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Filling the Middle Skills Gap: Increasing Silver-Level Career Readiness Certificate Attainment in Mississippi

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FILLING THE MIDDLE SKILLS GAP: INCREASING SILVER-LEVEL CAREER READINESS CERTIFICATE ATTAINMENT IN MISSISSIPPI

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APPROVAL OF DISSERTATION

We, the faculty supervising the work of **Steven Wayne Pickering**, affirm that the dissertation, *Filling the Middle Skills Gap: Increasing Silver-Level Career Readiness Certificate Attainment in Mississippi*, meets the high academic standards for original scholarship and creative work established by the EdD Program in **Leadership Studies** and the College of Education and Professional Development. This work also conforms to the editorial standards of our discipline and the Graduate College of Marshall University. With our signatures, we approve the manuscript for publication.

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DEDICATION

This dissertation is dedicated to my wife, Jeanine. Without her encouragement, support and unwavering dedication, I would not have been able to complete this journey. I would also like acknowledge my daughters, Avery, Ellie and Emma. This journey was as much about you as anything else, to demonstrate that you can accomplish anything when you dedicate yourself to that endeavor. And finally, to my parents and grandparents, thank you for instilling in me the joy of curiosity.

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ABSTRACT

The purpose of this study is to examine the effectiveness of Smart Start Career Pathway as a method of supporting student success on the ACT WorkKeys assessment. Since the 1970s, the skills gap has been a national concern as workforce demand has outpaced supply. As a means of connecting individuals to the workforce, Mississippi adopted ACT WorkKeys and the National Career Ready Certificate (NCRC). As a result, programs such as Smart Start have been developed and deployed to support success in achievement in ACT WorkKeys and NCRC.

This causal comparative study was conducted utilizing a convenience sample of 1,001 participants from a program located in central Mississippi. The participant level data consisted of existing ACT WorkKeys scores and NCRC credential attainment. The study investigated if differences exist in student performance on ACT WorkKeys when participating in Smart Start Career Pathway. Specifically, the relationship in performance on ACT WorkKeys when a participant completes the Smart Start Career Pathway career-ready curriculum. Additionally, the study assessed if there is any influence between gender and race. The study did not find significant difference in frequencies of participant bronze, silver, gold and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in the Smart Start training compared to those who did not participate in the Smart Start training or significance as it relates to the influence, if any, of gender and race status on overall test scores of ACT WorkKeys National Career Readiness Assessment for those who participated in the Smart Start training compared to those who did not participate in the Smart Start training.

CHAPTER 1

INTRODUCTION

Across the nation, a key concern in the workforce is the growing gap between the supply and demand of workers with specialized skills. The United States Department of Labor estimates more than 6.5 million jobs are unfilled because employers are unable to find workers with necessary skills. The crux of the issue is primarily attributed to inadequate worker training and a lack of soft-skills (Ezrati, 2018). The United States Department of Labor, Bureau of Labor (2019) estimates there are 7.1 million open jobs in the United States. The number of open jobs has changed very little over the last year (Bartash, 2018). Middle-skill jobs have attracted a great deal of attention in recent years as an area of opportunity. These jobs require more than a high school education but less than a bachelor's degree, which includes a 2-year associate's degree, certification, occupational licensing, or apprenticeships.

It is estimated that 54% of all available jobs in the United States are middle-skill jobs (Adult education, 2019). In Mississippi there are over 52,000 open jobs (Mississippi Works, 2018). As many as 56% of those jobs are middle skill jobs (Middle-skill job fact sheet, 2017). The Mississippi Department of Employment Security (2018b) has prioritized meeting the needs of Mississippi's workforce supply and demand issues. It is clear that filling these openings is the key to the long-term economic viability of the state and creating economic growth for the numerous low-to-moderate income families in the state.

Background

Earnest deployment of career credentialling has its origins in the TRIO programs of the 1960s. As a response to support non-college ready high school students, the program provided academic, social, and financial supports for first-generation, low-income college students. TRIO spurred the growth of workforce programs on community college campuses and highlighted the need to define and connect the relationships between foundational skills for success in school and work, key academic subjects, occupations and career pathways, and career clusters (Chaney, et. al., 1997). In the 1990s, the focus shifted to rapid workforce engagement as welfare policy shifted to include welfare time limits and financial sanctions for failure to comply with program requirements. These policy shifts resulted in thousands of low-skilled unmarried parents, generally unprepared to enter the workforce, into low-wage, limited mobility jobs. In the new millennia, post-secondary education centered on credentialling has been fueled by positive evaluation findings and promising instructional strategies. The career pathway model, in particular, has gained support in both policy and practitioner circles as a framework for connecting low-skilled and non-traditional learner populations, who are often low wage earners, to the workforce (Fein, 2012).

Data suggests that workers who are academically unprepared, lacking at least a high school diploma or equivalency, are often confronted with barriers to employment. Within these studies, females and individuals of color are disproportionately represented within the demographics of the population. These individuals' job prospects are limited, leading then to employment in low-wage, low-quality jobs that are at-risk for automation and lack opportunities for advancement or promotion (Jimenez, 2020). Meanwhile, there

continues to be a shortage of workers in the middle-skills job space, those jobs that do not require a college degree but do require some training after high school (Gross & Marcus, 2018). Career and technical education programs have focused acutely on developing a system to provide training and education that prepares individuals for these high-skill, high-demand, high-wage jobs. The key is ensuring that there are meaningful pathways that begin with a foundation of quality training that connects to a high-quality job with opportunity for growth.

Middle-skill jobs have been purported as the gateway to financial stability and economic mobility because the jobs pay a living wage, generally defined as a wage greater than $15 per hour (Lamback, Gerwin, and Restuccia, 2018). These jobs require education greater than a high school diploma, but less than a bachelor's degree (Holzer & Lerman, 2007). Adult and career technical education providers have transitioned the focus from entry to middle-skill jobs to career pathway development connected to middle-skill jobs that advancement opportunities. The key difference being the focus on development of skills that facilitate the more long-term focus of a career as opposed to the short-term focus of entering the workforce (Hendra, 2017). As this focus has changed, so has the definition of "career pathway" within the domain of the literature related to this topic. The United States Department of Health and Human Services defines it as providing "post-secondary education and training that is organized as a series of manageable steps leading to successively higher credentials and employment opportunities in growing occupations." (Fein, 2012). The shift from job entry to career pathways have influenced the credentialing efforts in adult and career technical education.

Career pathways have come to encompass the collective set of strategies, from basic job skills required to employment to career advancement skills necessary for advancement. The initial step in a career pathway program provides entry-level, industry-recognized credentials so an individual can obtain a job in their chosen occupation as quickly as possible (Eyster & Gebrekristos, 2018). These jobs typically have low wages or have few benefits and may require more education and training to earn promotion to a position that has a family-sustaining wage. As such, career pathways incorporate more advanced steps to support an individual's potential for promotion through additional postsecondary education and training tied to a particular industry (Center for law and social policy (CLASP), 2016). As the focus has shifted from job entry to career development, policy focus has followed.

At the federal level, the Workforce Innovation and Opportunity Act of 2014 and the reauthorized Carl D. Perkins Career and Technical Education Act of 2006, encourage career pathways as an important workforce development strategy for building American workers' skills and credentials and meeting employer demand. The Workforce Investment and Opportunity Act of 2014 (WIOA) mandates adult education and literacy activities under Title II of WIOA. The Carl D. Perkins Career and Technical Education Act of 2016 is the main federal law supporting the development of career and technical skills among students in secondary and postsecondary education. The Perkins Act aims to improve academic outcomes and preparedness for higher education or the labor market among students enrolled in career and technical education (Granovskiy, 2016). Stimulated by this support at the federal level, career pathways have spread across the country as a strategy to help those who lack skills necessary to access entry

level employment develop skills, earn credentials, and find and retain employment in high-demand occupations (Eyster, et al., 2018).

