

**A Comparison of ACT WorkKeys Performance of Young Adults Who Are Completers
and Non-Completers of a Career and Technical Pathway**

by

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Abstract

The purpose of this study was to compare the performance on the ACT WorkKeys assessment of young adults who participated in a career tech educational pathway and young adults who did not participate in a career tech educational pathway. In this study, there were two groups: Career Tech completers and Non-Career Tech pathway completers. Gender, race, and socio-economic status were also examined in regard to performance on the ACT WorkKeys. The ACT WorkKeys assessment grades participants on career ready skills and provides certificates based on performance. Certificates range from Platinum, Gold, Silver, to Bronze. The data for this study was previously collected which allowed a comparison between the two groups. The data was retrieved from a southeast Alabama high school. The school had approximately 620 students in grades 9–12 and reported approximately 79% of its students received free or reduced lunch. Once the data was compiled, the researcher was able to answer if there was a difference in performance on an evidence-based national career ready test of young adults who completed a career tech pathway from the young adults who did not complete a career tech pathway. Gender, race, and socio-economic status was reviewed to determine if there was any relationship between demographics and ACT WorkKeys scores. Data revealed there was a significant relationship between race and performance on the ACT WorkKeys. There was also a significant relationship between socio-economic status and performance on the ACT WorkKeys, but the data failed to yield a significant relationship between completers and

non-completers of Career and Technical Educational Pathways. Data also revealed no significant difference in gender as it relates to performance on the ACT WorkKeys.

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CHAPTER 1. INTRODUCTION

Overview

In recent years, a movement has occurred within the school systems in the United States. In 2001, the No Child Left Behind Act (NCLB) was passed which marked the beginning of modern reform for education in America. However, NCLB was not the first act to mandate equal and appropriate education for students no matter his or her race, sex, or ability. The Elementary and Secondary Education Act of 1965, which was rooted in equal rights for all students, was established at the height of the Civil Rights Movement (Hewitt, 2011). At the time of the ESEA 1965, law makers were determined to create a fair educational process for every American but specifically African Americans. NCLB Act of 2001 gave the federal government a place in local education, and it took steps to ensure every child was educated in such a way they could succeed in life after high school (Hewitt, 2011). NCLB held school systems accountable for academic performance and mandated each school, receiving federal money, to administer standardized tests. In 2015, President Obama reauthorized the Elementary and Secondary Education ACT and replaced NCLB with Every Child Succeeds Act which is widely praised by educators and state governments because the law decreased the federal footprint in state education. It allowed individual states to determine specific accountability measures for students and outlined state reporting responsibilities to the federal government (Darrow, 2016).

No matter the law or educational reform movement, the focus has seemingly always been on the student, even though some educators disagree. Each reform has maintained that a fair and appropriate education be provided to all students regardless of his or her subgroup. However, the focus seemed to shift from vocationally driven to academically driven with the implementation of NCLB. Nonetheless, Alabama, for some time, has maintained the same student first motto, “What is best for our students?”, (ALSDE, n.d.) and this resonates through each school district in Alabama. Before August 2016, the vision for Alabama was outlined in the strategic plan, Plan 2020, which stated “Every Child A Graduate – Every Graduate Prepared for College, Work, and Adulthood in the 21st Century” (ALSDE, n.d.). The plan defines a graduate as a young adult who “Possesses the knowledge and skills needed to enroll and succeed in credit-bearing, first-year courses at a two- or four-year college, trade school, technical school without the need for remediation.” The graduate also “Possesses the ability to apply core academic skills to real-world situations through collaboration with peers in problem solving, precision, and punctuality in delivery of a product, and has a desire to be a life-long learner” (ALSDE, n.d.). Objectives in this plan were implemented to close the gap between subgroups, increase achievement and growth for all students, increase graduation rate, and ensure every child walks across the stage at commencement ceremonies prepared for the real world. This plan highlighted the need for college and career ready students in Alabama and provided guidelines to meet the stated objectives by 2020. To receive College and Career Ready status, a student must meet one of the following indicators: 1) A benchmark score on any section of the ACT, 2) A qualifying score on an AP or IB exam, 3) Pass an approved college or postsecondary credit while in high school, 4) A benchmark level on the ACT WorkKeys, 5) An approved industry credential, or 6) documented acceptance for enlistment into the military (ALSDE, n.d.). Once a graduating

young adult has reached college and career ready status, they are viewed by the state of Alabama Department of Education as ready for secondary education or the workforce. However, research states that employers across the nation do not believe that graduates are leaving high school as young adults ready for the workforce. In 2014 from a study completed by Achieve, 18% of employers believed young adults fresh from high school had the skills necessary to be effective in a work environment (Achieve, 2015). These percentages were low; however, only 46% of jobs in Alabama only require a high school diploma while 53% of the population in Alabama only have a high school diploma. With approximately half the jobs in Alabama requiring only a high diploma, and more than half only completing high school level education, it is evident that career preparedness is imperative at the high school level.

Career and technical education (CTE) is offered in most high schools across the state because the local agency realizes the importance of the courses. These courses may differ from district to district, but the focus is to prepare young adults to exit high school and enter the workforce as skilled workers. The skills taught are many times soft skills such as collaboration with others, character building, service to one another, and professionalism all of which are universal to any job or career. This trend of career development has seen an increase since the early 1990s when the “What Work Requires of Schools” was published in 1991 and the School-to-Work Opportunities Act was enacted in 1994 which enticed education agencies to prepare young adults for the workplace and postsecondary programs (Schenck, Anctil, Smith, Dahir, 2012). However, in 2004, with the beginning phase of NCLB in process, determined to prove CTE was not effective in improving academic achievement, the Federal government attempted to stop federal funds allocated to career tech education. However, in 2006, Perkins IV was signed by President Bush setting in motion a complete overhaul of career and technical education. The

most significant change was a name change from Vocational Education to Career and Technical Education. The change of name was demonstrated in the definition of Career and Technical Education which emphasized on the integration of academics and career tech (Freidel, 2011). Overall, the purpose of the Perkins Act of 2006, was to provide career tech students an education which involved high academic standards along with work ready skills. With the Act in place, a new direction for CTE and an ever-increasing graduation rate goal, the stakeholders in CTE were tasked to demonstrate effective strategies which would help students meet the guidelines of NCLB (Freidel, 2011). However, through this change, deficits in America still existed in the areas of math and science. This is evident by an article published by U.S. News in 2014 (Lennon, 2014) which discussed the possible economic decline due to unskilled workers in the area of science, technology, engineering, and math. The author references a skills gap in the United States and discusses programs developed for unskilled workers to develop work-related skills needed to inhabit job vacancies across America. Nonetheless, employers provided less on the job training which shifted the burden of preparation to third party organizations or high schools (Lennon, 2014).

Now, with high schools being called upon by the nation to produce work ready young adults and a federal reform mandating standardized testing in areas of Math, Science, Reading, and English, ACT, otherwise known as American College Test, developed the ACT WorkKeys in 2010 which is a specially designed test to indicate career readiness (WorkKeys Assessment, n.d.). ACT defines career ready as the skills and proficiency levels needed for specific career clusters. The ACT WorkKeys was designed to help school districts identify the effectiveness of the career tech programs offered to students. The test assesses Alabama high school seniors in workplace skills critical to job retention, real world problem solving, critical thinking, and job

effective reasoning. Data are present for three ACT WorkKeys cognitive assessments: Reading for Information, Applied Mathematics, and Locating Information. These are the three areas of focus on the assessment, although sub-topic scores are given if the student wants to know what area was a strength (WorkKeys Assessment, n.d.). This test was proposed to be the tool necessary to blend CTE goals and objectives with the mandates of education reform in the United States. The results of the test are presented in four tiers: platinum, gold, silver, and bronze. Each individual scoring in the platinum, gold or silver tier receive a National Career Ready Certificate. ACT reports higher annual wages, and an increased likelihood of attaining and retaining employment (Employment Outcomes, 2017). Not only does the potential employee benefit from the National Career Ready Certificate, but employers report a “23% increase in employee productivity in task performance, a 22% increase in output due to increased employee safety, a 19% reduction in hiring needs due to increased performance, 19% reduction in hiring needs due to increased employee safety, a 25–75% reduction in turnover, a 50–70% reduction in time-to-hire, and a 50% reduction in training time” (Employment Outcomes, 2017). The benefits of receiving a National Career Ready Certificate from an individual’s ACT WorkKeys score seem beneficial for both the potential employee and the employer, but the true indicator of career ready may not lie with the test. Career and Technical Education may be the foundation and the cornerstone to help transition a young adult into a fast paced, ever changing society.

Problem Statement

In 2013, Alabama began testing all high school seniors on the ACT WorkKeys to determine career readiness. In 2015, the Alabama Department of Education reported only 52% of Alabama received a National Career Ready Certificate. In one small town in southeast

Alabama, data indicated from the 2015 report, only 32% of high school seniors received a Platinum, Gold, or Silver on the ACT WorkKeys. With a graduation rate climbing to nearly 90% in this particular high school, it is a concern that young adults are graduating from this high school not career ready based on the reported data from ACT WorkKeys (ALSDE, n.d.). By looking at one indicator from Plan 2020, the ACT WorkKeys, the career ready percentage would be lower because all indicators were not taken into account during this study. The Alabama Department of Education releases report cards of each school to the public and college and career readiness accounts for 20% of the school's report card. Each school strives to generate the best results because the data is made public. Ultimately, the report can influence city growth in population and economically because as businesses move in, they hire employees who have school age kids, and these parents are wanting to find the best education. It is essential for parents to know that the school system in which they choose to enroll their kids will help their student become college and career ready. The school in this study has a career and technical center where students are allowed to take Career and Technical Education courses. Students are given freedom of choice in whether they want to focus on academic or career related courses. Students must take 3 Carnegie units in either a career field, foreign language, or art education. It is the hope that students who complete a pathway in a career field will leave high school as career ready measured by the ACT WorkKeys. Due to differences and the lack of uniformity in school district career and technical educational offerings, one school was used in this study. The researcher wanted to know if the classes offered to these particular students in this school was actually preparing them to succeed on the ACT WorkKeys.

Purpose of the Study

The purpose of this study was to compare ACT WorkKeys data of students who completed a career and technical pathway and those students who did not complete a career and technical pathway during their high school career. This study determined whether or not there was a positive correlation between a student completing a career and technical pathway and scoring high enough on the ACT WorkKeys to be labeled Career Ready. This study also examined the relationship between race, gender, and socioeconomic status as related to achievement on the ACT WorkKeys.

The career and technical education courses offered on the campus of the high school in this study are taught by highly qualified secondary teachers in the areas of Engineering, IT Data, Culinary Arts, Business, Welding, Health Science, Education and Training, and JROTC. Classes are offered through face to face interaction and students are not allowed to take classes virtually. Classes are scheduled for 18 weeks totaling 144 hours through a semester format. To reach completer status, a student must complete 3 Carnegie units in sequence during his or her high school career. If a student completes 3 classes, he or she would have completed 432 hours of subject matter and job readiness development in hopes to score high enough on the ACT WorkKeys.

Research Questions

The following research questions were used in this study:

1. To what extent does completing a career pathway in high school have on student scores on the ACT WorkKeys?
2. What is the comparison of scores between a completer and a non-completer of a career pathway and the success on the ACT WorkKeys?

3. What is the relationship of gender, race, and socioeconomic status of students who completed a career and technical pathway and a non-completer and achievement on the ACT WorkKeys?

Assumptions

The following assumptions were made:

- A. The ACT WorkKeys is a valid and reliable test.
- B. The population which was examined had the same class options in the area of career and technical education. No classes were added or dropped in the 4 years examined.
- C. The academic ability level of the population will vary due to variation in backgrounds, IQ level.
- D. Each participant gave his or her best effort on the ACT WorkKeys.

Limitations of the Study

This study involved only one school in southeast Alabama. Only one school was used because of data governance policies. However, one other school gave permission for use of their data, but their career and technical education courses are not taught by high school teachers. Their classes are taught by college professors which would not be in comparison to the high school teachers who teach at the high school in this study. Also, the career and technical education courses differ from both high schools.

This study consists of 569 scores from graduating seniors of years of 2015, 2016, 2017, and 2018. The study was based on standardized testing so the researcher could not guarantee students tried their best. Even though incentives are given to students, it is not known if the reinforcement of a National Career Ready Certificate is big enough to achieve the wanted

behavior. The data may not reflect data from other school districts who do not have the same demographics.

Another limitation was that not every senior attended school the day the ACT WorkKeys was given. The WorkKeys is given during February of a student's senior year, and in some cases, students who have completed all requirements graduated in December and did not take the test. However, it is almost certain that particular population was not great enough to shift the data. Data were collected for four years on four different senior classes. In that time, teacher turnover could have occurred, but administration and the goals of the school have remained consistent. Standards taught in class have also remained consistent in the observation years of this study.

Definitions of Terms

The following definition of terms are furnished to provide, as nearly as possible, clear and concise meanings of terms as used in this study.

ACT WorkKeys – an assessment which is research-based measures of foundational work skills required for success across industries and occupations. Measures the cognitive skills in the areas of Applied Mathematics, Locating, Information, and Reading for Information. Non-cognitive skills assessed are in the area of fit and talent. All of which one needs for success in the workforce (WorkKeys Assessment, n.d.).

Career and Technical Education – Organized educational activities that offer a sequence of courses that provides individuals with the academic and technical knowledge and skills the individuals need to prepare for further education and for careers in current or emerging employment sectors (U.S. Department of Education, 2006).

Career and Technical Pathway – In this study, classes offered in the following areas: Engineering, IT Data, Culinary Arts, Business, Welding, Health Science, or JROTC. There are 16 clusters in which a student can receive credit for earning a career and technical education pathway. The Career and Technical Pathway is a framework used by many schools and states to organize the world of work (Torpy, 2015).

Carnegie Unit – One class or credit given to students in grades 9–12 for completion of a semester of 144 hours of instruction.

Completer – Student completes 3 Carnegie units in one of the following areas: Engineering, IT Data, Culinary Arts, Business, Welding, Health Science, or JROTC.

National Career Ready Certificate – A portable, evidence-based credential that certifies the essential skills for workplace success. It is a valid predictor of job performance.

Non-Completer – A student who chooses to not complete 3 Carnegie units of a career tech path way. Even if a student takes 1 or 2 classes in a career pathway, they are labeled as a non-completer.

Socio-Economic Status – A measure of family income, parental education, and parental occupations. In this study, family income will determine which socio-economic group a student will be (Willingham, 2012).

Soft Skills – Skills students will need to have in order to keep a job such as being able to work in groups, interpersonal skills, and communication skills.

Standardized Test – Tests which are given to students in grades 3–12 on a consistent timeline. These tests are used to determine student readiness for the next steps. These tests are also used to hold school systems accountable (Burrow, 2016).

Vocational Education – An educational framework which offers a sequence of courses which help individual develop and prepare for paid or unpaid employment in current or emerging occupations which do not require post-secondary education. (U.S. Department of Education, 2002).

Young Adults – In this study, young adults are seniors in high school who are preparing to enter the workforce after completing all graduation requirements.

CHAPTER 2. REVIEW OF LITERATURE

Introduction

The objective of this review of literature is to examine the impact of career and technical education courses as related to young adults exiting high school as a career ready adult. The literature review will be divided into four sections. The principles of andragogy and pedagogy will be reviewed because it is important to understand the motivation behind adults as it relates to careers and how career and technical classes are presented to the learner. Secondly, the impact and value of career and technical education for young adults transitioning to adulthood or a career will be explored because it is important to examine the need for this area for some young adults. In this section, data and studies on the particular impact that career and technical education has had on young adults entering adulthood will be reviewed. The third area which will be reviewed is an examination of the history of career and technical education which will seamlessly transition the review into the fourth section which is an insight to educational reform and Alabama's role in establishing a plan for students as well as standardized testing.

The literature review will attempt to help the reader comprehend the relationships between career and technical education and standardized testing and their impact on a young adult's career ready status upon exiting high school.

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The purpose of this study was to compare ACT WorkKeys data of students who completed a career and technical pathway and those students who did not complete a career and technical pathway during their high school career. This study determined whether or not there

was a positive correlation between a student completing a career and technical pathway and scoring high enough on the ACT WorkKeys to be labeled Career Ready. This study also examined the relationship between race, gender, and socioeconomic status as related to achievement on the ACT WorkKeys.

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History of Standardized Testing

The essence of learning is measured by assessments. Wiliam (2010) considered assessment as the only avenue to determine if learning has occurred, because even thorough instruction cannot completely guarantee cognitive adherence. This mindset would lead one to believe that assessment should be uncontroversial, and all stakeholders involved in the development or deliverance of the assessment is a straightforward measure to ensure learning has occurred (Wiliam, 2010). Proponents of standardized assessments believed them to be a fair and objective indicators of student ability allowing school systems to be held accountable to all stakeholders (Wiliam, 2010). Alternatively, stakeholders who oppose the effectiveness of standardized testing consider the assessments as non-objective instruments consisting of a narrow curriculum and drill like test which undermines the process of education and produces products who lack critical thinking skills and innovative citizens (Background of the Issue, 2016). Defined by W. James Popham, the former president of the American Education Research Association, standardized tests are assessments administered, scored, and interpreted in a standard predetermined manner (Background of the Issue, 2016).

In 1845, Horace Mann suggested written tests as an alternative to annual oral exams. Mann's idea was instrumental in the foundation of how today's educational system works (Gershon, 2015). Even though the idea of written exams took years to become mainstream, standardized school tests were designed not to measure achievement but ability. According to Gershon, in the 1920s, testing was viewed as a way to identify students who were more likely to be successful in life and helped avoid wasting resources on students who did not perform as well. This form of testing helped track students and allowed educators to set students on a career path deemed appropriate for them. During the same timeframe, a test of ability created, called the

College Entrance Examination Board, was later renamed the Scholastic Aptitude Test and was determined at the time as the most important test of ability (Gershon, 2015). Boston, Massachusetts efforts to produce a single test which helped obtain objective information about quality of education was soon adopted by school systems nationwide but not without opposition (Gershon, 2015). As early as 1906, the New York State Department of Education voiced its opinion in the same manner many of today's opponents of standardized testing, stating these types of testing sacrifice systematic instruction to gain knowledge about students who are persistently drilled in answering questions (Background of the Issue, 2016).

