The Impact of a Four-Day School Week
on High School Student College Readiness and District Financial Savings

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Abstract

As school district budgets have declined and districts looked to find solutions to budget shortfalls, the four-day school week schedule has become more popular. The effects of this shortened schedule, however, are not well known. The first purpose of this study was to determine the effect of a four-day school week schedule on college-readiness, as measured by the average ACT composite scores of school districts in the state of Kansas utilizing a four-day school week. The second purpose of this study was to determine if cost savings were realized when a school district switched from a five-day school week to a four-day school week.

Using average ACT composite scores as a measure of college-readiness, school districts utilizing a four-day school week were compared to districts with similar demographics that utilized a five-day school week. The results showed that switching to a four-day school week negatively impacted ACT composite scores, an indicator of college readiness. Using school district budget expenditures from two years before the district switched to a four-day school week and two years after the district made the switch, savings in the areas of utilities (heating and electricity), transportation, classified staff personnel costs, and food service personnel costs were examined. School districts that switched to a four-day school week showed significant savings in the areas of heating, transportation, and food service personnel costs. Savings in the areas of electricity and classified personnel costs were not realized.

The study has implications for school districts that are currently using a four-day school week as well as those districts that are considering its use in the future. While more than one set of data should be collected to ultimately guide the decision to stay with

or implement a four-day school week schedule, the results of this study could help guide this decision. It is recommended that future research include additional measures of college readiness, perhaps examining longitudinal effects of a four-day school week schedule on students' future endeavors. It is also recommended that a larger number of school districts be examined to increase the power of the statistical analyses garnered from a larger sample size.

Dedication

First, I dedicate this dissertation to my match and partner, Susan. You are without a doubt the most thoughtful, understanding, and patient person I've ever met, and I could not have done this without your support. I look forward to spending more time with you, Homer, and Pepper now that this is completed!

Next, to my mom, Connie. Since I was little you've helped to instill a love of learning and a desire to know how the world works. You will forever be one of the wisest women I know. I am the woman I am today because of you. Thank you for loving me for who I am. I love you dearly. I can only hope to make you proud of me.

To the other members of my family: my dad, Richard; my sisters, Bonnie and Elizabeth, and my favorite brother, Jeff. The world is a less scary place knowing that I have you all to count on. Thank you for putting up with my not answering my phone (usually because I was in the library) and being absent these past years. I promise to be there for you going forward, just as I know you will be for me. You are each a rock that I stand on and I appreciate your love and support that you've shown me throughout this journey

Finally, I dedicate this work to my two nieces, Jescie and Sarah, who continue to inspire me. I am so proud of the young women you have become. Never, ever believe that you cannot do what you want to do, just because you're a girl or just because someone else says so. Go out there and do it. And let's continue to go on adventures together and explore this amazing world in which we live. I love you both so very much!

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Chapter 1

Introduction

With the implementation of the Every Student Succeeds Act (ESSA) in 2015, as well as the vision developed by the Kansas Department of Education (KSDE) adopted in 2016, both federal and state governments continue to emphasize the importance of college-readiness. Schools are being asked to increase their accountability for student success after high school while district budgets continue to decline (Baker, Farrie, & Sciarra, 2016; Leachman, Albares, Masterson, & Wallace, 2016). According to Leachman, Albares, Masterson, and Wallace (2016), in at least 31 states, the average spending per pupil in 2014 was below 2008 levels; in 15 of those 31 states, the difference was more than 10%. Many school districts have taken to adjusting the school calendar in hopes of cutting costs (Chmelynski, 2003; Levin, 2016), including the practice of reducing the five-day school week schedule to four days.

Literature regarding four-day week schedules centers on potential cost-savings (Kordosky, 2012). However, new research is emerging that focuses on the impact a four-day school week schedule has on student achievement, as measured by standardized test scores, such as state-mandated end-of-year assessments (Feaster, 2002; Hewitt & Denny, 2011). Absent from the discussion about the impact of a four-day school week schedule is the effect this schedule has on student college-readiness.

Background

School district budgets across the United States have been decreasing for several years now (Leachman et al., 2016). Local school boards are left striving to find innovative ways to save money while not harming student learning. Of the many

innovations attempted in the preceding years, changing the school calendar to a four-day week seems to be more prevalent. Over 120 school districts in 21 states in the United States currently use a four-day week schedule as opposed to a five-day schedule and this number has been increasing steadily (Chmelynski, 2003; National Conference of State Legislatures, 2017). As of 2008, 15% of school district superintendents were considering the change (Donis-Keller & Silvernail, 2009).

The decision to change to a four-day week has been largely driven by financial concerns in a school district (Anderson & Walker, 2015; Donis-Keller & Silvernail, 2009; Griffith, 2011; Henton, 2015, 2015; Plucker, Cierniak, & Chamberlin, 2012; Sagness & Salzman, 1993). The majority of school districts that utilized a four-day school week did so with the primary purpose of reducing operating costs in a school district. However, school districts have not always experienced significant cost savings when switching to a four-day school week (Blankenship, 1984; Grau & Shaughnessy, 1987; Henton, 2015; Sagness & Salzman, 1993; Yarbrough & Gilman, 2006).

While superintendents believed the change to a four-day week schedule would ultimately save school districts money, the impact on student achievement was unclear, especially in the area of college-readiness. According to ACT (2016), only 26% of students were *college-ready*, meaning they met benchmarks in all four areas (English, reading, mathematics, and science) on the ACT assessment. In general, college-ready refers to students that are adequately prepared to meet the academic challenges of a college-level curriculum (ACT, 2016). Measures of college-readiness are numerous. Examples include high school transcript analysis, standardized test scores, such as ACT

and SAT scores, enrollment into remedial college courses, and bachelor's degree completion within six years.

Schulock et. al (2010) concluded that each year, nearly 60% of students choosing to attend college "discover that, despite being fully eligible to attend college, they are not academically ready for postsecondary studies" (p. 1). As further evidence of students not meeting the challenge of college-level work, the National Center for Educational Statistics (U.S. Department of Education, National Center for Education Statistics, 2016) reported that only 60% of students earned a bachelor's degree after six years. While there are undoubtedly other factors that contributed to students' ability to graduate in six years (Carey, 2004), the fact that 40% of the students that entered college did not graduate with a bachelor's degree in six years alarmed many educators. Carnevale, Smith, & Strohl (2013) reported that by the year 2020, 24% of all jobs in the United States will require a bachelor's degree. If the United States is to keep up with business and industry demands, more college attendees need to become college graduates.

The research concerning schools that have chosen a four-day school week has, thus far, not included an analysis of college-readiness or college-degree completion. The research has, however, addressed student achievement in K-12 education. Some researchers (Daly & Richburg, 1984; Feaster, 2002; Hewitt & Denny, 2011; Lefly & Penn, 2011; Yarbrough & Gilman, 2006) have found that the change to a four-day week schedule does not negatively impact student achievement at the high school level. In some instances, student achievement improved (Anderson & Walker, 2015; Koki, 1992). Performance on standardized tests remained above state and national averages (Grau & Shaughnessy, 1987; Hegwood, 2016). Other studies, however, showed mixed results in

student achievement (Lefly & Penn, 2011). In suburban Idaho, for example, student scores were significantly higher in some content areas but considerably lower in others after the school district implemented a four-day school week schedule (Sagness & Salzman, 1993).

In 2006, the U.S. Department of Education, National Center for Education Statistics modified the classification system for school districts based on size and geography. Instead of three classifications of school districts (small, medium, and large), there are now twelve classifications, all based on the proximity of the district to an urbanized area or urbanized cluster and census-defined descriptions of the location of the territory. Sixteen of the 17 school districts in the current study that utilized a four-day school week in 2016-2017 were classified as rural-remote (U.S. Department of Education, National Center for Education Statistics, 2016). Rural remote districts are those districts with a "census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster" (U.S. Department of Education, National Center for Education Statistics, 2016). One of the school districts operating a four-day school week was classified as rural-distant. A rural-distant designation identified school districts as a "census-defined rural territory that is more than five miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster" (U.S. Department of Education, National Center for Education Statistics, 2016).

In addition to their small, rural designation, school districts in this study utilizing a four-day school week in 2016-2017 reported higher percentages of non-White students than other districts across the state of Kansas (Kansas Department of Education, 2018)

(see Table A1 in Appendix A). The average percentage of non-White students in all school districts in Kansas was 18.7%. Eight of the 17 Kansas school districts in this study that utilized a four-day week in 2016-2017 reported higher non-White student enrollments than the state average. School districts in this study that utilized a four-day week in the state of Kansas in 2016-2017 have also reported higher percentages of students classified as economically disadvantaged. School districts across the state of Kansas have classified, on average, 48.4% of enrolled students as economically disadvantaged. The percentage of students classified as economically disadvantaged was higher than the state average in 13 of the 17 school districts in this study utilizing a four-day school week in 2016-2017.

For the current study, all school districts in Kansas that used a four-day school week in 2016-2017 were matched to school districts using a five-day school week based on school size and the student demographics in minority status and socioeconomic status (SES). For this study, 31 school districts were used: 18 that utilized a four-day school week and 13 school districts that utilized a five-day school week. Composite ACT scores were used to measure student college-readiness. Budget data from the 18 school districts operating a four-day school week in the state of Kansas in 2016-2017 were used to measure cost savings when switching to a four-day school week.

Statement of the Problem

School districts using a four-day school week to solve budgetary shortfalls may not be able to prepare students for the rigors of college-level academics. This is a problem because post-secondary education in the United States continues to be important to the future success of students. When the United States experienced the Great

Recession in 2007, over 8.7 million jobs were lost, many of those in manufacturing and other blue-collar industries (Carnevale et al., 2013). Since then, the United States has recovered only 6.1 millions of those lost jobs, and most of them were in industries that required some level of post-secondary education. Carnevale et al. (2013) reported that by the year 2020, 64% of all jobs in the United States would require some level of post-secondary education; 24% of those jobs will require a bachelor's degree. With regard to earnings, the gap between attaining a four-year degree and only getting a high school education is severe and it is only getting wider. Workers with a post-secondary degree "earn 74% more than workers with a high school diploma or less" (Carnevale et al., 2013, p. 7). When a school district implements a four-day school week schedule, there is a fear that some students will not be prepared to experience success attending college.

An additional fear expressed by school districts that have switched to a four-day school week is not saving as much on transportation, utilities, or classified staff salaries after the switch has occurred (Jennewein, 2016; Plucker et al., 2012; Richard, 2002). Many educators believe that a switch to a four-day school week will be detrimental to a student's education (Tharp, Matt, & O'Reilly, 2016). Therefore, if a significant saving is not realized, school districts would be wise to return to a five-day school week, as some have done (Hill, 2017; Hill & Heyward, 2017).

The research on the effects of implementing a four-day school week in schools is sparse (Beesley & Anderson, 2007; Donis-Keller & Silvernail, 2009; Gaines, 2008; Ryan, 2009). Most of the studies have not investigated the impact of a four-day week on college-readiness. The research has focused on student achievement in elementary and secondary schools, primarily using standardized state assessments (Feaster, 2002;

Sagness & Salzman, 1993). Additional research has examined teacher job satisfaction (Feaster, 2002; Hale, 2007; Nelson, 1983; Wilmoth, 1995), student and teacher absenteeism (Blankenship, 1984; Grau & Shaughnessy, 1987; Koki, 1992; Sagness & Salzman, 1993), and perceptions among students enrolled and teachers working in a school district using a four-day school week (Reinke, 1987). Missing from the literature, however, is any measure of the effect of a four-day school week on high school student college-readiness.

Purpose of the Study

The first purpose of this causal-comparative quantitative study was to determine if there was a difference in college-readiness of students enrolled in a four-day school week schedule compared to students enrolled in a five-day school week schedule. To this end, composite ACT scores from students in school districts utilizing a four-day school week were compared between school districts of similar demographics that were utilizing a five-day school week. The second purpose of this study was to determine the amount of money saved in the areas of utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs (wages and associated insurance premiums) by school districts employing a four-day week schedule.

Significance of the Study

With renewed focus on preparing students for success after high school (ESSA, 2015; Kansas Department of Education, 2017) as well as the continued budget problems present across the United States beginning in 2008 (Leachman et al., 2016b; Leachman & Mai, 2014), school districts have been under increased pressure to meet unprecedented academic and financial demands. School districts have searched for ways to shore up

budgets while still maintaining high academic standards. One possible solution has been to implement a four-day school week schedule.

