply marked “unsuccessful” in IC. The final status is “Deceased” and is, of course, considered neither successful nor unsuccessful.

### **Assignment of Treatment and Control Groups**

#### **Advanced/Honors Courses Treatment**

Since many students in high schools today may attempt a few advanced/honors courses, students were included in the advanced/honors treatment group only if they had completed at least five advanced/honors courses and did not participate in any AP courses or gifted services. Consideration was given to splitting this advanced academic service into sub-categories of differing degrees (e.g., 1-3 advanced/honors courses, 4-6 advanced/honors courses, 7 or more advanced/honors courses), but it was determined that this would have made group sizes too small.

#### **Advanced Placement/Dual Credit Treatment**

Students were considered to be part of the AP/dual credit treatment group if they had taken one or more of these courses. There was concern that the amount of advanced/honors and AP/dual credit courses offered in sample schools might be small

and necessitate that the AP/dual credit and advanced/honors courses treatment groups be combined in order to create a robust treatment; however, this was certainly not the case. It would be difficult to form a group of students taking a significant number of AP/dual credit courses who are not also taking other advanced/honors courses. As a result, the students in the AP/dual credit treatment group were also allowed to have taken advanced/honors courses. Students in this treatment group did not receive gifted services.

### **Gifted Services Treatment**

Students were assigned to the treatment group receiving gifted services if they were identified in IC as gifted in any of the available categories. Gifted services are made available if students are identified in one or more of several areas, including General Intellectual Ability; Specific Academic Ability in Language Arts, Math, Science, or Social Studies; Visual or Performing Arts Ability in Art, Dance, Drama, or Music; Creative or Divergent Thinking Ability; and Psychosocial or Leadership Skills. The first two of these categories can clearly lead to gifted services that could improve ACT scores and encourage school attendance and college entrance. According to Ruppert (2006), studying the arts contributes to student academic achievement and success, thus justifying the inclusion of Performing Arts Ability category within gifted services for purposes of this study. Anwar, Aness, Khizar, Naseer, and Muhammad (2012) provided empirical support for the relationship between different aspects of creative thinking and academic achievement, supporting inclusion of Creative or Divergent Thinking Ability category. Regarding Leadership Skills, Marzano (2000) found that student leaders understand that they are responsible for their own actions and will be equipped to resist peer pressure,

develop healthy relationships, resolve conflicts, and set goals. These leadership skills will help them achieve their full academic potential.

### **Control Group**

The control group consists of students who did not participate in AP/dual credit courses or gifted services but showed a reasonable level of academic aptitude and achievement by either (a) earning a score of apprentice or better on high school English II and Algebra II end-of-course exams or, if scores on those exams were unavailable, (b) a score of apprentice or better on eighth grade reading and math K-PREP test scores. End-of-course exams are mandated by KDE as the measure of reading and math proficiency for high school students. K-PREP tests are a measure of reading and math proficiency used in earlier grades. Students receive one of the four scores on each exam; novice, apprentice, proficient, or distinguished. Students with significant disabilities are given alternate assessments (Kentucky Department of Education, 2012b) and were not included in the control group. The purpose of using exam scores to ensure an apprentice level of reading and math achievement in the control group was to remove students who, due to low aptitude and/or poor levels of motivation, have low achievement.

It would be desirable for students in the control group to have taken no advanced courses/honors courses. This would have led to a very small control group because many high school students take at least a few advanced/honors courses. Therefore, students in the control group were allowed to take up to four advanced/honors classes and still be included in the group.

## **Analysis of Data and Hypotheses**

### **Descriptive Research Questions**

**Research question 1.** To what extent do rural remote high school students in Appalachia receive advanced academic services—specifically a) advanced/honors courses; b) Advanced Placement/dual credit courses; and c) gifted services?

To answer this question, Microsoft Excel was used to complete a descriptive analysis of the extent to which students in the sample received each advanced academic service (gifted services, AP/dual credit courses, or at least five advanced/honors courses) and the control group. The analysis included the number and percentage of students in the sample who received each advanced academic service.

**Research question 2.** What is the college readiness level of the students, based on ACT composite scores and full-time enrollment in college immediately after graduating from high school, who receive the advanced academic services?

To answer this question, Microsoft Excel was used to complete a descriptive analysis of the college readiness level of students in the sample who were members of each advanced academic service treatment group (gifted services, AP/dual credit courses, or at least five advanced/honors courses) and the control group and who had data available relative to each measure of college readiness. For the interval DV (ACT composite), the analysis included the number of members in each group and the mean ACT composite score. For the categorical DV (whether or not students enrolled full-time in college immediately after graduating from high school), the analysis included the number of members in each group and frequency counts and percentages for those who met the indicator.

### **Inferential Research Question 3**

Which of the advanced academic services are accompanied by the statistically significantly highest levels of college readiness?

This study uses two different measures of college readiness (ACT composite scores and whether or not students enrolled full-time in college immediately after graduating from high school). As a result, there are two sets of hypotheses and data analysis plans.

**ACT composite scores.** *Hypotheses associated with the interval measure of college readiness, ACT composite scores:*

H<sub>0</sub>RQ3.1: There are no significant differences in college readiness as measured by ACT composite scores between students in the population who receive the various advanced academic services and students who do not.

H<sub>1</sub>RQ3.1 (non-directional): There are significant differences in college readiness as measured by ACT composite scores between students in the population who receive the various advanced academic services and students who do not.

H<sub>1</sub>RQ3.1 (directional): The researcher believed that students in the population who received gifted services would be significantly more college ready than students who did not as measured by ACT composite scores and that this advanced academic service would be accompanied by the statistically highest average of this measure of college readiness.

For data analysis, the categorical IV (type of advanced academic service) and interval DV (ACT composite) prescribed the use of an Analysis of Variance (ANOVA). Before the analysis began, there was testing to verify that the assumptions of the

ANOVA were met. The first assumption is independence of observations. The process that has been described for assigning students to treatment and control groups ensures that students are in one and only one group. As a result, there is unmistakably independence of observations. The second assumption is that the ACT composite scores for each advanced academic service has a reasonable normal distribution. This was assessed with SPSS using the Shapiro-Wilk test with a typical alpha level of 0.05. When this assumption is violated, the use of ANOVA is still warranted (with minor concerns about type I errors) if there is a relatively large amount of data points (greater than thirty) for each advanced academic service. The third assumption is that the ACT composite scores for all advanced academic services have reasonably equal variances. This was assessed with SPSS using the Levene's Test of Equality of Error Variances with a typical alpha level of 0.05. When this assumption is violated, the use of ANOVA is still warranted with concerns about type I errors.