As the popularity for standardized testing began to spread, the sole purpose for standardized testing was debated. The idea of monitoring schools for the sake of knowledge of performance was logic and sympathized by most all stakeholders, but the motivation for these examinations in school systems, such as many systems in Massachusetts, was more complicated (U.S. Congress, 2002). Its use was, in fact, thought to have roots in a predisposed hypothesis of school failure and these assessments were developed in the minds of individuals who thought the quality of education was subpar. This perception of education became a cornerstone of school reform because in the minds of some opponents, the data obtained from the tests were used to confirm the perception of school failure (U.S. Congress, 2002). As the first applications of standardized testing were given and data began to be evaluated, the public was amazed at the poor results of test-takers and led to a fear that students were learning by rote memory. Through the continued test administration, questions and concerns from the public domain were consistent as well. The public perception was that the main beneficiaries were not the individuals who are directly responsible for instruction but used by state-level policy makers (U.S. Congress, 2002). Tests were important tools for educational policymakers, but limited the value to teachers,

students, and principals. In the later part of the 19th and early 20th centuries, changing mentality of citizens would continue to influence school and testing policy. Other factors would also begin to play a role in the development of psychology and the way individuals learn as a science. (U.S. Congress, 2002). The increasing influence of university and business interest on performance standards would also play a role in testing policy (U.S. Congress, 2002).

In the developmental stages of standardized testing, testing only measured ability, but during the era of World War I, a new testing format was introduced which measured mental and college readiness skill sets. Through this mode of testing, concepts of classifying and placing students by ability gained greater acceptance. At this time, tests were viewed to help businesses and schools reorganize around American principles. Then, by the end of World War I, standardized tests administered questions based in a variety of subjects and gave reformers the necessary data to push for improvements in educational quality (U.S. Congress, 2002).

The National Education Association reported that in the 1920s, intelligence and achievement tests were more prevalent and used to classify students more often. As educational reform and standardized testing seemingly was becoming the norm, the University of Iowa initiated the first state-wide testing program for high school students. In 1926, the first Scholastic Aptitude Test (SAT) was administered in a 315 question, 90-minute format in the areas of vocabulary, basic math, and fill-in-the-blank analogies (Fletcher, 2009). Between the years of 1930 and 1965, standardized testing became more prominent in the educational arena. Iowa's tests were made available to schools outside the state and remained the consistent measurable test until the Elementary and Secondary Education Act of 1965 opened the way for new and increased uses of norm-referenced tests to evaluate programs (Fletcher, 2009). The federal government began designing new achievement tests which would to evaluate the types of

instructional methods schools were using (Gershon, 2015). While standardized testing has evolved allowing students to participate in a variety of tests such as the SAT, the ACT, Advanced Placement examinations, and the PSAT (Fletcher, 2009), it is without question that standardized testing in the 21st century has driven reform. In 2001, the implementation of No Child Left Behind (NCLB) was the epitome of standardized testing which mandated testing to assess school performance. President George W. Bush signed this educational reform on January 8, 2002. Within the guidelines of this reform, schools were required to show sufficient Adequate Yearly Progress (AYP) or the school system could face sanctions from their respective state department. NCLB required that 100% of United States students meet expectations in the areas in reading and math tests by 2014 (Background of the Issue, 2016).

During the years of No Child Left Behind, spending on standardized tests, reported by each state, increased from \$423 million to \$1.1 billion. Eventually, on February 17, 2009, President Barack Obama signed the Race to the Top initiative which invited states to compete for an extra \$4.35 billion in extra funding based on student data (Background of the Issue, 2016). On March 13, 2010, President Obama proposed an overhaul of NCLB which would provide incentives to states if they were able to develop and provide additional testing which would align closer to state standards. The goal of this was to emphasize the importance of attendance, graduation rates and the learning climate. After facing opposition for a year, it is reported Obama urged educational minds to consider what standardized testing is used for inside American school districts (Background of the Issue, 2016).

Strauss reported in 2017 that standardized testing has brought on a movement of reform from parents, teachers, and students, and activists who are calling for change in the manner in which schools and students are held accountable. In New York State, several students have

opted out of mandated standardized testing because they do not believe it to be best for education. Some opponents perceived the accountability aspect of standardized testing being used to evaluate student scores as an important measure of student learning and to evaluate how schools have effectively been able to close the achievement gap (Strauss, 2017).

To truly understand the continued debate of standardized testing, one would consider accountability to be the foundation on which testing was created. Wiliam (2010) defined accountability as being responsible, to be answerable, to be blameworthy, or even to be liable. Nonetheless, literally, the definition of accountability is that of being held to account (Wiliam, 2010). Wiliam raises two questions concerning accountability; if a school or entity must account for their actions, and to whom and for what should they report. Popular opinion to these questions point to the taxpayer or the parent who in this case are the consumers. In more concise cases, the employer could be labeled as the consumer because they are receiving the product the schools are producing (Wiliam, 2010). On the surface, according to Wiliam, most would agree that when education thrives, all stakeholders thrive, and when education fails, the economy falls short as well. By outlining the unintended outcomes of accountability testing, Wiliam indicated that evidence reveals increased student achievement on a broad range of measures. However, Wiliam also suggested accountability testing decreases the opportunity for schools to retain teachers. Under scrutiny and debate, standardized testing accountability, according to Wiliam, could be improved. Perhaps the best developed and most significant ideas to make the improvements have come from a group assembled by the National Research Council to render recommendations to help alleviate the controversy on high stakes testing (Wiliam, 2010). The first recommendation consisted of a reduction of standards to be assessed noting some states having more than 50 standards for a subject at each grade. They determined key concepts would

be more beneficial to students and teachers. The second recommendation was that the curriculum standards should be written so all teachers can understand what is being asked of them to cover. This group felt it important that teachers were actually teaching the content to fidelity and with a clear understanding of the standards. Wiliam reported that the group's third recommendation was devoted to the design of the tests and its results. The group indicated that it was only critical to assess three to five standards per year but made it clear that all standards were eligible to be assessed (Wiliam, 2010).

The U.S. Department of Education (2015) released a Test Action Plan in October of 2015 in which the authors tried to outline the importance of standardized testing while providing steps to ensure test worthiness. The reports states that Assessments, can promote equity amongst students when designed and implemented effectively. Standardized testing provides relative information to all stakeholders in order to improve outcomes and measure progress.

Alternatively, when standardized testing is completed without direction and purpose, it creates an environment not conducive to students performing their best and ultimately decreases instructional time. In implementing standardized testing, it is vital to ensure all tests are fair, free from bias, take up minimum instruction time, and reflect student knowledge and preparedness for college and careers (U.S. Department of Education, 2015). In this action plan, the Department of Education outlines seven principles or best practices for fewer and smarter standardized testing.

The first principle to consider when trying to provide a standardized test worthy of praise from both perceptions, is to ensure the test is worthy of administering. Questions should be aligned with the curriculum and standards which students are being taught, and it is important to ask questions that guide students to use critical thinking skills. Standardized testing should be

used to monitor where students are and help administrators target potential weakness or resources needed to improve instruction. Secondly, standardized testing should be of high quality in nature covering the full range of relevant state standards, elicit complex student demonstrations or applications of knowledge so all stakeholders are aware of the strengths and weaknesses of the student as it relates to the real world, reveal accurate data of student achievement, and provide an adequate measure of cognitive growth (U.S. Department of Education, 2015). A student should not spend more than two percent of his or her instructional time taking standardized tests, and schools should prepare students and teachers for test administration. The department continued by providing details on how to provide a fair test in which school districts only use the data for purposes the tests were meant for. The same assessment should be given statewide in order to accurately reflect on what students know and need to improve on (U.S. Department of Education, 2015). Tests should be fully transparent by providing to the parents and students the purpose of the test, the source of the requirement, data information timeline, how districts use the data about student performance, and how parents can use that information to help their student. Districts should help students and parents understand the assessment results. Decisions about student progress and growth should not solely be based on one standardized test. Last but not least, the Department of Education believes while some tests are used for accountability, a majority should be used to strengthen the educational environment of a school (U.S. Department of Education, 2015).

Churchill (2015) indicated that standardized testing was essential for education. The author gave three reasons as to why standardized testing should be viewed as a must. The first reason was that standardized testing is objective in what it measures. The questions are conducted under nearly identical testing conditions and are usually graded by a machine, but

opponents of standardized testing argue that teacher grades are a sufficient measure of success and growth. However, to counter the argument, Churchill described teacher grading practices as wildly uneven and can be unfair. Limitations inside teacher grading could reveal subjectivity to higher grades for certain students based on behavior, participation, or attendance. Although, standardized tests allow a clear picture of academic mastery. The second reason Churchill discussed was that standardized testing is comparable. Standardized tests allow school districts, students, and parents to compare statewide scores to their own. This is important for parents who are school shopping and wanting to provide the best education for their child even though these tests are not meant to measure the quality of education. However, Popham (1999) believed that if parents and other stakeholders think that if test scores are high, then the school's education is effective, but if the tests scores are low, then the education is not effective. This idea can be flawed according to Popham because he believed educational quality is being measured by the wrong yardstick (Popham, 1999). Churchill (2015) explained that proposals have been pushed through legislators trying to provide an opportunity for school districts to pick their own assessment, but Churchill is adamant this will undermine the comparability principle of standardized testing. The last reason Churchill provided was that standardized testing provided a sense of accountability for school districts. Nonetheless, Churchill claimed that in a perfect world, standardized tests would not exist, all schools would be inviting and great, and that every student would meet their goals. However, school districts need hard objective evidence on student performance allowing schools to provide high quality education (Churchill, 2015).

The United States Department of Education reported in a 2015 Testing Action Plan, a call on Congress to reduce over-testing established in the Elementary and Secondary Education Act. In the report, proponents and opponents agree it is important to make investments in the nation's

youth, and it is imperative some sort of progress monitoring exists within subgroups. To better serve this agenda, the report suggested legislation should cap testing time, ultimately reducing the amount of instruction time students spend on standardized testing. Better information should be provided to parents, stating the purpose of the tests, the source of requirement, and how all stakeholders can use the testing data to ensure success of each student. Test quality and audits are two main objectives in the department's report along with making it a necessity that all assessments are aligned with state standards to ensure testing validity (U.S. Department of Education, 2015).

Evolution of Alabama's Role in Educational Policy in Career and Technical Education

Beadie (2004) suggested that accountability policies have narrowed the definition of what constitutes a high school diploma. She revealed that the meaning and value of the high school diploma have changed since the turn of the 20th century. The high school diploma became closely tied to the economy resulting in business leaders pursuing higher rates of attendance and completion. In the 1940s and 1950s, vocational education offered by machine shops and commercial departments was thought to provide the best equipped student for the labor market. In the 1970s, the high school diploma was an important factor in economic stability with non-graduates earning 700% below their counterparts (Beadie, 2004). With that mindset, a form of career education became evident in the United States.

Before August 2016, the vision for Alabama was outlined in the strategic plan, Plan 2020, which displayed the tagline, Every Child A Graduate – Every Graduate Prepared for College, Work, and Adulthood in the 21st Century (ALSDE, n.d.). The plan defines a graduate as a young adult who “Possesses the knowledge and skills needed to enroll and succeed in credit-bearing, first-year courses at a two- or four-year college, trade school, technical school without

the need for remediation” (ALSDE, n.d., Prepared Graduate Defined section, para. 1). The graduate also “Possesses the ability to apply core academic skills to real-world situations through collaboration with peers in problem solving, precision, and punctuality in delivery of a product, and has a desire to be a life-long learner” (ALSDE, n.d., Prepared Graduate Defined section, para 2). Objectives in this plan were implemented to close the gap between subgroups, increase achievement and growth for all students, increase graduation rate, and ensure every child walks across the stage at commencement ceremonies prepared for the real world. This plan highlighted the need for college and career ready students in Alabama and provided guidelines to meet the stated objectives by 2020. To receive College and Career Ready status, a student must meet one of the following indicators: 1) A benchmark score on any section of the ACT, 2) A qualifying score on an AP or IB exam, 3) Pass an approved college or postsecondary credit while in high school, 4) A benchmark level on the ACT WorkKeys, 5) An approved industry credential, or 6) documented acceptance for enlistment into the military (ALSDE, n.d.). Once a graduating young adult has reached college and career ready status, they are viewed by the state of Alabama Department of Education as ready for the real world. However, research has indicated that employers across the nation do not believe that graduates are leaving high school ready for the workforce. In 2004 from a study completed by Achieve, 49% of employers believed young adults fresh from high school had the skills necessary to be effective in a work environment. However, in 2015, only 29% believed these potential employees had viable skills. These percentages are concerning because 46% of jobs in Alabama only require a high school diploma while 53% of the population in Alabama have only a high school diploma. With approximately half the jobs in Alabama requiring only a high diploma, and more than half only completing high

school level education, it is evident that career preparedness is imperative at the high school level.

ACT WorkKeys Role In Alabama

Even though bronze level scores receive a National Career Ready Certificate, the Department of Education in the state of Alabama only recognizes the platinum, gold, or silver as a career ready student. The main objective of the ACT WorkKeys is provide documentation of an individual's level of work readiness skills which is a necessity for success in a variety of work environments (Lefebvre, 2016). Many employers use ACT WorkKeys data to evaluate foundational skills of potential job candidates. It is recommended that this test not be solely used as a qualifying characteristic of a potential candidate. It is noted by Lefebvre (2016) that other means of measure should be used as tools of hiring such as interviews and other tests. This certificate is used by the employer to justify employment or quantify work readiness skills of job candidates but should not be solely used (Lefebvre, 2016). Educational systems nationwide use this test to determine a student's career ready status. In Alabama, all seniors, even Non-Career and Technical Educational students, must take the ACT WorkKeys and the student must obtain silver or higher to qualify as Career Ready. According to an ACT report, students who earn a National Career Ready Certificate are more likely to receive higher annual wages and increases his or her likelihood of attaining and retaining employment (ACT, 2016). However, sometimes having motivation and completing Career and Technical Education pathway in high school provides skills necessary to be hired post-graduation or even provide the knowledge to simply graduate from high school.

Not only does the potential employee benefit from the National Career Ready Certificate, but employers reported a “23% increase in employee productivity in task performance, a 22%

increase in output due to increased employee safety, a 19% reduction in hiring needs due to increased performance, 19% reduction in hiring needs due to increased employee safety, a 25–75% reduction in turnover, a 50–70% reduction in time-to-hire, and a 50% reduction in training time” (Employment Outcomes, 2017). The benefits of receiving a National Career Ready Certificate from an individual’s ACT WorkKeys score seem endless for both the potential employee and the employer, but the true indicator of career ready may not lie with the test. Career and Technical Education may be the foundation and the cornerstone to help transition a young adult into a fast paced, ever changing society.

Roach (2016) examined if standardized job testing assisted employers in hiring the right candidates. Roach reported that firms who rely solely on interviews, resumes, and the manager’s decision have led to a host of poor quality, low-skill workers who ultimately were not retained. In an effort to counteract this trend, many hiring firms and business have turned to job testing and workforce analytics to evaluate job applicants. Roach believed this process is essential in hiring the best candidates (Roach, 2016). Taking human judgment out of the hiring equation was the topic for a study conducted by Hoffman, Li, and Kahn (2017) in a study called, “Discretion in Hiring.” The results from their study indicated that when businesses or industries hired outside the testing recommendations there were reduced outcomes. However, looking only at testing data, according to the authors, could be detrimental to the hiring managers and could overlook pertinent information about the potential candidate (Hoffman, Kahn, & Li, 2017).

ACT WorkKeys and Litigation

Using standardized testing for job readiness and hiring processes, according to some, has its drawbacks. Evans (2017) examined the effectiveness of using the ACT WorkKeys as a hiring method. Evans reported that “federal officials have blamed WorkKeys tests for illegal

discrimination in six cases over the past decade, affecting more than 1,000 people of color and women” (Evans, 2017). Leprino Foods Co. which is the largest producer of mozzarella cheese, has been accused of using the ACT WorkKeys to put 253 Latino, Black and Asian applicants at a disadvantage. This company eventually had to pay \$550,000 and hired 13 of the rejected job seekers. Several opponents of the ACT WorkKeys state the test does not adequately measure potential job candidates who would be an asset to the company. The skills tested are not critical for entry level jobs and do not give managers good insight into the job seeker. Evans suggested that cognitive tests can be efficient indicators of job performance in complex jobs, but opponents argue that companies are using the ACT WorkKeys for entry level jobs (Evans, 2017). When the ACT WorkKeys outcomes are used to examine workforce knowledge, results are many times, unbalanced which can be somewhat beneficial in separating the applicants who are ready and those who are not. However, when the tests are used to make decisions about jobs that are not closely related to the test content, it can be considered illegal. Evans reported that ACT does not deny that companies can misuse the test, but adamantly defends the content as a valid and reliable tool for job seekers and companies (Evans, 2017).

In the case against Leprino Foods, the U.S. Department of Labor’s Office of Federal Contract Compliance Programs entered into a consent decree with Leprino Foods to settle charges brought forth on high discrimination. Findings from this case revealed Leprino Foods was misusing the ACT WorkKeys by making hiring decisions based on the results of the test while the skills tested were not critical to entry level job tasks (U.S. Department of Labor, 2012).

Career and Technical Education’s Place in Education

All students have a choice to take college prep classes such as Advanced Placement, Dual Enrollment, or regular academic classes, but some students who wish not to go to college choose

Career and Technical Education. Career and Technical Education is described as a tool to provide hands-on training, work-related training, soft skills, integrating academic skills into real career relatable context (Jacob, 2017). Jacob (2017) considered that Career and Technical Education can motivate students to come to school more often and participate in meaningful discussions which will in turn, improve academic skills. A study in Arkansas conducted by Thomas B. Fordham Institute, revealed that Career and Technical Education was helping students in multiple ways. According to the study, students who participated in Career and Technical Education were more likely to graduate high school, find employment, enroll in technical college, and even begin jobs with higher hourly wages. The study also concluded the students who take three or more career and technical courses were 21% more likely to graduate high school; the study also is most likely to benefit students from lower economic families (Dougherty, 2016).

On the surface, Career and Technical Education seems as though every student should partake in some pre-career training, but a study conducted by Hanushek, Schwerdt, Woessmann, and Zhang (2015) indicated a different side of Career and Technical Education highlighting a downside. The study revealed that students who participated in Career and Technical Education, have a smoother transition from high school to the workforce, but those advantages diminish with age. The study concluded that students who participate in Career and Technical Education learn skills in a particular area, but as the economy changes, these same students have a tougher time adjusting to the requirements or the skills needed to experience success in the ever-changing labor market. Overall, the researchers in the study state that Career and Technical Education, however beneficial, should not replace basic academic skills (Haushek, Schwerdt, Woessmann, & Zhang, 2015).