Mississippi identified the career credential, also referred to locally as stackable credentials, as a key component in bridging the gap between individuals seeking employment but lacking the necessary skills and the surplus of available, hard to fill middle-skill jobs. The premise of this approach is to meet the needs of the workforce while simultaneously meeting the needs of those seeking an entryway to living-wage employment. Specifically, the career credential in Mississippi prioritizes engagement with low-income and first-generation students, a group under-represented in the workforce, in acquiring the entry-level skills that are connected to a career pathway or career ladder.

The intent of Mississippi's career pathway effort was to integrate career development and employment and training activities for not only college readiness and high school equivalency, but also career readiness (Mississippi Community College Board, 2017). In Mississippi, the Mississippi WIOA Combined State Plan, developed by the state's Workforce Investment Board core partners at the direction of the Governor, sets forth the implementation of WIOA's mandate in the state. The Mississippi WIOA Combined State Plan identifies the various synchronized pathways to career readiness, including the Work-Ready Pathway. The Work-Ready Pathway is for individuals who possess both basic skills and a level of academic and/or technical skill that identify them as ready to enter the workforce (Mississippi Department of Employment Security, 2018a).

Mississippi's State Workforce Investment Board selected the ACT WorkKeys assessment as the tool for addressing the needs and concerns of business and industry across the state. WorkKeys was identified as the first step in closing the skills gap and improving the quality of potential employees-for-hire available in the Mississippi workforce pipeline (Mississippi Department of Employment Security, 2018a). The WorkKeys assessment results in a National Career Readiness Certificate (NCRC), which demonstrates an individual has the skills necessary for particular jobs based on data collected by ACT, Inc. (ACT, Inc., 2019a). The nationally standardized WorkKeys assessment measures workers' skills against jobs profiled by ACT, Inc., indicating the potential level of proficiency of an individual in basic functional and productivity areas including math, reading for information, and locating information.

Statement of the Problem

In Mississippi, a total of 119,115 ACT WorkKeys NCRC certificate levels of platinum, gold, silver, or bronze, have been issued between January 2006 and September 2019 (Mississippi five-year strategic state-integrated workforce plan, 2012). In Mississippi, a silver level certificate is considered the minimum level for work-readiness. Bronze level represents 30.8% of all NCRC credentials attained (Mississippi, 2019). In Hinds County, where potential participants for the study reside, Mississippi Bronze level attainment represents 41.4% of all NCRC credentials attained (Hinds County, 2019). Only five percent of Mississippi residents between the ages of 25 and 64 hold an industry-recognized certificate. The state's overall postsecondary attainment rate is 36.4 %, suggesting credential attainment is key to unlocking Mississippi's workforce potential (Lumina Foundation, 2016).

In 2018, a community college in central Mississippi initiated the Smart Start Career Pathway program as a tool to increase WorkKeys NCRC attainment by individuals in the Work Ready Pathway. Smart Start Career Pathway was designed to support participant learning in math, reading for information, and locating information sections of the WorkKeys assessment. Smart Start Career Pathway included seven core areas, including life management to support workplace success, job skills, interpersonal communication, career discovery, self-discovery, job search and skill remediation. Further investigation is required to examine if differences exist in student performance on ACT WorkKeys when participating in Smart Start Career Pathway. Specifically, is there a relationship in performance on ACT WorkKeys when a participant completes the Smart Start Career Pathway career-ready curriculum and is there any influence between gender and race.

Purpose of the Study

The purpose of this study is to examine the effectiveness of Smart Start Career Pathway as a method of supporting student success on the ACT WorkKeys assessment. In 2019, the United States Department of Labor reported over 7.3 million jobs were unfilled (United States Department of Labor, Bureau of Labor Statistics, 2019). During the same period, Mississippi reported 52,187 unfilled jobs in the state (Mullan, 2018). According to Mississippi's Department of Employment Security, over 65% of those openings being middle-skill jobs. ACT WorkKeys has been widely adopted in Mississippi as an indicator of work readiness as a result of the Mississippi State Workforce Investment Board's adoption of the credential.

The study will compare ACT WorkKeys National Career Ready Certificate data of students who complete the Smart Start Career Pathway career-ready curriculum and those who do not complete the Smart Start Career Pathway career-ready curriculum. The intent is to determine whether there is a relationship between a participant's completing the Smart Start Career Pathway career-ready curriculum and the participant's scoring on the ACT WorkKeys National Career Ready Certificate. This study will also examine potential relationships between race and gender and overall achievement on the ACT WorkKeys National Career Ready Certificate.

Research Questions

1. Is there a significant difference in the frequencies of bronze, silver, gold, and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in Smart Start training compared to those who did not participate in Smart Start training?
2. Is there a significant difference in the ACT WorkKeys National Career Readiness Assessment overall scores, if any, of gender and race for those who participated in Smart Start training compared to those who did not participate in the Smart Start training?

SIGNIFICANCE OF THE STUDY

Currently, there are 52,000 open jobs in Mississippi (Mississippi Works, 2018). As many as 56% of those jobs are middle-skill jobs (Middle-Skill Job Fact Sheet, 2017). The Mississippi Department of Employment Security (MDES) has prioritized meeting the needs of Mississippi's workforce supply and demand issues (MDES, 2018b). It is clear that filling these openings is the key to the long-term economic viability of the state

and creating economic growth for the numerous low-to-moderate income families in the state.

ACT WorkKeys and the National Career Ready Certificate (NCRC) have been adopted in Mississippi as the measure of work and career readiness. The purpose of Smart Start Career Pathway is to support achievement on the ACT WorkKeys and NCRC. Information from this study can be used to support utilization of Smart Start Career Pathway as a tool to assist in attainment of ACT WorkKeys NCRC at the platinum, gold, silver, or bronze level. This study could also inform policymakers on the subject of whether Smart Start Career Pathway is supporting student achievement.

DEFINITION OF TERMS

The following definitions will provide insight for the study.

WorkKeys – The ACT WorkKeys assessments measure foundational skills required for job performance and success in the workplace. Individuals who successfully complete the Applied Math, Graphic Literacy, and Workplace Documents sections of ACT WorkKeys earn the WorkKeys National Career Readiness Certificate (ACT, Inc., 2014), a credential for students and job seekers seeking to verify foundational workplace skills (ACT, Inc.).

WorkKeys National Career Ready Certificate (NCRC) – A credential issued based upon the WorkKeys assessment that substantiates an individual's basic workplace skills for employers. An individual's score of bronze, silver, gold, or platinum is based upon responses in three areas: reading

for information, applied mathematics, and locating information (ACT, Inc., 2014).

Platinum Level NCRC – An individual possesses core employability skills for 99% of jobs profiled by ACT, Inc. (ACT. Inc., 2014).

Gold Level NCRC – An individual possesses core employability skills for 93% of jobs profiled by ACT, Inc. (ACT. Inc., 2014).

Silver Level NCRC – An individual possesses core employability skills for approximately 65% of jobs profiled by ACT, Inc. (ACT, Inc., 2014).

Bronze Level NCRC – An individual possesses core employability skills for 17% of jobs profiled by ACT, Inc. (ACT. Inc., 2014).

Smart Start Career Pathway – A curriculum designed to support increased attainment on the ACT WorkKeys National Career Ready Certificate. Smart Start Career Pathway includes seven core areas, including life management to support workplace success, job skills, interpersonal communication, career discovery, self-discovery, job search, and skill remediation.