While some small, rural districts have changed to a four-day school week, little is known about the implications of the four-day week schedule, including both the potential changes to student achievement and the actual cost savings to district budgets. Superintendents and boards of education could use the results of this study when considering the change to a four-day school week schedule. Not only should district leaders consider the cost savings of a four-day school week schedule, but they should also consider the potential change in student college-readiness.

Delimitations

According to Lunenburg and Irby (2008), delimitations are the boundaries that the researcher places on the study to narrow the focus and scope of the study.

The delimitations were as follows:

1. The location of this study was in the state of Kansas.
2. School districts who have implemented a four-day school week since the 2002-2003 school year were included.
3. Composite ACT scores were used to measure college-readiness.

Assumptions

Assumptions are the "postulates, premises, and propositions that are accepted as operational for purposes of research" (Lunenburg & Irby, 2008, p. 135). This study included the following assumptions:

1. The ACT test data provided by the Kansas State Department of Education (KSDE) was accurate.

2. School districts in the state of Kansas reported the use of the four-day school week accurately to the Kansas Association of School Boards (KASB).
3. Budget information reported to the Kansas Department of Education was accurate.

Research Questions

As Lunenburg and Irby (2008) explained, the research questions assess "the degree to which two or more variables are related to each other" (p. 127). In particular, this study examined the correlation between two or more variables. This study examined the following research questions:

RQ1. To what extent is there a difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in comparable school districts that utilize a five-day schedule?

RQ2. To what extent is the difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in school districts that follow a five-day schedule affected by the minority status of the students?

RQ3. To what extent is the difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in school districts that follow a five-day schedule affected by the socioeconomic status (SES) of the students?

RQ4. Is there a difference in the money spent on utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs after implementing a four-day school week?

Definition of Terms

The following terms were used throughout this dissertation and are defined here to assist the reader in adequately interpreting the information contained therein.

ACT. The ACT is a comprehensive assessment that has been shown to measure college-readiness. It is designed "to help high school students develop postsecondary educational plans," (ACT, 2014, p. 1) as well as to help postsecondary educational institutions with admissions and course placement of new students.

The ACT consists of four multiple-choice tests of education achievement – one each in the subjects of English, mathematics, reading, and science. Each component is scored on a scale of 1 to 36. The ACT composite score is the mean of the four component scores, rounded to the nearest whole number. The minimum composite score is 1; the maximum composite score is 36. Further, ACT has established College Readiness Benchmarks, which measure a student's chance of success in selected courses commonly taken during the first year of college. By attaining these College Readiness Benchmarks, a student has a 50% chance of earning a grade of B or higher in the first-year course or a 75% of earning a grade of C or higher in the first-year course (ACT, 2011, p. 2). A composite score of 21 is the average of the College Readiness Benchmarks for each of the components of the ACT. The breakdown of each of the four components is as follows:

English. The English test measures grammar, usage and mechanics, and rhetorical skills. A score of 18 or higher indicates a 50% chance of obtaining a B or higher or approximately a 75% chance of attaining a C or higher in a first-year college course, such as English Composition (ACT, 2011).

Mathematics. The mathematics test measures pre-algebra, elementary algebra, intermediate algebra, geometry, and trigonometry. A score of 22 or higher indicates a 50% chance of obtaining a B or higher or approximately a 75% chance of attaining a C or higher in a first-year college course, such as College Algebra (ACT, 2011).

Reading. The reading test measures comprehension ability in prose fiction, social sciences, humanities, and natural sciences. A score of 21 or higher indicates a 50% chance of obtaining a B or higher or approximately a 75% chance of attaining a C or higher in a first-year college course, such as a social science course in History, Psychology, Sociology, Political Science, or Economics (ACT, 2011).

Science. The science test measures scientific reasoning through interpretation of charts, tables, graphics, and text. A score of 24 or higher indicates a 50% chance of obtaining a B or higher or approximately a 75% chance of attaining a C or higher in a first-year college course, such as College Algebra (ACT, 2011).

College-readiness. College-readiness refers to a student's ability to be successful in an entry-level college course without the need for remediation. Conley (2007a) offered an operational definition of college-readiness as "the level of preparation a student needs in order to enroll and succeed—without remediation—in a credit-bearing general education course at a postsecondary institution that offers a baccalaureate degree or transfer to a baccalaureate program" (p. 5).

College- and career-readiness. According to Conley (2014) "a college- and career-ready student possesses the content knowledge, strategies, skills, and techniques necessary to be successful in any of a range of postsecondary settings" (p. 15). Conley (2014) further defined successful "as having the ability to complete entry-level courses at a level of performance that is sufficient to enable the students to continue to the next courses in their chosen field of study" (p.15). It has been argued by ACT (ACT, 2011) that both college-readiness and career-readiness require similar academic knowledge and skills. The current study will focus only on college-readiness, not college- and career-readiness.

District size. According to the U.S. Department of Education, National Center for Education Statistics (2016), school district size is measured not only by the number of students enrolled but also by the location of the school district.

Four-day school week schedule. A four-day school week schedule is the basis of a school calendar in which the students attend school for four of the five weekdays in a given week (Bauman, 1983). School districts typically use a Monday through Thursday or Tuesday through Friday schedule (Rymeski, 2013). Students attending only four days per week attend the same number of hours in a given school year as a student attending five days per week. The disparity is often accommodated by increasing the number of hours the student meets on a given day of the four-day week.

Socioeconomic status. According to Ravitch (2007), socioeconomic status (SES) is a measure of a student's family income. For this study, the percentage of students that qualified for free or reduced lunches through the school nutrition program was used to determine the school district's SES.

Organization of the Study

This study is organized into five chapters. Chapter 1 introduces the study including background information and the statement of the problem. The chapter also includes the significance and purpose of the study, the delimitations, assumptions, and definitions of terms. Chapter 2 is an overview of relevant literature regarding four-day week schedules and college-readiness. The methodology and research design of the study are described in Chapter 3. This includes information about the population and sample, instrumentation, measurement, data collection, and hypothesis test procedures used. Chapter 4 describes the results of the study. The last chapter, Chapter 5, consists of an interpretation of the results of the study, a discussion on the findings as related to the relevant literature, any conclusions drawn, implications for action, and recommendations for additional study.

Chapter 2

Review of the Literature

The first purpose of this quantitative study was to determine if there was a difference in college-readiness skills of students attending a four-day school week schedule compared to college-readiness skills of students attending a five-day school week schedule. To this end, composite ACT scores from students in each type of school district were compared between schools of similar demographics. The second purpose of the study was to determine if there were cost savings in school district budgets as they switched from a five-day school week to a four-day school week. Chapter 2 includes a comprehensive review of the related literature on time and learning, college- and career-readiness, the history of the four-day school week schedule, research about the academic impact on students in districts that utilized a four-day school week schedule, and finally, budgetary issues facing public education.

Time and Learning

Students enrolled in public schools across the United States have attended nearly the same amount of time each school year and devoted about the same amount of time to each subject they studied for over a century (National Education Commission on Time and Learning, 2005). Carnegie Units, established around 1906, may be one reason for this uniformity (Silva, White, & Toch, 2015). These units, created by the Carnegie Foundation for the Advancement of Teaching, prescribed the amount of time that counted as one credit in a particular subject area: 24 weeks per school year, 5 days per week, and 60 minutes per day (Silva et al., 2015; Tompkins & Gaumnitz, 1954). In total, a Carnegie Unit amounted to 120 hours of instruction each year. By clearly defining the

amount of time needed to adequately prepare students for post-secondary education, Carnegie Units shaped how secondary schools across the United States were structured in terms of time.

Once Carnegie Units became the standard way that secondary schools organized their academic calendars, colleges and universities could measure the academic preparation of potential students in a more uniform way (Silva et al., 2015). Admissions requirements could be set, and potential students could work to complete these requirements. This system and structure worked well for American public-school graduates through most of the 20th century.

Then, in 1983, *A Nation at Risk* (National Commission on Excellence in Education, 1983) was published. This report drew attention to the fact that American students lagged behind other industrialized nations in academic achievement. The commission made 38 recommendations for American schools to overcome this discrepancy. The recommendations were in five categories: content; standards and expectations; time; teaching; and leadership and fiscal support (National Commission on Excellence in Education, 1983). In regard to time, the commission recommended that school districts and state legislatures adopt 200- to 220-day school calendars and seven-hour days. The reason behind this recommendation was largely due to the fact that the students in other industrialized nations were attending school at this increased rate. For the United States to bridge the gap, the National Commission on Excellence in Education (1983) recommended that American students would need to attend school much more as well. By and large, however, the American education system has not adopted this schedule (Levin, 2016).

Perhaps in response to *A Nation at Risk*, many researchers argued that simply looking at the number of hours and days students spend in a school building did not accurately measure the time needed for learning. In their report of research about how time affects student learning, Aronson, Zimmerman, & Carlos (1999) separated how the concept of time was used in research studies into three categories: allocated time, engaged time, and academic learning time. Allocated time referred to time spent physically within the school building by a student on a given day. Engaged time referred to time spent engaged in a learning activity. Academic learning time referred to the time in which a particular student was actually learning. Aronson et al. (1999) argued that time impacted student achievement only when the *quality* of time spent in school was improved, not simply the mere *quantity* of time. In other words, the allocated time had no effect on student learning. Engaged time and academic learning time were positively correlated with higher levels of learning going on in a school system.

Engaged time was seen as one of the key differences between students in the United States compared to students from other industrialized nations (National Commission on Excellence in Education, 1983). In America, students spent more time disengaged from their learning, dealing with non-academic tasks like roll call, announcements over the intercom, and other classroom interruptions. In other countries, this is not the case (Aronson et al., 1999). Academic learning time, while considered the most valuable time spent in school from a learning standpoint, was also the most subjective and open to interpretation. For example, a student could appear engaged in a learning activity, actively participating, and not be *learning*. If the student was struggling, the learning activity could go well above the student's head. By contrast, if

the student was highly competent, the learning activity may not be sufficiently challenging to make the student learn anything new. With these two examples in mind, it is no wonder that research examining the relationship between academic learning time and student achievement is not more prevalent (Aronson et al., 1999).

Because engaged time and academic learning time were difficult to research, allocated time continues to be the subject of most research on time and learning (Aronson et al., 1999; Cuban, 2008). The research is clear. There is little to no relationship between the allocated time a student spends in school and the student's academic achievement. There is a slightly greater relationship between engaged time and student learning. Not surprisingly, the greatest relationship exists between academic learning time and student achievement. As Cuban (2008) wrote, "*How* [emphasis added] that time is spent … is far more important than decision makers counting the minutes, hours, and days students spend each year getting schooled" (p. 249). Years of school reform efforts have assumed that learning can be increased by increasing the hours in a school day (National Education Commission on Time and Learning, 2005). Merely increasing the hours and days that students spend in school will not lead to increased student achievement (Aronson et al., 1999).

One key variable that is often not studied is how the allocated time in a school district is configured and its relationship to student achievement (Farbman, Davis, Goldberg, & Rowland, 2015). In Kansas, students must attend school for a minimum of 1,116 hours each school year (School Attendance, 2017). School districts that utilize a four-day school week are required to adopt a school calendar with the same number of hours as school districts utilizing a five-day school week. The total number of hours

between the two groups is consistent. What has changed, however, is the configuration of those hours. Some districts spread the 1,116 hours over five days per week. Others have switched to only using four days per week.

College and Career Readiness

College-readiness, or, more precisely, college- and career-readiness has been discussed by educators for many years (ACT, 2006; Conley, 2007b; Conley & McGaughy, 2012; National Education Association, 1894; Sloan, 2012). For many educators, college-readiness and career-readiness are two separate measures. One would not assume, for example, that a student training to be a medical doctor would need the same secondary education as a student training to be a construction worker. While college-readiness is a measure of likely student success in a two- or four-year postsecondary institution, career-readiness is a measure of likely student success when entering the workforce directly after graduation (Conley & McGaughy, 2012). However, according to ACT (2006) and Conley (2007a, 2007b, 2014), many of the skills required to succeed in either of these training programs are universal. In order to be successful in both college and career, students must have a wealth of cognitive strategies at their disposal including "the ability to formulate problems, collect information, interpret and analyze findings, communicate in a variety of modes, and do all of this with precision and accuracy" (Conley & McGaughy, 2012, p. 31).

When the National Governors Association Center for Best Practices (NGA Center) and the Council of State School Officers (CSSO) (2012) adopted the Common Core State Standards (CCSS) Initiative, they bolstered this way of thinking. The purpose of the CCSS was to "prepare America's students for college and career" (NGA Center &

CSSO, 2017, p. 1). Much of the knowledge and skills identified by the CCSS should be transferable to either a two- or four-year college or to another postsecondary program, such as a technical training program.