Nonetheless, instruction in America is almost always transforming. New reforms from legislature often control the direction of education and Career and Technical Education has always been a part of this directional debate. In the 1980s, states began to increase the rigor of academic courses and mandating students take additional courses in math, science, history, and foreign language (Jacob, 2017). This was due to a sweeping mindset of educators and legislators who believed all students should be able to graduate with a four-year degree from a university. This mindset led to the decline of Career and Technical Education participation by 14% during the years of 1990 through 2009 (Jacob, 2017). Controversially to the study conducted by Dougherty (2016), a study conducted by Kreisman and Strange (2016) found Career and Technical Education students were less likely to enroll in college, but no less likely to earn a high school diploma. The same study also revealed a trend of self-selection of Career and Technical Education courses proved to benefit the student more so than a Career and Technical Education course required for graduation. Students who were motivated by selection of course tended to receive better results while in high school and after because of his or her motivation toward learning the skills (Kreisman & Strange, 2016).

Historically, education seems to cycle around different reforms which are consistently renamed but consist of the same ideas of the past. The debate of Career and Technical Education will continue to hold ground among the reforms, but as of now, businesses are lacking skilled workers to successfully complete jobs and consider Career and Technical Education a resource to help students develop pre-service skills in certain fields. The former idea that “Vocational Education”, now called Career and Technical Education was some sort of dumping ground for low performing students has changed as the economy’s priorities for workers has shifted. Dougherty (2016) suggested some employers question the value of a four-year degree. No

matter the route students take, the goal of an education program should be to develop individuals mentally, educationally, and socially in order to be successful members of society upon graduating high school. At this time, students in Career and Technical Education and Non-Career and Technical Education courses are one and the same. All are moving toward the same goal and all measured by a Career Readiness test called the ACT WorkKeys.

History of Career and Technical Education

Career and Technical Education has evolved throughout the 20th and 21st centuries, not only in name, but also in fundamental concepts. In the 1920s and well into the 20th century, many career related courses, then called vocational education, were in a separate school building than the students receiving college track courses (Conley & McCaughey, 2012). As the economy shifted, so did education. Conley and McCaughey (2012) discussed how the skills, once needed to be successful, shifted to those skills rooted in foundational academic knowledge in areas such as communication, technology, problem solving, and adaptability.

Education is a concept which changes when the needs of the people change. Vocational Education began in an effort to ensure that various organizations of the economy worked efficiently and effectively (Barlow, 1974). The Industrial Revolution apprenticeships, according to Brewer (2009), were not meeting the needs of industries and could not provide the necessary trainings to operate new and improved technological advances. Due to this, workforce needs have dictated the direction of Career and Technical Education. Brewer (2009) discussed the ideas of F. J. Keller who believed Career and Technical Education was more than just learning a skill. Keller considered it was more a life style and career and technical educators were charged with teaching to live, act, and co-exist in the workplace as well as in society. Some think the first form of career and technical education began in the 7th century when monks would teach

skills needed to conduct research along with the necessary life skills needed to live productively in society (Brewer, 2009). As time passed, many saw the benefits of this type of education and thus apprenticeships became a mainstay in society in order to pass on work skills.

Apprenticeships provided skills in the areas of food, clothing, shelter, learning to read and write, religious instruction, instruction in the trade, and secrets of the trade (Barlow, 1974). Barlow also thought that apprenticeships affected career and technical education three ways in the 20th century. He believed that apprentices learned not only the skills needed to earn wages in society, but it provided a way to learn educational concepts which is prevalent in present day education. Barlow thought that apprenticeships could be taught in high school so students could transition directly out of high school with the needed skills. This concept resembles present day Co-op programs where students gain their education in a naturalistic environment. The final way in which Barlow (1974) believed apprenticeships affected modern day education was that career and technical education not only could be taught to school age children but also to adults.

Early law, dating back to the 1600s, was put in place to ensure all families and children of the colony were learning specific trades as well as colony law and religious views (Brewer, 2009). The law was implemented because the colonists believed that in order for a child to be well rounded in education, he or she needed both general education and technical skills. This mindset in combining the two is evidence that for the past 400 years, career and technical education has changed its direction numerous times to satisfy the present economy, the will, and the needs of the people (Brewer, 2009).

At the turn of the 19th century, a shift in the economy and technology swept through the nation bringing on a complete overhaul of the landscape of career and technical education. It was during this time that machinery took the place of farm hands and farm-based societies.

People started migrating to the cities in order to find work, thus forever changing the scope of education in America (Brewer, 2009). It was at this time that schools and technical skill training programs took the place of apprenticeships (Barlow, 1974). All the while, schools began increasing the rigor in what Barlow (1974) calls “practical arts” which resembled basic life skills that students could readily relate to everyday industrial life. It was during the later years of the 19th century when trade school became prevalent allowing students to focus on vocational skills. However, with this change, some opponents arose. Described by Barlow (1974), there were three different types of schools. There were schools which only taught a trade, schools which combined the education of a trade and the general curriculum, and schools which provided residential facilities for the nation’s youth. In Barlow’s writings, he argued that the nation benefits more so when the curriculum combines both career and technical skills and reading, writing, and math (Barlow, 1974). To compare how closely the thought process of educators were from the 19th century to the 21st century, ACT conducted research in 2006, where that institution found that college ready requirements and career ready requirements were one in the same. In the same sense, more studies were conducted in the 21st century which tried to challenge the notion behind combining the curriculum. However, one study conducted by Conley, McCaughey, Cadigan, Forbes, and Young (2009) examined nine career and technical education subject areas. They dissected the course syllabus and determined the importance of a set of cross-disciplinary standards in cognitive strategies, learning skills and foundational knowledge. The researchers concluded that these educational skills were important to student success in the career and technical courses. However, a second study conducted by the same researchers, examined different skills for a variety of job related fields and concluded that there is not a universal educational skill which will blanket all career fields. For example, nursing

courses require more scientific knowledge than did the field of computer programming which requires more mathematical skills (Conley, McGaughy, Cadigan, et al., 2009). Overall these studies mirror the same mindset as the people of the nation did in the latter part of the 19th century.

In 1862, the Morrill Act, which established land grant colleges, was passed by the federal government. This law allowed land to be sold by states so the income could be used to develop agricultural and mechanical arts colleges. The Act was instrumental because it was the first law passed by the federal government which directly enhanced the development of career and technical education (Brewer & Achilles, 2008). To provide more money to support the colleges, the Second Morrill Act of 1890 was passed, which followed the 1887 Hatch Act which helped fund the development of agricultural experiment stations and helped spread information regarding agriculture across the nation (Calhoun & Finch, 1976).

As the 20th century became a period of economic growth, education was still not mandatory and post-secondary educational programs were only available to the part of society with high socio-economic status or an academic elite. However, programs were not geared toward career and technical education. Brewer (2009) reported that even with the resources available, students were not motivated to stay in school leading to poorly skilled workers. At that time, Agricultural and Mechanical colleges began to offer general educational courses and limited the career and technical education (Brewer, 2009). Barlow (1974) reported that in 1906, the National Society for the Promotion of Industrial Education was created essentially to rediscover the ideas and foundation of career and technical education. Then in 1914, they pushed the federal government to establish the Commission on Vocational Education, which produced data on the status of vocational education in America (Hawkins, et al., 1966). This

group, who later changed their name to American Vocational Association, and led by Dr. Charles A. Prosser, was instrumental in getting legislation passed for the career and technical field (Barlow, 1976).

During World War I, the military needed for trained workers to be able to deliver the military with supplies. The government required for all mechanics and technicians to be highly skilled in order to fight the war (Wang, 2009). The war also indirectly had a huge impact on women's career education because the women had to fill in for the jobs when men left for war. World War I was a turning point for the nation as it was instrumental in the development of the career and technical education field (Brewer, 2009).

As the Great Depression swept the nation, the youth suffered just as much as the adult population because employers were looking to hire experienced adults so they would not have to spend the time to train unskilled workers (Brewer, 2009). This led to the federal government implementing youth programs to prepare the nation's youth for the workplace, thus increasing the need for vocational education (ACTE, 2002).

According to Brewer (2009), World War II brought forth new challenges for America. One such challenge was funding for Vocational Education programs because the need to produce the programs was already met during the previous era, resulting in only the need to expand offerings and appropriations. Women also were major contributors to industries in the absence of the male workers (ACTE, 2002). Career and technical education expanded to include adult education and focused on retraining the men who were re-entering the workforce from the war. Due to the need for defense purposes, World War II was the reason for a surge in the field (ACTE, 2002). After World War II, the focus shifted back to economic development with certain subgroups at the forefront of legislation. From the 1960s to the 1980s, poverty-stricken

communities and students with disabilities were the concern evidenced by the passing of the Carl D. Perkins Act of 1984 where 57 percent of the federal grants were allotted for disadvantaged groups (Cohen & Bersharov, 2002). This led to an increase in students from lower socio-economic lifestyles and students with disabilities in career and technical education in the late 1980s and 1990s. However, during the 1980s, the publication of *A Nation at Risk* exacerbated the concern that America was falling behind academically in the global economy. The Commission on Excellence in Education, due to this publication, called for higher standards and more rigor inside the nation's classrooms in elementary and secondary schools (Cohen & Bersharov, 2002). This concern on academic excellence and an increase in academic graduation requirements led to a decrease in career and technical educational courses and an increase college preparation for all students. In 1994, the U.S. Department of Education issued an assessment report on Vocational Education stating that vocational education for the youth of national was becoming a dumping ground for the economically disadvantaged and students with disabilities because they were thought to be the subgroups not going to college. This report also expressed concerns over the qualifications of teachers and course rigor noting that most school districts did not meet the federal requirements (Boesel & McFarland, 1994). In response to the decline in vocational education, there was a push to abandon the narrow curriculum and expand vocational education to include academic skills needed to succeed at a postsecondary educational institute. This shift allowed the Perkins Acts of 1990 and 1998 to decrease the amount of grant money allotted to disadvantaged populations and students with disabilities. States were also mandated to begin collecting data for performance and to avoid any negative associations with vocational education. Career and technical education became the official name of workforce preparation (Cohen & Bersharov, 2002).

Today, most high schools across the nation offer career and technical education. Cohen and Bersharov (2002) reported that one or more career and technical education courses are offered in 93 percent of public schools in the nation. Almost all schools offer general labor market preparation while only 75 percent offer specific training in job related preparation courses. Some schools have career and technical centers in which students spend up to 50% of their day learning job training skills (Cohen & Bersharov, 2002). Career and technical education courses are usually offered as sequence courses leading up to work-based learning experience or internships (Cohen & Bersharov, 2002).

The Perkins Act was once again revised in 2006. This update required states to report to Congress each year on the progress in achieving the performance level indicators. The core indicators of Perkins IV are “Student attainment of challenging academic content standards and student academic achievement standards, as adopted by a state in accordance with section 1111 of the Elementary and Secondary Education Act of 1965, student attainment of skill proficiencies, student rates of attainment of high school diploma, GED, a proficiency credential, graduation rates and student placement in colleges, or military” (U.S. Congress, 2016 Section 113. Accountability para i).

Today, according to Sanchez (2016), young adults who are transitioning from high school to either the workforce or postsecondary educational institutes do not necessarily need a four-year degree. There is a trend that is tilting in favor of skilled laborers who earn more money than students leaving college. Sanchez believes that curriculums need to be focused on education devoted to the trends of the labor market (Sanchez, 2016). In a 2010 report, Dr. Willard R. Daggett discussed how Career and Technical Education can put people back to work in high wage, high demand occupations. For Career and Technical Education, it is the best of times in

terms of opportunities, and yet it is the worst of times in terms of how the mental model of CTE continues to be that of non-rigorous academics and separate from a college preparatory curriculum (Daggett, 2010).

The author described a study conducted in 1992 by Harold Stevenson and James Stigler where they compared mental models of Asian mothers and American mothers regarding academic success. In this study, Asian mothers believed effort was key in academic success while American mothers believed ability was the key factor in academic success (Daggett, 2010). In an attempt to change this mindset, proponents of CTE tried to change the name to market this type of education model differently to the American people, but to no avail. Sanchez believed that until this mindset of the value of postsecondary education and career and technical education mirror each other, CTE will continue to be thought of as a place for students who cannot succeed in the educational academic environment. The Obama administration made an attempt to do just that by trying to blur the lines together with the reauthorization and name change of the Elementary and Secondary Education Act, now referred to as Every Student Succeeds Act (Sanchez, 2016). It is believed that Career and Technical Education in today's society is trending because if it does not, America will face elimination from the role of a world leader in economics (Sanchez, 2016).

Federal Legislation on Vocation Education (Career and Technical Education)

Policy and law has guided the framework of the foundation of Career and Technical Education and the following laws have been instrumental in educational reform.

- Smith-Hughes Act of 1917 – Also known as the Vocational Education Act of 1917.

It provided funding to states to support vocational education in secondary schools and

allotted money for school to develop programs in agriculture, trade and industry, and home economics (Calhoun & Finch, 1976).

- Fess-Kenyon Act of 1920 – Provided funding for vocational rehabilitation services for individuals with disabilities. Known also as the Industrial Rehabilitation Act. This Act gave access to the workforce for many individuals with disabilities.
- George-Reed ACT of 1929 – This act provided funds to support home economics and agricultural programs. However, these funds were only appropriated through 1934 resulting in the need for more legislation (Brewer, 2009).
- George-Ellzey Act of 1934 – This Act was an extension to the Smith Hughes Act and provided additional funding to the George-Reed Act of 1929. It also allotted money to be given for trade and industry programs through 1937 (Calhoun & Finch, 1976).
- George-Deen Act of 1936 – Continued the funding for home economics, agriculture, trade, and industry programs. Provided funding for programs for vocation programs in larger geographic areas along with provided funding to train instructors (Calhoun & Finch, 1976).
- Servicemen’s Readjustment Act of 1944 – Commonly referred to as the G.I. Bill which provided funding for soldiers upon their return after World War II.
- George-Barden ACT of 1946 – Provided additional funding to vocational programs. It also provided the states the authority to determine how funds are spent for vocational educational programs (Calhoun & Finch, 1976).
- Manpower Development and Training Act of 1962 – The Act allowed state-based agencies to train and educate individuals in the labor market (Brewer, 2009).

- Vocational Education Act of 1963 – This supplemented the original Smith-Hughes Act and the George-Barden Act. Vocational education, under this Act, included business occupations and nursing. The focus was on high school students, but specifications allowed funds to be used for young adults who had already graduated or dropped out (Calhoun & Finch, 1976). States were required to submit action plans on how the money would be spent and their evaluations of the programs (Brewer, 2009).
- Economic Opportunity Act of 1964 – This Act was established to help young adults in lower socioeconomic areas of the country. Job Corps, which is still in existence today, was established to provide housing and work-training programs to young adults. This Act created a program to assist migrant workers and agricultural employees by funding the state in return to work with these populations (Hawkins, 1966).
- Vocational Education Amendments of 1968 – These amendments, according to Calhoun and Finch (1976), increased the seats on the National Advisory Council requiring members be appointed directly by the president. The Act also created stipulations that states must show through a plan of action how it will use the funds (Calhoun & Finch, 1976).
- Elementary and Secondary Education Act of 1965 – This Act was implemented to improve learning across the nation for students living in economically disadvantaged neighborhoods (Calhoun & Finch, 1976).
- Education Amendments of 1972 – This legislation created the Bureau of Occupational and Adult Education and increased vocational counseling not only to

elementary aged students but to post-secondary schools. The amendments introduced consumer education as an important aspect of the educational training (Calhoun & Finch, 1976).

- Education Amendments of 1974 – These amendments strengthened the idea that all graduates should be prepared to enter the workforce. They also created the Office of Career Education (Calhoun & Finch, 1976).
- Education Amendments of 1976 – These amendments focused on program evaluation because it was reported by the National Assessment of Vocational Education that funding had been inappropriately spent (Brewer, 2009).
- Carl D. Perkins Vocational Education and Applied Technology Act of 1984 – This Act focused on the need of the nation and tried to reestablish credibility for vocational education. Major improvements were needed in the quality of education in the area of vocational education and this Act focused on doing just that (Wonacott, 2003).
- Carl D. Perkins Vocational Education and Applied Technology Act of 1990 – This Act is known as Perkins II, and it outlined additional road maps for vocational programs. Within this Act, there was a push to incorporate more academics into the vocational curriculum. The Act also reinforced the idea that students needed to continue education past the point of high school in order to succeed in an ever-changing economy (Wonacott, 2003).
- National School-to-Work Opportunities Act of 1994 – This legislation acted as a partnership between schools and employers where the students would attend the school for half the day while the other half was spent learning skills in the naturalistic environment (ACTE, 2002).

- Carl D. Perkin Vocational Education and Applied Technology Education Act of 1998 – Also known as Perkins III, this Act continued to push the idea of academics in active skills training courses while implementing technology. Programs were asked to work with disadvantaged populations and special populations and were required to keep performance data regarding “student aptitude, secondary education completion, postsecondary, military service completion, and other forms of job training program completion” (Wonacott, page #14, 2003).
- Carl D. Perkins Career and Technical Education Act of 2006 – This Act supports the development of academic and technical skills for students at the secondary or postsecondary levels. The Act allows for funding to be spent to develop or improve Career and Technical Education programs. Perkins IV authorized additional programs such as “Tech prep, national programs, Tribally Controlled Postsecondary Career and Technical Institutions, and Occupational and Employment information” (Dortch, 2012, page #2).
- Strengthening Career and Technical Education for the 21st Century Act – This bill overhauled the Carl D. Perkins Career and Technical Education Act of 2006. It increased funding grants to the states in order to fund CTE programs on the secondary and postsecondary level. Within this bill, states can reserve up to 15% of their funds for rural areas with higher numbers of career and technical education students. States are also able to set their own targets of performance and prohibits the department of education from withholding funds from school districts who do not meet performance standards (U.S. Congress, 2017).

Pedagogy vs. Andragogy

In any field or career, it is important for employers to hire well qualified individuals who are committed to lifelong learning. With that goal in mind, lifelong learning, many times, begins at the high school level. Nonetheless, many times, especially in the educational field, the term ‘lifelong learner’ is used to describe professionals who participate in professional development either through his or her company or self-directed research. However, often lifelong learners are not thought of as adults who are retired, but this particular group is the epitome of an adult learner. It is important to remember, no matter the age, physical, or cognitive ability, if an adult possesses the characteristics of an adult learner such as goal oriented, ability to adapt to teaching styles, and able to balance class work and other responsibilities, he or she can learn at a high level (Cercone, 2008). The field of adult education has increased in importance throughout history and has seen a long development process since the term ‘andragogy’ was first coined by Malcolm Knowles. Andragogy is defined by Knowles as the art and science of helping adults learn (Chan, 2010). Since the evolution of adult learning, there has been a continuous debate on the teaching and learning techniques for adults compared with those for younger students. Under the term ‘pedagogy’, it is believed that children and adults learn exactly the same. However, Knowles, along with other educational researchers, argue adults have distinctive needs to learn at a high level. Andragogy is based on six assumptions which are self-directedness, need to know, use of experience in learning, readiness to learn, orientation to learning, and internally motivated (Chan, 2010).