LIMITATIONS OF THE STUDY

The proposed study involves only participants from a program located in Mississippi, where program participants resided in three Mississippi counties. Given the geographic location of the residents, comparison group students will be selected from a single community college in one geographic location in Mississippi serving the same counties. As such the study may not be generalizable to other geographic populations. The population of the study will have varying degrees of academic ability due to

variances in background, IQ level, reading and comprehension levels. This study will use existing participant data of ACT WorkKeys scores and NCRC credential attainment. Additionally, this study will be limited to participants seeking an NCRC to support employment.

The selection of a causal comparative study presents limitations as well. Causal comparative studies occur ex post facto, limiting the researcher's ability to control or manipulate variables. Additionally, the selection of a causal comparative study prevents the researcher from constructing random samples for experimental and control groups (Brewer & Kuhn, 2010).

METHODS

A causal-comparative research design is proposed to determine the impact of Smart Start Career Pathway on ACT WorkKeys National Career Ready Certificate level attainment. The causal-comparative design was chosen to find relationships between independent and dependent variables after an action or event has occurred. In this case, the goal of the research is to determine whether the independent variable, Smart Start Career Pathway completion, affected the outcome or dependent variable, ACT WorkKeys National Career Ready Certificate level attainment, by comparing Basic Workplace Essential completers that take the ACT WorkKeys National Career Ready Certificate assessment to a control group of individuals that take ACT WorkKeys National Career Ready Certificate assessment, but have not completed Smart Start Career Pathway. Data for completers will be drawn from a local community college in central Mississippi that administers Smart Start Career Pathway. Comparison group data of individuals that have not been exposed to Smart Start Career Pathway but have

completed the ACT WorkKeys National Career Ready Certificate assessment will be drawn from a community college located in central Mississippi. Additional comparisons of performance based on selected demographics (i.e., race and gender) are proposed as well.

SUMMARY

Chapter I provided background information on issues pertaining to pre-employment assessments and the establishment of the ACT WorkKeys system, the National Career Readiness Certificate, and the subsequent development and implementation of the Career Readiness Pathway program. Basic information regarding employability and career connectivity was introduced along with historical perspective of career pathway credentialing.

The statement of the problem, purpose of the study, and research questions were identified with focus on attainment of the silver-level NCRC. Justification for identification of the population and general information regarding research methodology were provided. Significance, innovative aspects, and anticipated limitations of the study were defined. Key terms relevant to the study were also identified and defined within the chapter.

CHAPTER 2

REVIEW OF LITERATURE

The current research reflects three areas of interest related to this study: (1) the skills gap; (2) low to moderate income workforce attainment (3) ACT WorkKeys; and (4) numerous dissertations related to WorkKeys. Research in each of the four areas are examined in the following review of the literature.

The Skills Gap

The skills gap has been a concern in the United States since the 1970s as the demands of the workforce have changed due to innovation, technology, and consumerism. Much of the early focus on addressing the skills gap was placed on the role of education in meeting the demands of the workforce and the role of skills assessment in aligning the education process to the intended outcomes (Kochan, Finegold, & Osterman, 2012). Hurrell (2016) suggests that the skills gap is a complex confluence of family, government, education, and the individual. Almost 40 years later, the skills gap continues to drive the narrative around education policy and labor response development (Cappelli, 2015).

In 1992, Secretary of Labor Lynn Martin formed the Secretary's Commission on Achieving Necessary Skills, commonly referred to as SCANS, to examine the intersection of workforce demands and a sufficient number of potential employees that could meet those demands (McKay, 2019). The Commission was directed to advise the Secretary on the level of skills required to enter employment. Specifically, the Commission was to define the skills needed for employment, propose levels of proficiency, identify effective ways to assess proficiency, and develop a dissemination

strategy (The Secretary's Commission on Achieving Skills, 1991). The Commission identified five core competencies and three foundation skills that everyone in the workforce must possess, collectively known as the SCANS skills.

SCANS was widely implemented in response to the skills gap following its publication in 1991 (Beerman & Kowalski, 1998; Harkins, 2001; Packer, 2001). It heavily influenced education policy (Blalock, Streiter, & Hughes, 2006), and significantly affected the foundation of the workforce readiness response in the United States (Whetzel, 1992). Richens and McLain (2000) conducted a qualitative study to assess employer perceptions of need related to skills available in the employee marketplace based on SCANS, concluding that the deficit was basically the same after a decade. Employers still decry the lack of skilled workers, on both soft skills and technical skills, that enter the workforce, suggesting the skills gap remains a significant barrier (Tulgan, 2015). Recent reports suggest that even as technical skill programs have provided greater supply, employers continue to struggle finding employees with the desired skills (The Economist, 2014; Restuccia, Taska, & Bittle, 2018).

The trouble with the skills gap is that the deficiencies are numerous and driven by a complex intersection of variables that create confusion around what is driving the skills gap and which priorities are most pressing. Many factors contribute to skills gaps, including the pace of technological change and a tight job market, which restrict a company's ability to attract new talent. In light of these factors, a growing number of employers believe their companies are experiencing a skills gap. (Wiley Education & Future Workplace, 2019). More recently, the skills gap has been defined as cumulative, the result of many different gaps across different occupations (Restuccia, Taska, &

Bittle, 2018). The core of the issue has not changed greatly since SCANS was first published in 1991; a perceived lack of alignment between skills needed in the workforce and skills available in the applicant pool continues to persist. Cappelli (2015), however, suggests that there is little evidence to support the claim that there is a strong correlation between the employer complaints about a skills shortage and the skills available. He posits that the skills gap is more a factor of employer-driven perspective related to labor-cost factors, a failure of employers to communicate skills needed to education, and a failure of education to entice students into skilled-labor work (Cappelli, 2015).

The confluence of education and workforce is a central theme in the skills gap discussion. In fact, it was one of the major catalysts for the initiation of the SCANS commission (Secretary's Commission on Achieving Skills, 1991). Citing the 2010 Critical Skills Survey by the American Management Association, Martz, Hughes and Braun (2016) found that many employers were seeking candidates that were innovative, creative and problem-solvers. The study concludes that education must move to incorporate opportunities for learning in these areas as early as possible (Martz, Hughes & Braun, 2016). Grunewald (2019) suggests that workforce-centered learning should occur in early childhood settings to provide a foundation for growth of desired skills. Meyer (2014) suggests that the change in mindset from "college or vocation" to "postsecondary and career" is the catalyst for merging the interests of education and workforce preparation. Integration of the two pathways of career-focused learning and academic learning shows promise in the form of positive student outcomes in

graduation rates, college entrance, completion rates, and increased income (Meyer, 2014).

Low-to-Moderate Workforce Attainment

The Survey of Adult Skills, produced by the Programme for the International Assessment of Adult Competencies (PIAAC), was designed to measure adults' proficiency in several key information-processing skills, namely literacy, numeracy and problem-solving in technology-rich environments. The PIAAC found that 36 million working-age Americans have limited skills in key foundational areas of reading, math, and English (OECD, 2016). The National Skills Coalition supports this conclusion, estimating that 44% of workers in the U.S. job market have the requisite skills needed to fill the available middle skills jobs (ACT, Inc., 2019b). Low-income youth and adults have traditionally had difficulty getting jobs in the middle skills sectors because they lack the needed education, basic skills, training, or occupational experiences (Holzer & Lerman, 2007; Martinson, 2010). Ironically, employers report difficulties in attracting and retaining skilled workers, even when a four-year college diploma isn't a requirement (Holzer, 2007). Tyson (2012) affirms the mismatch between available and needed skills, but suggests the effects of the Great Recession of 2007 to 2009 affected less-educated, lower-skilled workers, creating polarization within the job market. Connecting low-income workers to the workforce continues to be a priority for the Federal government as existing strategies are assessed and revised, or promising practices promote entry into the middle skills market (Heinrich, 2018).