The CCSS Initiative was not the first national attempt to determine a universal curriculum for secondary students in the United States (National Education Association, 1894). In 1894, the National Education Association (NEA) formed a committee to help guide the future of secondary education in the United States, specifically as it applied to preparing students for college or university.

During the summer of 1892, the NEA appointed ten prominent educators to serve on a committee charged with examining the current state of secondary education in the United States (National Education Association, 1894). They began their study with an examination of what was currently being taught in secondary schools. In November of 1892, the Committee of Ten met for three days and, based on the information that was collected from principals and superintendents across the country, determined that there were approximately nine subject areas that nearly all secondary schools were teaching: Latin; Greek; English; other modern languages; mathematics; physics, chemistry, and astronomy; natural history (biology, including botany; zoology, and physiology); history, civil government, and political economy; and geography (physical geography, geology, and meteorology). To this end, the committee formed nine conferences and requested that ten educators for each conference be assigned. These educators were subject-area specialists that taught either in secondary schools or post-secondary schools (National Education Association, 1894).

The reports of each of the conferences led the Committee of Ten to one conclusion: secondary schools across the United States were far from uniform and in need of reform. While some schools gave great importance to Greek, others gave more to history or the natural sciences (Mackenzie, 1894). While virtually all of the schools taught English, the extent to which the subject was taught and the number of hours per week devoted to the subject was very haphazard. It was soon determined that a system of courses and a recommended level of study be presented to the secondary schools across the United States to make the taught curriculum more uniform. The extent to which each subject area was thought to be an integral part of this curriculum was debated at great length (Mackenzie, 1894).

Nine subcommittees, centered around subject areas, presented their findings to the Committee of Ten, which published its final report in 1894. According to the Chairman of the Board of Trustees of the National Education Association, Dr. Norman A. Calkins, there was general agreement among educators that the report was "the most important educational document ever issued in the United States" (National Education Association, 1894, p. iv).

When the Committee of Ten released their final report, educators believed that secondary schools should not be in the business of solely preparing students for college (National Education Association, 1894). The authors believed that secondary schools across the United States did not exist "for the purpose of preparing boys and girls for colleges….Their main function is to prepare for the duties of life" (National Education Association, 1894, p. 51). That being the case, the members of the Committee of Ten believed that there were overlaps in educating a pupil toward an eventual entrance into

college, what we would today call being college-ready, and educating a pupil to take up the demands of a citizen in a democracy, what we could call *career-ready* today.

One recommendation of the Committee of Ten was the establishment of a uniform college entrance system (Jacobson, 2017). By the end of the 19th Century, tests for admission to college were specific to each school. Some colleges would use *admission by certificate,* meaning that the high school that the student attended was certified by a particular college or university that would accept the graduates of the high school.

In December of 1899, the College Entrance Examination Board, today known simply as the College Board, was founded. This organization was tasked with administering annual exams in subjects thought important to college-level work. The colleges would then use these scores as they wanted. At that time, a mere 4% of high school graduates attended college (Jacobson, 2017). In 1917, psychologist Carl Brigham helped develop the Army's *Alpha Intelligence Tests* to quickly determine aptitude of recruits entering World War II. This test would eventually merge with the work of the College Board and help create the first Scholastic Aptitude Test or SAT. When it was first given in June 1926, the SAT sought to assess aptitude for learning rather than mastery of subjects already learned, thereby assessing individuals independently of the high school curriculum taught. The test included nine sub-tests: two in math (arithmetical problems and number series) and seven verbal tests (definitions, classification, artificial language, antonyms, analogies, logical inference, and paragraph reading). Today, the SAT includes only two sections: critical reading and math.

The ACT began as a direct response to the SAT (Jacobson, 2017). In the summer of 1959, Ted McCarrel and E.F. Lindquist suggested there was a need for a new test for college-bound high school students. In the view of McCarrel and Lindquist (as cited in Jacobson, 2017), the SAT was only being used by private college and universities on the east coast. A new test that benefited public colleges and universities in the Midwest and West Coast was needed. McCarrel and Lindquist also believed that a test was needed that could function as more than just an admissions test but as a placement test for students entering college. Finally, McCarrel and Lindquist believed that a new test should be primarily used as an indicator of academic preparation. In other words, the test needed to be an achievement test, not an aptitude test, like the SAT. In November 1959, the first ACT was administered to about 75,000 students. At that time, there were nearly 800,000 students taking the SAT. Today, more high school students take the ACT than the SAT, with 1,666,017 students taking the ACT in 2012 compared to 1,664,479 students taking the SAT in 2012 (Jacobson, 2017).

The ACT has evolved since its first administration (Atkinson & Geiser, 2009; Evans, 2012; Jacobson, 2017). The first test had four sections: English, mathematics, social studies, and natural sciences. In 1989, both the social studies and natural science sections were eliminated. The social studies section was replaced with a section titled *Reading* and designed to assess reading ability and comprehension. The natural science section was replaced with a section titled *Science Reasoning*. This change de-emphasized specific scientific content knowledge and instead assessed students' analytical and problem-solving skills using charts, graphs, tables, and reading material

drawn from scientific literature (Atkinson & Geiser, 2009). In 2006, the ACT added an optional writing section for test takers.

There has been a coincidence between the implementation of the CCSS, which has the stated goal of more adequately preparing students for college and career, and the rise in the number of ACT administrations (ACT, 2011). Both national and state boards of education are using ACT as an indicator of student college- and career-readiness. As of the 2016-2017 school year, 18 states require high school students in grades 10 or 11 to take the ACT or SAT (Gewertz, 2017).

Colleges and universities are also avid users of the ACT for their admission processes (Geiser, 2009). While some authors believe the ACT to be inadequate when considered a lone measure of college-readiness, admissions counselors at over 80% of colleges and universities across the United States say ACT and/or SAT are of moderate to considerable importance to their admission processes (Clinedinst & Koranteng, 2017). Current research into college-readiness suggests that, when included as part of a number of performance indicators, ACT can help predict how successful students will be in college (ACT, 2016). This measure of success has been shown via a number of measures, including first-year college grade point average (FYCGPA), college retention rates, and grades in typical first-year college courses.

Composite ACT scores have helped predict overall first-year college grade point average (ACT, 2014). In a study of 291 public and private, 2-year and 4-year colleges and universities, researchers (ACT, 2014) showed that there was a relationship between higher composite ACT scores and FYCGPA of 3.0 or higher. Using the Pearson correlation coefficient, where a value of 0 represents no relationship and a value of 1

represents a perfect linear relationship, higher composite ACT scores and an FYCGPA of 3.0 or higher had a correlational score of 0.42. Similarly, high school grade point average (HSGPA), an often-cited predictor of college success, showed a 0.51 correlational coefficient with a FYCGPA of 3.0 or higher.

Another index of college success, the retention of college students is also predicted by ACT composite scores (Allen, Robbins, Casillas, & Oh, 2008). In their study of 6,872 students, students that dropped out of college had lower ACT composite score than those that were retained either at the same school or transferred to another college or university. Students who chose to drop out of college had an average ACT composite score of 20.0 while those that were retained had an average ACT composite score of 22.0.

Many of these educational institutions also use the ACT Benchmark Scores as predictors of college- and career readiness (Allen & Sconing, 2005). ACT publishes a list of College-Readiness Benchmarks which are statistically aligned with undergraduate course grades (ACT, 2014). The College-Readiness Benchmark score in each subject-area is tied to the student earning a grade of C or better in an entry-level college course. These benchmark scores were last revised in 2013 (ACT, 2014). The benchmark score for English is 18. The benchmark score for both reading and mathematics is 22. For science, the benchmark score is 23. These scores average out to a composite score of 21.3. Using standard rounding conventions, the score of 21 is, therefore, the benchmark standard for the composite score. Theoretically, a student receiving a composite score of 21 is determined college-ready by the ACT. For this reason, an ACT composite score of

21 continues to be a standard admissions benchmark for many colleges and universities in the United States (ACT, 2016).

Allen and Sconing (2005) also studied the ACT Benchmark scores in English, reading, mathematics, and science and compared them to student achievement in typical first-year college courses. Their findings are summarized in Table 1.

Table 1

Probability of First Year College Course Grade as Determined by ACT *Benchmark Score*

Subject Area	First Year College Course	Probability of earning a B or higher	Probability of earning a C or higher
English	English Composition	69%	86%
Reading	Social Sciences[a]	64%	81%
Mathematics	College Algebra	64%	86%
Science	Biology	62%	86%

Note. Adapted from *Using ACT Assessment Scores to Set Benchmarks for College Readiness* by J. Allen and J. Sconing, 2005, from ERIC database (ED489766).

[a]Social Sciences includes several first-year introductory courses in the social sciences such as sociology, psychology, and other humanities courses.

Students who met the established benchmark scores of 18 in English, 22 in reading, 22 in mathematics, and 23 in science have a higher probability of earning a B or better in the corresponding first-year college course.

Conley (2007b), suggested that more than an ACT score was needed to adequately determine the college-readiness of a student. According to him, high school grade point average and the rigor of courses taken during high school were more reliable predictors of college success (Conley, 2007a). Noble and Sawyer (2004) showed,

however, that HSGPA was not a good indicator of FYCGPA or overall college success alone. As they stated,

> Postsecondary institutions seek high achievement for their students and want to admit students who have a good chance of being successful in college. These results suggest that for a wide variety of postsecondary institutions, ACT composite scores provide greater differentiation across levels of achievement than do high school GPAs in terms of students' probable success during their first year in college. (Noble & Sawyer, 2004, p. 22)

History of Four-Day School Week Schedules

The earliest documented adoption of a four-day school week schedule was the Madison, South Dakota school district. During the 1931-1932 school year, Madison Schools students attended a traditional school schedule for four days while the fifth day was set aside for extracurricular activities (Blankenship, 1984). Occurrences of four-day week school schedules were considered quite rare, until the 1970s (Donis-Keller & Silvernail, 2009; Ryan, 2009). As of 2017, public schools in 21 states utilized a four-day school week schedule (National Conference of State Legislatures, 2017). Colorado had the greatest number of school districts operating with this unique setup, with 88 school districts or 44% of all Colorado school districts using the shortened school week (Colorado Department of Education, 2016). Oklahoma school districts seemed to make the change at the highest rate (Brown, 2017). As of fall 2017, 96 of 513 (19%) school districts in Oklahoma were using a four-day school week. This was triple the number from 2015 and nearly four times as many as 2013. An additional 44 school districts are considering the change for next school year (Brown, 2017).

In the early 1970s, the United States endured an energy crisis due to the Arab oil embargo and resulting energy crisis (Donis-Keller & Silvernail, 2009). Schools were crowded, budgets were cut, energy costs were staggeringly high, and school bond elections to address these issues were failing. Some schools, like those in Shrewsbury, Massachusetts, scheduled students every four days to deal with overcrowding (Roeth, 1985). The school was still open all five days, but any given student would only attend four of those days. Students were given the choice of attending the traditional five-day schedule, attending four days and staying two hours later each day, or attend only four days and make up missing hours by taking evening courses (Wilmoth, 1995). This system continued until the school successfully passed a bond issue to build additional school sites. In Barnstable, Massachusetts, the school district operated Monday through Thursday from 7:00 AM to 7:00 PM. On Fridays, students could participate in a work-study program, do additional academic study, or work in a volunteer community service program. This schedule continued until 1976-1977 when a new school was built (Wilmoth, 1995).

One of the first districts to utilize a four-day school week schedule in response to budget shortfalls was Franklin Pierce School District in Tacoma, Washington (Wilmoth, 1995). In 1971, the Franklin Pierce School District received a federal grant to experiment with a four-day school week. The students were in traditional classes Monday through Thursday. On Friday, students received instruction outside the more traditional schedule. The elementary students participated in noncompetitive sports, arts, music, specialized science, and remediation during the fifth day. Junior High girls took industrial arts courses and junior high boys took cooking classes and learned other traditional female

duties. High school students devoted Friday to additional academic study. The federal grant received by Franklin Pierce to fund this schedule ended in 1976 and the district returned to the traditional five-day school week schedule.