Pedagogy placed the role of leader of education on the teacher. The teacher decided what the students should learn, how students were to be taught, and when the process will begin. According to the foundation of andragogy, the assumptions of pedagogy are too broad for the

adult learner. It is thought that the adult is a self-directed learner and adults want more than pedagogy can offer in terms of assignments from the teacher (Chan, 2010). If Malcolm Knowles' idea that adults learn differently because of these six assumptions, it is inevitable one would need to consider the six assumptions of andragogy in order for adults to be successful in an educational program.

Adults are self-directed and independent because they understand the reason why they are wanting to learn (Chan, 2010). However, according to Cercone (2008) some adults are more passive and need help to become self-directed. Scaffolding or providing structure around the educational process helps adults become more self-directed in their learning. In some cases, pushing a learner who is not ready to be self-directed could result in negative opinions of the educational process or program. It is recommended that teachers act as only a guide to allow growth in the area of self-direction (Cercone, 2008).

The role of experiences is a factor in developing a program because adults can draw from unique life experiences in order to make sense of the learning environment (Chan, 2010). This assumption is based on the idea that previous knowledge exists, and adults will use this knowledge to build new information and concepts. It is important for the instructor to recognize the vast differences in experiences and try and use each experience as a teaching resource (Cercone, 2008).

The third assumption of andragogy which needs to be considered is the eagerness or readiness of an adult to learn. Adults routinely are ready to learn what they believe they need to know for work or life in general (Chan, 2010). Social roles need to be closely related to the learning objectives because adults know what they want to learn and want the material to be

aligned to their personal goals. Adults want a reason for learning and believe any learning should be able to generalize to their work or home environment (Cercone, 2008).

As in any other role adults play, they tend to want to be able to apply what they have learned immediately to a current situation. Adults' learning orientation is focused on the problem, task, and must align life goals (Chan, 2010). Any coursework or activity needs to be relevant to a person's life and make he or she feel as though instruction is preparing them for challenging or complex responsibilities (Lieb, 1991).

All adults who typically participate in an adult educational program will be internally motivated because they tend to understand the reasons for learning or the program (Chan, 2010). Some adults only want to learn for the knowledge. Some want to learn for health reasons, and some want to learn because they like to learn. Other factors which increase internal motivation are increased job satisfaction, quality of life, and self-esteem (Fidishun, 2000).

The sixth factor in which one would need to consider would be the idea that adults need to know. Adults need to know the value of learning and why they need to learn what is being delivered in the program (Chan, 2010). Questions need to be able to be answered by the program if it has aspirations to be successful.

Of the six factors of adult education or andragogy, the factors in which are most important to creating a successful adult education program are self-direction and prior experiences. These are the cornerstones of a successful adult program. The program needs to be based on two adult learning concepts which are experiential learning and transformative learning. These two concepts are deeply rooted in the idea that adults are self-directed and use prior knowledge to increase current knowledge. Experiential learning is defined as a concept composed of three components, all of which center around the learner's knowledge developed

through experiences. The three components are the knowledge of concepts, prior knowledge, and reflection (Cercone, 2008).

Transformative learning is a theory developed by Jack Mezirow which is based on the idea that an individual's frame of reference or way of viewing the world changes as the learning experience progresses. This concept helps adults learn and understand prior and current experiences so they can develop new ideas (Cercone, 2008).

Pedagogy, on the other hand, was developed in Europe in the Middle Ages inside the monasteries and then spread through secular schools in Europe and America, becoming the most dominant form of instruction (Hiemstra & Sisco, 1990). As stated before, in the pedagogy model, the teacher has full responsibility for the learning of his or her classroom. Every decision about types of activities, materials, and content is made by the teacher. This type of learning is truly teacher led. It is assumed, in this model of teaching, that the student only needs to know what the teacher teaches them (Knowles, 1984).

As observed by Makhoul (2016), the most obvious difference in pedagogy and andragogy is how the student learns. Many times, the pedagogy model leaves the student submissive to the adult teacher, and in turn, learns only because they are penalized in the classroom if they do not learn or perform to a specific standard. However, Makhoul (2016) describes the andragogy model as way for the student to take control of his or her own learning. Students who learn best in this model are self-motivated and interested in topics of education which have an effect on their immediate life (Makhoul, 2016). Questions surrounding these two teaching methods have long histories of debate, and Philip O. Ozuah (2005) describes both as similar teaching models. The author discusses how pedagogy does not acknowledge the six assumptions and principles of andragogy, but focuses on personality, extrinsic motivation, and

prior knowledge. While the learner in pedagogy model is dependent on the teacher, it does not mean andragogy does not blend some pedagogical characteristics within its framework (Ozuah, 2005). There are times when the learner is a dependent learner, but in all sense, also exhibits the characteristics found in the andragogy model. For example, Ozuah (2005) mentioned a student who has never flown an airplane would be dependent of the teacher, but this learner could be self-motivated, self-directed, and learn best in naturalistic environments. The subtle difference in this example is that the teacher in the pedagogy model would keep the student in the dependent stage while the andragogy model would shift the learner toward increasing autonomy (Ozuah, 2005).

This exact idea could be used in the career and technical education classroom at the secondary level. At first the learner enters the class as a dependent learner desiring to learn a skill he or she can use after high school. Throughout the year, the teacher attempts to move the student along so they are able to use the skill in naturalistic environments. If that is the case, one would question whether pedagogy or andragogy is the correct teaching model in the Career and Technical Education field. To examine this thought, an article Gehring (2000) discussed the pedagogy-andragogy issue. The author attempted to break down both terms not by their assumptions, but the differences in needs of children and adults. Under that assumption, Gehring concluded that both teaching styles could be taught to any student as long as the need of the student is taken in consideration. If the student is immature in knowledge and needs specific skill development, the instructor should apply pedagogical principles. However, if the student is mature in knowledge and is self-motivated, the instructor should use andragogical principles (Gehring, 2000).

Demographics in Career and Technical Education

The U.S Department of Education examined public high school graduates from 2004. Within 8 years of graduating, 89 percent of graduates had enrolled in some sort of postsecondary education. Graduates who earned fewer career and technical education course credits enrolled at a higher rate than did the graduates who took three or more credits in a career field. Non-concentrators or students who took 3 or less CTE courses in different fields, enrolled in postsecondary school at a rate of 91% while concentrators or those students who concentrated 3 or more of their high school credits in a certain CTE field, enrolled at a slightly less rate of 82% (NCES, 2017). This data can be used to understand the roles students are playing after high school. It also reinforces the idea of a society that emphasizes academics and the value of a degree (Gaunt & Palmer, 2007). In years past, and even in today's society, some even consider career and technical education is tailored for low-achieving, non-college bound students. This idea is evidenced by data gathered from 1982–1994 which found that typically students with lower GPA were completing more Career and Technical Education courses (Palmer & Gaunt, 2007). In 2003, a study conducted by Levesque and Hudson revealed that students engaging in advanced academic courses with higher academic achievement were less likely to enroll in CTE courses. The study also examined income levels and determined students who come from lower socio-economic backgrounds were enrolled in CTE courses at a higher rate (Palmer & Gaunt, 2007). Based on these studies, one would believe students enrolled in CTE courses usually come from a disadvantaged academic and economic background (Palmer & Gaunt, 2007). With past studies in mind, Palmer and Gaunt (2007) undertook a study where they examined income levels of non-CTE students and CTE students. Students were asked four questions regarding family income and difficulty to provide family needs. The author used the Mann-Whitney test to

determine if there was a significant difference in relationship to family income and enrollment in CTE classes. The findings revealed a significant difference between non-CTE and CTE students based on their economic status. Slightly more CTE students come from a lower socio-economic background (Palmer & Gaunt, 2007).

In the Perkins IV final report to Congress, data was tabulated in 1990 and again in 2009. Data reveals a decrease in concentration among high school graduates from 1990 to 2009. As the data relates to ethnicity, in 1990, White students concentrating in CTE was reported at 24% compared to the 2009 data which revealed 20%. African American students concentrated at 24% in 1990 compared to 23% in 2009. Hispanic students concentrating in CTE participated at a rate of 24% in 1990 while there were only 17% in 2009. Asian students' rate of concentration in CTE was 12% in 1990 and only 7% in 2009. American Indian students concentrated in CTE at a rate of 30% in 1990 and 18% in 2009. In the sub-category of sex, males' concentration percentage decreased by 4% from 25% to 21% in the range of years of data. Females went from enrolling 24% in CTE courses to only enrolling 19% in 2009 (U.S. Department of Education, 2014).

Even though numbers have fallen, Hodges (2015) is adamant on the successful placement of students in career and technical education courses. Only 28.6% of students were becoming completers in a career and technical pathway despite the benefits and the economic need for trained workers in the workforce. Hodges mentions the idea that many students are not enrolling in these courses due to the stigma around career and technical education courses. Yet, data tends to lend itself to students who are taking rigorous college preparedness courses along with career and technical education courses by boasting an 80% success rate in meeting college and career

readiness standards. Nonetheless, only 63% of students enrolled in only academic courses tend to meet college and career readiness standards (Hodges, 2015).

In Alabama, the Career and Technical Education websites reports there are 162,229 students enrolled in Career and Technical Education. The average graduation rate is 89% while career and technical education concentrators graduate at a staggering rate of 92%. Ninety-three percent (93%) of CTE graduates are either in college, military, or working within six months of graduation. Among the jobs in Alabama's labor market, it is reported that 59% only require some postsecondary and training but not a bachelor's degree while only 47% of workers in Alabama are qualified to fill those positions (U.S. Department of Education, 2014).

Demographic Relationships in Standardized Testing

A study which examined how test format could influence the gap on standardized tests found that tests with more multiple-choice questions favored males while tests with more constructed responses favored females. (Readon, Kalogrides, Fahle, Podolsky, & Zarate, 2018). The researchers cite up to 25 percent variation in the gap across the nation. In this study, 8 million test scores were examined in 47 different states and determined that on multiple-choice tests, males typically score on average 1/3 of a grade level higher. However, when the tests consist of constructed responses, females score on average 1/3 of grade level higher (Readon, Kalogrides, Fahle, Podolsky, & Zarate, 2018). The ACT WorkKeys is a multiple-choice test, and from data, it would seem as though higher scores would favor the male students in this particular study.

Race is a factor that is well documented in the literature as it relates to standardized testing. In the authorization of No Child Left Behind, it was mandated that all states begin standardized testing in hopes to identify gaps and help close those gaps in order to equalize

education across the nation (Karp, 2003). Even Ladson-Billings (2006) discussed the pressing issue of achievement gaps among racial and economic groups, stating that is a persistent issue and has been over time. No Child Left Behind, in all minds, has yet to deliver on the promise of educational equality. Research suggests there is an ever-increasing gap between Caucasian students and Non-Caucasian students (Lee, 2002). Wayne (2009) believes the effects of high-stakes testing are felt nation-wide because of test score disparity, but also, it is hindering the curriculum because teachers are teaching to the test.

Willingham (2012) discussed why wealthy children do better in school than poor kids. This discussion ties in the demographics of this study. Willingham believed wealthier children do better cognitively because parents are able to provide resources and better learning opportunities than students of low socio-economic status. He also indicated that students from poorer homes tend to deal with more stress, which he says research has shown can be debilitating to the learning process (Willingham, 2012). Jenson (2013) discussed in a report that vocabulary is a main part of learning, memory, and cognition, and believes children who grow up in lower income homes tend to have smaller vocabularies which in turn causes lower cognitive growth (Jenson, 2013).

Ehrenberg, Brewer, Gamoran, and Williams (2001) discussed how school reform has ultimately overlooked the relationship between race, socio-economic status, and standardized testing. Much of the focus has been on the effects of classroom size, school size, financial resources, but has failed to implement promising change in school-level race and socio-economic status which impact academic performance as well. Educators agree that these factors all effect academic achievement, but an achievement gap still exist. One the No Child Left Behind Act's purposes was to potentially eliminate the ever-growing achievement gap between student groups

such as African American, Hispanics, and those from low socio-economic statuses when compare to White students from higher socio-economic statuses (White et al., 2016). These gaps tend to increase as students age and the attempt of NCLB to help students across all races and socio-economics statuses were insufficient because more affluent schools could afford better resources to help with standardized testing (Jennings & Bearak, 2014). The continued gap between race and socio-economic status is enough to spark discussion about the reason for standardized testing (White et al., 2016).

Summary

The objective of this literature review was to examine how career and technical education along with standardized testing has shaped today's education, especially in Alabama. The review discussed a history of standardized testing because testing is one of the cornerstones of accountability education is charged with. Wiliam (2010) believed assessment is the only avenue to determine if learning has occurred, because even thorough instruction cannot completely guarantee cognitive adherence. Testing is an objective way to determine the standards students know and gave a way for all stakeholders to compare scores. Opponents of standardized testing believe teacher tests should be enough, but controversially, many believe teacher bias would affect scores (Churchill, 2015).

The evolution of Alabama's role in educational policy in Career and Technical Education was examined by reviewing Alabama's action plan for their students. There's a push in Alabama for every child to be college and career ready upon leaving high school, and career credentials are a must for Alabama students to be able to obtain college and career ready status. In this particular study, the career credential discussed was the ACT WorkKeys. This test, in Alabama, is given to every high school senior. The ACT WorkKeys is defined by ACT as specially

designed test to indicate career readiness (ACT WorkKeys, 2017). ACT defines career ready as skills necessary to compete on a national level in specific career clusters (ACT WorkKeys, 2017). The ACT WorkKeys was designed to help school districts identify the effectiveness of the career and technical programs offered to students. “Data are present for three ACT WorkKeys cognitive assessments: Reading for information, Applied Mathematics, and Locating Information” (ACT WorkKeys). In Alabama, students must score at silver level or better to reach career ready status while ACT recognizes a bronze level as career ready.

Although, the ACT WorkKeys test seems to be a good indicator for work readiness, the review outlined a few litigations where employers were using the test in the wrong manner. ACT WorkKeys is meant to help employers establish an idea of the skills potential employees may have. It was never meant to be a sole indicator to hire or not hire someone.

The evolution of career and technical education is important to the society of education. It is evident that as the economy evolves, so does education. Career and Technical Education is one aspect of education many students from different backgrounds can learn from, especially with the push to incorporate more academics in the CTE courses (Cohen & Douglas, 2002). Although career and technical education was viewed somewhat as an unequal education and place for the disadvantaged, literature indicates a somewhat balance in gender, sex, and race. Pedagogy and andragogy were discussed in this chapter to examine the teaching styles and how they relate to the students taking CTE courses. The students taking these courses are usually students who will be entering the workforce where andragogy style of teaching in learning is more prevalent. Discussing these two approaches allows the reader to think about the concept of naturalistic teaching as it relates to CTE and real-world jobs. Normally, most adults, receive naturalistic teachings, a concept of andragogy, in the real world. However, students in high

school classes normally are taught using a pedagogy method. CTE courses give an opportunity for those two methods to cross. Many of the principles of andragogy could have an effect on how students learn in career and technical education courses.

Overall, the great debate of educational magnitude of standardized testing and career and technical education will remain in many minds as instrumental in developing young minds; however, some will always believe instructional time and college is most important for America's future leaders. No matter one's stance, the ACT WorkKeys, a career ready test, gives insight to the skills of those future leaders. Hodges (2015) believes CTE content should not be the main point for supporters of career and technical education. He believes the soft skills taught during those classes helps students be successful in the workforce after high school (Hodges, 2015). The question remains to see if completers of career and technical education courses help students achieve at a higher rate than non-completers.

The review of literature examined the debate between standardized testing as well as the importance of career and technical education as it relates to the economy. Alabama's role in education policy was discussed along with the demographic shifts in CTE courses. The teaching method of pedagogy and andragogy and how both methods may have a place in career and technical educational courses was discussed. Chapter 1 introduced an idea that ACT WorkKeys scores could be dependent on the classes a student takes while in high school. Chapter 2 discussed research on standardized testing and CTE courses while giving backgrounds on each subject. Chapter 3 will examine methodology used to determine if there is a correlation between completing a career pathway and achievement on the ACT WorkKeys. This chapter will also explain methodology used to determine if there is a relationship between achievement on the ACT WorkKeys and race, gender, or socio-economic status.

CHAPTER 3. METHODS

Introduction

An individual embarking on his or her first endeavor after high school has only the tools or resources that were provided to him or while in school or their home life. These tools were taught and learned to produce a productive member of society. No matter if a student leaves high school heading to college or a career, he or she needs the educational background in order to succeed. One of the main goals of career and technical education (CTE) in America is to afford the opportunity for students to gain the knowledge and the skills necessary to enter the labor force and produce quality material to enable America to maintain its top tier place in the world economy (Moore, 2015). Moore describes career and technical education as a vehicle to help fill the skill gap in the current workforce. CTE provides opportunities to more than 14 million students throughout the nation, but according to the U.S. Chamber of Commerce, over 17 million Americans are without jobs. Most 21st century industries are looking to hire skilled workers and need a steady flow of candidates. CTE is a resource for Americans to find jobs and be successful members of society (Moore, 2015). It is imperative students entering the workforce directly out of high school are career ready and possess the skills needed in today's society. In this chapter, the methods of this study will be examined. The foundation of this research is grounded in the idea that students will become career ready based on the classes each student chooses to take during their high school tenure. Data collection methods also will be discussed in the body of Chapter 3.

Purpose of the Study

The purpose of this study was to compare ACT WorkKeys data of students who completed a career and technical pathway and those students who did not complete a career and technical pathway during their high school career. This study determined whether or not there was a positive correlation between a student completing a career and technical pathway and scoring high enough on the ACT WorkKeys to be labeled Career Ready. This study also examined the relationship between race, gender, and socioeconomic status as related to achievement on the ACT WorkKeys.

The career and technical education courses offered on the campus of the high school in this study are taught by highly qualified secondary teachers in the areas of Engineering, IT Data, Culinary Arts, Business, Welding, Health Science, Education and Training, and JROTC. Classes are offered through face to face interaction and students are not allowed to take classes virtually. Classes are scheduled for 18 weeks totaling 144 hours through a semester format. To reach completer status, a student must complete 3 Carnegie units in sequence during his or her high school career. If a student completes 3 classes, he or she would have completed 432 hours of subject matter and job readiness development in hopes to score high enough on the ACT WorkKeys.

Research Questions

The following research questions were used in this study:

1. To what extent does completing a career pathway in high school have on student scores on the ACT WorkKeys?
2. What is the comparison of scores between a completer and a non-completer of a career pathway and the success on the ACT WorkKeys?