In the last two decades, a number of strategies have emerged with the intent of bridging the middle skills gap. Hamilton (2001) identifies programs that focus on

expediting employment and placement showed greater results than training programs, which tend to require longer-term engagements. Prince, King and Oldmixon (2017) identify sectoral strategies in the workforce as a best practice that should be replicated, pointing out that states that work to identify skills gaps and create pathways for potential employees to fill in-demand jobs have been successful. Low-skill individuals need education and job training to obtain better jobs. Many suggest that training which leads to recognized credentials aligned with the local labor market is an effective means of aligning job seekers with employers (Holzer & Martinson, 2005, Jacobson & Mokher, 2009). Individuals that earn credentials experience significant earnings gains after four years of employment (Heinrich, Mueser, Trsoke, Jeon, & Kajvecioglu, 2013). More recently, two-generation approaches to poverty alleviation have reinforced many of the findings of previous research. Two-generation efforts have expanded to include “whole-family” approaches to poverty, which include the key tenets of skills development, credentialing, coaching and skills matching (Sommer, et al, 2018).

ACT WorkKeys

The main objective of the ACT WorkKeys is to 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). In 2006, ACT began issuing the ACT National Career Ready Certificate as a portable, evidence-based credential certifying an individual possesses essential foundational skills needed in the workplace (Langenfeld, 2014). Individuals that successfully complete the WorkKeys assessments in applied math, reading for information, and locating information earn the WorkKeys National Career Readiness Certificate (Mattern & Hanson, 2015, p. 1).

The most recent data available, states that over 20 million total ACT WorkKeys assessments have been administered (Langenfeld, 2014). Through job profiling, ACT, Inc. has aligned ACT WorkKeys scores with job skills of over 19,000 jobs (ACT WorkKeys Job Profiling & WorkKeys Estimator, 2019). ACT connects employers to potential candidates by demonstrating the alignment between the foundational skills of potential job candidates and the available jobs in the market (Restuccia, Taska, & Bittle, 2018). It is recommended that this test not be used solely as a qualifying characteristic of a potential candidate, however. LeFebvre (2016) suggests that other means, such as interviews and additional assessments, should be used in the selection process.

In Mississippi, the community colleges oversee the Mississippi Career Readiness Certificate (CRC), which determines a job seeker's ability in three main skills: reading for information, locating information, and doing applied math. ACT, Inc., through its WorkKeys Occupational Profile Database, selected these skills as important for more than 85% of jobs across all industries (Mississippi Five-year Strategic State Integrated Workforce Plan, 2012). Through the CRC, employers can identify individuals best suited for their available jobs. Each individual has the opportunity to earn one of four levels of Career Readiness Certification: bronze, silver, gold or platinum. Each certification tells what percentage of jobs in the ACT, Inc. database an individual is qualified to do (ACT , Inc., 2018). ACT, Inc. research states that a silver level certificate worker has the necessary skills for 65 percent of jobs, while a platinum level certificate worker has the skills for 99 percent of jobs (ACT, 2014). In Mississippi, the State Workforce Investment Board (SWIB) recognizes individuals as career ready only if they score platinum, gold, or silver.

Mississippi's State Workforce Investment Board selected the WorkKeys assessment as the tool for addressing the needs and concerns of business and industry across the state. WorkKeys was identified as the first step in closing the skills gap and improving the quality of potential employees available in the Mississippi workforce pipeline (Mississippi Department of Employment Security, 2018a). SWIB has also elected to participate in the ACT Work Ready Community initiative as a means of increasing the number of employers that recognize the ACT National Career Ready Certificate (Mississippi Department of Employment Security, 2018a). According to an ACT report, students who earn a National Career Ready Certificate are more likely to receive higher annual wages and increases their likelihood of attaining and retaining employment (LeFebvre, 2016).

The ACT WorkKeys National Career Ready Certificate provides value to both the potential employee and employers. ACT, Inc. research demonstrates that individuals earning a gold, silver or bronze ACT NCRC certification have an increased earning potential of $7,476, compared to $2,196 for individuals with an associate degree (LeFebvre, 2016). In addition to greater earning potential, individuals earning gold, silver or bronze also have increased likelihood of attaining employment and remaining employed (ACT, Inc., 2017a). The NCRC is attributed to 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, a 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 (ACT, Inc., 2017b).

Dissertations Related to ACT WorkKeys

As ACT WorkKeys has experienced expanded utilization, several dissertation research studies have been completed. Belton (2000) compared groups of technical completers that completed ACT WorkKeys at a Mississippi community college. His work focused on comparison of the ACT WorkKeys scores of two groups: a group of one-year technical completers and a second group of two-year technical completers. He found that, overall, the two-year completers scored higher than the 1 one-year technical completers on the ACT WorkKeys assessments.

In 2002, Buchanan examined the ACT WorkKeys applied mathematics, locating information, and reading for information assessments of a sample of incarcerated individuals at a Texas jail, comparing them to participant results from the Test of Adult Basic Education (TABE). Buchanan's study assessed the variables of age and employment status prior to incarceration in relationship to performance on the two assessments. Results demonstrated that WorkKeys assessment results were higher for older individuals and for those who were employed prior to incarceration.

Barnes (2002) conducted research specific to the WorkKeys assessments on reading for information and applied mathematics. His work was focused on the statistical differences in the two assessments based on race, gender, and overall educational score levels. The study included assessments for over 3,000 high school, technical college, 2 two-year college students and incumbent workers. Barnes (2002) concluded there were no significant differences in the results between genders. There were, however, significant differences on the reading for information and applied

mathematics assessments when comparing African-American and Caucasian test takers.

A study of ACT WorkKeys was conducted by Bowles (2004) that assessed the potential of ACT WorkKeys as a tool for placement into college level reading, mathematics, and English courses. Bowles compared the ACT WorkKeys results with the existing performance frameworks of the Assessment of Scholastic Skills Through Education Testing (ASSET) exam, an exam commonly used for academic placement. His findings were not strong enough to support the use of ACT WorkKeys as a tool for placement into standard higher education academic courses.

In 2006, Hendrick reviewed ACT WorkKeys as a pre-employment assessment tool to increase employee retention. His study included a quantitative analysis of 757 applicants' test scores with corresponding qualitative interviews with 12 companies. Hendrick's findings indicated that companies using WorkKeys as a pre-employment assessment were pleased with the quality of employees they were receiving after testing, and the retention rates of these employees was higher those of employees who had not been pre-screened.

Similar to Barnes' study (2002), Stone (2007) examined differences on ACT WorkKeys assessments of reading for information, locating information, and applied mathematics based on gender, age, and race. The study focused on one Alabama community college that provided 6,962 records from technical program students and incumbent workers. Stone found that the older test takers, age 40 and over, scored significantly lower than their younger counterparts on the applied mathematics assessment. The same findings were found when comparing older and younger test

takers' scores on the reading for information or locating information exams. Further, Stone's work found significant differences related to scores with regard to race. Caucasians scored higher than African-Americans on all three ACT WorkKeys assessments. Stone found that females scored lower than males, with significant differences noted on the applied mathematics assessment.

Lindon (2010) examined the use of ACT WorkKeys as a measure of success for community and technical college students. The purpose of the research study was to examine ACT WorkKeys assessment level scores to determine whether relationships existed between ACT WorkKeys scores and classroom grades, and between WorkKeys scores and cumulative grade point averages. The researcher used a quantitative research design and utilized correlational statistics to determine the depth and extent of relationships between the listed variables. Lindon collected data including WorkKeys scores, course grades, and cumulative grade point averages from the years of 2005 through 2008 from seven different community and technical colleges. Lindon's findings showed there were weak relationships between WorkKeys assessment scores and grades of C or better in college level reading and mathematics courses. Findings also indicated weak relationships between WorkKeys assessment scores in reading for information and applied mathematics and cumulative grade point averages.