Unity School District in Maine implemented a four-day school week during the 1971-1972 school year (Roeth, 1985). Before the decision to change to a four-day school week, the district received a grant through the Elementary and Secondary Education Act for Title III Funds to train teachers in individualized instruction, curriculum development and evaluation, preparation of learning activities and materials, and team-teaching procedures. At that same time, the citizens of Unity School District voted to reduce the school operating budget by 10% or $130,000 that same year (Roeth, 1985). The district decided to change to a four-day school week and used a Monday through Thursday schedule, extending the school day by 35 minutes. The school district saved over $13,000 in operational costs the first five months they used the schedule (Roeth, 1985). This included transportation, support staff salaries, custodial supplies, electricity, and heating fuel. During the first year on the new schedule, student achievement increased on the Stanford Achievement Test. Scores in the categories of arithmetic, reading paragraphs for meaning, science, and social studies all increased. The faculty was required to attend teacher in-service training from 8:00 AM – 12:00 PM each Friday. Unity discontinued the four-day school week after the 1974-1975 school year. Rodney McElroy, the principal of the high school at the time, stated several reasons for returning to a traditional five-day school week (Roeth, 1985). The Title III Federal Grant expired, the state commission of education dismissed their proposal for a four-day school week,

the energy problem diminished, and the school operating budget was returned to prior levels, thereby eliminating the need for drastic cost-saving measures (Roeth, 1985).

Cimarron Schools in New Mexico is the longest continually operating school district actively involved in a four-day school week (Richards, 1990). Cimarron started the four-day school week schedule in the 1972-73 school year and, as of the 2017-2018 school year, continues the shortened week schedule (Cimarron Municipal Schools, 2017). Initially, the district made the change to reduce costs. The district eliminated Mondays and held school Tuesday through Friday from 8:30 AM to 4:10 PM. The school not only changed the schedule but also regulated energy use. The heating units in the school buildings were on from 7:00 AM to 2:00 PM and the heat was set at 68 degrees in all rooms. The school district realized major energy savings that translated into monetary gains. From 1973 to 1977, the kW electrical usage went from 144,450 kWh to 46,073 kWh. Propane usage decreased from 61,234 gallons in 1973 to 46,409 gallons in 1977. Transportation fuel costs were also reduced by more than 12% during this period (Richards, 1990).

The trend toward changing to a four-day week continued with the Lebanon School District in New Hampshire (Stemmock, 1975). In 1974, Lebanon School District used a four-day school week to conserve fuel during the energy crisis. The school district used the four-day week during the coldest three months of the year: December, January, and February. This schedule was not popular with parents, so it was discontinued after only one year.

Use of the four-day school week is becoming a more viable option for school districts. In fact, the number of state boards of education that allow four-day school

weeks continues to expand (National Conference of State Legislatures, 2017). State laws that allow a four-day school week fall into three categories: (a) the allowance for four-day school weeks outright, (b) the allowance for equivalent number of hours or days as a five-day schedule, and (c) the allowance of a four-day school week schedule with written permission from the state board of education (Education Commission of the States, 2008). Arizona, Arkansas, California, Minnesota, and Virginia have laws that specifically allowed four-day school week schedules to be utilized in school districts. Kansas, Montana, Nebraska, New Mexico, Oregon, South Dakota, and Wyoming all have laws that have a minimum attendance requirement that allow for a four-day week. In Kansas, students in grades 1 through 11 must meet for 1,116 hours while students in grade 12 must meet for 1,086 hours. Kindergarten students must meet for 465 hours (School Attendance, 2017).

In the 1980s, before the state of Kansas explicitly allowed four-day weeks in its school systems, Dexter Public School District, a small, rural school district in south-central Kansas, began experimenting with the four-day school week (Blankenship, 1984). Dexter was part of a group of two or three school districts in the state to move to a four-day school week. Dexter held classes from Monday through Thursday from November to March. Dexter utilized a traditional five-day school week during the rest of the school year. Only custodial and maintenance staff reported to the school on Fridays. If the school needed to take a day off due to inclement weather, the day could be made up on a Friday, thereby eliminating the need for additional days at the end of the school year. Dexter continues to use a four-day school week schedule today, as do many school districts in Kansas (Blankenship, 1984). In fact, as of the 2016-2017 school year, 17

school districts in the state of Kansas used a four-day school week schedule (Kansas Association of School Boards, 2017). Many of these schools have changed to a four-day school week schedule despite the lack of research on the impacts on student achievement or other unknown factors.

Impact of a Four-Day School Week Schedule

Research on the benefits and constraints of a four-day school week schedule is limited (Donis-Keller & Silvernail, 2009; Plucker et al., 2012; Tharp et al., 2016). Richburg and Sjogren (1982) conducted the first large-scale research study in the early 1980s with his colleagues at Colorado State University. At the time, twelve small, rural school districts in Colorado with large geographical areas were piloting the four-day school week in response to increasing transportation costs. In 1980, the legislature in Colorado modified the compulsory attendance law to allow for any schools to modify their calendar to a four-day school week. Part of this legislation required any school district that implemented the change to report back to the state the following: cost benefits, including transportation and facility use; the reactions of teachers, parents, and students; and any other adjustments the change to a four-day school week necessitated. Richburg was in charge of this study and reported his results to the state of Colorado (Richburg & Sjogren, 1982).

In their report, Richburg and Sjogren (1982) examined the academic achievement of three school districts in the study. They compared the achievement of third- and fourth-grade students under a five-day week with their achievement as fifth-graders under a four-day week. Richburg and Sjogren used scores in Reading and Mathematics from

the Iowa Test of Basic Skills (ITBS) for this comparison. The results are summarized in Table 2.

When examining the results for these students, no discernable pattern emerged. Students that attended District A showed greater achievement in the four-day school week, but students in District B showed slightly greater achievement in the five-day school week. Richburg and Sjogren (1982) determined that although these results did not show definitive academic improvement attributed to a four-day school week, there was no academic harm done either.

Table 2

Comparison of ITBS Grade-Level Scores in Reading and Mathematics

	Reading			Mathematics		
District	A	B	C	A	B	C
3rd Grade	3.8	4.5	4.8	3.8	4.5	4.0
4th Grade	4.7	5.9	4.9	4.1	5.8	5.6
5th Grade	6.3	6.3	6.5	5.7	6.3	5.7

Note. Students attended school five days a week in 3rd and 4th grade and four days a week in 5th grade. Adapted from *The Four-Day School Week* by R. Richburg and D. Sjogren, 1982, http://www.jstor.org/stable/20386479

Richburg and Sjogren (1982) also examined the cost savings and stakeholder perceptions in the twelve school districts. School districts saved 7% to 25% in heating fuel costs when they switched to a four-day school week. Gasoline consumption declined by 22.5% on average. Bus maintenance costs also declined 18% on average. The school districts did not realize cost savings in personnel, however. Richburg & Sjogren hypothesized that this was likely due to the fact that most school district employees

worked the same number of hours per week, some just did so on a four-day schedule instead of a five-day schedule. Richburg and Sjogren (1982) surveyed parents, students, and teachers as to their perceptions of a four-day school week after the switch from a five-day school week. Over 90% of parents, 93% of students, and 95% of teachers favored a four-day school week over a five-day school week.

Since Richburg & Sjogren's review, only a handful of research has examined the impact of the four-day school week. Most of the reports about the effect of a four-day school week focused on similar areas as their 1982 study: academic achievement, stakeholder perceptions, attendance and discipline, and cost savings.

Academic achievement. Later studies involving school districts that adopted a four-day school week analyzed student achievement. Daley and Richburg (1984) and Reinke (1987) found that a four-day school week did not affect student achievement, while other studies found that a four-day school week increased student achievement (Sagness & Salzman, 1993; Wilmoth, 1995; Yarbrough & Gilman, 2006).

Daly and Richburg (1984) studied five school districts in Colorado that were all using the ITBS for at least two years before changing to a four-day school week and two years after the change. The ITBS measured student's performance in the following areas: vocabulary, reading comprehension, language skills (spelling, capitalization, punctuation, and usage), work-study skills (visual materials, reference materials), and mathematics skills (concepts, problem-solving, and computation). The results of each of these sub-scores were combined into one composite score. Once Daly and Richburg analyzed these composite ITBS scores, they determined that an increase or decrease in student achievement could not be realized. "It is clear that the overall conclusion to be drawn

from the data available on these five rural school districts is that the change to a four-day school week has had no effect on the academic achievement of students" (Daly & Richburg, 1984, p. 23).

Sagness and Salzman (1993) found mixed results in their analysis of student achievement and the four-day school week. Using ITBS scores for students during one year before a switch to a four-day school week and one year using a four-day school week, the researchers found that some grade levels showed significant gains while others reported significant losses. The fourth-grade group scored higher on all sub-scores of the ITBS while the fifth-grade group scored higher on two sub-scores (reading comprehension and language skills) and lower scores on the others (vocabulary, work-study skills, and mathematics skills). Eighth-grade students showed significantly higher sub-scores on the language skills section while eleventh-graders had considerably lower sub-scores in both work study skills and social studies.

Yarbrough and Gilman's (2006) study of Webster County Public Schools in western Kentucky showed that students operating in a four-day school week showed significant gains in achievement. Their analysis centered on Comprehensive Test of Basic Skills (CTBS) scores from the spring of 2002 and 2003, in which the school district utilized a five-day school week, and CTBS scores from spring 2004 and 2005, in which the school district employed a four-day school week. As shown in Table 3, student achievement improved in all subject areas after the change to a four-day school week.

Table 3

CTBS Scores Under Five-Day and Four-Day School Week

	Five-Day Week				Four-Day Week			
Grade	Reading	Math	Language	Battery	Reading	Math	Language	Battery
3	55.65	56.72	55.03	56.64	57.92	60.93	56.93	59.62
9	49.68	51.32	48.59	50.32	55.38	53.85	54.04	55.01

Note. Adapted from *From Five Days to Four* by R. Yarbrough and D.A. Gilman, 2006, p.82.

The studies regarding academic achievement of students enrolled in four-day school weeks centered on test scores which assess national benchmarks or standards, such as the ITBS or CTBS assessments. None of the studies have examined the effect of a four-day school week on college-readiness, as evidenced by achievement on the ACT composite scores of students enrolled in a four-day school week compared to students enrolled in a five-day school week.

Stakeholder perceptions. Blankenship (1984) reported on perceptions of stakeholders in his research using Colorado school districts. In Cotopaxi County, one of the districts in the study, nearly 93% of the community, faculty, and students approve the system. Similar results were seen in Custer schools. Such widespread acceptance of an educational initiative is not common. One administrator stated, "If I were selling an education program and I [could show that the four-day schedule] would increase student attendance, allow more class time, raise student morale, and provide more time for staff development, you'd buy it" (Blankenship, 1984, p. 32). However, some schools reported negative responses to the four-day school week schedule. Teachers reported challenges with changing their teaching methods to accommodate the new schedule and some

coaches were unhappy because the scheduling conflicted with other schools in the same athletic league. Families with two working parents did not like the new schedule because they had to find babysitters for a full day during the week. Students who lived at the end of long bus routes had to get on the bus earlier and return later, making for very long days away from home (Blankenship, 1984).

On the other hand, Grau and Shaunessy (1987) reported general approval for the four-day school week among teachers, students, and parents. Parents, in particular, liked the four-day schedule because there was more time for home chores and family activities. Wilmouth (1995) surveyed administrators from 84 school districts across the United States that utilized a four-day school week. The administrators reported students and staff overwhelming approved of the four-day school week schedule. Additionally, more than three-fourths of the administrators in the study also believed that student morale had improved with the new schedule (Wilmouth, 1995).

Hale's (2007) study dealt exclusively with stakeholders' perceptions on the change the school districts made to a four-day school week. In her study, which examined five school districts in South Dakota that operated a four-day school week from the school years 1995-2006, school districts reported that staff and student morale was higher. Among the other positive perceptions were that students were receiving more remediation and enrichment opportunities in school and families were spending more time with one another. The negative outcomes perceived by stakeholders centered around the lack of finding child care on the day off and the intensity and length of the longer school day (Hale, 2007).

Attendance and discipline. One of the impacts of changing to a four-day school week schedule was the increase in student and teacher attendance (Koki, 1992; Reinke, 1987; Sagness & Salzman, 1993). Reinke (1987) found that in Union School District in eastern Oregon, teacher absenteeism declined 27.5%. This not only led to additional savings in substitute teacher costs, it also benefited the students of Union. "As absenteeism [directly affects] achievement, one of the benefits of increased attendance is increased academic gains and higher morale" (Reinke, 1987, p. 7). Perhaps this partially explains why several school districts reported student achievement gains after they switched to a four-day school week schedule.