After assessment of the assumptions, the ANOVA was conducted using SPSS. This was a One-Way ANOVA due to one IV with four levels and one DV. A conclusion regarding differences in the means of the DV (ACT composite scores) between the treatment and control groups was made with a typical alpha level of 0.05. Post hoc testing was conducted as needed to draw conclusions regarding the hypotheses.

For post hoc testing, due to different treatment group sizes, the Tukey Kramer test using SPSS was appropriate. Groups found to have significantly different ACT composite score means from the control group were reported. Among those groups, those found to have significantly different ACT composite score means from each other



were reported and analyzed to determine which produced the highest ACT composite mean.

**College enrollment.** *Hypotheses associated with categorical measure of college readiness, enrollment in college full-time immediately after graduating from high school:*

H<sub>0</sub>RQ3.2: There are no significant differences in college readiness as measured by enrollment in college full-time immediately after graduating from high school between students in the population who receive the various advanced academic services and students who do not.

H<sub>1</sub>RQ3.2 (non-directional): There are significant differences in college readiness as measured by enrollment in college full-time immediately after graduating from high school between students in the population who receive the various advanced academic services and students who do not.

H<sub>1</sub>RQ3.2 (directional): The researcher believed that students in the population who took Advanced Placement courses would be significantly more college ready than students who did not as measured by enrollment in college full-time immediately after graduating from high school and that this advanced academic service would be accompanied by the statistically highest frequency of this measure of college readiness.

For data analysis, the categorical IV (type of advanced academic service) and categorical DV (whether or not students enrolled full-time in college immediately after graduating from high school) associated with this study prescribed the use of a chi-square test of independence. Before the analysis began, there was testing to verify that the assumptions of the chi-square were met. The first assumption is that there is only one observation per subject. This requirement was clearly met with the DV (whether or not

students enrolled full-time in college immediately after graduating from high school) being Boolean in nature. The second assumption is that no more than 20% of the expected counts are less than five and that all individual expected counts are at least one. Given that the counts are associated with the numbers of students in a graduating class that immediately enroll full-time in college and those who do not, no issues were anticipated or encountered with this assumption.

After assessment of the assumptions, the chi-square was conducted using SPSS. A conclusion regarding differences in frequency of the DV (whether or not students enrolled full-time in college immediately after graduating from high school) between the treatment and control groups was made with a typical alpha level of 0.05. Post hoc testing was conducted as needed to draw conclusions regarding the hypotheses.

For post hoc testing, six comparisons were needed to determine, using individual chi-square tests of independence, which treatments had different frequencies of the DV (whether or not students enrolled full-time in college immediately after graduating from high school) than the control group and the other treatments (advanced/honors courses vs. AP/dual credit courses, advanced/honors courses vs. gifted services, AP/dual credit courses vs. gifted services, and each treatment vs. the control group). Because there were six comparisons, the Bonferroni-adjusted  $p$  value needed for significance was  $0.05/6$ , or 0.008. Groups found to have different frequencies from the control group and from the other treatment groups were reported and analyzed to determine which produced the highest percentage of students enrolled full-time in college immediately after graduating from high school.

### **Parameters of the Study**

This study investigated comparisons between certain academic advanced academic services (gifted services, advanced/honors courses, and AP/dual credit courses) using certain indicators of college readiness (ACT composite scores and whether or a not students enrolled in college full-time immediately after graduating from high school). This study used data from the 2014-2015 school year from rural remote Appalachian Kentucky high schools.

This study did not seek to establish cause and effect between any academic advanced academic service and indicators of college readiness. Also, this study was not a comprehensive analysis of academic advanced academic services and indicators of college readiness, but dealt with only those that have been stated. This study did not seek to make any conclusions that might be possible by analyzing longitudinal data spanning multiple school years. Lastly, this study did not seek to make implications about college readiness initiatives outside of the geographical area of the study or about school levels other than high school.

### **Limitations of the Data**

The information used in this study about advanced academic services received by students does not provide any information about the rigor of those advanced academic services or the effort that the students put forth in the advanced academic services. The ACT composite scores used as an indicator of college readiness by this study do not actually tell us if a student attended college. Also, although ACT composite scores are widely considered to be excellent indicators of college readiness, cultural bias and other limitations are problems with most standardized tests. The other indicator of college

readiness used by this study obtained from IC does reveal whether or not a student enrolled in college full-time immediately after graduating from high school. However, neither indicator of college readiness offers any information about whether or not a student was successful in college. Also missing from both indicators of college readiness is any information about challenges faced by a successful college student and root causes of failure for a student who was not successful.

### **Summary**

The general purpose of this study is to help improve college readiness of students in rural remote Appalachian Kentucky. The study seeks to determine which of the various advanced academic services (advanced/honors courses, AP/dual credit courses, and gifted services) are accompanied by the statistically significantly highest levels of college readiness in the population. College readiness was measured by ACT composite scores and enrollment in college full-time immediately after graduating from high school. The study used a quantitative and comparative approach. In order to test for statistically significantly different indicators of college readiness between advanced academic services, treatment groups for each of the three advanced academic services were established. Also, a control group was established from students of relatively high ability but who had received none or very little advanced academic services. Data for the study were obtained from Kentucky's electronic student information system, IC. The researcher believed that gifted services would be accompanied by the statistically significantly highest ACT composite scores and that AP courses would be accompanied by the statistically significantly highest frequency of enrollment in college full-time immediately after graduating from high school.

## CHAPTER 4

### RESULTS

#### **Introduction**

In this study, data on 2,792 students in five high schools in five school districts in rural remote Appalachian Kentucky were analyzed to research the impact of advanced academic services (advanced/honors courses, Advanced Placement/dual credit courses, and gifted services) on student college readiness. Raw data were obtained from Kentucky's electronic student information system, Infinite Campus (IC), of cooperating districts from the 2014-2015 school year. ACT composite scores and full-time enrollment in college immediately after graduation were measured against advanced academic course work and gifted services in order to evaluate to what extent specific academic programs actually led to increased college readiness and attendance. It was hoped that by understanding the impact of these programs, districts will be better equipped to focus on and expand those found to be effective, and change ineffective programs. Ultimately, the goal is better education, more academic proficiency, and increased college readiness for remote rural Appalachian Kentucky students.