CHAPTER 3

METHODS

This chapter will provide details about the design for the study as outlined in the research questions, hypothesis and data analysis. Additionally, details related to the participants, instruments, and variables of the study will be addressed. A synopsis of the research design will be described to provide clarity to the methods utilized in the study. This study will determine if there is a difference in attainment level of students enrolled in Smart Start, a program designed to support level attainment on the ACT WorkKeys National Career Readiness Certificate (NCRC), versus individuals that do not participate in Smart Start. Level attainment was measured by the certificate awarded upon completion of the NCRC. The data will determine if there are differences in performance and attainment based on the instructional support offered through Smart Start. This study will also examine the impact of the independent variable, the Smart Start training course, on the dependent variables. This research is important as the findings have implications for providing academic support to individuals seeking to complete the NCRC in support of work-related goals as outlined in the Mississippi State Workforce Investment Board plan and the Mississippi Community College Work-Ready Community goals and standards.

RESEARCH DESIGN

This quantitative study will use a causal comparative research design approach due to the types of variables to be measured. Causal comparative research design is used in research in which the goal is “to determine whether the independent variable affected the outcome, or dependent variable, by comparing two or more groups of

individuals" (Salkind, 2010, p. 125). The data used in the study was supplied by the participating community college and was extracted from its student records database in September 2020. The data pulled from the database include:

- ACT WorkKeys National Career Readiness Assessment certificate attainment level earned in 2017/2018, 2018/2019 and 2019/2020,
- Smart Start enrollment status,
- Race, and
- Gender.

The students chosen for this study were those who entered the Smart Start program in the 2017-2018, 2018-2019 and 2019-2020 program years. These variables may help identify if participation in the Smart Start program supports success in certificate attainment on the ACT WorkKey National Career Readiness Certificate in support of Mississippi's work-ready communities.

RESEARCH QUESTIONS

The purpose of this study is to determine if participants enrolled in the Smart Start curriculum have the same level of attainment success as compared to those participants that do not participate in the Smart Start program.

RQ1: Is there a significant difference in the frequencies of bronze, silver, gold, and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in Smart Start training compared to those who did not participate in Smart Start training?

RQ2: Is there a significant difference in the ACT WorkKeys National Career Readiness Assessment overall scores, if any, of gender and race

for those who participated in Smart Start training compared to those who did not participate in the Smart Start training?

PARTICIPANTS AND SETTING

The participants for the study will be students located at a community college in central Mississippi for each program year from 2017 – 2020. The institution is a public community college located in a metropolitan area serving multiple counties in the surrounding area. The population will be students participating in the Adult Basic Education program.

A purposeful sampling approach will be used to gather data for this study. Data on the WorkKeys assessment scores and National Career Ready Certificate level attainment from students that have completed the Smart Start Career Pathway program will be collected, as well as selected demographics (i.e., gender and race). Data will be collected from a comparison group of students that have not completed Smart Start Career Pathway (n_1=224). Data for Smart Start Career Pathway completers (n_2=777) will be gathered from a community college located in central Mississippi that provides the program. Comparison group data will be collected from the same community college located in central Mississippi that provides WorkKeys assessments and National Career Ready Certificate credentials.

The sample of students will be collected from the community college database which contains information collected from students that have completed enrollment paperwork for admission to the community college's Adult Basic Education program. The application will identify the students' demographic data. Additionally, data will be collected from the community college data reporting system to identify students for each

of the comparison groups of completing Smart Start or not completing Smart Start prior to completing the ACT WorkKeys National Career Readiness Assessment.

For the purpose of this study, the two groups that will be addressed in the study are those students that complete Smart Start prior to attempting the ACT WorkKeys National Career Readiness Assessment and those students that do not complete Smart Start prior to attempting the ACT WorkKeys National Career Readiness Assessment. Separation of the two groups is vitally important to the independent variable of completing Smart Start. In this study, the independent variable was participation in the Smart Start training course. The dependent variable was student performance on the ACT WorkKeys National Career Readiness Assessment. The causal comparative design was appropriate for the study given the independent variables, enrollment status, and certificate attainment have already occurred (Salkind, 2010).

A convenience sample was utilized for this study. Participants for the study were selected based on participation in the ACT WorkKeys National Career Readiness Certificate assessment. This resulted in a sample size of (n = 1001):

- Participants completed the ACT WorkKeys National Career Readiness Assessment,
- Participants either participated in the Smart Start program prior to competing the NCRC assessment or did not, and
- Participants completed the NCRC assessment in the 2017-2018, 2018-2019 or 2019-2020 program year.

The sample resulted in the following characteristics:

- For FY 17/18, 201 completed the NCRC assessment. Of the 209, 159 students participated in the Smart Start program,
- For FY 18/19, 443 completed the NCRC assessment. Of the 443, 338 students participated in the Smart Start program, and
- For FY 19/20, 349 completed the NCRC assessment. Of the 349, 280 students participated in the Smart Start program.

The sample consisted of 57% female (*n* = 567) participants and 43% male (*n* = 434). Table 2 identifies the number and percentage of participants based on race. The study sample included 67% African-American, 29% Caucasian, and 3% Other. The data collected identifies other as Asian, Pacific Islander, Hispanic, Native American or 2 or more races selected.

INSTRUMENTATION

Data collected from ACT WorkKeys assessment scores; including overall and section scores for Applied Mathematics, Locating Information, and Reading for Information, will be utilized. These ACT WorkKeys sections are required in order to receive the National Career Readiness Certificate (NCRC). The combined scores from each section are subsequently utilized to determine the NCRC certificate attainment level. Participants may achieve a score between 3-7 on reading for information and applied mathematics sections of the assessment and 3-6 on the locating information section of the assessment.

The National Career Readiness Certificate (NCRC) is an assessment-based credential issued at four levels: platinum, gold, silver, and bronze. It measures and certifies the essential work skills needed for success in jobs across industries and

occupations. The certificate serves as verification of skills proficiency in the areas of problem solving, critical thinking, reading and using work-related text, applying information from workplace documents to solve problems; applying mathematical reasoning to work-related problems; setting up and performing work-related mathematical calculations; locating, synthesizing, and applying information that is presented graphically; and comparing, summarizing, and analyzing information presented in multiple related graphics (ACT, Inc., 2014).

The Mississippi Community College Board Office of Adult Education has primary responsibility for implementation of the Mississippi Works Smart Start Pathway Model through Smart Start Classes. The Smart Start pathway is designed around three components: Basic Skills, (reading, writing, math); Career Awareness, (interviewing, job search, resume writing, etc.); and Necessary Skills (communication, work ethic, team building, etc.). The Smart Start pathway is intended to promote the foundational skills needed for careers, learn and practice good work habits and develop effective communication skills necessary for successful employment. Students learn how to become prepared to learn new skills for future careers within the workforce sector, identifying the career components that are necessary for middle-skill employment. Smart Start pathway participants also complete the WorkKeys assessments for Applied Math, Reading for Information and Workplace Documents (Mississippi Community College Board, 2017).

DATA COLLECTION

Data was collected from the local community college located in central Mississippi. ACT WorkKeys assessment scores in Applied Mathematics, Locating

Information, and Graphic Literacy, along with Smart Start pathway participation, were obtained for participants from the 2017-2018, 2018-2019, and 2019-2020 program years. Data on National Career Readiness Certificate attainment level were collected, including the individual ACT WorkKeys scores in Applied Mathematics, Locating Information, and Graphic Literacy, as well as the cumulative scores used to determine the NCRC certificate level attainment for each participant. The data used in the study was provided by the community college's proprietary reporting database. The data pulled include age, gender, race, ACT WorkKeys score and NCRC level attainment. The participants chosen for this study were those that completed the ACT WorkKeys assessment during the 2017-2018, 2018-2019 and 2019-2020 program years.