Koki (1992) reported on a school district in Hawaii that also showed improved attendance and discipline when they switched to a four-day school week. The Ma'ili school district, a remote school district on the island of Oahu, found that student attendance improved nearly 3% in the initial year of implementing the four-day school week. The number of student discipline referrals also declined. In the semester preceding implementation of the four-day school week, the school received 203 referrals. In the semester after implementation, only 75 referrals were received. The researchers attribute this decline to a decrease in the unstructured time students spend outside of a classroom. With a four-day school week, teachers used class time more efficiently and there was less down time for students (Koki, 1992, p. 5).

In a study of one suburban school district in Idaho, Sagness and Salzman (1993) reported on student, teacher, and staff attendance for two years before the district changed to a four-day school week and one year after the district utilized the modified schedule. While attending five days a week, student absenteeism was 5% on average

throughout the school year. Teacher and staff absenteeism were each 4%. After implementing the four-day school week schedule, each of these subgroups' absenteeism decreased by 2%. The researchers attributed the decline in student absenteeism to families being able to schedule appointments and other activities on the day of the week that school was not in session (Sagness & Salzman, 1993).

Cost savings. Many people would make the claim that since the school week is reduced by 20%, the potential cost savings for school districts would be the same. This claim has been shown to be far from reality. The potential cost savings reported by Griffith (2011) in Table 4 took into account several crucial budget items that were directly affected by a reduction in the number of days students attended school in a given week. As shown in Table 4, most of the budget items were not reduced by a factor of 20% when a school chose a four-day school week. Salaries, for example, the most significant line item in the budget, were not reduced because teachers typically work the same number of hours over the course of their contract under a four-day school week as they would in the traditional five-day school week. Only transportation and food services realized the 20% reduction of their budget line-item.

Table 4

Maximum Cost Savings for School Districts Operating a Four-Day Week

Budget Item	Percentage of Total Expenditures	Costs Reduced by a Four-Day Week	Maximum Potential Savings to Budget
Operations and Maintenance	9.74%	Yes	1.36%
School Administration	5.59%	Yes	1.06%
Student Support	5.40%	Yes	0.95%
Transportation	4.25%	Yes	0.85%
Food Services	3.79%	Yes	0.76%
Other Support	3.22%	Yes	0.42%
Instruction	60.82%	Yes	0.03%
Instructional Staff Services	5.00%	No	
General Administration	1.96%	No	
Enterprise Operations	0.23%	No	
Total	100.0%		5.43%

Note. Cost savings determined by Education Commission of the States review of educational expenditures from the U.S. Department of Education's 2010 Digest of Education Statistics. Adapted from *What Savings are Produced by Moving to a Four-Day School Week?* by M. Griffith, 2011, p. 2.

In practice, most districts found an average overall budget reduction of 0.4% to 2.5%. As Griffith (2011) found, "the average district could produce a maximum savings of 5.43% of its total budget by moving to a four-day week" (p. 1). While this may seem like a very minimal amount, most districts that chose a four-day school week schedule found this savings enough of a factor to continue using the schedule (Blankenship, 1984; Grau & Shaughnessy, 1987; Wilmoth, 1995).

Blankenship (1984) studied eighteen school districts in Colorado that were the first to implement the four-day school week schedule in the early 1980s. "Obviously, you can save energy if you turn the thermostats down over three-day weekends in the winter and if the need for buses is reduced by 20%" (Blankenship, 1984, p. 32). A survey of Colorado schools showed not only cost savings but savings in other areas related to cost as well. Overall, school districts used 23% less gasoline for their school buses, 23% less electricity, and required 18% fewer maintenance jobs. Additionally, with a weekday to take care of personal appointments, teachers were absent less often and thus the amount needed for substitute teacher pay declined.

The cost savings on fuel, electricity, and transportation reported by Grau and Shaunessy (1987) from ten New Mexico school districts showed an average of 10-25% in savings. The New Mexico schools set thermostats to heat buildings at 68 to 70 degrees for four of the five days each week. Also, by reducing the amount of gasoline consumed by buses that get approximately five miles to the gallon of gas, school districts realized additional savings. Koki (1992) found similar cost savings measures in his analysis of school districts in New Mexico. Although some districts only use the four-day school week schedule during the winter months, annual fuel and electricity costs decreased by 10 to 15% and transportation costs decreased by 10 to 20%.

Reporting cost savings for a suburban Idaho school district, Sagness and Salzman (1993) found similar results. The researchers compared school district expenditures for two years: one year on a five-day school week schedule and one year on a four-day school week schedule. The following line items were examined: heating fuel, water and sewer, substitute teacher salaries, telephone, and transportation costs (including

personnel, supplies, and fuel). In their analysis, heating costs decreased by $2,000, substitute teacher salaries declined by $25,800, telephone costs decreased by $3,600, and total transportation costs decreased $42,000. Water and sewer costs increased by $4,500. These cost savings, when combined, represented a 1.6% cost savings of the total operating budget of the school district.

In Webster County Public Schools in rural western Kentucky, the change to a four-day school week in 2003 brought substantial financial savings (Yarbrough & Gilman, 2006). In the first three years of implementation, the school district realized a 2% savings. Similar to the findings from research by Grau and Shaunessy (1987), Griffith (2011), and Sagness and Salzman (1993), Yarbrough and Gilman (2006) found that the savings came from "reduced transportation costs, reduced overtime hours for support staff, reduced workers' compensation costs, and less need for substitute teachers" (p. 82).

There can be no doubt that changing to a four-day school week schedule can save school districts money. Stakeholders in the district, however, are often much more concerned with other factors than financial savings.

Budgetary Issues in Public Education

Ensuring that all students receive an adequate education has been a national concern for a long time in the United States (Conant, 1959; Umpstead, 2007). Many argue that spending on education is directly tied to the ability of citizens of the United States being able to compete in a global market (Hanushek & Lindseth, 2009). However, in the past decade, the United States has gone from spending more than $100 billion per

year on education in 2006 to $40 billion per year in 2013 (U.S. Department of Education, 2015).

Prior to 2008, spending per pupil in K-12 public education in the U. S. steadily increased (Hanushek & Lindseth, 2009). Adjusting for inflation, the spending almost quadrupled from $2,606 in 1960 to $9,910 per student in 2005. Since the recession of 2008, however, per-pupil spending in the U.S. has been reduced (Baker, Sciarra, & Farrie, 2014; Leachman & Mai, 2014; Levenson, Baehr, Smith, & Sullivan, 2014). As of 2015, many states continued to grapple with cuts to federal education budget allocations (Anderson & Walker, 2015). State, district, and local school leaders continued to search and implement money-saving measures. Reductions in the budget were seen through increasing class size, amending the school calendar, imposing a hiring freeze, and furloughing classified staff. Options became limited for significant cost savings (Anderson & Walker, 2015; Brent, Sipple, Killeen, & Wischnowski, 2004; Farbman et al., 2015).

Kansas has seen significant decreases in funding for public education since 2008 (Baker et al., 2014; Leachman & Mai, 2014). Leachman and Mai (2014) reported that in FY15, Kansas state funding for school districts was 14.6% below 2008 levels. Regarding dollar amounts, Kansas was appropriating $861 less per student, adjusted for inflation, in FY15 than it was in FY08.

A further indication of the decreasing funding from the state of Kansas was the change in Base State Aid Per Pupil (BSAPP). Table 5 shows the difference in the BSAPP since the 2003-04 school year (Dennis & Neuenswander, 2015). The spending during the 2014-2015 school year was lower than 2003-2004 levels. There has been a

gradual 12.5% overall decrease in BSAPP since reaching the maximum in the 2008-2009 school year.

Table 5

Base State Aid Per Pupil for Kansas School Districts from 2003-2004 to 2015-2016

School Year	BSAPP	School Year	BSAPP
2003 - 2004	$3,863	2009-2010	4,012
2004-2005	3,863	2010-2011	3,937
2005-2006	4,257	2011-2012	3,780
2006-2007	4,316	2012-2013	3,838
2007-2008	4,374	2013-2014	3,838
2008-2009	4,400	2014-2015	3,852

Note. BSAPP = Base State Aid Per Pupil. Adapted from *General State Aid for Kansas Unified School Districts: General Fund and Supplemental General Fund* by D. Dennis and B. Neuenswander, 2015, p.5.

A number of Kansas school districts were particularly affected by the decreases in state aid. USD 285 Cedar Vale reported expenditures of $19,147 per pupil in the 2008-2009 school year (KSDE, 2017). In 2015-2016, Cedar Vale reported only $11,213 in spending per pupil, a 41.4% decrease. USD 494 Syracuse showed a 20.5% reduction in spending per pupil. USD 217 Rolla saw a decrease of 14.8% of expenditures per pupil.

There appears to be no correlation between the resources a school district has and student achievement. Hanushek (1997) combined findings from 377 research studies on the effects of school resources on student achievement. These studies looked directly at spending measures such as teacher salaries and expenditures per student as well as indirect measures of resource allocation such as teacher education, teacher experience,

and teacher-student ratio. The majority of studies (282 of 377) compared the resource allocations to student standardized test scores.

The result of Hanushek's 1997 meta-analysis suggested that there is no overwhelming evidence of a correlation between resource allotment and student achievement. Of the studies on teacher education level and student achievement, 9% showed a positive correlation, meaning that, as teacher education level increased, so did student achievement or vice versa. Studies on teacher-student ratio and student achievement were mixed. Fifteen percent of the studies showed a positive correlation, meaning that as teacher-student ratio increased, student achievement also increased, but 13% showed a negative correlation, meaning that as teacher-student ratio increased, student achievement decreased. Therefore, no statistically significant conclusion can be made about teacher-student ratio and student achievement. Teacher experience was the strongest indicator of student achievement, with 29% of studies showing a positive correlation. However, this means that over 71% of the studies showed either no effect or a negative effect on student achievement (Hanushek, 1997).

Summary

Chapter 2 outlined the literature related to how a four-day school week has been used to reduce school district budgets. In the first section, an examination of how time affects student achievement was presented. In the second section, the concept of college and career readiness, including its history and ways of measuring it, were included. In the third section, the history of the four-day school week was outlined. In the fourth section, the research studies relating to the four-day school week were described. Many of these studies revolved around student achievement measures, stakeholder perceptions,

and other student measures, such as absenteeism and discipline. Finally, in the last section, the history of budgetary crises in public education was discussed. Chapter 3 details the research methodology used in this study.

Chapter 3

Methods

The first purpose of this study was to determine if there was a difference in college-readiness of students enrolled in a four-day school week schedule compared to students enrolled in a five-day school week schedule. To this end, composite ACT scores from students in school districts utilizing a four-day school week were compared between school districts of similar demographics that were utilizing a five-day school week. A second purpose of the study was to determine if there were cost savings in the budgets of school districts employing a four-day school week compared to districts utilizing a five-day school week. This chapter describes the research methods used in the study and includes the following sections: research design, selection of participants, measurement, data collection procedures, data analysis and hypothesis testing, and limitations of the study.

Research Design

The design of this quantitative study was causal-comparative. The independent variables were the type of schedule in which the school district participated (four-day school week versus five-day school week), the minority status of students in the school district, and the SES of students in the school district. The dependent variables were the college-readiness of students enrolled in the high school as measured by average composite ACT scores and the amount of money spent on utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs.

Selection of Participants

The population for this study was composed of school districts in the state of Kansas. A purposive sample was taken, using districts in the state of Kansas, the state where the researcher currently resides. According to Lunenburg and Irby (2008), purposive sampling involves selecting a sample "based on the researcher's experience or knowledge of the group to be sampled" (p. 175).

All districts in Kansas that presently utilize a four-day week schedule were selected and then matched with similarly sized and located school districts utilizing a five-day school week from the state of Kansas to provide two samples of school districts for comparison. All school districts utilizing a four-day school week that had a designation of rural-remote or rural-distant were matched with school districts utilizing a five-day school week based on the number of students enrolled in the district, the percentages of minority students, and the percentages of students receiving free or reduced meals in the district.

Measurement

The instrument used in this study to measure college-readiness was the ACT. The ACT was selected because it has been shown to indicate potential college success and because of its prevalent use among colleges and universities to measure college-readiness of incoming first-year students (ACT, 2014). The instrument used in this study to measure cost savings to school districts operating as a four-day school week was the school district budget.

ACT Test. The ACT Test is a content-based assessment, not one based on perceived intelligence or aptitude (Atkinson & Geiser, 2009; Jacobson, 2017). As such,

ACT claims that their tests are "designed to determine how skillfully students solve problems, group implied meanings, draw inferences, evaluate ideas, and make judgments in subject-matter areas" (ACT, 2011, p. 3) critical to achieving success in college.