#### **Participation in Advanced Academic Services**

The first research question sought to investigate the extent to which students in the sample participated in advanced academic services, and specifically whether they took advanced/honors courses, AP/dual credit courses, or received broader gifted services. Specifically, the research question is:

To what extent do rural remote high school students in Appalachia receive advanced academic services—specifically a) advanced/honors courses; b) Advanced Placement/dual credit courses; and c) gifted services?

Significant numbers of students in the sample participated in each advanced academic service that is part of this study. It was found that 545 (19.52%) students from the sample received gifted services, 665 (23.82%) students from the sample took at least one AP/dual credit course, and 656 (23.50%) students from the sample took at least five advanced/honors courses (see Table 4.1).

There was overlap among the groups of students participating in each advanced academic service; however, there were still significant numbers of students who participated in only one of each of the advanced academic services. Gifted services was the lone advanced academic service received by 183 students, 187 students took only AP/dual credit courses, and 197 students took only advanced/honors courses (see Table 4.1). These numbers are additional demonstration of the dissimilarity of the educational experience between the groups of students receiving the various advanced academic services. This provides more credibility to this study's comparison of the effectiveness of the different advanced academic services. It was also found that 1,669 students did not receive gifted services, did not take any AP/dual credit courses, and did not take at least five advanced/honors courses. This indicates the existence of enough students for a control group.

Table 4.1

*Descriptive Analysis of Participation in Advanced Academic Services in the Sample*

Service	Number of Students Receiving Each Advanced Academic Service (Percentage of Total Sample of 2,792 Students)	Number of Students Receiving <u>Only</u> Each Advanced Academic Service
Gifted Services	545 (19.52%)	183
AP/Dual Credit Course(s)	665 (23.82%)	187
Advanced/Honors Courses (at least 5)	656 (23.50%)	197

**Formation of Treatment and Control Groups**

Students were placed into the gifted services treatment group simply if they had received gifted services. Students were placed into the AP/dual credit treatment group if they had not received gifted services, but had taken at least one AP/dual credit course. Students were placed into the advanced/honors courses treatment group if they had not received gifted services or taken any AP/dual credit courses, but had taken at least five advanced/honors courses. Students were placed into the control group if they had not received gifted services, not taken AP/dual credit courses, not take more than four advanced/honors courses, and scored at least apprentice on state proficiency testing in language arts and mathematics. These parameters placed a total of 554 students into the control group. Removing students from the control group who had taken five or more advanced/honors courses removed only 67 possible students, so the cut point for the number of advanced/honor courses that potential members of the control group could take received some justification.

## **Advanced Academic Services and College Readiness**

The second research question sought to establish the college readiness level of students in the treatment and control groups. Specifically, the research question is:

What is the college readiness level of students in the population who receive the various advanced academic services?

This research question is descriptive. There were 2,792 students in the five high schools from the five districts in the sample.

### **ACT Composite Scores by Category**

Of the students in the sample, 1,723 had an ACT composite score available in the dataset and the mean composite of all of these students was found to be 18.3. A total of 240 students were in the control group and had an ACT composite score available. This group had a mean ACT composite score of 18.2. A total of 386 of the students were in the gifted services group and had an ACT composite score available. This group had the highest mean ACT composite score among the groups of 22.9. A total of 229 of the students were in the AP/dual credit group and had an ACT composite score available. This group had a mean ACT composite score of 20.2 which was noticeably higher than that of the control group. A total of 155 students were in the advanced/honors courses group and had an ACT composite score available. This group had the lowest mean ACT composite score of 16.7 which was lower than that of the control group (see table 4.2).



Table 4.2

*Descriptive Analysis of ACT Composite Scores by Treatment Group*

Group	N	M
All Students in Sample with an ACT Composite Score	1,723	18.3
Control	240	18.2
Gifted Services	386	22.9
AP/Dual Credit Courses	229	20.2
Advanced/Honors Courses	155	16.7

**Full-Time Enrollment in College Immediately After High School by Category**

Of the students in the sample, 647 had information available about what they did immediately after high school graduation in the dataset. It was found that 280 (43.3%) of these students met the college readiness indicator of enrolling full-time in college immediately after high school graduation. A total of 54 students were in the control group and had post-secondary information available with 12 (22.2%) of the students meeting this college readiness indicator. A total of 164 of the students were in the gifted services group and had post-secondary information available with 123 (75.0%) of the students meeting this college readiness indicator. A total of 130 of the students were in the AP/dual credit courses group and had post-secondary information available with 72 (55.39%) of the students meeting this college readiness indicator. A total of 92 students were in the advanced/honors courses group and had post-secondary information available with 40 (43.5%) meeting this college readiness indicator (see table 4.3).

Table 4.3

*Descriptive Analysis of Full-Time Enrollment in College Immediately After Graduating From High School by Treatment Group*

Group	N	Number of Students Enrolled Full-Time in College Immediately After Graduating From High School	%
All Students in Sample with Post-Secondary Information Available	647	280	43.3
Control	54	12	22.2
Gifted Services	164	123	75.0
AP/Dual Credit Courses	130	72	55.4
Advanced/Honors Courses	92	40	43.5

**Differences in Advanced Academic Services and College Readiness**

The third research question sought to investigate the differences in college readiness found between the treatment groups receiving the various advanced academic services and the control group. Specifically, the research question is:

Research Question 3: Which of the advanced academic services are accompanied by the statistically significantly highest levels of college readiness?

**Advanced/Honors Courses**

The advanced/honors courses treatment group was found to have a statistically significant different ACT composite mean than that of the control group and the AP/dual credit and gifted services treatment groups. This mean was 16.7 which was lowest

among the 18.2 mean of the control group, the 20.2 mean of the AP/dual credit group, and the 22.9 mean of the gifted services group.

When considering the college enrollment indicator of enrollment in college full-time immediately after graduating from high school, the advanced courses treatment group was found to have a statistically significant lower 43.5% of students meeting the indicator than the 75.0% of the gifted services group. However, there were no statistically significant differences found between the advanced courses treatment group and the control or AP/dual credit groups.

### **Advanced Placement/Dual Credit Courses**

The AP/dual credit courses treatment group was found to have a statistically significant different ACT composite mean than that of the control group and the advanced/honors courses and gifted services treatment groups. This mean was 20.2 which was higher than the 18.2 mean of the control group and the 16.7 mean of the advanced/honors courses group, but lower than the 22.9 mean of the gifted services group.