3. What is the relationship of gender, race, and socioeconomic status of students who completed a career tech pathway and a non-completer and achievement on the ACT WorkKeys?

Research Methodology

The methods used in this study are a quantitative correlation design. A quantitative correlational study is meant to describe a relationship between two variables when neither variable is manipulated (Price, Jhangiani, & I-Chant, 2015). This study is designed to examine the relationship between completing a career pathway while in high school and success on the ACT WorkKeys. The ACT WorkKeys was used as the instrument for this study. There were two groups being examined; those are completers, students who have completed at least 3 Carnegie units in high school, and non-completers, students who have completed less than three Carnegie units in a CTE pathway while in high school. The study identified senior students who took the ACT WorkKeys, a mandated test for all seniors in the state of Alabama, during February of their senior year. The data was drawn from a high school in southeast Alabama from the years of 2015, 2016, 2017, and 2018. Permission to collect this data was granted from the respective school district and permission was granted by Auburn's University's Institutional Review Board to conduct this study (See Appendix A).

Participants

The individuals included in this study consists of graduating seniors from a high school in southeast Alabama in the years ranging from 2015–2018. Scores from a total of 551 students were examined in the areas of Applied Math, Graphic Literacy, and Workplace Documents of the ACT WorkKeys. The scores were released as non-identifiable data to the researcher by the school district (See Appendix B). In order for the score to be used, the student was a graduating

senior who was on track to graduate during their respective senior year. To be a graduating senior, a student must have completed 24 Carnegie units consisting of 16 core classes, a physical education course, a career preparation course, a health course, and 3 Carnegie units in either a career pathway, foreign language, or art pathway. The two groups examined in the study were those students who completed a career pathway and those students who did not complete a career pathway. In order to be classified as a completer, the student must have completed 3 or more Carnegie units in one specific pathway. In this particular school district, students are able to choose pathways in the area of Culinary, JROTC, Engineering, Welding, Education and Training, Health Science, and Database Design. Of the participants in the ranging years of this study, 190 students were labeled as a completer upon exiting high school while the remainder were labeled either non-completer or concentrator. Concentrators were students who finished 2 Carnegie units in a particular pathway, but in this study those students will be included in the non-completer category. This study also examined scores based on gender, race, and socio-economic status of a particular high school in southeast Alabama. According to the National Center for Education Statistics (NCES), there are other high school in the same county as the high school in this study. According to data collected in 2016, the average enrollment of the high school in the study is 627 9th through 12th grade with approximately 79% of students receiving free or reduced lunch; 370 students are listed as African American, 227 as Caucasian, 13 as Asian, and 15 as Hispanic. Another high school in the county reported an enrollment of 468 students with 82% of students receiving free and reduced lunch; 278 students were African American, 161 Caucasian, 14 Hispanic, and 15 listed as Other. The third high school in the county listed an enrollment of 469 students with 68% of students receiving free or reduced lunch,

with 178 students listed as African American, 271 Caucasian, 3 Hispanic, and 17 listed as Other (National Center for Education Statistics, n.d.).

Instrument

The ACT WorkKeys was used as the instrument for this study. ACT WorkKeys is a career aptitude test which measures job acquisition skills sets which have been identified as the needed skills to ensure success in the workplace. There are three sections of the test which include Applied Math, Graphic Literacy, and Reading for information, and if students can successfully use their work base knowledge, they earn an ACT WorkKeys National Career Readiness Certificate, which ACT refers as a credential for students and those seeking employment to verify that they possess the skill necessary to be successful in the workplace (ACT WorkKeys, 2017). Each assessment is approximately an hour long and is given in web-based format. Each section of the ACT WorkKeys is scored from below 3 to 6. Students scoring below 3 do not receive a National Career Readiness Certificate. In order to gain this certificate, the participant must score 3 or better in all three subjects. Students scoring 3 in all three subjects earn a Bronze level certificate, while students scoring 4 receive a Silver level certificate. Students who score in the range of 5 receive Gold level status, and students scoring 6 or above receive Platinum status. Although the students who score in the Bronze level earn a National Readiness Certificate, the state of Alabama does not recognize the students as being career ready. In order for a school district to count a student as career ready based on the ACT WorkKeys, a student must score Silver, Gold, or Platinum.

The Applied Math portion of the test consists of 34 items which participants have 55 minutes to complete. ACT describes the Applied Math assessment as a measure of competency in critical thinking, mathematical reasoning, and problem solving for situations occurring daily in

the workplace. Students scoring on the Bronze level of this assessments can translate word problems to math equations, solve equations involving positive and negative numbers with the exception of multiplication and division, where they can only solve positive numbered equations. Participants can convert fractions to decimals and decimals to fractions with familiar numbers such .5 or .75. They are able to add the prices of products and give back correct change. Silver level students are able to decipher information which has been presented out of order, and they can solve word problems and equations which contain unnecessary information. Level 4 students are also able to solve problems which contain charts, diagrams, or graphs (WorkKeys Assessment, 2017). Students scoring in level 5 or Gold status are able to solve problems requiring several steps of calculation and computation. Platinum level participants are able to solve equations and word problems which require translation from verbal form to mathematical expression. They are able to set up equations which involve multiple-step calculations (WorkKeys Assessment, 2017).

The Graphic Literacy assessment is a 55-minute test which participants must answer 38 items. Participants are asked to examine charts, graphs, diagrams, and floor plans and decide how to use the information to solve work-related problems. Students who score Bronze on this assessment are able to locate and find information and determine next steps in a process. They can solve elementary type graphs and charts when presented one at a time. Silver level participants are able to determine answers to graphs and charts presented with only the needed information. These graphs may have multiple levels of data where the participant must compare more than two pieces of information. Students are able to identify patterns and make inferences from these patterns. Gold level participants can solve multi-leveled graphs with multiple variables when more than one chart or graph is presented to the participant. They are able to

compare more than two patterns and identify the most effective way to solve the problem.

Platinum level participants are able to complete problems which are deemed complicated and detailed. They are able to justify decisions based on the given charts or graphs. It is important to note that students who score on the platinum level possess the skills in the Bronze, Silver, and Gold categories as well (WorkKeys Assessment, 2017).

Workplace Documents Assessment or the Reading for Information portion is a 35-item test where participants have 55 minutes to complete questions concerning messages, letters, directions, bulletins, websites, and contracts (ACT, 2016). Students scoring Bronze on this assessment are able to identify main idea separating details as important or not important. They are also able to choose when to act on a step in a series. Students scoring Silver can complete all necessary skills listed in the Bronze category as well as apply given information to another similar situation and choose next steps if conditions change and calls for different action. Students scoring Gold are able identify, infer, and apply information from documents to make decisions in changing scenarios. Platinum level scores indicate students can infer implied details, understand acronyms, jargon, and technical terms from the context of the situation. These students are able to identify rationale behind documents and apply knowledge from the content to make a decision in a new situation (WorkKeys Assessment, 2017).

Reliability and Validity

According to McLeod (2013), reliability is the consistency in which a tool measures outcome. Reliability, according to Heale and Twycross (2015), there are three attributes of reliability. The first is Homogeneity or internal consistency. This type of reliability is measured by splitting the results in half and reviewing the coefficients. Strong coefficients and weak coefficients determine the level of reliability. The second attribute of reliability is stability. This

is the repeated testing of same instrument to determine the consistency of results (Heale & Twycross, 2015). In this particular study, the test-retest method was used to determine reliability. The ACT Workkeys was given to different students under the same circumstances to make a determination of reliability. The third attribute of reliability is equivalence. This attribute is the consistency among results of different users of the instrument. This attribute is often used when raters are asked to judge a certain observation. Validity is if the assessment results measure what they truly are intended to measure (Sauro, 2014). According to ACT, scientific research supports that the ACT WorkKeys assessments meets professional standards for both validity and reliability. ACT describes validity as the gap between what a test actually measures and what it is supposed to measure (ACT WorkKeys, 2017). It is important for ACT to continue to update evidence which supports the validity and reliability of their tests. ACT reports two primary sources in which they make their claim for validity for ACT WorkKeys. The 1978 publication of Uniform Guidelines on Employee Selection Procedures and the Standards for Educational and Psychological Testing, published in 2014, are the two sources which ACT uses to make the claim for construct validity, criterion validity, and content validity (ACT WorkKeys, 2017). ACT claims the ACT WorkKeys assessments have been found to have a positive relationship to other assessments which fall in the same career ready category. ACT claims criterion validity, which is according to Heale and Twycross (2015) is the extent to which an instrument can be used to measure the same variable as another instrument. They claim this because the scores on the ACT WorkKeys has been shown to indicate future job performance. Content validity is the extent of accuracy among constructs while using a single instrument (Heale & Twycross 2015). Content validity is demonstrated by the analysis of employment data collection in ACT JobPro which is a database of information, skills and skill levels associated

with more than 20,000 jobs across the nation (ACT Workkeys , 2017). The data is evidence that skills assessed are linking to performance (ACT WorkKeys, 2017). Researchers trying to determine the validity of standardized tests look specifically at criterion-related validity which is the fact that a particular student can mentally perform criteria that has been taught and learned. Also known as predictive validity, criterion-related validity is whether or not these tests, such as the ACT WorkKeys, can predict outcomes. The hope is that the outcomes of the ACT WorkKeys will determine how well an individual will perform in the work environment (Robinson, 2017).

In 1996, to increase reliability of the ACT WorkKeys, ACT transitioned from the Guttman item-based pattern scoring to the IRT scoring model. In the Guttman item-based pattern scoring system, scores were based on the items administered at a given level which results in low reliability because of the difficulties applying it to actual test data. The IRT scoring model tests were based on level of difficulty and assessments were measured on a single domain. This gave ACT the ability to infer and predict the participant's ability level and not just the probability of correctly answering the items in given question set (ACT, 2016).

Data Collection Procedure

A total of 569 test scores were examined from graduating seniors in years ranging from 2015–2018. Data was released by the school district (see Appendix B). A request letter was sent to the Federal Coordinator and Testing Coordinator of the district asking for non-identifiable data to be researched and for the superintendent to give approval. ACT WorkKeys data is received directly from ACT and released to the local school and district office. Reports were retrieved from the Alabama Department of Education Identify Management system in the area of career and technical education. These reports indicated if a student was a completer or non-

completer. Race, gender, and socio-economic data was pulled from the district's identification system called Chalkable.

Data Analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS) reporting the means, standard deviation, frequencies, and percentages.

The research questions which were analyzed in the is study are listed below along with the findings for each.

1. To what extent does completing a career pathway in high school have on student scores on the ACT WorkKeys?

This particular question was analyzed using descriptive statistics. The researcher put each participant into one of two categories. A chi square independence test was performed to determine if there was a relationship between completion of a career pathway or not completing a career pathway and achievement on the ACT WorkKeys. Each participant was placed either in the completer category or the non-completer category. Once all participants were placed in their respective category, each score was analyzed and determined if it was career ready or not career ready. Note that in the state of Alabama, Bronze is not recognized as being career ready. This ultimately will determine baseline statistics on the effect of completing a pathway on a student's ACT WorkKeys score and if there is a relationship between the two variables.

2. What is the comparison of scores between a completer and a non-completer of a career pathway and the success on the ACT WorkKeys?

This question was answered using the chi-square independence test. A Chi-Square test is used when a researcher wants to compare observed data versus data that is expected. The Chi-Square test is used to determine if there is a significant difference in observed and expected data

(Fisher & Yates, 1963). Each participant was separated into two categories, completer or non-completer. Then test scores were examined to see if there was a significant difference in completing a career pathway and not completing a career pathway and achievement on the ACT WorkKeys. Scores were separated into five categories, below bronze, bronze, silver, gold, and platinum.

3. What is the relationship of gender, race, and socioeconomic status of students who completed a career tech pathway and a non-completer and achievement on the ACT WorkKeys?

Question 3 was answered using the Chi-Square Independence Test. Three different Chi-Square Independence Tests were used to answer Question 3.

In the first test, each participant was separated into two categories, male and female. Then test scores were examined to determine if there was a significant difference in gender as it relates to achievement on the ACT WorkKeys using cross-tabulation tables and Pearson Chi-Square.

In the second test, each participant was separated into 5 categories: Caucasian, African American, Asian, and Hispanic. Test scores were then examined to determine if there was a significant difference in race as it relates to achievement on the ACT WorkKeys.

In the third Chi-Square Independent Test, each participant was separated into two groups, paid or free/reduced. The test scores then were examined to determine if there was a significant difference in gender as it relates to the achievement on ACT WorkKeys using cross-tabulation tables and Pearson Chi-Square.

Summary

Chapter 3 described the research methods used in this study. The study examined the relationship between seniors completing or not completing a career pathway and career readiness status based on the ACT WorkKeys score, relationship between completing or not completing a career pathway and level of achievement on the ACT WorkKeys, and the relationship between race, gender, and socioeconomic status and level of achievement on the ACT WorkKeys.

CHAPTER 4. RESULTS

Introduction

Throughout the nation, especially in Alabama, educators and legislators believe every graduate should be college and career ready upon exiting high school. This plan and vision is laid out in Plan 2020, Alabama's strategic academic plan. In order to be labeled either college or career ready, a student must meet certain indicators. In this study, career readiness was the focus. The main way to meet career ready status in Alabama is for a student to pass the ACT WorkKeys with a score of Silver or better. The ACT WorkKeys is a career ready test which measures career readiness skills in the three areas of Applied Math, Graphic Literacy, and Workplace Documents, and this test will serve as the instrument for this study. A total of 569 student ACT WorkKeys scores were recorded from a southeast school district in Alabama. Only seniors were included in this study because Alabama requires all seniors in Alabama to take the test. Completer status was examined along with gender, race, and socio-economic status to determine the relationship of achievement on the ACT WorkKeys. Of the completers in this study, 120 were female while 70 were male. In total, of the 569 scores examined, 120 were female and 70 were male. In the category of race, 134 were African American, 52 Caucasian, 3 Asian, and 1 Hispanic. In total, 338 were African American, 210 Caucasian, 11 Asian, and 10 Hispanic. In the Socio-Economic category, determined by free or reduced lunch status, 131 qualify for free or reduced lunch while 59 pay full-priced. In total, 390 qualify for free or reduced lunch and 179 pay full price.

In order for a student to earn completer status, he or she must pass 3 or more Carnegie units in a career pathway. In this chapter, the results of the study were reported. A breakdown of completers, non-completers, scores on the ACT WorkKeys, gender, race, and socioeconomic status were analyzed as related to the success on the ACT WorkKeys.

Purpose of the Study

The purpose of this study was to compare ACT WorkKeys data of students who completed a career and technical pathway and those students who did not complete a career and technical pathway during their high school career. This study determined whether or not there was a positive correlation between a student completing a career and technical pathway and scoring high enough on the ACT WorkKeys to be labeled Career Ready. This study also examined the relationship between race, gender, and socioeconomic status as related to achievement on the ACT WorkKeys.

The career and technical education courses offered on the campus of the high school in this study are taught by highly qualified secondary teachers in the areas of Engineering, IT Data, Culinary Arts, Business, Welding, Health Science, Education and Training, and JROTC. Classes are offered through face to face interaction and students are not allowed to take classes virtually. Classes are scheduled for 18 weeks totaling 144 hours through a semester format. To reach completer status, a student must complete 3 Carnegie units in sequence during his or her high school career. If a student completes 3 classes, he or she would have completed 432 hours of subject matter and job readiness development in hopes to score high enough on the ACT WorkKeys.

Research Questions

The following questions were used in this study:

1. To what extent does completing a career pathway in high school have on student scores on the ACT WorkKeys?
2. What is the comparison of scores between a completer and a non-completer of a career pathway and the success on the ACT WorkKeys?
3. What is the relationship of gender, race, and socioeconomic status of students who completed a career tech pathway and a non-completer and achievement on the ACT WorkKeys?

Demographics

Table 1 reveals the frequency counts for the participants in this study (see Figure 1, 2, and 3). This study included 569 ACT WorkKeys scores from graduating seniors. Tests were administered during the spring of 2015, 2016, 2017, and 2018. Of the 569 students whose scores were reported, 254 were male and 315 were female. Racially, African American students' scores were most prevalent with 338 followed by Caucasian with 210. Asian students accounted for 11 scores, and Hispanic students accounted for 10. Socio-economic status, in this study, was determined by federal free and reduced guidelines. Students were either labeled as a paid student or a free and reduced student. Out of the 569 indicated scores, 190 scores belonged to students who had completed a career pathway while 379 scores belonged to students who had not completed a career pathway.