DATA ANALYSIS

The data analysis utilized version 25 of the Statistical Package for Social Sciences (SPSS) to analyze each research question. Each of the research questions was examined for significance at the .05 level of significance. Research Question 1 was analyzed using the non-parametric 2 x 4 Chi-Square statistic for frequencies of participant bronze, silver, gold, and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in the Smart Start training compared to those who did not participate in the Smart Start training. Research Question 2 was analyzed using the ANOVA test to compare difference in overall scores of ACT WorkKeys National Career Readiness Assessment to examine the influence, if any, of gender and race status for those who participated in the Smart Start training compared to those who did not participate in the Smart Start training.

CONCLUSION

This chapter detailed the methodology utilized to conduct the research study. The study examined the relationship between participants completing or not completing Smart Start career pathway training program and the influence it has on performance on ACT WorkKeys scores and the relationship between completing or not completing the Smart Start career pathway and level of achievement on the National Career Readiness Certificate, and the relationship between race and gender on the level of achievement on the National Career Readiness Assessment. The participants, procedures, and instrumentation are addressed, as well as the validity and reliability of the study. The procedures to be utilized in the data collection and analysis are also discussed.

CHAPTER 4

ANALYSIS OF DATA

In this chapter information is presented that summarizes the study's findings and analysis of collected data. The purpose of this study was to examine the effectiveness of Smart Start Career Pathway as a method of supporting student success on the ACT WorkKeys assessment through a comparison of ACT WorkKeys National Career Ready Certificate data of students who complete the Smart Start Career Pathway career-ready curriculum and those who do not complete the Smart Start Career Pathway career-ready curriculum. The intent was to determine whether there is a relationship between a participant's completing the Smart Start Career Pathway career-ready curriculum and the participant's scoring on the ACT WorkKeys National Career Ready Certificate. Additionally, the study will assess the potential relationships between gender and ethnicity and achievement on the ACT WorkKeys National Career Ready Certificate.

PARTICIPANTS

The participants for the study were students located at a community college in central Mississippi for each program year from 2017 – 2020. The institution is a public community college located in a metropolitan area serving multiple counties in the surrounding area. The population were students who participated in the Adult Basic Education program. A purposeful sampling approach was used to gather data for this study. Data was collected from a comparison group of students who did not complete the Smart Start Career Pathway (n1=224) to compare to data for Smart Start Career Pathway completers (n2=777).

Participants for the study were selected based on the following criteria. This resulted in a sample size of n = 1001.

- Participants completed the ACT WorkKeys National Career Readiness Assessment,
- Participants either participated in the Smart Start program prior to competing the NCRC assessment or did not, and
- Participants completed the NCRC assessment in the 2017-2018, 2018-2019 or 2019-2020 program year.

The sample resulted in the following characteristics:

- For FY 17/18, 201 completed the NCRC assessment. Of the 209, 159 students participated in the Smart Start program,
- For FY 18/19, 443 completed the NCRC assessment. Of the 443, 338 students participated in the Smart Start program, and
- For FY 19/20, 349 completed the NCRC assessment. Of the 349, 280 students participated in the Smart Start program.

The sample consisted of 57% female (n = 567) participants and 43% male (n = 434).

The study sample included 67% African-American, 29% Caucasian, and 3% Other. The data collected identifies Other as Asian, Pacific Islander, Hispanic, Native American, or 2 or more races.

RESEARCH QUESTIONS

The following questions were considered in this study:

RQ1: Is there a significant difference in the frequencies of bronze, silver, gold, and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in Smart Start training compared to those who did not participate in Smart Start training?

RQ2: Is there a significant difference in the ACT WorkKeys National Career Readiness Assessment overall scores, if any, of gender and race for those who participated in Smart Start training compared to those who did not participate in the Smart Start training?

DATA COLLECTION

Data was collected from the local community college located in central Mississippi. ACT WorkKeys assessment scores in Applied Mathematics, Workplace Documents, and Graphic Literacy, along with Smart Start pathway participation (completer or non-completer), were obtained for participants from the 2017-2018, 2018-2019, and 2019-2020 program years. Data on National Career Readiness Certificate attainment level (Platinum, Gold, Silver, Bronze) were also collected, including the individual ACT WorkKeys levels in Applied Mathematics, Workplace Documents, and Graphic Literacy, to determine the NCRC certificate level attainment for each participant. The data used in the study was provided by the community college's proprietary reporting database. The data pulled include gender, race, ACT WorkKeys score and NCRC level attainment.

DATA ANALYSIS

Quantitative data were provided in the form of ACT WorkKeys achievement levels attained by the participants who completed the Smart Start Program and those

that did not. The following presents the statistical analysis of data for each research question using the Chi Square statistical test. Throughout the Chi Square analyses, it is noted that expected count is less than 5 in many of the table results. The researcher notes this can weaken the reliance on the analysis results. Also, for the tables providing data analysis results for the sub-test types, Mathematics, Workplace Documents, and Graphic Literacy, the n within each year for each test are not always the same because the participants do not take all three sub-tests at the same time.

RQ1: Is there a significant difference in the frequencies of bronze, silver, gold, and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in Smart Start training compared to those who did not participate in Smart Start training?

The following tables present the analysis of the data collected for the 2017-2018 program year concerning participant ACT WorkKeys achievement levels for the Overall test and subtests Mathematics, Workplace Documents, and Graphic Literacy.

Table 1

2017-2018 Overall Test Results: Training vs Level Attained (n=206)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	59	85	5	0	2.231**	0.328
	% within Year	39.6%	57.0%	3.4%	0%		
No Training	Count	29	26	2	0		
	% within Year	50.9%	45.6%	3.5%	0%		

* Significance attained at $p < 0.05$. ** 1 cells (16.7%) have expected count less than 5. The minimum expected count is 1.94.

Table 2

2017-2018 Mathematics Test: Training vs Level Attained (n = 261 students)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	51	75	34	4	4.781**	0.189
	% within Year	31.1%	45.7%	20.7%	2.4%		
No Training	Count	41	33	19	4		
	% within Year	42.3%	34.0%	19.6%	4.1%		

* Significance attained at $p < 0.05$. ** 1 cells (12.5%) have expected count less than 5. The minimum expected count is 2.97.

Table 3

2017-2018 Workplace Documents Test: Training vs Level Attained (n = 52 students)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	4	12	4	0	0.784**	0.853
	% within Year	20.0%	60.0%	20.0%	0.0%		
No Training	Count	6	20	5	1		
	% within Year	18.8%	62.5%	15.6%	3.1%		

* Significance attained at $p < 0.05$. ** 4 cells (50.0%) have expected count less than 5. The minimum expected count is .38.

Table 4

2017-2018 Graphic Literacy Test: Training vs Level Attained (n = 48 students)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	3	9	8	1	4.205**	0.240
	% within Year	14.3%	42.9%	38.1%	4.8%		
No Training	Count	8	5	11	3		
	% within Year	29.6%	18.5%	40.7%	11.1%		

* Significance attained at $p < 0.05$. ** 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.75.

The 2017-2018 program year Chi Square analysis of the overall test result found no significance difference in the frequencies of the participant achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups. Throughout each of the 2017-2018 program year Chi Square analyses of the Mathematics, Workplace Documents, and Graphic Literacy sub-tests, no significance difference was found in the frequencies of the participant achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups.