When considering the college enrollment indicator of enrollment in college full-time immediately after graduating from high school, the AP/dual credit courses treatment group was found to have a statistically significant higher 55.4% of students meeting the indicator than the 22.2% of the control group and a statistically significant lower percentage of students meeting the indicator than the 75.0% of the gifted services group. However, there were no statistically significant differences found between the AP/dual credit courses treatment group and the advanced/honors courses service group.

## **Gifted Services**

The gifted services treatment group was found to have a statistically significant different ACT composite mean than that of the control group and the advanced/honors courses and AP/dual credit courses treatment groups. This mean was 22.9 which was highest among the 18.2 mean of the control group, the 20.2 mean of the AP/dual credit courses group, and the 16.7 mean of the advanced/honors courses group.

When considering the college enrollment indicator, the gifted services treatment group was found to have a statistically significant higher (75%) of students meeting the indicator compared to 22.2% of the control group, 43.5% of the advanced/honors courses group, and the 55.39% of the gifted services group.

### **Conclusions Regarding the Advanced Academic Services and College Readiness**

These findings rejected the null hypothesis and supported the substantive hypothesis that there are significant differences in college readiness as measured by ACT composite scores between students who receive advanced academic services and students who do not. It was found that there were significant differences as measured by ACT composite scores between students in each treatment group and the control group. The findings also supported the researcher's directional hypothesis that students who received gifted services were significantly more college ready, as measured by ACT composite scores, than any other group of students. The mean ACT composite score of the gifted services group was 22.9, compared to 20.2 for the AP/dual credit courses group, 16.7 for the advanced/honors courses group, and 18.2 for the control group.

These findings also rejected the null hypothesis and supported the substantive hypothesis that there are significant differences in college readiness as measured by full-

time enrollment in college immediately after graduation between students who receive advanced academic services and students who do not. It was found that there were significant differences as measured by full-time enrollment in college immediately after graduation between the gifted services group and the control group as well as the advanced/honors courses group and the AP/dual credit courses group. There were also significant differences between the AP/dual credit group and the control group. No significant differences were found between the advanced/honors courses group and the control group or the AP/dual credit courses group. The percentage of student enrolling full-time in college immediately after graduation was 75% for the gifted services group, 55.4% for the AP/dual credit courses group, 43.5% for the advanced/honors courses group, and 22.2% for the control group. The findings did not support the researcher's directional hypothesis that students in the population who took AP courses would be significantly more college ready, as measured by full-time enrollment in college immediately after graduation, than any other group of students.

## **Hypothesis Testing**

### **ACT Composite Scores**

**Assumptions.** For the ACT composite score measurement of college readiness, hypotheses were tested and findings were established with a One-Way ANOVA. As a preliminary step, the assumptions associated with the ANOVA were assessed. The first of these assumptions, independence of observations, was clearly met. The second of these assumptions was a reasonable normal distribution of the dependent variable (DV), ACT composite scores, for each category of the independent variable (IV), the advanced academic services. This was assessed with SPSS using the Shapiro-Wilk test and a

typical alpha level of 0.05. It was found that  $p < 0.05$  for each group (see Table 4.4). As a result, the test's null hypothesis that there exists a normal distribution of ACT composite scores is rejected. The use of ANOVA is still warranted, with minor concerns about Type I errors, due to the relatively large number of data points, greater than thirty, for each category of the IV (type of advanced academic service).

Table 4.4

*Shapiro-Wilk Test of Normal Distribution of ACT Composite Scores for Each Advanced Academic Service Group*

Group	Statistic	Df	Sig.
Advanced/Honors Courses	0.970	155	0.002
AP/Dual Credit Courses	0.977	329	0.000
Gifted Services	0.991	386	0.017
Control	0.982	240	0.004

The final assumption, reasonably equal variances among the DV (ACT composite scores) for all categories of the IV (the advanced academic services) was assessed with SPSS using Levene's Test of Equality of Error Variances and a typical alpha level of 0.05. It was found that  $p < 0.05$  (see Table 4.5). As a result, the test's null hypothesis that the groups have reasonably equal variances is rejected. The use of ANOVA is still warranted, with minor concerns about type I errors.

Table 4.5

*Levene's Test of Equality of Error Variances of ACT Composite Scores among Study Groups*

Levene Statistic	df1	df2	Sig.
27.642	3	1,106	0.000

**ANOVA.** With assumptions addressed, the One-Way ANOVA was completed. There was a significant effect on ACT composite scores at the  $p < 0.05$  level for the three advanced academic services and control groups [ $F(3, 1,106) = F, p = 0.000$ ] (see Table 4.6). As a result, the null hypothesis was rejected, the non-directional substantive hypothesis was supported. There are significant differences in college readiness as measured by ACT composite scores between students in the population who receive the various advanced academic services and students who do not.

Table 4.6

*One-Way Analysis of Variance of ACT Composite Scores among Study Groups*

Source	df	SS	MS	F	p
Between groups	3	5,632.799	1,877.600	150.419	0.000
Within groups	1,106	13,805.599			
Total	1,109	19,438.397			

**Post hoc analysis.** The next step was post hoc analysis to assess the directional substantive hypothesis by determining which advanced academic services were

accompanied by statistically significantly different levels of college readiness as measured by ACT composite scores. Tukey Kramer tests were conducted on all possible pairwise contrasts. All pairs of groups were found to be significantly different ( $p < 0.05$ ) (See Table 4.7). Each treatment group when compared to the other treatment groups and each treatment group compared to the control group was accompanied by a statistically significantly different ACT composite mean. The students in the population who received gifted services had the highest ACT composite mean (see Table 4.2 earlier in this chapter). As a result, the directional substantive hypothesis was supported, students in the population who received gifted services were significantly more college ready than students who did not as measured by ACT composite scores and that this advanced academic service would be accompanied by the statistically significantly highest average of this measure of college readiness.