Table 1

Demographics (569 Total Scores)

Frequency Counts	<i>n</i>	%
<i>Completer</i>		
Gender		
Male	70	12.3%
Female	120	21%
Race		
Caucasian	52	9.1%
African American	134	23.5%
Hispanic	1	0.1%
Asian	3	0.5%
Socio-economic Status		
Free/Reduced Lunch	131	23.0%
Paid Lunch	59	10.3%
<i>Non-Completer</i>		
Gender		
Male	184	32.3%
Female	195	34.2%
Race		
Caucasian	158	27.7%
African American	204	35.8%
Hispanic	9	1.9%
Asian	8	1.4%
Socio-economic Status		
Free/Reduced Lunch	259	45.5%
Paid Lunch	120	21%

N = 569

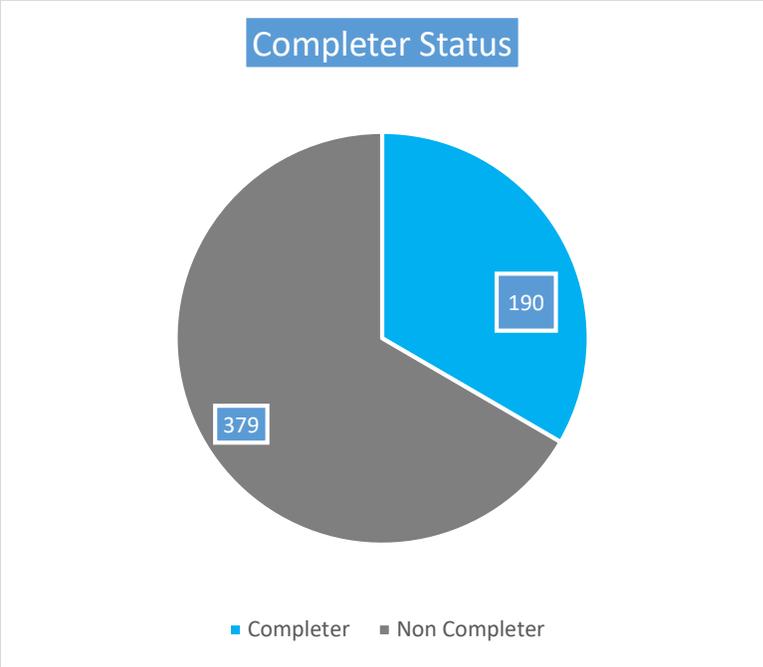


Figure 1. Participant Completer Status

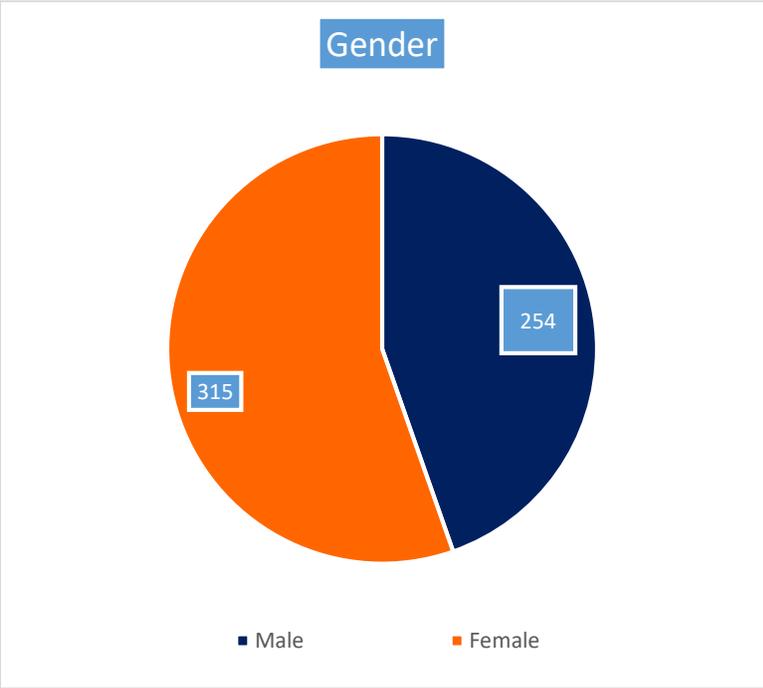


Figure 2. Gender of Participants

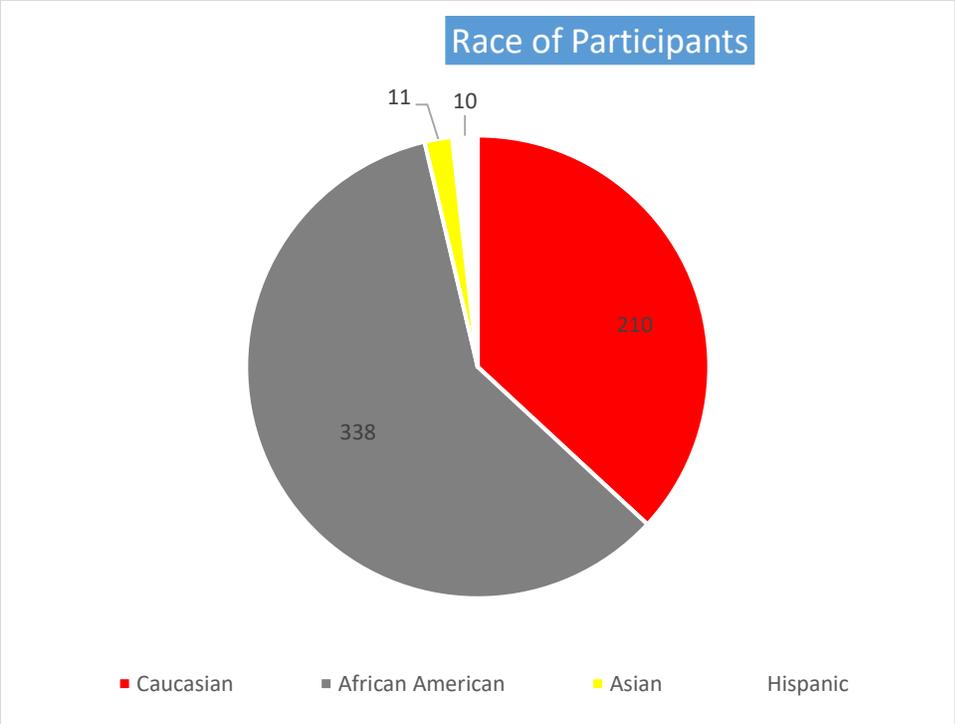


Figure 3. Race of Participants

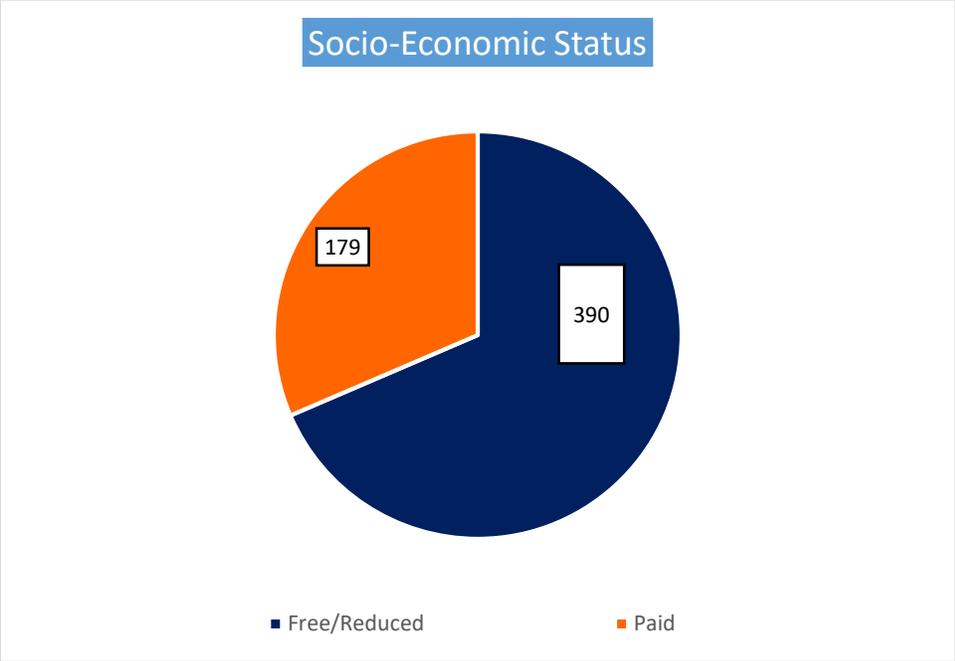


Figure 4. Socio-Economic Status of Participants

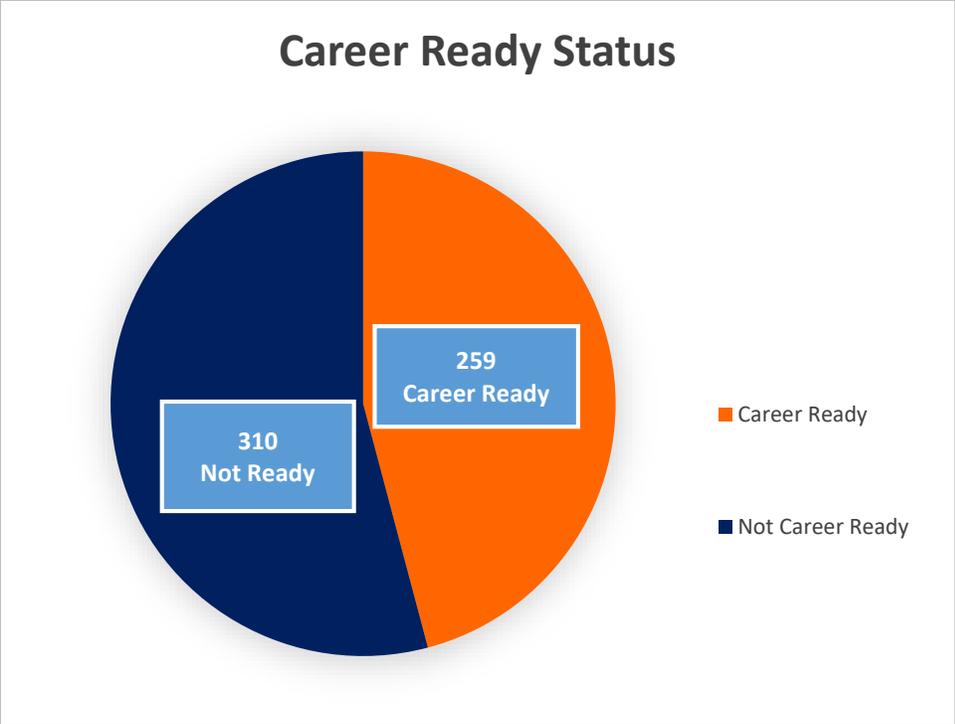


Figure 5. Career Readiness Status

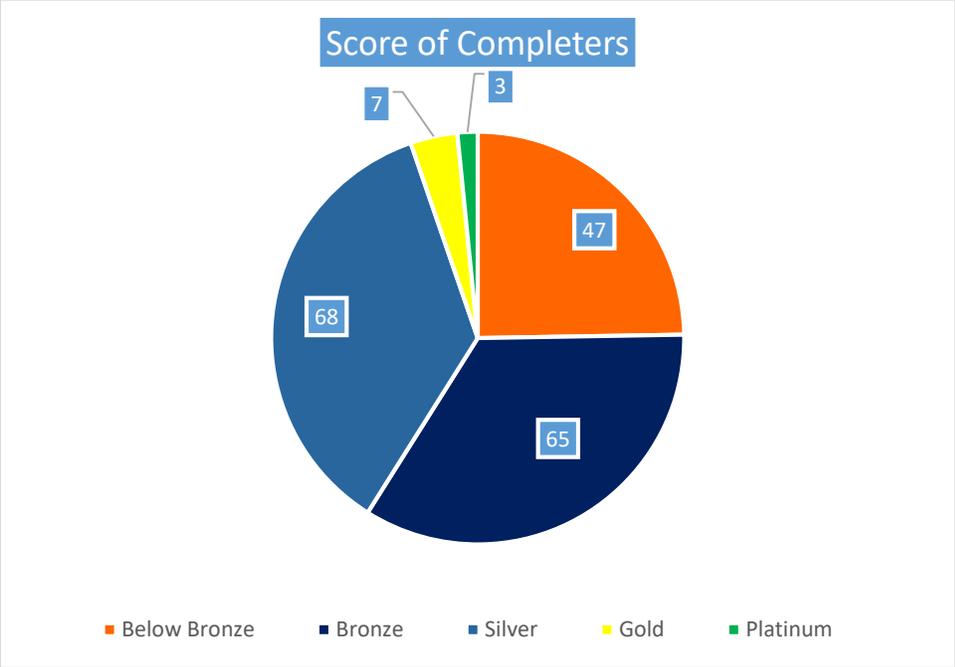


Figure 6. Scores Range of Completers

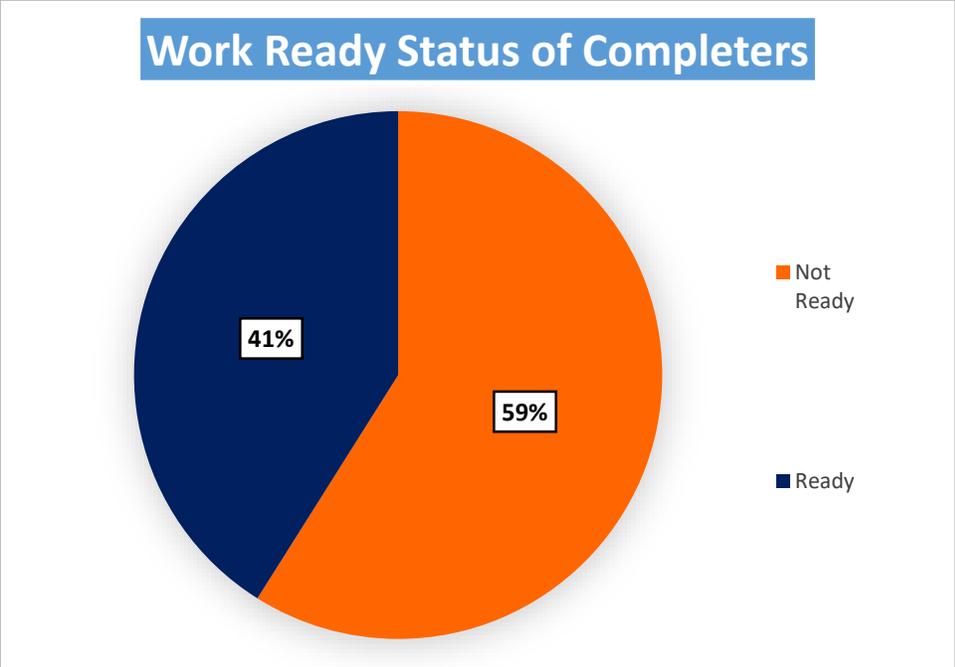


Figure 7. Work Readiness Status for Completers

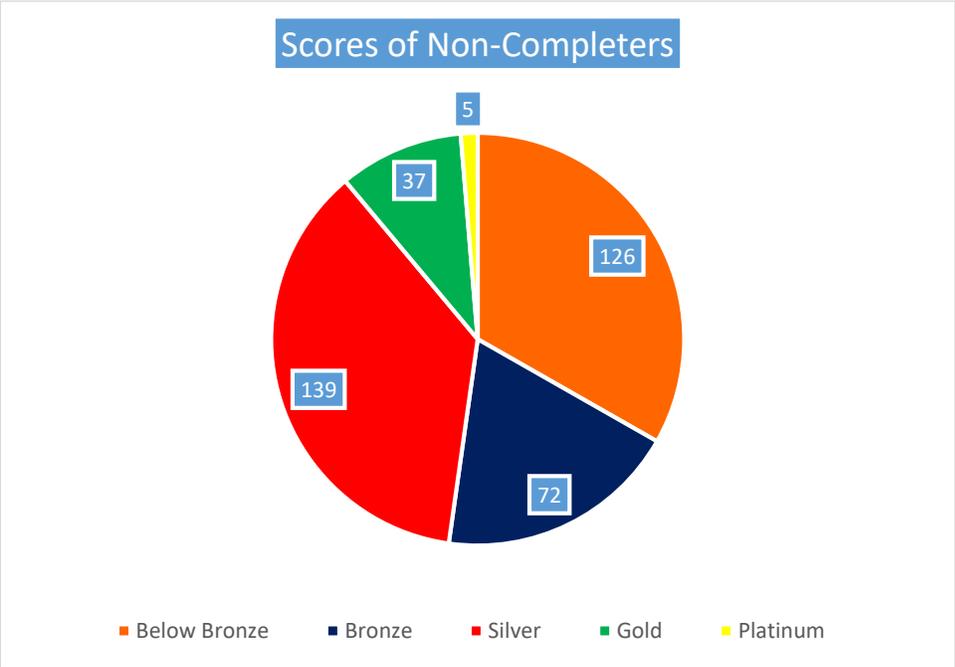


Figure 8. Scores of Non-Completers

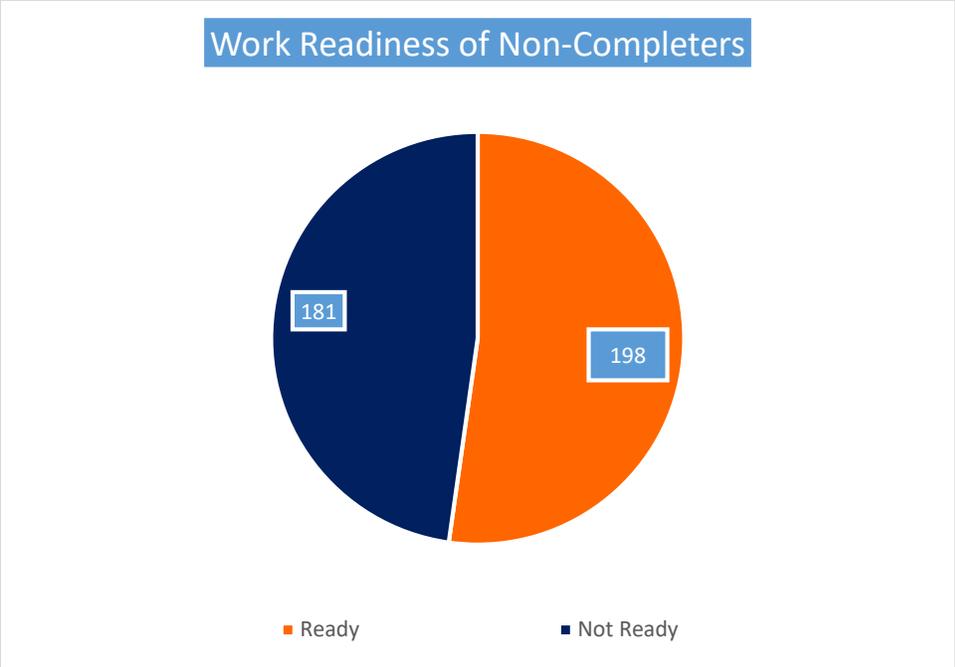


Figure 9. Work Ready Status of Non-Completers

To examine the relationship between completing a career pathway and achievement on the ACT WorkKeys, a Chi-Square Independent Test was performed. Two independent variables were compared to determine the extent of the relationship of completers and non-completers to their achievement on the ACT WorkKeys. The results from the chi-square test are presented in Table 2 and Table 3.

Table 2

*ReadyStatus * CompStatus Crosstabulation Completers/Non-Completers and Career Ready*

Status

		CompStatus		Total	
			Completer	Non-completer	
ReadyStatus	Ready	Count	78	181	259
		% within ReadyStatus	30.1%	69.9%	100.0%
		% within CompStatus	41.1%	47.8%	45.5%
		% of Total	13.7%	31.8%	45.5%
	Not Ready	Count	112	198	310
		% within ReadyStatus	36.1%	63.9%	100.0%
		% within CompStatus	58.9%	52.2%	54.5%
		% of Total	19.7%	34.8%	54.5%
Total	Count	190	379	569	
	% within ReadyStatus	33.4%	66.6%	100.0%	
	% within CompStatus	100.0%	100.0%	100.0%	
	% of Total	33.4%	66.6%	100.0%	

In Table 2, students completed a career pathway and scored silver or better on the ACT WorkKeys accounted for 78 students of the 569 for a percentage rate of 41.1%. Students who had not completed a career pathway but scored Silver or better on the ACT WorkKeys accounted for 181 students for a percentage rate of 47.8%. A total of 112 students scored Bronze or below on the ACT WorkKeys and had completed a career pathway totaling 58.9%. Of the non-completers, 52.2% did not score high enough on the ACT WorkKeys to be labeled work ready.

Tests to determine if there was a significant difference or relationship between completing a career pathway or not completing a career pathway and achievement on the ACT WorkKeys indicated that there was not a significant difference between completers and non-completers (See Table 3). ($X^2(1, N = 569) = .130, p > .05$).