The ACT test includes four sections: English, reading, mathematics, and science (ACT, 2014). These subjects are assessed using a multiple-choice format. The English section is comprised of 75 questions and students have 45 minutes to complete this section. The English section evaluates grammar usage, sentence structure, and rhetorical skills. The reading section is comprised of four passages with ten questions each, for a total of 40 questions. Students have 35 minutes to read and answer these questions. The reading passages include prose fiction, as well as nonfiction passages from the areas of social science, humanities, and natural science. The mathematics section consists of 60 questions that students must answer in 60 minutes. The section includes questions from Pre-Algebra, Algebra I, Geometry, Algebra II, and Trigonometry. The final section, science, consists of 40 questions to be completed in 30 minutes. In the science section, students must draw conclusions and make comparisons based on seven different experiments.

Scoring. The ACT test utilizes a scaled score from 1 to 36. Subject-area tests in English, reading, mathematics, and science are scored from 1 to 36. The ACT composite score is an average of subject-area scores using standard rounding conventions as needed to obtain an overall composite scaled score between 1 and 36.

Validity and reliability. Validity is the extent to which an instrument measures a specific variable, while reliability is the extent to which an instrument consistently measures the variable it is measuring (Lunenburg & Irby, 2008). The validity and

reliability of the ACT have been examined thoroughly. ACT (2014) provided two studies that confirmed the validity of the ACT test to measure a student's probable college success using the ACT benchmarks. In the first study, students' composite ACT scores were compared to the following indicators of college-readiness: a) enrollment into any two- or four-year college in the fall following high school graduation, b) first-year college course grades, c) first-year college grade point average (GPA), d) remediation in English or mathematics courses in college, and e) retention to the same college in year two. The researchers established that those students meeting the ACT test benchmark scores were: a) more likely to enroll in a two- or four-year college in the fall following high school graduation, b) more likely to achieve a B or higher grade in first-year college courses, c) more likely to earn a first-year college GPA of 3.0 or higher, d) less likely to take remedial English or mathematics courses, and e) more likely to persist to the second year at the same college (ACT, 2014).

A second study (ACT, 2014) that measured the validity of the ACT to assess college-readiness compared the relationship between a student's performance on the ACT and the student's cumulative college grade point average (GPA) during the five years before graduation from college. Based on enrollment information from 87 bachelors'-level-degree-granting colleges and universities, which included 15,882 students that had both taken the ACT and graduated with a bachelor's degree, a linear model was used to examine the relationship between ACT scores and college GPA. The findings suggested that ACT is predictive of college GPA. Based on the results of these two studies, ACT was determined to be a useful measure of college-readiness.

The most recent research on the reliability of the ACT test was conducted during the 2011-12 school year. ACT examined reliability coefficients of subject-area tests taken during the six administrations of the ACT test that school year. Reliability coefficients "are estimates of the consistency of test scores" (ACT, 2014, p. 51). Reliability coefficients range from 0 to 1, with the values closer to one indicating higher levels of reliability or consistency (ACT, 2014).

Table 6 shows the median, minimum, and maximum scale score reliability coefficients among the subject area test scores, or scale scores, and the composite scores in the six administrations of the ACT test during the 2011-12 school year. Data were used from approximately 2,000 student tests given that school year. As Table 6 shows, a very high rate of reliability is shown within each subtest score and composite score.

Table 6

Scale Score Reliability for ACT *Tests Administered During the 2011-12 School Year*

	Median	Minimum	Maximum
English	.92	.92	.93
Mathematics	.91	.90	.92
Reading	.88	.86	.90
Science	.83	.80	.85
Composite	.96	.96	.97

Note. Adapted from *ACT Technical Manual* by ACT, p. 61. Copyright 2014 by ACT.

Budget Data. The budget data represented the amount that each school district reported in each area under consideration. Data was collected from two years prior to the school changing to a four-day school week schedule and two years after the school made

the change (KSDE, 2018). For each area of the budget in the study, the mean was calculated for the two years prior to the school district changing to a four-day school week schedule (mean before) and for the two years after the district changed to a four-day school week schedule (mean after). For this study, the mean before and the mean after were used as the comparison means in the hypothesis tests.

Some school districts involved in the study did not have complete budget information for the two years prior to switching to a four-day school week or for the two years after making the switch. For example, three school districts switched to a four-day school week schedule as of the 2016-2017 school year and, therefore, budget data for all categories was only available for one year after the school districts made the switch to a four-day school week. Another school district only reported classified personnel costs for one year after they made the switch to a four-day school week. In these instances, the budget expenditure from the year after the school district switched to a four-day school week was used in place of the mean. One school district did not report heating or electricity expenditures for either of the two years after the school districts made the switch to a four-day school week. The budget expenditures from this school district were omitted from the statistical analysis.

Utilities (heating and electricity). Heating and electricity expenditures were reported in the budget document (KSDE, 2018) from each school district for the two years prior to the school changing to a four-day school week schedule and two years after the school made the change, with the exception of the one district mentioned above. Both heating and electricity expenditures were measured using reported dollar amounts in the school district budget document.

Transportation. Transportation data was measured in miles traveled. Using the Selected Transportation Data Report (KSDE, 2018), a total number of miles was reported for the following categories: regular routes, summer school routes, special education routes, vocational education routes, and activity trips. For the purpose of this study, only the number of miles from regular routes were used from each school district for the two years prior to the school changing to a four-day school week schedule and two years after the school made the change.

Food service personnel costs. Food service personnel costs were reported by each school district in the budget document (KSDE, 2018) from each school district for the two years prior to the school changing to a four-day school week schedule and two years after the school made the change. These costs were measured using reported dollar expenditures in the school district budget document. Reported non-certified salaries and non-certified benefits were combined to attain a total food service personnel cost for each school district.

Classified personnel costs. Classified personnel costs were reported in the Budget-At-A-Glance document (KSDE, 2018) from each school district. Classified personnel costs were measured by multiplying the total number of classified full-time employees and the average salary of these employees. The data used was from the Average Salary table of the Budget-At-A-Glance document (KSDE, 2018) from each school district.

Demographics. The demographics of each school district were measured using reported data from the K-12 Building Report Cards and the K-12 Report Generator on the Kansas State Department of Education website (KSDE, 2018). For measurements of

minority status, percentages of White, African-American, Hispanic, and Other were collected for each school district. Percentages of African-American, Hispanic, and Other were then summed to represent the percentage of students within a district classified as non-White. For measurements of SES, the total number of students enrolled in the school district and the total number of students who participated in the free and reduced lunch program were collected. The percentage of students who participated in the free and reduced lunch program was then calculated.

The school districts were then placed into categories according to the percentage of White/non-White students enrolled in the district to distinguish higher and lower minority. A cut score of 85% was used as the cutoff between higher and lower minority districts. Those school districts with above 85% White students were deemed *lower minority* school districts and those with below 85% White students were deemed *higher minority* school districts.

The school districts were also divided according to the percentage of students classified as economically disadvantaged in the school district to distinguish between higher and lower SES. A score of 60% was used as the cutoff between higher and lower SES districts. Those districts with more than 60% of students participating in the free and reduced lunch program were deemed *lower SES* school districts and those with below 60% of students participating in the free and reduced lunch program were deemed *higher SES* school districts.

Data Collection Procedures

The researcher began the process of obtaining permission from Baker University to conduct research by submitting a request to the Institutional Review Board (IRB) of

the university (see Appendix B). Approval was granted by the Baker University IRB for the study on November 30, 2017 (see Appendix C). The researcher collected data from the Kansas State Department of Education's website in January 2018 and February 2018. The reports used in the study were the Budget document and Budget-At-A-Glance document from each school district in the study as well as the Selected Transportation Data Report for all school districts in the state of Kansas. The Budget document from each school district was used to collect data about district expenditures in heating, electricity, and food service personnel. The Budget-At-A-Glance document was used to collect the average salary and number of classified employees employed in the school district. The Selected Transportation Data Report was used to collect the number of miles driven on regular routes. Enrollment data were collected from the online K-12 Report Generator, including percentages of White and non-White students and percentages of students eligible for the free or reduced-price lunches. Once the data were merged into a single Microsoft Excel workbook, it was imported into the IBM SPSS© Version 24 statistics program for analysis.

Data Analysis and Hypothesis Testing

Each research question includes a corresponding hypothesis. The research question is listed below followed by the corresponding hypothesis and statistical analysis used. The level of significance used for the statistical analysis was $\alpha = .05$.

RQ1. To what extent is there a difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in comparable school districts that utilize a five-day schedule?

H1. There are differences in composite ACT scores of students in school districts that utilize a four-day school week as compared to composite ACT scores of students in school districts that utilize a five-day schedule.

A two-factor analysis of variance (ANOVA) was conducted to test H1. The two categorical variables used to group composite ACT scores were schedule type (four-day school week or five-day school week) and minority status (lower minority and higher minority). The two-factor ANOVA can be used to test three hypotheses including a main effect for schedule type, a main effect for minority status, and a two-way interaction effect (schedule type x minority status). The main effect for schedule type was used to test H1. The level of significance was set at .05.

RQ2. To what extent is the difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in school districts that follow a five-day schedule affected by the minority status of the students?

H2. The difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in school districts that utilize a five-day schedule is affected by the minority status of the students.

The interaction effect (schedule type x minority status) from the two-factor ANOVA used to test H1 was used to test H2. The level of significance was set at .05.

RQ3. To what extent is the difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite

ACT score of students in school districts that follow a five-day schedule affected by the SES of the students?

H3. The difference in the mean composite ACT score of students in districts that utilize a four-day school week and the mean composite ACT score of students in school districts that utilize a five-day schedule is affected by SES.

A second two-factor analysis of variance (ANOVA) was conducted to test H3. The two categorical variables used to group the dependent variable, composite ACT scores, were schedule type (four-day school week or five-day school week) and SES (lower SES and higher SES). The two-factor ANOVA can be used to test three hypotheses including a main effect for schedule type, a main effect for SES, and a two-way interaction effect. The interaction effect (schedule type x SES) was used to test H3. The level of significance was set at .05.

RQ4. Is there a difference in the money spent on utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs in the two years before implementing a four-day school week and the two years after implementing a four-day school week?

H4. There is a difference in district expenditures on heating after implementing a four-day school week.

H5. There is a difference in district expenditures on electricity after implementing a four-day school week.

H6. There is a difference in district expenditures on transportation after implementing a four-day school week.

H7. There is a difference in district expenditures on food service personnel costs after implementing a four-day school week.

H8. There is a difference in district expenditures on classified personnel costs after implementing a four-day school week.

Paired sample *t* tests were conducted to address each of the above hypotheses. The sample mean for each type of expenditure from two years before the school district switched to a four-day school week was compared to the sample mean from the two years after the school district switched to a four-day school week. The level of significance was set at .05.

Limitations

Limitations are those "factors that may have an effect on the interpretation of the findings or on the generalizability of the results" (Lunenburg & Irby, 2008, p. 133). The limitations of this study were as follows:

1. Only a subset of students from each school district took the ACT, therefore, the college-readiness of those students in a school district who did not take the ACT was not included in this study.
2. The school districts involved in the study were all from the Midwest United States; therefore, results may not be generalizable across the country.
3. Some of the school districts operating as a four-day school week used Monday as the day off while others used Friday as the day off.
4. Other variables outside the control of the researcher may play a part in any of the students' composite ACT scores. These variables may include availability

and utilization of practice ACT classes and tests, access to an advanced college-preparatory curriculum, and type of curriculum completed.

Summary

In this chapter, the design of the study was explained. This chapter provided information about the use of a causal-comparative research design, a description of the population and sample, sampling procedures, instrumentation, measurement, and validity and reliability. Lastly, a description of the methods used to collect data, data analysis and hypothesis testing, and limitations were included. The results of the data analysis and hypothesis testing are discussed in Chapter 4.

Chapter 4

Results

The first purpose of this causal-comparative quantitative study was to determine if there was a difference in college-readiness of students enrolled in a four-day school week schedule compared to students enrolled in a five-day school week schedule. To this end, composite ACT scores from students in each type of school district were compared to schools of similar demographics. The second purpose of this study was to determine if money was saved in the areas of utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs by school districts after employing a four-day week schedule. This chapter presents descriptive statistics and the associated test results of the hypothesis testing for each of the research questions.

Descriptive Statistics

The descriptive statistics in this section describe the variables used in the study. Eighteen school districts were identified as having utilized a four-day school week in the state of Kansas. Seventeen of these 18 school districts were using a four-day school week during the 2016-2017 school year. An additional 13 districts utilizing a five-day school week during the 2016-2017 school year were also involved in the study. The school districts that utilized a five-day school week were chosen for this study based on similar demographics to the school districts utilizing a four-day school week.