The following tables present the analysis of the data collected for the 2018-2019 program year concerning participant ACT WorkKeys achievement levels for the Overall test and subtests Mathematics, Workplace Documents, and Graphic Literacy.

Table 5

2018-2019 Overall Test Results: Training vs Level Attained (n = 442)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	194	106	27	5	3.895**	0.273
	% within Year	58.4%	31.9%	8.1%	1.5%		
No Training	Count	74	29	7	0		
	% within Year	67.3%	26.4%	6.4%	0.0%		

* Significance attained at $p < 0.05$. ** 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.24.

Table 6

2018-2019 Mathematics Test: Training vs Level Attained (n = 452 students)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	131	125	55	11	14.964**	0.002 *
	% within Year	40.7%	38.8%	17.1%	3.4%		
No Training	Count	78	35	16	1		
	% within Year	60.0%	26.9%	12.3%	0.8%		

* Significance attained at $p < 0.05$. ** 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.45.

Table 7

2018-2019 Workplace Documents Test: Training vs Level Attained (n = 473 students)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	89	155	51	21	3.520	0.318
	% within Year	28.2%	49.1%	16.1%	6.6%		
No Training	Count	57	71	20	9		
	% within Year	36.3%	45.2%	12.7%	5.7%		

* Significance attained at $p < 0.05$.

Table 8

2018-2019 Graphic Literacy Test: Training vs Level Attained (n = 482 students)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	107	90	109	19	13.880	0.003*
	% within Year	32.9%	27.7%	33.5%	5.8%		
No Training	Count	79	33	40	5		
	% within Year	50.3%	21.0%	25.5%	3.2%		

* Significance attained at $p < 0.05$.

The 2018-2019 program year Chi Square analysis of the overall test result found no significance difference in the frequencies of the participant achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups. Throughout the 2018-2019 program year Chi Square analyses of the Mathematics, Workplace Documents, and Graphic Literacy sub-tests, two of the sub-tests showed significance difference in the frequencies of the participant achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups. Significance was found in the mathematics sub-test. It appears the significance occurred throughout all of the achievement levels. There are significantly fewer participants who received training who achieved the Bronze level compared to those who did not receive training. For the other levels, it appears the frequency of participants who received training was higher for Silver, Gold, and Platinum levels than those who did not receive training. Significance was found in the Graphic Literacy sub-test. It appears the significance occurred throughout all of the achievement levels. There are significantly fewer participants who received training who achieved the Bronze level compared to those who did not receive training. For the other levels, it appears the frequency of participants who received training was higher for Silver, Gold, and Platinum levels than those who did not receive training.

The following tables present the analysis of the data collected for the 2019-2020 program year concerning participant ACT WorkKeys achievement levels for the Overall test and subtests Mathematics, Workplace Documents, and Graphic Literacy.

Table 9

2019-2020 Overall Test Results: Training vs Level Attained (n = 349 students)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	153	74	27	5	6.265**	0.099
	% within Year	59.1%	28.6%	10.4%	1.9%		
No Training	Count	58	29	3	0		
	% within Year	64.4%	32.2%	3.3%	0.0%		

* Significance attained at $p < 0.05$. ** 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.29.

Table 10

2019-2020 Mathematics Test: Training vs Level Attained (n=371)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	109	90	39	10	8.136 **	0.043 *
	% within Year	44.0%	36.3%	15.7%	4.0%		
No Training	Count	66	46	10	1		
	% within Year	53.7%	37.4%	8.1%	0.8%		

* Significance attained at $p < 0.05$. ** 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.65.

Table 11

2019-2020 Workplace Documents Test: Training vs Level Attained (n=426)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	70	113	41	26	22.580	0.000*
	% within Year	28.0%	45.2%	16.4%	10.4%		
No Training	Count	84	68	19	5		
	% within Year	47.7%	38.6%	10.8%	2.8%		

* Significance attained at $p < 0.05$.

Table 12

2019-2020 Graphic Literacy Test: Training vs Level Attained (n=416)

		Level Attained				Chi-Square	p value attained
		Bronze	Silver	Gold	Platinum		
Training	Count	89	67	69	23	16.863	0.001*
	% within Year	35.9%	27.0%	27.8%	9.3%		
No Training	Count	94	35	29	10		
	% within Year	56.0%	20.8%	17.3%	6.0%		

* Significance attained at $p < 0.05$.

The 2019-2020 program year Chi Square analysis of the overall test result found no significance difference in the frequencies of the participant achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups. Throughout the 2019-2020 program year Chi Square analyses of the Mathematics, Workplace Documents, and Graphic Literacy sub-tests, all of the sub-tests showed significance difference in the frequencies of the participant achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups. Significance was found in the Mathematics sub-test. It appears the significance occurred throughout all of the achievement levels. There are significantly fewer participants who received training who achieved the Bronze level compared to those who did not receive training. For the other levels, it appears the frequency of participants who received training was higher for Silver, Gold, and Platinum levels than those who did not receive training. Significance was found in the Workplace Documents sub-test. It appears the significance occurred throughout the Silver, Gold and Platinum achievement levels. There are significantly fewer participants who received training who achieved the Bronze level compared to those who did not receive training. For the other

levels, it appears the frequency of participants who received training was higher for Silver, Gold, and Platinum levels than those who did not receive training. Significance was found in the Graphic Literacy sub-test. It appears the significance occurred throughout all of the achievement levels. There are significantly fewer participants who received training who achieved the Bronze level compared to those who did not receive training. For the other levels, it appears the frequency of participants who received training was higher for Silver, Gold, and Platinum levels than those who did not receive training.

RQ2: Is there a significant difference in the ACT WorkKeys National Career Readiness Assessment overall scores, if any, of gender and race for those who participated in Smart Start training compared to those who did not participate in the Smart Start training?

The following tables present the data analysis of the data collected for the 2017-2018 program year concerning participant ACT WorkKeys overall achievement levels based on the composite scores for the subtests Mathematics, Workplace Documents, and Graphic Literacy based on demographics of gender and ethnicity.

Table 13

2017-2018 Overall Test Results: Training vs Level Attained Considering Gender (n=206)

			Bronze	Silver	Gold	Platinum	Chi-Square	p value attained
Female	Training	Count	30	51	3	0	4.074**	0.130
n=114		% within year	35.7%	60.7%	3.6%	0%		
	No Training	Count	17	12	1			
		% within year	56.7%	40.0%	3.3%			
Male	Training	Count	29	34	2	0	0.024***	0.988
n=92		% within year	44.6%	52.3%	3.1%	0%		
	No Training	Count	12	14	1			
		% within year	44.4%	51.9%	3.7%			

* Significance attained at p< 0.05. ** 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.05. *** 2 cells (33.3%) have expected count less than 5. The minimum expected count is .88.

Table 14

2017-2018 Overall Test Results: Training vs Level Attained Considering Ethnicity (n=206)

			Bronze	Silver	Gold	Platinum	Chi-Square	p value attained
African American	Training	Count	41	56	0	0	9.523**	0.009*
n=138		% within year	42.3%	57.7%	0.0%	0.0%		
	No Training	Count	27	13	1	0		
		% within year	65.9%	31.7%	2.4%	0.0%		
Caucasian	Training	Count	16	25	3	0	2.904***	0.234
n=59		% within year	36.4%	56.8%	6.8%	0.0%		
	No Training	Count	2	12	1	0		
		% within year	13.3%	80.0%	6.7%	0.0%		
Other	Training	Count	2	4	2	0	0.900****	0.638
n=9		% within year	25.0%	50.0%	25.0%	0.0%		
	No Training	Count	0	1	0	0		
		% within year	0.0%	100.0%	0.0%	0.0%		

* Significance attained at p< 0.05. ** 2 cells (33.3%) have expected count less than 5. The minimum expected count is .30. *** 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.02. **** 6 cells (100.0%) have expected count less than 5. The minimum expected count is .22.