Table 3

Chi-Square Tests of Completer/Non-Completer and Career Ready Status

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.294 ^a	1	.130		
Continuity Correction ^b	2.032	1	.154		
Likelihood Ratio	2.303	1	.129		
Fisher's Exact Test				.153	.077
Linear-by-Linear Association	2.290	1	.130		
N of Valid Cases	569				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 86.49.

b. Computed only for a 2x2 table

To determine the comparison of scores between a completer and non-completer of a career pathway, a chi-square test was performed. Students were grouped into two groups, completer and non-completers and scores ranging from below bronze to platinum were compared. Figure 10 indicates percentage rates of scores in the two groups, completers and non-completers. Completters scored highest in the Bronze and Platinum tier while non-completers scored highest in the below Bronze and Gold tier. Of non-completers, 84% scored in the Gold range while only approximately 15.9% completers scored in the Gold tier. These differences were significant ($X^2 = 21.3, df = 4, p < .05$). The analysis information is found in Figure 10.

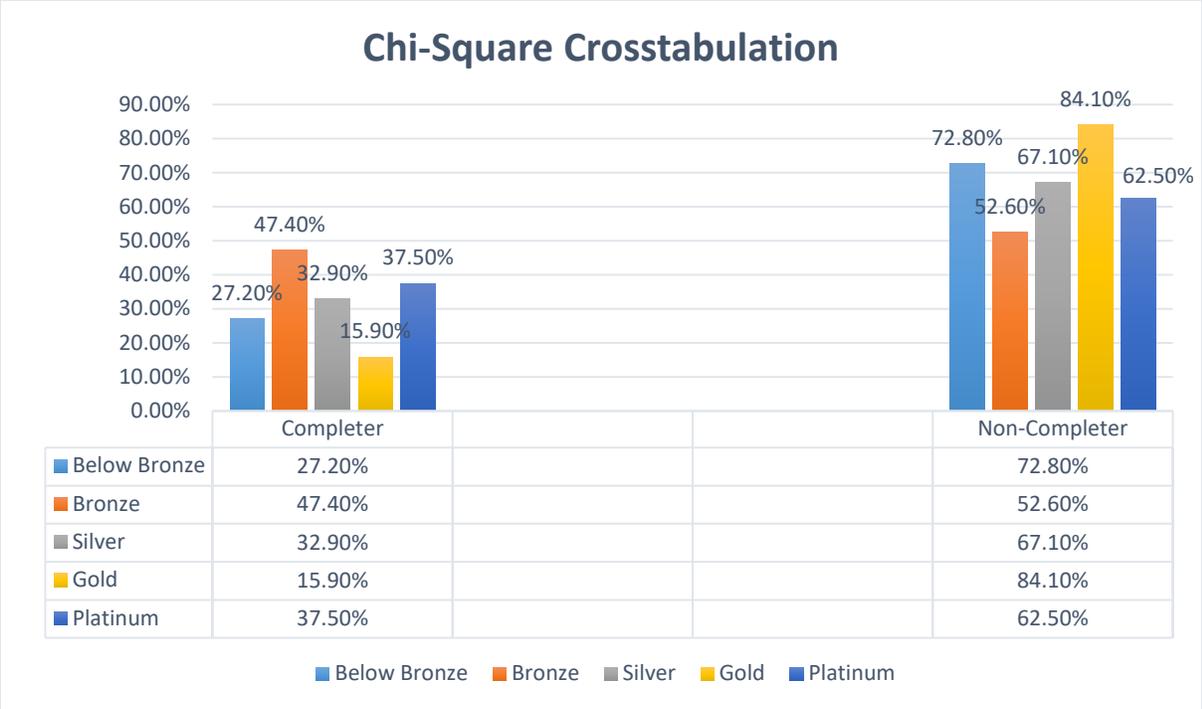


Figure 10

To determine if gender has a significant role in scores on the ACT WorkKeys, a chi-square independence test was conducted. Students were grouped in to two groups, male and female and their scores were disaggregated into 5 groups. Scores range from Below Bronze, Bronze, Silver, Gold, to Platinum. The information can be found in Table 4. To determine the effect size of gender on scores, a Cramer V analysis was performed. Scores falling in the Below Bronze, Gold, and Silver tiers were split in half amongst both genders. The table indicates the highest score range for the male population is Gold, Platinum, and Below Bronze. In the female group, the highest tier range is silver where 60.8% of all Silver tiered scores belong to females. These differences in scores do not indicate that gender is a significant difference in scores on the ACT WorkKeys ($X^2 = 5.063$, $df = 4$, $p > .05$).

Table 4

Gender vs. Score

	Male	Female
Below Bronze	50%	50%
Bronze	44.2%	55.8%
Silver	39.2%	60.8%
Gold	50%	50%
Platinum	50%	50%

To further assess the significant roles certain factors, have in scores on the ACT WorkKeys, race was evaluated as a factor. To determine if race of an individual has an impact on his or her ACT WorkKeys score, a Chi-Square Independence Test was performed. Scores were divided into five sections, Below Bronze, Bronze, Silver, Gold, and Platinum. Each participant in the study was placed in their respective race. Four race groups were prevalent in this study. Groups consisted of scores for 210 Caucasian students, 338 African American students, 10 Hispanic students, and 11 Asian students. Table 5 results indicate race is a significant factor in score on the ACT WorkKeys. Of all scores falling within the Below Bronze category of the ACT WorkKeys, 16% belong to Caucasian students while 82% of scores falling in the same tier belong to African American students. Hispanic students make up 1.2% of this tier while Asian students make up .6% of the Below Bronze category. In the Bronze category, which still does not meet Alabama career ready standards, 26% of the scores belong to Caucasian students, while 71.1% of the scores in this tier belong to African American students. Hispanic students account for 1.4% of this tier. According to the results in the Silver tier,

Caucasian students account for 53.6%. African American students account for 42.7% of the scores while both Hispanic students and Asian students account for only 1.9% each of this tier. In the Gold tier, Caucasian students were responsible for 61.4% of the scores, while African Americans accounted for 20% of the scores. Hispanic students held a 4.5% stake and Asians accounted for 13.6% of this scoring tier. The Platinum tier was only reached by 8 students, 75% of which were Caucasian and 25% were African American students. In total, 168 students scored in the Below Bronze tier, 138 in the Bronze tier, 211 in the Silver tier, 44 in the Gold tier, and 8 in the Platinum tier. According to the data, race is a significant factor in the scores on the ACT WorkKeys ($X^2 = 128.691$, $df = 12$, $p < .05$). The analysis can be found in Table 5.

Table 5

Race vs Score on ACT WorkKeys

	Below Bronze	Bronze	Silver	Gold	Platinum
Caucasian	16.1%	26.8%	53.6%	61.4%	75%
African American	82.1%	71.7%	42.7%	20.5%	25%
Hispanic	1.2%	1.4%	1.9%	4.5%	0%
Asian	.6%	0%	1.9%	13.6%	0%

To determine if socio-economic status has an effect on ACT WorkKeys scores, a Chi-Square Independence Test was performed. Students were grouped in to one of two groups, paid or free and reduced, and test scores of each student was examined. Test scores were split into 5 categories ranging from Below Bronze, Bronze, Silver, Gold, Platinum. In this study, 359 students were labeled as receiving free or reduced lunch while only 210 were labeled as students

who paid. Table 6 shows the relationship between socio-economic status and scores on the ACT WorkKeys. Table 6 data shows the impact of socio-economic status, determined by free or reduced lunch status, on scores of the ACT WorkKeys. The Free and Reduced group accounted for 93.5% of all scores which fell in the Below Bronze category. A total of 170 scores were placed in this category and only 6.5% of those 170 scores belonged to students who pay for lunch. In the Bronze tier, 68.8% of tests belonged to students in the free and reduced category while only 31.2% of test scores in the Bronze tier belonged to students who were in the paid group. Only 209 students scored in the Silver tier to become career ready. Of the 209 scores, 43.5% belonged to students in the free and reduced group and students in the paid category accounted for 56.5% of this tier. Students in the paid group accounted for 70.5% of Gold tier scores while only 29.5% of test scores belonged to the free and reduced group. A total of 44 test scores fell in the Gold tier. Only 8 individuals reached a Platinum level. Of these individuals, 87.5% were part of the paid group and only 12.5% of students scoring in this tier were part of the free and reduced group. According to the data, there is a significant relationship between socio-economic status and scores on the ACT WorkKeys ($X^2 = 133.961$, $df = 4$, $p < .05$).

Table 6

Socio-Economic Status vs. Score

	Below Bronze	Bronze	Silver	Gold	Platinum
Free/Reduced	93.5%	68.8%	43.5%	29.5%	12.5%
Paid	6.5%	31.2%	56.5%	70.5%	87.5%

CHAPTER 5. IMPLICATIONS, RECOMMENDATIONS FOR FUTURE REASEARCH AND CONCLUSIONS

This chapter serves as a conclusion and summary of the findings of this study. Support for the findings can be found in the chapter reviews and literature. Future recommendations for research will be discussed in this chapter along with implications for the field. It is the goal that this study will help guide future studies and policy as it relates to the field of Career and Technical Education. The transitions period of students into the workforce is vital to the success of the economy. This chapter also discusses the limitations involved in the study along with summary of the data.

Purpose of the Study

The purpose of this study was to compare ACT WorkKeys data of students who completed a career and technical pathway and those students who did not complete a career and technical pathway during their high school career. This study determined whether or not there was a positive correlation between a student completing a career and technical pathway and scoring high enough on the ACT WorkKeys to be labeled Career Ready. This study also examined the relationship between race, gender, and socioeconomic status as related to achievement on the ACT WorkKeys.

The career and technical education courses offered on the campus of the high school in this study are taught by highly qualified secondary teachers in the areas of Engineering, IT Data, Culinary Arts, Business, Welding, Health Science, Education and Training, and JROTC. Classes

are offered though face to face interaction and students are not allowed to take classes virtually. Classes are scheduled for 18 weeks totaling 144 hours through a semester format. To reach completer status, a student must complete 3 Carnegie units in sequence during his or her high school career. If a student completes 3 classes, he or she would have completed 432 hours of subject matter and job readiness development in hopes to score high enough on the ACT WorkKeys.

Research Questions

The following research questions were used in this study:

1. To what extent does completing a career pathway in high school have on student scores on the ACT WorkKeys?
2. What is the comparison of scores between a completer and a non-completer of a career pathway and the success on the ACT WorkKeys?
3. What is the relationship of gender, race, and socioeconomic status of students who completed a career tech pathway and a non-completer and achievement on the ACT WorkKeys?

Summary

Participants in this study were students who graduated from a high school in southeast Alabama. All test scores used were from the ACT WorkKeys, a norm-referenced standardized test which assesses work ready skills. Scores range from No Score, referred to Below Bronze in the study, Bronze, Silver, Gold, to Platinum. Platinum is the highest score possible. There were 569 test scores examined from the years of 2015, 2016, 2017, 2018. Among the test scores, 254 were male and 315 were female. In the range of years, a total of 190 students reached completer status while 379 students did not take any Career and Technical Education courses or only took 2

courses. Of the completers, 120 were female while only 70 were male. Out of the 569 reviewed scores, 261 scored silver or better on the ACT WorkKeys earning a career ready status in Alabama. It is important to note that although ACT does acknowledge a Bronze level score as career ready, Alabama does not. Among the remaining 310 scores who did not receive Silver or better, 138 scored in the Bronze tier while 170 students received no score or Below Bronze. Overall, 209 scored in the Silver tier, 44 scored Gold, and only 8 scored in the Platinum tier.

Demographically, 210 scores belonged to Caucasian students, 338 to African American students, 11 to Asian students, and 10 to Hispanic students. Of the completers, 52 were Caucasian, 134 African American, 3 Asian, and 1 Hispanic. There were two socio-economic status groups in this study, free and reduced and paid. Lunch codes were used to determine which group students were selected. In this study, a total of 359 students received free or reduced lunch while 210 were paying students. Of the completers, 131 were part of the free or reduced lunch group and 59 were part of the paid lunch group.

Completion Status and Work Ready Status

The Chi-Square test indicated there was not a significant relationship between the student that completes a career and technical education pathway and his or her work readiness status ($X^2 = 2.294$, $df = 1$, $p = .130$). The goal is a student who completes a career pathway will earn work ready status at a higher rate than a student who chooses to concentrate on academic classes only. There were 41.1% completers that reached career ready status with 58.9% of completers scoring Bronze or lower on the ACT WorkKeys. Non-completers were 47.8% able to obtain career ready status while 52.2% of non-completers did not reach career ready status. This data indicates that career and technical education courses may only be teaching the necessary skills to learn a specific trade within in the class.

Completion Status and ACT WorkKeys Score

There was a significant relationship between completion status and a student's actual score on the ACT WorkKeys ($X^2 = 21.3$, $df = 4$, $p < .001$). Since the data indicated insignificance in relationship between completion status, this part of the study examined the actual score to see if completers or non-completers scored at a higher rate. A Chi-square Independence Test was performed to determine relationship amongst variables. Data revealed that completion status has a large effect on the actual score. Data indicated that non-completers actually score more consistently in the Silver, Gold, and Platinum range. Non-Completers accounted for 72.8% of the Below Bronze and completers accounted for 27.2%. The high percentage of non-completers scoring in this category lends itself to the belief that non-completers would not score as high because they have not completed a pathway. Then completers once again out-scored the non-completers in the Bronze category, but in the categories which determine career readiness in Alabama, completers are out-scored by the non-completers by 35% in the Silver category, 69% in the Gold category, and 25% in the Platinum category. This change could possibly be explained by top tier students who focus on academic classes and test well who scored higher on the test than completers.

Gender's Relationship to ACT WorkKeys Score

A Chi-Square Independence Test was performed to determine the relationship between an individual's gender and his or her ACT WorkKeys Score. It was believed that there would be no significant difference in score between genders. Upon reviewing the data, it was determined that there was not a significant relationship between gender and ACT WorkKeys score ($X^2 = 5.063$, $df = 4$, $p = .281$). The biggest differences in scores were seen in the Bronze and Silver tier

with females slightly edging males in both categories. Overall, according to the study, gender should not have an effect on ACT WorkKeys scores.

Race's Relationship to ACT WorkKeys Score

Overall, 210 Caucasian students, 338 African American students, 11 Asian students, and 10 Hispanic students' scores were included in this study. To determine if race could be a factor in ACT WorkKeys scores, a Chi-Square Independent Test was performed. It was believed that race would not have a significant relationship to someone's ACT WorkKeys score. However, upon evaluation of the data, a significant relationship was found ($X^2 = 128.691$, $df = 12$, $p < .001$). The analysis indicated that most students score in the Bronze or Silver range, but 75% of all Platinum scores belonged to Caucasian students while only 25% of the same score belonged to African American students. Hispanic and Asian students made up approximately 15% of the Silver and Gold range. African American students made up 82.1% of the Below Bronze tier and 71.7% of the Bronze. The Silver range was more evenly spread with Caucasian making up 53.6% and 42.7%. The disparity of scores is the reason for the significant relationship.

Socio-economic Relationship to ACT WorkKeys Score

A Chi-Square Independent Test was performed to determine if socio-economic status was a factor in a student's ACT WorkKeys score. Each student score belonging to a student was put into either a free and reduced group or a paid group. Overall, 359 of the 569 scores evaluated were placed in the free and reduced group. The remaining 210 scores were placed in the paid group. There was a significant relationship among socio-economic status and ACT WorkKeys scores. However, upon reviewing the data, it was determined that there was a significant relationship ($X^2 = 133.961$, $df = 4$, $p < .001$). Socio-economic status had a large effect on ACT WorkKeys scores according to Cramer V test. Of the Platinum scores, 87.5% came from the

paid group, 70.5% of all Gold scores came from paid group, and 56.5% of Silver scores came from the paid group. This was different from the opposite group which delivered 93.5% of all Below Bronze scores and 68.8% of all Bronze scores, both of which do not meet career ready status.

Overall, ACT WorkKeys scores could be affected by an individual's race and someone's socio-economic status. These results were only based on one high school in Alabama throughout a 4-year span. The study found insignificance in relationship to the scores of non-completers and completers of a career and technical pathway. These findings somewhat oppose the idea from the Fordham Institute (2016) published an article on a study which suggests they have found that Career and Technical Education courses provide a boost to the kids who need it most, and they state those groups consists of boys and students from low-income homes (Dougherty, 2016). This study raises some questions to the validity of career and technical education and its correlation to being work ready as measured by the ACT WorkKeys. The Fordham study indicated states that CTE provides the biggest boost for these two groups; however, in this study students from lower income families not do well on the ACT WorkKeys.

A gender gap, according to Tom Segal (2013), exists among standardized testing in the United States. Typically, boys score higher than girls especially in Math. However, this study contradicts the gender gap notion evidenced by the lack of significant relationship between gender and the ACT WorkKeys scores. Another meta-study constructed by Byrnes, Miller, and Schafer (1999) revealed that boys are more likely to guess on questions they may not know which could explain the gender gap on standardized test because tests such as the ACT or SAT reward educated guesses. The difference in the ACT WorkKeys is that the questions are

determining skill level and not pure academic knowledge. This could be the reason for the lack of gender gap.

There was a significant relationship among race and scores on the ACT WorkKeys. These findings are supported by data from other standardized tests. Hardy (2015) reported there is an achievement gap among races in America. This achievement gap is often viewed as a lack of opportunity gap. Hardy suggested that factors such as income levels, employment rates, environment in homes and neighborhoods are, on average, typically worse for African American and Hispanics than Caucasian students. These circumstances, many times, could lead to fewer opportunities to experience learning in a naturalistic environment. Language barriers could also be a predictor of poorer test scores. Hardy reported that in Philadelphia, a study of 2,200 schools in reading indicated that all but 198 schools' reports indicated lower than 90% proficiency rate. Those 198 schools are the only schools of the 2,200 who did not have over 50% disadvantaged populations (Hardy, 2015). When compared to this study's high school, the demographics are similar. The school in this study reports approximately 62% African Americans and 4% Hispanic. The school also reports an approximate free and reduced lunch rate of 79%. In the same report, Hardy, suggested that 18% of 8th grade students who receive free or reduced lunch were proficient on Math compared to the 48% of students scoring proficient whose family's income was more than allowed for free and reduced lunch (Hardy, 2015).

Limitations of the Study

This study involved only one school in southeast Alabama. Only one school was used because of data governance policies. However, one other school gave permission for use of their data, but their career and technical education courses are not taught by high school teachers. Their classes are taught by college professors which would not be in comparison to the high

school teachers who teach at the high school in this study. Also, the career and technical education courses differ from both high schools.