Complete budget data was not available for several of the 18 school districts that have utilized a four-day school week in Kansas. Three districts for which no budget data were available were not used in the analysis that involved the budget variables. One

district did not have heating expenditures reported for the first or fourth year of the study. One district did not have electricity expenditures reported for the two years after the switch to a four-day school district. One district did not report classified personnel costs for the first year of data collected. Three school districts switched to a four-day school week at the beginning of the 2016-2017 school year and therefore do not have a fourth year of budget data. For these three school districts, the mean district expenditure was not calculated for two years after the district switched to a four-day school week; the expenditure from the first year after the district switched to a four-day school week was used in the hypothesis test.

Hypothesis Testing

The four research questions are presented with the accompanying hypotheses. The hypotheses were tested for statistically significant differences. The analyses and results of the hypothesis tests are presented after each hypothesis.

RQ1. To what extent is there a difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in comparable school districts that utilize a five-day schedule?

***H1*.** There are differences in composite ACT scores of students in school districts that utilize a four-day school week as compared to composite ACT scores of students in school districts that utilize a five-day schedule.

A two-factor analysis of variance (ANOVA) was conducted to test H1. The two categorical variables used to group composite ACT scores were schedule type (four-day school week or five-day school week) and minority status (lower minority and higher

minority). The main effect for schedule type was used to test H1. The level of significance was set at .05.

The results of the analysis indicated there was a statistically significant difference between the two means, $F = 4.344$, $df = 1, 26$, $p = .047$. See Table 7 for the means and standard deviations for this analysis. The hypothesis that a statistically significant difference between the average ACT composite scores of school districts using a four-day school week and school districts using a five-day school week was supported. The average ACT composite score for school districts utilizing a four-day school week was 1.4 points lower than the average ACT composite score for school districts utilizing a five-day school week.

Table 7

Descriptive Statistics for the Results of the Test for H1

Schedule Type	*M*	*SD*	*N*
Four-Day School Week	19.5	1.9	17
Five-Day School Week	20.9	1.6	13

RQ2. To what extent is the difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in school districts that follow a five-day schedule affected by the minority status of the students?

H2. The difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of

students in school districts that utilize a five-day schedule is affected by the minority status of the students.

The interaction effect (schedule type x minority status) from the first two-factor ANOVA was used to test H2. The level of significance was set at .05. The results of the analysis indicated there was a marginally significant difference between the two means, $F = 2.921$, $df = 1, 26$, $p = .099$. See Table 8 for the means and standard deviations for this analysis. Although the difference was not statistically significant and no post hoc was conducted, the average ACT composite score for school districts with higher percentages of non-White students was 2.5 points lower in school districts utilizing a four-day school week compared to school districts utilizing a five-day school week. The average ACT composite score for school districts with lower percentages of non-White students was 0.3 points lower in school districts utilizing a four-day school week compared to school districts utilizing a five-day school week. The hypothesis that the difference between the average ACT composite scores of school districts using a four-day school week and school districts using a five-day school week was affected by the minority status of students enrolled in the school district was to some extent supported.

Table 8

Descriptive Statistics for the Results of the Test for H2

Schedule Type	Minority Status	*M*	*SD*	*N*
Four-Day School Week	Lower	20.1	1.97	7
	Higher	19.0	1.80	10
Five-Day School Week	Lower	20.4	1.26	7
	Higher	21.5	1.84	6

Note. Lower = school districts with less than 20% non-White students; Higher = school districts with more than 20% non-While students.

RQ3. To what extent is the difference between the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in school districts that follow a five-day schedule affected by the SES of the students?

H3. The difference in the mean composite ACT score of students in school districts that utilize a four-day school week and the mean composite ACT score of students in school districts that utilize a five-day schedule is affected by SES.

A second two-factor ANOVA was conducted to test H3. The two categorical variables used to group the dependent variable, average ACT composite score, were schedule type (four-day school week or five-day school week) and SES of students (lower SES and higher SES) enrolled in the school district. The interaction effect (schedule type x SES) was used to test H3.

The results of the analysis indicated there was a marginally significant difference between the two means, $F = 2.887$, $df = 1, 26$, $p = .101$. See Table 9 for the means and standard deviations for this analysis. Although the difference was not statistically

significant and no post hoc was conducted, the average ACT composite scores for school districts with higher percentages of students classified as economically disadvantaged (lower SES) was 2.7 points lower in school districts utilizing a four-day school week compared to lower SES school districts utilizing a five-day school week. The hypothesis that the difference between the average ACT composite scores of school districts using a four-day school week and school districts using a five-day school week was affected by the SES of students enrolled in the school district was to some extent supported.

Table 9

Descriptive Statistics for the Results of the Test for H3

Schedule Type	SES	*M*	*SD*	*N*
Four-Day School Week	Lower	18.3	1.57	7
	Higher	20.3	1.76	10
Five-Day School Week	Lower	21.0	2.14	6
	Higher	20.8	1.10	7

Note. Lower = school districts with more than 60% of students classified as economically disadvantaged; Higher = school districts with less than 60% of students classified as economically disadvantaged.

RQ4. Is there a difference in the money spent on utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs in the two years before implementing a four-day school week and the two years after implementing a four-day school week?

H4. There is a difference in district expenditures on heating after implementing a four-day school week.

The sample mean of heating costs from two years before the school district switched to a four-day school week was compared to the sample mean of heating costs

from the two years after the school district switched to a four-day school week. The results of the paired samples *t* test indicated a marginally significant difference between the two values, $t = 2.064$, $df = 12$, $p = .061$. Although the difference was not statistically significant, the sample mean for heating costs before switching ($M = 25946.92$, $SD = 10100.07$) was higher than the sample mean for heating costs after switching ($M = 22419.54$, $SD = 7745.70$). The hypothesis that there is a difference in school district expenditures on heating costs after implementing a four-day school week was to some extent supported.

H5. There is a difference in district expenditures on electricity after implementing a four-day school week.

The sample mean of electricity costs from two years before the school district switched to a four-day school week was compared to the sample mean of electricity costs from the two years after the school district switched to a four-day school week. The results of the paired samples *t* test indicated no difference between the two values, $t = 1.296$, $df = 12$, $p = .219$. Although the sample mean for electricity costs before switching ($M = 53088.04$, $SD = 31798.34$) was higher than the sample mean for electricity costs after switching ($M = 51247.12$, $SD = 33307.46$), the difference was not meaningful. The hypothesis that there is a difference in school district expenditures on electricity costs after implementing a four-day school week was not supported.

H6. There is a difference in district expenditures on transportation after implementing a four-day school week.

The sample mean of transportation miles from regular bus routes from two years before the school district switched to a four-day school week was compared to the sample

mean of transportation miles from regular bus routes from the two years after the school district switched to a four-day school week. The results of the paired samples *t* test indicated a marginally significant difference between the two values, $t = 1.869$, $df = 13$, $p = .084$. Although the difference was not statistically significant, the sample mean for transportation miles before switching ($M = 54071.61$, $SD = 35227.50$) was higher than the sample mean for transportation costs after switching ($M = 50137.75$, $SD = 29324.76$). The hypothesis that there is a difference in school district expenditures on transportation after implementing a four-day school week was to some extent supported.

H7. There is a difference in district expenditures on food service personnel costs after implementing a four-day school week.

The sample mean of food service personnel costs from two years before the school district switched to a four-day school week was compared to the sample mean of food service personnel costs from the two years after the school district switched to a four-day school week. The results of the paired samples *t* test indicated a statistically significant difference between the two values, $t = 2.239$, $df = 13$, $p = .043$. The sample mean for food service before switching ($M = 64077.21$, $SD = 28771.00$) was higher than the sample mean for food service after switching ($M = 57743.75$, $SD = 27922.89$). The hypothesis that there is a difference in school district expenditures on food service personnel costs after implementing a four-day school week was supported.

H8. There is a difference in district expenditures on classified personnel costs after implementing a four-day school week.

The sample mean of classified personnel costs from two years before the school district switched to a four-day school week was compared to the sample mean of

classified personnel costs from the two years after the school district switched to a four-day school week. The results of the paired samples *t* test indicated no difference between the two values, $t = 1.006$, $df = 13$, $p = .333$. Although the sample mean for classified before switching ($M = 489563.69$, $SD = 369894.20$) was higher than the sample mean for classified after switching ($M = 465871.52$, $SD = 365341.37$), the difference was not meaningful. The hypothesis that there is a difference in school district expenditures on classified personnel costs after implementing a four-day school week was not supported.

Summary

This chapter presented the results of the two-factor ANOVA tests and the paired sample t-tests that were used to analyze the raw data collected in this study. The results of the two-factor ANOVA tests indicated that students attending a five-day school week district showed a higher level of college-readiness than their peers at four-day school week districts. The result of the two-factor ANOVA tests also showed that minority status did have a statistically significant effect on the college-readiness of students and SES did not have a statistically significant effect on the college-readiness of students that attend a four-day school week compared to students that attend a five-day school week. The results of the paired sample *t*-tests were mixed in their statistical significance. Chapter 5 presents a summary of the study, the research findings, how these findings relate to the literature, implications for the field of education, and recommendations for further research.

Chapter 5

Interpretation and Recommendations

This chapter presents a summary of the study including an overview of the problem, purpose statement, research questions, and a review of the methodology. The findings related to the literature are detailed, followed by a conclusion that includes the implications for action and recommendations for further research. The chapter ends with concluding remarks.

Study Summary

The study summary recounts an overview of the problem facing school districts regarding budget shortfalls and increased pressure to ensure college-ready graduates. Additionally, the purpose statement and research questions describe the reason the study was conducted. The review of methodology discusses the design and data collection procedures. Finally, the results of the study were provided in the major findings section.

Overview of the problem. Prior to 2008, school district budgets were steadily increasing (Hanushek & Lindseth, 2009). Since then, however, school district budgets have been in a steady decline (Leachman, Albares, Masterson, & Wallace, 2016; Leachman & Mai, 2014; U.S. Department of Education, 2015). One of the ways districts have dealt with the problem of funding shortfalls has been to implement a four-day school week schedule (Anderson & Walker, 2015; Donis-Keller & Silvernail, 2009; Griffith, 2011; Henton, 2015, 2015; Plucker et al., 2012; Sagness & Salzman, 1993), thereby eliminating transportation and food service costs for one day per school week and decreasing the classified personnel wages as well as utility use throughout the district. With a decrease in the number of days students attend school, some educators are

concerned that this reconfiguration of time will have a negative impact on student achievement, most notably on student college-readiness.

Since the Great Recession of 2007, the United States has been trying to increase the number of students that succeed at the postsecondary level (Carnevale et al., 2013). Over six million of the over 8.7 million jobs lost since 2008 have been recovered. Most of these jobs, however, were in industries that require some sort of post-secondary education. For this reason, new calls for post-secondary success have been announced by boards of education across the country, including the state of Kansas.

The combination of decreasing school district budgets and increased focus on college-readiness has made this study timely and significant to the field. If school districts are to increase student college-readiness at a time when school district budgets are decreasing, is switching to a four-day school week a viable solution or should school districts seek other solutions to overcome budget shortfalls? Is the budget savings worth a potential decline in student college-readiness? Educators must ensure that attempts to curtail declining budgets do not negatively affect student achievement, particularly in the area of college-readiness.

Purpose statement and research questions. The first purpose of this causal-comparative quantitative study was to determine if there was a difference in college-readiness of students enrolled in a four-day school week schedule compared to students enrolled in a five-day school week schedule. To this end, ACT composite scores from students in school districts that utilized a four-day week were compared with ACT composite scores from students in school districts that utilized a five-day school week. The second purpose of this study was to determine if money was saved in the areas of

utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs by school districts employing a four-day week schedule. Budget data were examined for two years preceding the switch to a four-day school week and two years after switching to a four-day school week.

Review of the methodology. This quantitative study was organized using a causal-comparative design. The dependent variables were ACT composite scores and school district expenditures in utilities (heating and electricity), transportation, food service personnel costs, and classified personnel costs. The independent variables were the minority status of students, as measured by the percentage of White students enrolled in each school district, and the SES of students, as measured by the percentage of economically disadvantaged students enrolled in each school district. There were 18 school districts involved in the study that utilized a four-day school week schedule. Two-factor ANOVAs were conducted to examine the statistical significance of the first three hypotheses concerning the effect of switching to a four-day school week on ACT composite scores. Paired sample t-tests were conducted to examine the statistical significance in the difference of the means of budget expenditures before the change to a four-day school week and the budget expenditures after the change to the four-day school week.