Table 4.7

*Tukey Kramer Analysis of All Pairwise Contrasts of Study Groups*

(I) Advanced Academic Service Type	(J) Advanced Academic Service Type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Gifted Serv.	AP/ Dual C.	2.75521	0.26510	0.000	2.0731	3.4373
	Adv Courses	6.18802	0.33596	0.000	5.3236	7.0524
	Control	4.67081	0.29043	0.000	3.9236	5.4181
AP/Dual C. Courses	Gifted Serv.	-2.75521	0.26510	0.000	-3.4373	-2.0731
	Adv Courses	3.43281	0.34420	0.000	2.5472	4.3184
	Control	1.91560	0.29992	0.000	1.1439	2.6873
Adv/Honors Courses	Gifted Serv.	-6.18802	0.33596	0.000	-7.0524	-5.3236
	AP/ Dual C.	-0.43281	0.34420	0.000	-4.3184	-2.5472
	Control	-1.51720	0.36406	0.000	-2.4539	-0.5805
Control	Gifted Serv.	-4.67081	0.29043	0.000	-5.4181	-3.9236
	AP/ Dual C.	-1.91560	0.29992	0.000	-2.6873	-1.1439
	Adv Courses	1.51720	0.36406	0.000	0.5805	2.4539

## **College Enrollment Indicator**

**Assumptions.** For college enrollment full-time immediately after graduating from high school measurement of college readiness, hypotheses were tested and findings were established with a chi-square test of independence. As a preliminary step, the assumptions associated with the chi-square were assessed. The first assumption is that there is only one observation per subject. This requirement was clearly met with the DV (college enrollment full-time immediately after graduating from high school) being Boolean in nature. The second assumption is that no more than 20% of the expected counts are less than five and that all individual expected counts are at least one. This assumption is clearly met (see Table 4.3 earlier in this chapter).

**Chi-Square.** With the assumptions addressed, a chi-square test of independence was performed to examine the relation between advanced academic service received or membership in a control group and whether or not students attend college full-time immediately after graduating from high school. The relation between these variables was significant,  $X^2 (3, N=440) = 54.940, p < 0.05$  (see Table 4.8). As a result, the null hypothesis was rejected, the non-directional substantive hypothesis was supported. There are significant differences in college readiness as measured by enrollment in college full-time immediately after graduating from high school between students in the population who receive the various advanced academic services and students who do not.

Table 4.8

*Chi-Square Test of Independence of Attending College Immediately After High School Graduation among Study Groups*

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	54.940 <sup>a</sup>	3	0.000
Likelihood Ratio	56.994	3	0.000
N of Valid Cases	440		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 23.69.

**Post hoc analysis.** The next step was post hoc analysis to assess the directional substantive hypothesis by determining which advanced academic services were accompanied by statistically significantly different levels of college readiness as measured by enrollment in college full-time immediately after graduating from high school. Chi-square tests were conducted on all possible pairwise contrasts. Because there are six comparisons, the Bonferroni-adjusted  $p$  value needed for significance was  $0.05/6$ , or  $0.008$ . Comparisons of the AP/dual credit courses and the gifted services treatment groups were each found to be significantly different with the control group ( $p < 0.008$ ). Comparisons of the advanced/honors courses and AP/dual credit courses treatment groups were each found to be significantly different with the gifted services treatment group ( $p < 0.008$ ). However, comparisons of the advanced/honors courses treatment group with both the AP/dual credit courses treatment group and the control group were not significantly different (see Table 4.9). The students in the population

who received gifted services had the highest rate of enrolling in college immediately after graduating from high school (see Table 4.3 earlier in this chapter). As a result, the directional substantive hypothesis was not supported, students in the population who took AP courses were not significantly more college ready, as measured by full-time enrollment in college immediately after graduation, than any other group of students.

Table 4.9

*Chi-Square Test of Independence of All Pairwise Contrasts of Study Groups*

Advanced Academic Service Types		Value	df	Asymptotic Significance (2-sided)
Adv/H & Gifted	Pearson Chi-Square	25.318 <sup>a</sup>	1	0.000
	Likelihood Ratio	25.089	1	0.000
	N of Valid Cases	256		
Adv/H & AP/DC	Pearson Chi-Square	3.055 <sup>b</sup>	1	0.080
	Likelihood Ratio	3.062	1	0.080
	N of Valid Cases	222		
AP/DC & Gifted	Pearson Chi-Square	12.493 <sup>c</sup>	1	0.000
	Likelihood Ratio	12.488	1	0.000
	N of Valid Cases	294		
Adv/H & Control	Pearson Chi-Square	6.705 <sup>d</sup>	1	0.010
	Likelihood Ratio	6.967	1	0.008
	N of Valid Cases	146		
AP/DC & Control	Pearson Chi-Square	16.911 <sup>e</sup>	1	0.000

Table 4.9 (continued)

Advanced Academic Service Types		Value	df	Asymptotic Significance (2-sided)
	Likelihood Ratio	17.769	1	0.000
	N of Valid Cases	184		
Gifted & Control	Pearson Chi-Square	47.994 <sup>f</sup>	1	0.000
	Likelihood Ratio	48.034	1	0.000
	N of Valid Cases	218		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 33.42.

b. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 45.59.

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 43.78.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 19.23.

e. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 24.65.

f. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.56.

### Summary

#### Description of the Extent of Advanced Academic Services

Descriptive analysis of the extent of advanced academic services for all students in the sample revealed that 1,123 or 40.22% of students in the sample had one or more of the advanced academic services. Conversely, 1,669 or 59.78% of students in the sample had minimal or no advanced academic services. The most common advanced academic service included 545 students or 19.52% of the sample who received gifted services. AP/dual credit courses were taken by the second largest group of 665 or 23.82% of students in the sample. The smallest category was for five or more advanced/honors courses that included 656 or 23.5% of students in the sample.

### **Description and Inferential Analysis of ACT Composite Scores**

Descriptive analysis of the interval measure of college readiness using ACT composite scores revealed that the mean ACT composite for all students in the sample was 18.3. Students in the control group (those receiving no gifted services nor taking advanced coursework) had a slightly lower mean ACT composite of 18.2. Surprisingly, students in the advanced/honors courses group had the lowest mean ACT composite score of 16.7. Students in the AP/dual credit courses group had a moderately high mean ACT composite score of 20.2. It was only the students in the gifted services group who had a reasonably high mean ACT composite score of 22.9. It appears that only those students who take AP/dual credit courses and those who receive special gifted services score well on college readiness tests. Interestingly, advanced/honors high school courses were not accompanied by statistically significantly higher ACT scores.

Inferential analysis of the advanced academic services (advanced/honors courses, AP/dual credit courses, and gifted services) and the statistical significance of differences in the interval measure of college readiness (ACT composite) revealed a significant effect at the  $p < 0.05$  level for the three advanced academic services and control [ $F(3, 1,106) = F, p = 0.000$ ]. Tukey Kramer post hoc testing revealed that all pairs of groups, the three advanced academic services and the control group, were significantly different ( $p < 0.05$ ).