This study consists of 569 scores from graduating seniors of years of 2015, 2016, 2017, and 2018. The study was based on standardized testing so the researcher could not guarantee students tried their best. Even though incentives are given to students, it is not known if the reinforcement of a National Career Ready Certificate is big enough to achieve the wanted behavior. The data may not reflect data from other school districts who do not have the same demographics.

Another limitation was that not every senior attended school the day the ACT WorkKeys was given. The WorkKeys is given during February of a student's senior year, and in some cases, students who have completed all requirements graduated in December and did not take the test. However, it is almost certain that particular population was not great enough to shift the data. Data were collected for three years on three different senior classes. In that time, teacher turnover could have occurred, but administration and the goals of the school have remained consistent. Standards taught in class have also remained consistent in the observation years of this study.

Implications for the Field

Information from this study may be helpful in examining standards in Career and Technical Education in Alabama. If the ACT WorkKeys is the measure of career readiness, it is optimal that data show completers of Career and Technical Education do well on the test. Data could help educators transform students into skilled workers who are competent not only with their hands but who can also locate information, apply math skills, and read for information. These skills are needed to fill the ever-vacant skill set jobs across the nation.

As seen in the past, education is ever transforming and it is necessary for career and technical education to be on the forefront of legislators' minds as they make decisions for the education of our country. In this study a small selection of the population inside Alabama is relevant because it supports larger studies in the areas of demographics and standardized testing. There will always be a debate about the importance of standardized testing and Career and Technical Education. This study attempted to examine the mixture of the two called the ACT WorkKeys. The future of this test and its use will help employers understand the skills which potential employees possess, but future research is necessary to determine if Career and Technical Education has a true impact on scores on the ACT WorkKeys.

The Fordham study indicated that career and technical education is beneficial to students from lower income families, but standardized testing does not indicate a student from lower income families score better. It is important for future policy makers to take resources opportunities into account when credentialing and labeling a student for marketability. It is common in education for an opportunity gap to become an attitude gap thus resulting in an achievement gap. Opportunities for success through avenues other than standardized testing should be evaluated and debated.

Recommendations for Future Research

It is important to determine how effective career and technical education is for students in high school. As many skilled workers are retiring, not only Alabama, but the nation is in need of young adults who are skilled and ready to work. A report completed by Adecco (2018) outlines the effects of the retirement of the baby boomers group. If nothing is accomplished with career and technical education, it is reported that 32% of billion-dollar manufacturers will lose over \$100 million as the boomers retire. At least 74% of firms predict a shortfall of qualified skilled

workers, and an estimated 31 million jobs could be left vacant by 2020 (Bidwell, 2013). With that knowledge, it becomes ever more important to train students through career and technical education so they become ready to work.

The ACT WorkKeys will continue to be a measure for work readiness. However, the data in this study does not support a relationship between completion of career and technical education and the ACT WorkKeys assessment. It is recommended this study be duplicated in other parts of the state of Alabama or in the country who use the ACT WorkKeys as a measure of career readiness. Future studies may include students with special needs as they are reported to be a disadvantaged group who takes part in career and technical education. Future studies could also examine ACT scores and ACT WorkKeys scores to see how completers compete with non-completers in two different tests, one of which tests career readiness and the other academic achievement.

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APPENDIX A
ACT WORKKEYS SCORE REPORT SAMPLE
BELOW BRONZE

**AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD for RESEARCH INVOLVING HUMAN SUBJECTS
REQUEST FOR EXEMPT CATEGORY RESEARCH**

For information or help completing this form, contact: THE OFFICE OF RESEARCH COMPLIANCE, 115 Ramsay Hall
Phone: 334-844-5966 e-mail: IRBAdmin@auburn.edu Web Address: <http://www.auburn.edu/research/vprichu/index.htm>

Revised 2/1/2014 Submit completed form to IRBsubmit@auburn.edu or 115 Ramsay Hall, Auburn University 36849.

Form must be populated using Adobe Acrobat / Pro 9 or greater standalone program (do not fill out in browser). Hand written forms will not be accepted.

Project activities may not begin until you have received approval from the Auburn University IRB.

1. PROJECT PERSONNEL & TRAINING

PRINCIPAL INVESTIGATOR (PI):

Name Craigory Brock Kolley Title Doctoral Student Dept./School Adult Education
Address 148 Prospect Ridge Rd Troy, AL 36079 AU Email cbk0009@tigermail.auburn.edu
Phone 334-208-6377 Dept. Head Dr. Sherida Downer

FACULTY ADVISOR (if applicable):

Name Dr. James Witte Title Program Coordinator Dept./School Adult Education
Address Auburn University 4036 Haley Center Auburn, AL 36849
Phone 334-844-3054 AU Email witteje@auburn.edu

KEY PERSONNEL: List Key Personnel (other than PI and FA). Additional personnel may be listed in an attachment.

Name	Title	Institution	Responsibilities

KEY PERSONNEL TRAINING: Have all Key Personnel completed CITI Human Research Training (including elective modules related to this research) within the last 3 years? YES NO

TRAINING CERTIFICATES: Please attach CITI completion certificates for all Key Personnel.

2. PROJECT INFORMATION

Title: A Comparison of ACT Workkeys Performance of Young Adults who are Completers of a Career and Technical Pathway and Non-Completers of a Career and Technical Pathway

Source of Funding: Investigator Internal External

List External Agency & Grant Number: N/A

List any contractors, sub-contractors, or other entities associate with this project.

N/A

List any other IRBs associated with this project (including those involved with reviewing, deferring, or determinations).

N/A

FOR ORC OFFICE USE ONLY

DATE RECEIVED BY ORC: _____	by _____	APPROVAL # _____
DATE OF IRB REVIEW: _____	by _____	APPROVAL CATEGORY: _____
DATE OF ORC REVIEW: _____	by _____	INTERVAL FOR CONTINUING REVIEW: _____
DATE OF APPROVAL: _____	by _____	
COMMENTS: _____		

APPENDIX B

ACT WORKKEYS SCORE RELEASE OF DATA LETTER



Dr. Lee A. Hicks
Superintendent

TROY CITY BOARD OF EDUCATION

358 Elba Highway, Troy, Alabama 36079
Phone: (334) 566-3741 | Fax: (334) 566-1425

"Trojans Committed to Success"

April 4, 2018

To Whom It May Concern:

Brock Kelley has been granted permission to use requested de-identified existing data sets from ACT Aspire and ACT WorkKeys coupled with Socio-Economic Status (SES) to complete his study for Auburn University in pursuit of his doctoral degree.

If you have any questions or concerns, please feel free to contact me.

Respectfully,

Dr. Lee Hicks
Superintendent
Troy City Schools

APPENDIX C
ACT WORKKEYS SCORE REPORT SAMPLE
BELOW BRONZE

17088555-012670-6

Exam ID: 1948131733

ACT WorkKeys[®]
Memo to Examinee

Report for:

Test Date: 02/2017

Test Site:

Report Date: 03/09/2017

Your WorkKeys skill report can help you understand how you did on the test(s), and how you can do better. This report tells you about your skills and gives information on how you can further develop them.

Applied Mathematics (Levels range from 3 to 7) Level: <3 Scale Score: 70

Your score on the Applied Mathematics test does not show that you now have the skills to score at Level 3 or above. To improve your skills:

- practice reading the entire problem carefully and deciding whether to add, subtract, multiply, or divide.
- figure out what you need to know to solve the problem.
- estimate the answer before you calculate.
- work on changing among fractions, decimals, and percentages.
- work on changing between units of dollars and cents.
- check your work to see if you answered the question that was asked and if your answer is reasonable. Ask yourself if the units are correct, and see if your answer is near your estimate.

Locating Information (Levels range from 3 to 6) Level: <3 Scale Score: 71

Your score on the Locating Information test does not show that you now have the skills to score at Level 3 or above. To improve your skills:

- read different types of simple workplace graphics such as tables, forms, charts, graphs, maps, and diagrams.
- find one or two pieces of information in these types of graphics.
- fill in one or two pieces of information that are missing from these types of graphics.

Reading for Information (Levels range from 3 to 7) Level: 3 Scale Score: 74

You scored at Level 3. People who score at this level can correctly identify the main points in short, straightforward reading materials containing basic vocabulary. Such reading materials may include listed instructions, simple company policies, and simple announcements. To improve your skills:

- read business materials which are more detailed than simple lists of instructions or company announcements.
- work on understanding procedures that involve more than one step.
- restate information found in business materials in your own words.

We hope you find this WorkKeys information useful. If you have questions about these scores or about the WorkKeys system or skills, please contact WorkKeys (96), ACT, 2201 North Dodge Street, P. O. Box 168, Iowa City, IA 52243.

LS=Level Scores:

Use for selection, promotion, or other individual high-stakes purposes. For more information on Level Scores go to: <http://www.act.org/workkeys/pdf/forms/interp.pdf>

SS=Scale Scores:

Use to show growth over time and provide group comparisons in outcome measurement. Not intended for selection and hiring. Scale Score range: 50-90. For more information on Scale Scores go to: http://www.act.org/workkeys/pdf/scale_score_interp_guide.pdf

APPENDIX D
ACT WORKKEYS SCORE REPORT SAMPLE
BRONZE

17088471-012670-65

Exam ID: 1971723133

ACT WorkKeys®
Memo to Examinee

Report for:

Test Site:

Test Date: 02/2017

Report Date: 03/09/2017

Your WorkKeys skill report can help you understand how you did on the test(s), and how you can do better. This report tells you about your skills and gives information on how you can further develop them.

Applied Mathematics (Levels range from 3 to 7) Level: 3 Scale Score: 73

You scored at Level 3. People who score at this level can set up and solve problems with one-step mathematical operations (addition, subtraction, multiplication, or division) on whole numbers, simple fractions, decimals, or percentages. To improve your skills:

- decide which steps to perform and the order in which to perform them by reading the whole problem carefully.
- locate the information you need to solve each step of the problem, estimate your answer, and check to be sure that you do each step.
- set up and solve problems with more than one step using several whole numbers, fractions, decimals, or percentages.
- practice adding fractions with the same denominator; multiplying a mixed number by a decimal; using ratios and proportions; and calculating percentages, rates, and the average of several numbers.
- check your work to see if your answer is reasonable.

Locating Information (Levels range from 3 to 6) Level: 3 Scale Score: 72

You scored at Level 3. People who score at this level can correctly use simple workplace graphics, such as basic order forms, bar graphs, tables, and floor plans to find and/or fill in one or two pieces of information. To improve your skills:

- read straightforward workplace graphics such as standard tables, order forms, charts, line graphs, maps, and diagrams.
- find several pieces of information in these types of graphics.
- summarize and compare information and trends in a single graphic.
- summarize and compare information and trends among more than one workplace graphic, such as a bar chart and a data table showing related information.

Reading for Information (Levels range from 3 to 7) Level: 4 Scale Score: 76

You scored at Level 4. People who score at this level can apply information to situations specifically described in the reading materials. Such reading materials may contain several details or describe processes involving several steps. To improve your skills:

- read business materials that are very detailed and involve a large number of steps.
- work on understanding words or phrases that have multiple meanings or specific meanings in particular work (occupational) settings.
- apply information given in the reading materials to situations that are similar but not identical to those contained in the materials.

APPENDIX E
ACT WORKKEYS SCORE REPORT SAMPLE
SILVER

17088471-012670-83

A

Exam ID: 1948094279

ACT WorkKeys[®]
Memo to ExamineeReport for: _____
Test Site: _____Test Date: 02/2017
Report Date: 03/09/2017

Your WorkKeys skill report can help you understand how you did on the test(s), and how you can do better. This report tells you about your skills and gives information on how you can further develop them.

Applied Mathematics (Levels range from 3 to 7) Level: 5 Scale Score: 78

You scored at Level 5. People achieving this level can set up and solve problems involving multiple-step calculations on a mixture of whole numbers, fractions, decimals, or percentages when the information is presented in a logical order. To improve your skills:

- set up and solve problems that involve multiple-step calculations containing extra information or information presented out of order.
- determine what information, calculations, unit conversions, and formulas are needed to solve the problem.
- determine how to arrange the information you have in order to calculate the solution correctly.
- solve problems that involve multiple-step conversions in English and metric systems, that compare production rates and pricing schemes, and those that need two formulae or a change in the order of a formula.
- calculate simple areas or volumes of rectangular solids.
- check to see that each step in the calculation is done correctly and that you have solved the problem posed.

Locating Information (Levels range from 3 to 6) Level: 4 Scale Score: 77

You scored at Level 4. People who score at this level can use one or more straightforward workplace graphics, such as order forms, standard tables, line graphs, and uncomplicated diagrams to find several pieces of information, compare trends and main points, and/or summarize information. To improve your skills:

- read complicated workplace graphics such as detailed tables, forms, maps, and diagrams, as well as charts and graphs that are not straightforward.
- compare information and trends in these types of graphics.
- summarize information and trends within a single graphic or several graphics.
- summarize and compare information and trends using several different graphics representing related information.

Reading for Information (Levels range from 3 to 7) Level: 4 Scale Score: 78

You scored at Level 4. People who score at this level can apply information to situations specifically described in the reading materials. Such reading materials may contain several details or describe processes involving several steps. To improve your skills:

- read business materials that are very detailed and involve a large number of steps.
- work on understanding words or phrases that have multiple meanings or specific meanings in particular work (occupational) settings.
- apply information given in the reading materials to situations that are similar but not identical to those contained in the materials.

APPENDIX F
ACT WORKKEYS SCORE REPORT SAMPLE
GOLD

17088471-012670-87

Exam ID: 1950518140

 ACT WorkKeys®
 Memo to Examinee

Rid

 Report for: _____
 Test Site: _____

 Test Date: 02/2017
 Report Date: 03/09/2017

Your WorkKeys skill report can help you understand how you did on the test(s), and how you can do better. This report tells you about your skills and gives information on how you can further develop them.

Applied Mathematics (Levels range from 3 to 7) Level: 6 Scale Score: 82

You scored at Level 6. People achieving this level can set up and solve problems containing extraneous information or information presented out of logical order and involving multiple-step calculations on a mixture of whole numbers, fractions, decimals, or percentages. To improve your skills:

- apply ratios that involve a mixture of fractions and decimals, and perform multiple-step conversions that involve fractions and decimals.
- calculate multiple areas or volumes of rectangular solids, spheres, cylinders, and other complex shapes.
- check to see that each step of your calculations is correct, that you have solved the problem posed, and that your answer is reasonable.

Locating Information (Levels range from 3 to 6) Level: 5 Scale Score: 82

You scored at Level 5. People achieving this level can use one or more complicated workplace graphics, such as complex forms and tables, multivariable graphs, maps, and diagrams to compare trends and main points, and/or summarize information. To improve your skills:

- read a variety of complex workplace graphics such as very complicated tables and forms, and very detailed maps, blueprints, and diagrams, as well as charts and graphs that are difficult to understand and unfamiliar to you.
- make decisions, draw conclusions, and apply information to new situations using several related graphics.

Reading for Information (Levels range from 3 to 7) Level: 6 Scale Score: 84

You scored at Level 6. People achieving this level can understand reading materials containing difficult concepts, complicated procedures, and/or a great deal of detail about a topic, such as excerpts from straightforward regulatory and legal documents, and rental agreements. To improve your skills:

- read densely detailed materials that contain jargon and technical terms whose definitions you must determine from the contexts of materials.
- generalize from what you have read and apply your generalization to new situations.
- analyze complex policies and procedures to identify the underlying reasons for them.

We hope you find this WorkKeys information useful. If you have questions about these scores or about the WorkKeys system or skills, please contact WorkKeys (96), ACT, 2201 North Dodge Street, P. O. Box 168, Iowa City, IA 52243.

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APPENDIX G
ACT WORKKEYS SCORE REPORT SAMPLE
PLATINUM

17088471-012670-14

Exam ID: 1948132384

P
ACT WorkKeys®
Memo to Examinee

Report for: _____R

Test Date: 02/2017

Test Site: _____

Report Date: 03/09/2017

Your WorkKeys skill report can help you understand how you did on the test(s), and how you can do better. This report tells you about your skills and gives information on how you can further develop them.

Applied Mathematics (Levels range from 3 to 7) Level: 7 Scale Score: 90

You scored at Level 7. People achieving this level can set up and solve complex problems requiring extensive calculations and several conversions between systems of measurement. They can calculate percent change, set up and manipulate complex ratios and proportions, determine multiple areas or volumes of two- and three-dimensional shapes, determine the most cost effective (best economic value) of several alternatives, and locate errors in multiple-step calculations.

Your Applied Mathematics skills are at least as high as this test measures. Congratulations on your fine performance! We encourage you to use and expand upon your considerable skills in this area by learning additional mathematical procedures and by seeking out and solving a variety of challenging mathematical problems.

Locating Information (Levels range from 3 to 6) Level: 6 Scale Score: 87

You scored at Level 6. People achieving this level can understand and interpret complex workplace graphics, such as very difficult charts and graphs, and detailed tables, forms, maps, and diagrams. They can apply information from these types of graphics and draw conclusions or make decisions about new situations based on information contained in the graphics.

Your skills in Locating Information using workplace graphics are at least as high as this test measures. Congratulations on your fine performance! We encourage you to use and expand upon your considerable skills in this area by seeking out and learning from graphics in a wide variety of formats.

Reading for Information (Levels range from 3 to 7) Level: 7 Scale Score: 87

You scored at Level 7. People achieving this level can apply concepts from densely detailed passages, such as excerpts from complex regulatory and legal documents, to new situations. They can understand difficult concepts and complicated procedures containing jargon and technical terms whose definitions must be derived from context.

Your Reading for Information skills are at least as high as this test measures. Congratulations on your fine performance! We encourage you to use and expand upon your considerable skills in this area by continuing to read and learn from a wide variety of challenging reading materials.

We hope you find this WorkKeys information useful. If you have questions about these scores or about the WorkKeys system or skills, please contact WorkKeys (96), ACT, 2201 North Dodge Street, P. O. Box 168, Iowa City, IA 52243.

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If you have completed three assessments, Applied Mathematics, Reading for Information and Locating Information, and received at least a level score of 3 for each test, you may qualify for a National Career Readiness Certificate. Go to www.MyWorkKeys.com to access your scores. An individual can obtain a certificate, and share testing information with potential employers at this site.

APPENDIX H

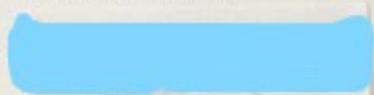
ACT NATIONAL CAREER READINESS CERTIFICATE SAMPLE

2.

ACT[®] National Career Readiness Certificate™



ACT certifies that



has earned the ACT National Career Readiness Certificate™ at the **Gold** level.

Registered Certificate # FT386547BHMJ
Issue Date: March 20, 2015