Major findings. The results from the two-factor ANOVA tests designed to answer RQ1, RQ2, and RQ3 varied in their levels of statistical significance. The ACT composite scores from the five-day school districts were significantly higher than the ACT composite scores from the four-day school district. Without accounting for minority status or SES, the difference in average composite ACT scores between four-

day school districts and five-day school districts was 1.4 points. When minority status and SES were considered, the differences were marginally significant. Among school districts with a student body that has a higher percentage of minority students, the average composite ACT score was 2.5 points lower in school districts utilizing a four-day school week compared with school districts utilizing a five-day school week. For school districts with lower SES, the average composite ACT score in school districts utilizing a four-day school week was 2.7 points lower in school districts utilizing a five-day school week. The analysis of the budget items used to address RQ4 showed that while school districts did not save in the areas of electricity and classified personnel, school districts did save on expenditures in the areas of heating, transportation, and food service personnel when switching to a four-day school week from a five-day school week.

Findings Related to the Literature

This section connects the major findings of the study with the related literature presented in Chapter 2. The current study both confirmed and was in conflict with the research studies described in Chapter 2. The connections to the literature on the academic impact of a four-day school week and the literature on cost savings after switching to a four-day school week are reviewed below, along with findings from the current study.

Researchers have supported the idea that switching to a four-day school week has no impact on student achievement. Both Daly and Richburg (1984) and Reinke (1987) found that a four-day school week did not increase or decrease student achievement. Researchers Wilmoth (1995) and Yarbrough and Gilman (2006) each showed that student achievement increased after the switch to a four-day school week. Sagness and Salzman

(1993) showed mixed results in their study of how a change to a four-day school week affected TBS scores. The current study, examining college-readiness rather than student achievement, showed that college- readiness, as measured by ACT composite scores, was significantly affected by the change to a four-day school week. Composite ACT scores in school districts utilizing a four-day school week were significantly lower than composite ACT scores in school districts utilizing a five-day school week.

Griffith (2011) found that school districts could realize a maximum cost savings of 5.43% of its total budget by changing to a four-day school week. He found that costs were decreased in the areas of transportation and food service. Although Griffith (2011) measured transportation costs in terms of dollars spent on gasoline each school year, the current study measured transportation costs in terms of miles driven each school year on regular routes. The results of the current study support Griffith's finding that costs associated with transportation as well as food service personnel decreased. However, the findings in the current study were not statistically significant.

Blankenship (1984), Grau and Shaunessy (1987), Koki (1992), Sagness and Salzman (1993), and Yarbrough and Gilman (2006) also reported that cost savings could be realized when school districts switched to four-day school week. Blankenship (1984) reported that school districts in Kansas and Colorado that had switched to a four-day school week saved money in the areas of transportation, heating, and electricity costs, just as the current study determined. While Blankenship only looked at a handful of school districts utilizing a four-day school week in Kansas and Colorado, the current study took a more inclusive approach, examining cost savings for every school district in Kansas that had utilized a four-day school week.

Grau and Shaughnessy (1987) reported a 10-25% decline in heating and electricity costs and Koki (1992) reported 10-15% decrease in heating and electricity costs. Koki (1992) also reported a 10-20% reduction in transportation costs. While the current study did not compute the percent of cost savings, the current study did support Grau and Shaughnessy's (1987) and Koki's (1992) claims that cost savings could be realized after school districts switched to a four-day school week. Both transportation and heating costs were significantly lower in school districts after switching to a four-day school week. Electricity costs were virtually the same in school districts after making the change to a four-day school week.

Both Sagness and Salzman (1993) and Yarbrough and Gilman (2006) reported overall cost savings of near 2% of the total school district budget after switching to a four-day school week. Both of these researchers cited decreases in heating, electricity, transportation, and classified staff costs as reasons for the decline. The results of the current study also showed significant savings in transportation, heating, and food service personnel costs. However, the current study did not find significant savings in electricity or classified personnel costs.

Conclusions

This section contains implications for educators currently using or contemplating using a four-day school week schedule within their school districts. Recommendations for future research are also presented, followed by concluding remarks.

Implications for action. The major findings from this study have implications for school districts that are currently utilizing or anticipate utilizing a four-day school week in the future. For those school districts that are currently using a four-day school

week, the results of this study can be used as guidance in future decisions about whether to continue the use of a four-day school week. Because of the negative effect on college-readiness, school districts currently utilizing a four-day school week should weigh potential budget savings against the potential detriment to the college-readiness of their students. For school districts contemplating the switch to a four-day school week, the results of this study may be used to discourage such a change, as the study showed that there was a significant negative effect on the college-readiness of students using a four-day school week compared to those using a five-day school week. However, because the current study involved a very small sample size and the difference in composite ACT scores was less than two points, school districts should consider other factors as well when ultimately determining whether they should switch to or continue using a four-day school week schedule.

Additionally, school districts that currently use a four-day school week schedule with the intention of saving money might reexamine their budgets to determine where, if anywhere, they are saving money. According to the results of this study, school districts are not saving money on electricity or classified personnel. However, the savings in heating, transportation, and food service personnel costs may be enough to warrant a continuation of the four-day school week to save money in these areas.

Recommendations for future research. The following recommendations are made for others interested in studying the effects of a four-day week school schedule as well as administrators, educators, and others in the field of education that are currently utilizing a four-day school week schedule.

1. It is recommended that future research include additional measures of college-readiness, such as: a) high school grade point average, b) college-preparatory courses taken (such as AP, IB, and dual-credit college-level courses), c) other college-readiness assessments (such as the SAT), d) remediation rates in the first year of college, and e) college retention rates.
2. It is recommended that future research examine the longitudinal effects of a four-day school week on student post-secondary success.
3. It is recommended that additional demographic variables be taken into account, such as the geographic size of the school district or the percentage of students enrolled in dual-credit courses.
4. It is recommended that future research examine additional parts of the school district budget for savings when switching from a five-day school week to a four-day school week, such as expenditures on substitute teachers.
5. It is recommended that future research examine the college-readiness of students in additional geographical areas that currently allow and utilize a four-day school week schedule.
6. It is recommended that future research examine a larger number of school districts to increase the power of the statistical analyses garnered from a larger sample size.

Concluding remarks. Funding for education across the United States continues to be in jeopardy, especially for small, rural school districts. As these school districts seek ways to overcome budget shortfalls while still maintaining a quality education system for their students, the switch to a four-day school week schedule could be a viable

alternative. Switching to a four-day school week is not without its drawbacks, however. Based on the results of this study, significant differences exist between composite ACT scores of students in school districts utilizing a four-day school week and school districts utilizing a five-day school week. Administrators need to be aware of this difference and make decisions for their districts knowing that a decline in composite ACT scores, indicating a decline in college-readiness, is possible. Further, there does not appear to be great cost savings for school districts after switching to a four-day school week. While school districts have saved money in some areas of the school budget, overall cost savings may not provide enough of an advantage to overcome budget shortfalls. Administrators must ask themselves if these slight cost savings are worth the risk to student college-readiness.

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Appendices

Appendix A: Table of Demographics of School Districts Utilizing a Four-Day School Week in the 2016-2017 School Year

School District	Total Student Enrollment	% Non-White Students	% Economically Disadvantaged
A	129	**27.1**	**57.4**
B	490	10.0	**50.4**
C	210	**69.5**	**80.5**
D	134	**42.5**	**54.5**
E	196	**23.5**	45.9
F	150	**48.0**	**51.3**
G	104	3.8	43.3
H	208	8.7	**51.0**
I	65	7.7	43.1
J	353	17.3	**59.2**
K	189	**19.2**	**72.0**
L	60	8.3	**60.0**
M	316	16.5	**63.6**
N	67	**25.4**	**62.7**
O	145	6.2	46.9
P	542	**54.8**	**63.7**
Q	438	8.9	**62.8**
State of Kansas Average %		18.7	48.4

Note. Retrieved from *Kansas Education Data Reporting* by Kansas Department of Education, 2018, http://datacentral.ksde.org.

Appendix B: Baker University IRB Request

BAKER UNIVERSITY

IRB Request

Date 11/28/2017

IRB Protocol Number _____
(IRB use only)

I. Research Investigator(s) (students must list faculty sponsor)

Department(s) Education

	Name	Signature	
1.	Lisa Braun	Lisa Braun Digitally signed by Lisa Braun Date: 2017.11.27 16:33:59 -06'00'	Principal Investigator
2.	Verneda Edwards		☑ Check if faculty sponsor
3.			☐ Check if faculty sponsor
4.			☐ Check if faculty sponsor

Principal investigator contact information

Phone (785) 766-1172

Email lisabraun1172@gmail.com

Address 524 Lyon St
Lawrence, KS
66044

Note: When submitting your finalized, signed form to the IRB, please ensure that you cc all investigators and faculty sponsors using their official Baker University (or respective organization's) email addresses.

Faculty sponsor contact information

Phone _____

Email vedwards@bakeru.edu

Expected Category of Review: ☑ Exempt ☐ Expedited ☐ Full ☐ Renewal

II. Protocol Title

The Academic and Financial Impact of a Four-Day School Week

III. Summary:

The following questions must be answered. Be specific about exactly what participants will experience and about the protections that have been included to safeguard participants from harm.

A. In a sentence or two, please describe the background and purpose of the research.

The purpose of this research is to determine the effect of a four-day school week schedule on high school students' college-readiness. Specifically, the study will attempt to determine the effect of a four-day school week as measured by ACT composite scores. In addition, the study will investigate the cost savings to the district by moving to a four-day school week from a traditional five-day school week.

B. Briefly describe each condition, manipulation, or archival data set to be included within the study.

The study will be using the following sets of archival data:
1) ACT composite scores of students attending a four-day school week vs a five-day school week during the 2015-2016 school year
2) school district calendar data to determine which school districts use a four-day school week (KASB)
3) school district budget information on expenditures from 2012-2016 (KSDE)

IV. Protocol Details

A. What measures or observations will be taken in the study? If any questionnaire or other instruments are used, provide a brief description and attach a copy.

The variables used in the study are measured using archived test score and budget data from online databases.

B. Will the subjects encounter the risk of psychological, social, physical, or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that risk.

No subjects participating in this study will encounter the risk of psychological, social, physical, or legal risk.

C. Will any stress to subjects be involved? If so, please describe.

No subjects participating in this study will be stressed in any way.

D. Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.

No subjects participating in this study will be deceived or misled in any way.

E. Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.

No subjects participating in this study will be asked for personal or sensitive information.

F. Will the subjects be presented with materials which might be considered to be offensive, threatening, or degrading? If so, please describe.

No subjects participating in this study will be presented with materials which might be considered offensive, threatening, or degrading.

G. Approximately how much time will be demanded of each subject?

Subjects participating in this study will not have any time demanded of them.

H. Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

No subjects participating in this study will be solicited or contacted. The data collected is publicly available.

I. What steps will be taken to insure that each subject's participation is voluntary? What if any inducements will be offered to the subjects for their participation?

No subjects participating in this study will be offered any inducements. The data collected is publicly available.

J. How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.

No subjects participating in this study will be required to sign a written consent form. The data collected is publicly available.

K. Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.

No aspect of the data will be made a part of any permanent record that can be identified with the subject.

L. Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher, or employer? If so, explain.

The fact that any subject did or did not participate in a specific experiment or study will not be made part of any permanent record.

M. What steps will be taken to insure the confidentiality of the data? Where will it be stored? How long will it be stored? What will be done with the data after the study is completed?

The data used for this study was retrieved from the Kansas Department of Education report card data. This data is available online for each of the school districts investigated in the study.

N. If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?

There are no risks involved in this study.

O. Will any data from files or archival data be used? If so, please describe.

The archival data files are publicly available. The following data sets will be used in the study:
1) ACT Composite scores for each school district in the study for the 2015-2016 school year
2) Budget-At-A-Glance files from each school district in the study for two years prior to switching to a four-day school week and two years after switching to a four-day school week
3) Calendar data that includes information on whether a school district was operating a four-day or five-day school week during the 2015-2016 school year

Appendix C: Baker University IRB Approval

BAKER UNIVERSITY
Own Confidence

Baker University Institutional Review Board

November 30th, 2017

Dear Lisa Braun and Verneda Edwards,

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

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at npoell@bakeru.edu or 785.594.4582.

Sincerely,

Nathan D. Poell

Nathan Poell, MA
Chair, Baker University IRB

Baker University IRB Committee
Scott Crenshaw
Erin Morris, PhD
Jamin Perry, PhD
Susan Rogers, PhD