### **Description and Inferential Analysis of College Enrollment Indicator**

Descriptive analysis revealed that only 43.3% of students in the sample met college readiness based on full-time enrollment in college immediately after graduation. That percentage was lower for students in the control group, at 22.20%. Students in the advanced/honors courses group attended college at a higher degree of 43.5%. It was only

students in the AP/dual credit courses group (55.4%) and the gifted services group (75%) who showed much higher levels of college attendance immediately after graduation.

Inferential analysis of the advanced academic services (advanced/honors courses, AP/dual credit courses, and gifted services) and the statistical significance of differences in the categorical measure of college readiness (enrolling in college full-time immediately after high school graduation) revealed a significant effect at the  $p < 0.05$  level for the three advanced academic services and control [ $\chi^2(3, N=440) = 54.940$ ]. Posthoc testing using chi-square with a Bonferroni-adjusted  $p$  value of 0.008 revealed that comparison of the AP/dual credit courses and gifted services groups to the control group were significantly different as was comparisons of the gifted services group to the advanced/honors courses and AP/dual credit courses groups. Comparisons of the advanced/honors courses group to both the control group and AP/dual credit courses groups were not found to be significantly different.

### **Conclusion**

It does appear that advanced academic services are accompanied by statistically significant differences in college readiness. Both AP/dual credit courses and gifted services were accompanied by statistically significant positive differences. Interestingly and unexpectedly, advanced/honors courses were actually accompanied by statistically significantly lower ACT composite scores.

## CHAPTER 5

### DISCUSSION

#### **Summary of Findings**

In this study of 2,792 public high school students in rural remote Appalachian Kentucky, 19.52% (545) of the students received gifted services, 23.82% (665) received AP/dual credit coursework, and 23.50% (656) participated in at least five advanced/honors courses.

#### **ACT Composite Scores**

Of these students who had ACT composite scores available, treatment groups were formed of students receiving gifted services (386 students), students taking AP/dual credit courses and not gifted services (229 students), and students taking only at least five advanced/honors courses (155 students). A non-treatment group was also formed of students scoring at least apprentice on language arts and math state tests and who took only no more than four advanced/honors courses (240 students). It was found that the mean ACT composite score was 22.9 for the gifted services group, 20.2 for the AP/dual credit courses group, 16.7 for the advanced/honors courses group, and 18.2 for the non-treatment group. Unexpectedly, the advanced/honors courses group had the lowest ACT composite scores.

#### **Enrollment in College Full Time Immediately after High School**

The percentage of students enrolling in college full time immediately after high school was 75% (123 out of 164 students) for students in the gifted services treatment group, 55.4% (72 out of 130 students) for the AP/dual credit courses group, and 43.5% (40 out of 92 students) for the advanced/honors courses group. For the non-treatment



group, only 22.2% (12 out of 54 students) enrolled in college full time immediately after high school.

### **Significance**

Data analysis revealed that the differences in ACT composite scores among the various treatment groups and the non-treatment group were all significant. Analysis similarly found difference in rates of college enrollment full time immediately after high school. There was significant difference between the control group and both the AP/dual credit courses and gifted services treatment groups. There was also significant difference between the gifted services group and both the advanced/honors courses and AP/dual credit courses groups. There were no significant differences between the advanced/honors courses group and the AP/dual credit courses group. Interestingly, there also were no significant differences in full time college enrollment between the control group and the advanced/honors group.

### **Questions Raised**

It would be useful to learn the extent to which the longer-term and broader gifted services impact student performance overall and more about the extent to which AP/dual credit courses impact college readiness. It would also be useful to learn why the advanced/honors classes don't seem to promote college readiness.

### **Connections to Theoretical Frameworks**

One of the theoretical frameworks for this study is Critical Rural Theory which acknowledges the differences and disadvantages associated with the rural experience when compared to the urban experience. These differences sometimes go unnoticed as they often only become apparent to an individual when they leave a rural area and

experience an urban area. Since many colleges are located in urban areas, this suggests that rural students are often plunged into a much different culture when they arrive at college. Urban areas have a hegemonic relationship with rural areas and people. As a result, the appearance, dialect, background, and personal stories of rural students may result in them feeling belittled by their urban peers. Also, the differences highlighted by Critical Rural Theory are often thought to be disadvantages rooted in poverty. As a result, rural students may encounter fiscal issues during college. While scholarships and financial aid are available, difficulties associated with travel and incidental expenses will remain. These concerns can lead to rural students dropping out of college. As a result, suggestions will be made that schools prepare their college-bound students for the cultural and financial challenges that they will likely experience in college and follow-up with those students after several years have elapsed to evaluate the schools' efforts. A major critique leveled against the critical school is that it has failed to package its liberating ideas in a way that is accessible to the lay person. As a result, an emphasis has been placed on making the suggestions associated with this study practical.

A second theoretical framework for this study is Gagné's Differentiated Model of Giftedness and Talent which holds that giftedness is a superior ability while a talent is an ability that has been developed exceptionally well. This perspective means that without training and effort a gift may not be realized and potentially not even noticed at all. This model illustrates how gifted students can display differentiated school performance as a result of how schools function to cultivate gifts. The results of this study suggest varying effectiveness of school programs for advanced students. This serves as additional illustration of Gagné's claim.

This study further acknowledges Gagné's Model as it seeks to offer suggestions for improving schools' efforts to develop students' gifts into talents. Gagné claims that gifts are developed into talents as a result of catalysts such as motivation, interests, and environmental factors such as family and school. The suggestions of this study seek to improve these catalysts. Gagné also notes that the development of gifts into talents is not an event, but rather an ongoing process. The results of this study supports this assertion as it suggests that gifted services, which happen over a longer period of time, are more effective than more short-term services such as advanced courses and AP/dual credit courses.

### **Other Implications**

**Lack of resources.** Advanced/honors and AP/dual credit courses often require special facilities such as more advanced science and arts labs. Additional lab supplies, equipment for the arts, and print resources are also often required. These needs can require extensive funding. It has been found that low-income students are less likely to receive equitable per student funding (Flores, 2007). Concurring with this finding and focusing more on advanced students, Colangelo, Assouline, and New (1999) examined rural education side by side with gifted education and found that both have received relatively little funding. Lack of funding may be leading to deficiencies associated with resources needed and may be a partial cause for the relative ineffectiveness of advanced/honors and AP/dual credit courses suggested by this study.

Lack of funding also leads to issues relative to human resources. The No Child Left Behind Act of 2001 (NCLB) increased the demand for "highly qualified" teachers and resulted in higher competitive salaries. This has made it even more difficult for low

resource rural schools to attract and retain teachers. The difference between average rural teacher salaries and other teacher salaries varies from \$250 to as much as \$10,400 (North Central Regional Educational Laboratory, 2003).

**Teachers.** The geographical isolation of rural areas also make it difficult to attract teachers due to social and professional isolation and distance from the amenities of larger communities (North Central Regional Educational Laboratory, 2003). This leads to several problems relative to the teachers in rural areas. Teaching in fields far removed from the area of training, high turnover, and lack of diversity among teachers were found to be issues of teachers in rural areas (Monk, 2007). Teachers of rural students often lack job-specific training (Stambaugh and Wood, 2015). Only a small proportion of rural teachers take coursework in gifted education (Jones and Southern, 1992). In often low-funded rural districts using human resources in the most efficient ways possible may limit the extent to which specific teachers can be assigned to work with advanced students (Howley, Rhodes, & Beall, 2009). Finally, teachers in rural areas often find themselves with the challenge of preparing for a larger variety of courses each day (North Central Regional Educational Laboratory, 2003). All of these problems may have contributed to the findings of this study.

**Gaps in student knowledge.** It has been found that rural kindergarten students have slightly lower average mathematics achievement levels than their suburban peers. Widening this problem, the average increase in mathematics achievement from kindergarten to eighth grade for rural children has been found to be smaller than the increase for suburban children (Graham & Provost, 2012). These gaps may cause rural students to struggle in advanced and AP/dual credit courses and with gifted services

(Stambaugh & Wood, 2015). A counterpoint to the gaps in knowledge that rural student may have is the idea that these students often possess a type of knowledge known as phronesis which is associated with practical application. It has been found that it is possible and useful to make connections between this knowledge and what rural students are learning in school (Avery & Kassam, 2011).

**Teacher expectations.** It has been found that even when course titles are the same, the curriculum taught in predominantly poor schools is essentially different from that taught in predominantly upper-class schools (Oakes, 1990). Advanced/honors and AP/dual credit courses may lack effectiveness because of the courses' teachers' relatively low expectations of students. These low expectations may be rooted in lack of teacher qualifications, teacher beliefs in student ability, or in low teacher motivation. Flores (2007) found that low-income students are less likely to have access to experienced and qualified teachers and more likely to face low expectations. In a study by Kocabas (2009), an extensive list of motivating factors for teachers was created. Absent from that list was any factor associated with getting the most from advanced learners. The list did contain "getting good inspection results". Inspection results could include NCLB measures which have nothing to do with advanced learners. These results could also be AP exam results or dual credit pass rates, but finding any inspection results associated with advanced/honors courses is difficult.

**Student expectations.** Students may believe that enrolling in advanced/honors or AP/dual credit courses is all that they need to do in order to reap benefits. They may not expect significantly more rigorous curriculum. If they do encounter such curriculum, they may not be willing to put forth the work to master it. This theory is supported by

claims that just under half (49%) and students enrolled in AP classes get credit for passing grades on the exams. This conflicts with the College Board's claims that two-thirds of students taking AP exams score high enough to qualify for college credit (Santoli, 2002). This is a major concern as it has been found that students who took advanced coursework but did not achieve well in the classes did not benefit as much on college entrance exams than students who achieved well (Brody & Benhow, 1990).

**Student aspirations.** Although the gap has been closing, Apostol and Bilden (1991) found that a greater percentage of urban students, males and females, planned on attending college than rural students. Families in Appalachia may be partially to blame for this lack of aspirations as they sometimes discourage kids from attending college or at least don't know how to help them do so. Also to blame may be that poverty typical in rural areas has the potential to negatively impact interpersonal skills such as motivation and self-esteem (Stambaugh & Wood, 2015). Another cause for lack of college aspirations in rural student is that those who are socialized in "working class" homes and neighborhoods, which are more prevalent in rural Appalachia, may learn to value labor over education and may develop more dismissive or disparaging attitudes toward college (Chenoweth & Galliher, 2004). Lack of a true aspiration toward college readiness may be a contributing factor to the results of this study.

**Short-term versus long-term advanced academic services.** This study found that students who received gifted services had statistically significantly higher ACT composite scores than those who took AP/dual credit courses or advanced/honors courses. The advanced/honors courses group actually had statistically significantly lower ACT composite scores than did students in a control group. One important difference

between gifted services and AP/dual credit courses or advanced/honors courses is that gifted services typically happen over a much longer period of time, often beginning in fourth grade. AP/dual credit courses and advanced/honors courses typically do not begin until eighth grade in mathematics and ninth grade or later in other subject areas. This characteristic of short-term versus long-term between these advanced academic services may be a substantial contributing factor to the differential effectiveness observed in this study.

AP/dual credit courses and advanced/honors courses are examples of between-class ability grouping which has been found to have little or no effect on the achievement of secondary students as measured by standardized tests. This finding is consistent across subject areas and student ability levels (Slavin, 1990). Longitudinal data to evaluate the effectiveness of long-term gifted services are very limited; however, one such study found that student learning was enhanced at significant and important levels through the use of gifted services across academic years in language arts and science. The long-term services were described using the word “consistency” as opposed to “novelty” which may be applied to short-term services (Feng, VanTassel-Baska, Quek, Bai, & O’Neill, 2010).

**Leadership.** At the school level, it has been found that principals spend most of their time on internal administrative tasks as opposed to curriculum and teaching related tasks (Lavigne, Shakman, Zweig, & Greller, n. d.). This combined with the assertion of Gentry (2006) that gifted education exists today in the shadow of the deficit-based nature of the No Child Left Behind Act of 2001, suggests that principals are likely devoting scant time to developing advanced offerings. Horng, Klasik, and Loeb (2009) also found that school principals spend much of their day on administration and organization

management tasks, and substantially less on day-to-day instruction and instructional program tasks. Worsening this issue for Appalachian, they also found that this discrepancy is greater in high poverty schools than in low poverty schools. At the upper level of leadership, Chalker (2002) warned that school boards in rural areas may be unlikely to give attention to advanced programming. Also, even if they attempt to do so, they may not be prepared for the endeavor.

### **Suggestions for Schools**

#### **Implementation of a Rigorous, Relevant, and Varied Curriculum**

Schools need to establish written rigorous curriculum timelines for each of their advanced courses. If the content expertise to do so does not exist within the school, then help could be solicited from local colleges or universities. To ensure that they are implemented, it is essential that these curriculum timelines be monitored with periodic assessments aligned to the timelines. The content of AP courses is established by The College Board, so only a timeline and the monitoring assessments would be required. The curriculum in rural schools should make connections with the practical knowledge often possessed by rural students. Also, the curriculum in schools needs to be vertically aligned so that students can move smoothly from beginning to highly rigorous content. Lack of this vertical alignment will make it more likely that students will enter advanced classes with knowledge gaps requiring remediation. Limited staff in rural schools often leads to advanced/honors courses being offered only in certain content areas. In order to address the interests of all students, schools need to find ways to increase the content variety of advanced and AP/dual credit courses to the extent possible.



### **Teachers as Content Experts**

Rigorous curriculum plans cannot be implemented without teachers who deeply understand that curriculum. With this in mind, schools need to make efforts to recruit and retain teachers with this quality. Interview processes need to include questions about content in addition to the more traditional pedagogical questions. When existing teachers are found to lack appropriate content knowledge, they need to be provided with professional development to address this issue in addition to the, once again, more traditional pedagogical topics. Content expert mentors from local colleges or universities can also be of assistance.

### **Facility and Equipment Needs**

Some advanced/honors and AP courses, especially in the sciences and arts, require extensive specialized equipment and facilities. Schools must make these needs priorities in their facilities and purchasing plans. Grant writing training for teachers or even employing a grant writer can help to secure funding. Used equipment from colleges, universities, and industry can also help address these needs. Equipment needs in high poverty schools can actually be greater than those of other schools because students may not be able to afford items such as graphing calculators and band instruments. As a result, schools may have to maintain an inventory of items for loan.

### **College-Going Culture**

Schools need to foster a college-going culture. This includes steps that need to happen early in students' high school careers such conveying the importance of attending college to students and their parents as motivation. Also of early importance is that

students need to be taught how to make good use of their time in high school to academically prepare for college by taking and excelling in the proper classes.

Later in high school, it is customary to help students find scholarships and complete college applications, but this leaves several missing pieces. Students from poverty need help finding ways to earn spending money for incidental expenses while in college. They need to understand what personal items that they need to secure for their time in college. Sometimes they simply need transportation to college.

Most colleges are in larger cities and most college students are from larger cities. Steps may need to be taken to prepare students from rural areas for life in the city and for interactions with peers who are not from rural areas. The transition to life in a college dorm is difficult for most individuals. Many students have the opportunity to make this transition slowly in the form of short stays in college dorms during summer programs. Students from poverty situations may not have had these opportunities, so steps may need to be taken to help them prepare for this transition.

Collectively, these steps can help to build much-needed self-confidence in rural students so that they can succeed in college.

### **Quality Control of College Readiness Initiatives**

Schools in Kentucky are required to determine whether or not their students were enrolled in college a few months after high school graduation. This does not provide information on whether or not the students were still enrolled at least a few semesters later and eventually graduated. It also does not provide information on the challenges that the students may have faced as they transitioned to college. Although it is sometimes difficult to establish contact with former students after significant time has elapsed, it can

usually be done if contact information is obtained at the time of graduation. Important details about the length and quality of former students' college experiences could be gleaned from a short telephone interview or email exchanges. When this information reveals that students faced difficulties, schools may be able to determine ways to help prevent these issues with future students.

### **Recommendations for Future Research**

#### **Academic Program**

An analysis of the status of the curriculum for advanced programming could happen on many levels and be useful in establishing the need for reform and the root causes for some of the results of this study. First, it would be interesting to learn the prevalence of advanced/honors courses with no written curriculum. For those with a written curriculum, questions follow about the rigor of that curriculum and whether or not it is actually implemented. Similarly, an inventory of the instructional strategies in use relative to advanced programming could be useful in that it can be compared with current accepted best practices. This would establish the need for and scope of reforms as well as continue to add to possible roots causes for the results of this study.

#### **Supports for the Academic Program**

Advanced programming requires appropriate facilities. It would be useful to work with those who provide this programming to establish a set of needs. The status of facilities in various areas could then be compared to these needs to determine the level of deficiency. This information could be useful for officials at many levels who make funding decisions. Similarly, those who provide advanced programming could be surveyed to determine their professional development needs and which of those needs are

unmet. This information could be useful on many levels as plans are made for professional development offerings.

### **Attitudes of Stakeholders**

It would be useful to gain an understanding of the attitudes of parents, students, teachers, and administrators relative to various aspects of schools' advanced programming and the importance of college. This could help reveal possible negative attitudes that could be addressed. It could also reveal deficiencies of the advanced programming and of college readiness initiatives.

### **Other Populations**

Although somewhat complex, the data collection, cleanup, and analysis methods used in this study could be used with other populations in public schools in the state of Kentucky without modification since all of the schools use the same electronic student information system, Infinite Campus (IC), and data standards. Infinite Campus, Inc. (2016), reported that IC is used in 45 states with statewide implementation in seven states. This involves 2,000 districts and 7.7 million students. In these 45 states the IC core product is in use; however, significant database differences exist in addition to different data standards. Nevertheless, thoughts of expanding this study into multiple states with modest modifications to methods is intriguing. Expanding this study to other states using completely different student information systems would be much more difficult. If this study can be expanded to other populations with varying degrees of difficulty then it could also be expanded to school years in addition to 2014-2015 for a longitudinal analysis. This would help to assess the effectiveness of various improvement initiatives that may be beginning, ongoing, or concluding in schools.

### **Addressing Stated Limitations of This Study**

One limitation of this study was that most of the students who received gifted services also took advanced/honors and/or AP/dual credit courses. This means that gifted services were not exclusively judged by this study in isolation of other services. This limitation is lessened by the fact that gifted services would have been provided to students over a long period of time, likely since fourth grade. It would be interesting to attempt to assess gifted services more in isolation of the various advanced/honors courses. Since gifted students who do not take advanced coursework of some type would be rare, perhaps qualitative research consisting of student interviews would be a feasible approach. Something similar could be done relative to the overlaps between the AP/dual credit courses and advanced/honors courses treatment groups.

Another limitation of this study is that it only involved high school students. While there are no AP or dual credit courses below the level of high school, there are some advanced/honors courses in most middle schools and gifted services beginning in grade four in all schools. It would be interesting to assess how these services on the pre-secondary level were impacting early college readiness.

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## APPENDICES

## Appendix A

### Figures

Figure 2.1

*Literature Review Graphic Organizer*