Throughout the 2017-2018 program year Chi Square analyses of these sub-tests, one of the sub-tests showed significance difference in the frequencies of the participant composite score achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum between Training and No Training groups when considering demographics. Significance was found in the African-American ethnicity sub-test. In the overall test results for ethnicity, there were significantly more African-American participants who received training that achieved the silver-level compared to those who

did not receive training. There was no significance found in the analysis of the sub-test for Gender.

The following tables present the data analysis of the data collected for the 2018-2019 program year concerning participant ACT WorkKeys overall achievement levels based on the composite scores for the subtests Mathematics, Workplace Documents, and Graphic Literacy based on demographics of gender and ethnicity.

Table 15

2018-2019 Overall Test Results: Training vs Level Attained Considering Gender (n=442)

			Bronze	Silver	Gold	Platinum	Chi-Square	p value attained
Female n=249	Training	Count	110	56	18	2	2.123**	0.547
		% within year	59.1%	30.1%	9.7%	1.1%		
	No Training	Count	43	15	5	0		
		% within year	68.3%	23.8%	7.9%	0.0%		
Male n=193	Training	Count	84	50	9	3	1.830***	0.608
		% within year	57.5%	34.2%	6.2%	2.1%		
	No Training	Count	31	14	2	0		
		% within year	66.0%	29.8%	4.3%	0.0%		

* Significance attained at $p < 0.05$. ** 2 cells (25.0%) have expected count less than 5. The minimum expected count is .51. *** 3 cells (37.5%) have expected count less than 5. The minimum expected count is .73.

Table 16

2018-2019 Overall Test Results: Training vs Level Attained Considering Ethnicity (n=442)

			Bronze	Silver	Gold	Platinum	Chi-Square	p value attained
African American	Training	Count	147	59	10	1	0.793**	0.851
n=304		% within year	67.7%	27.2%	4.6%	0.5%		
	No Training	Count	62	22	3	0		
		% within year	71.3%	25.3%	3.4%	0.0%		
Caucasian	Training	Count	44	44	16	4	1.230***	0.746
n=126		% within year	40.7%	40.7%	14.8%	3.7%		
	No Training	Count	9	6	3	0		
		% within year	50.0%	33.3%	16.7%	0.0%		
Other	Training	Count	3	3	1		0.686****	0.710
n=12		% within year	42.9%	42.9%	14.3%			
	No Training	Count	3	1	1			
		% within year	60.0%	20.0%	20.0%			

* Significance attained at p< 0.05. ** 3 cells (37.5%) have expected count less than 5. The minimum expected count is .29. *** 3 cells (37.5%) have expected count less than 5. The minimum expected count is .57. **** 6 cells (100.0%) have expected count less than 5. The minimum expected count is .83.

Throughout the 2018-2019 program year Chi Square analyses of these sub-tests, none of the sub-tests showed significance difference in the frequencies of the participant composite score achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum related to gender or ethnicity between Training and No Training groups when comparing demographics.

The following tables present the data analysis of the data collected for the 2019-2020 program year concerning participant ACT WorkKeys overall achievement levels based on the composite scores for the subtests Mathematics, Workplace Documents, and Graphic Literacy based on demographics of gender and ethnicity.

Table 17

2019-2020 Overall Test Results: Training vs Level Attained Considering Gender (n=349)

			Bronze	Silver	Gold	Platinum	Chi-Square	p value attained
Female n=203	Training	Count	88	45	23	3	5.969**	0.113
		% within year	55.3%	28.3%	14.5%	1.9%		
	No Training	Count	28	15	1	0		
		% within year	63.6%	34.1%	2.3%	0.0%		
Male n=146	Training	Count	65	29	4	2	0.952***	0.813
		% within year	65.0%	29.0%	4.0%	2.0%		
	No Training	Count	30	14	2	0		
		% within year	65.2%	30.4%	4.3%	0.0%		

* Significance attained at p< 0.05. ** 2 cells (25.0%) have expected count less than 5. The minimum expected count is .65. *** 4 cells (50.0%) have expected count less than 5. The minimum expected count is .63.

Table 18

2019-2020 Overall Test Results: Training vs Level Attained Considering Ethnicity (n=349)

			Bronze	Silver	Gold	Platinum	Chi-Square	p value attained
African American n=227	Training	Count	114	37	9	2	1.767**	0.622
		% within year	70.4%	22.8%	5.6%	1.2%		
	No Training	Count	43	19	3	0		
		% within year	66.2%	29.2%	4.6%	0.0%		
Caucasian n=108	Training	Count	36	32	17	1	5.814***	0.121
		% within year	41.9%	37.2%	19.8%	1.2%		
	No Training	Count	13	9	0	0		
		% within year	59.1%	40.9%	0.0%	0.0%		
Other n=14	Training	Count	3	5	1	2	1.923****	0.588
		% within year	27.3%	45.5%	9.1%	18.2%		
	No Training	Count	2	1	0	0		
		% within year	66.7%	33.3%	0.0%	0.0%		

* Significance attained at p< 0.05. ** 3 cells (37.5%) have expected count less than 5. The minimum expected count is .57. *** 3 cells (37.5%) have expected count less than 5. The minimum expected count is .20. **** 8 cells (100.0%) have expected count less than 5. The minimum expected count is .21.

Throughout the 2019-2020 program year Chi Square analyses of these sub-tests, none of the sub-tests showed significance in the frequencies of the participant composite score achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum related to gender or ethnicity difference between Training and No Training groups when considering demographics.

CHAPTER 5

SUMMARY, DISCUSSION OF FINDINGS, AND RECOMMENDATIONS

This chapter serves as a conclusion and summary of the findings of the research conducted in completion of this study. Included is a summary of the study, a review of the methods, a discussion of the findings, and implications and limitations of the study. Recommendations for further research will also be addressed.

METHODS

A causal-comparative research design was utilized to determine the impact of Smart Start Career Pathway on ACT WorkKeys National Career Ready Certificate level attainment. The causal-comparative design was chosen to find relationships between independent and dependent variables after an action or event has occurred. In this case, the goal of the research is to determine whether the independent variable, Smart Start Career Pathway completion, affected the outcome or dependent variable, ACT WorkKeys National Career Ready Certificate level attainment, by comparing Basic Workplace Essential completers that take the ACT WorkKeys National Career Ready Certificate assessment to a control group of individuals that take ACT WorkKeys National Career Ready Certificate assessment, but have not completed Smart Start Career Pathway. Data for completers was drawn from a local community college in central Mississippi that administers Smart Start Career Pathway. Comparison group data of individuals that have not been exposed to Smart Start Career Pathway but have completed the ACT WorkKeys National Career Ready Certificate assessment will be drawn from a community college located in central Mississippi. Additional comparisons

of performance based on selected demographics (i.e., race, sex and socioeconomic status) are proposed as well.

SUMMARY OF FINDINGS

Research question one examined frequencies of participant bronze, silver, gold and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in the Smart Start training compared to those who did not participate in the Smart Start training. A discussion of the findings follows.

RQ1: Is there a significant difference in the frequencies of bronze, silver, gold and platinum level scores from the ACT WorkKeys National Career Readiness Assessment for those who participated in Smart Start training compared to those who did not participate in Smart Start training?

The Chi Square analyses of the overall test results indicated there was no significance difference in the frequencies of the participant achievement of ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups for the data collected for the 2017-2018, 2018-2019, and 2019-2020 program years. Although for the overall test results significance was not present, there appears to be a pattern of decreased bronze attainment within the groups that received training. This result is consistent across each program year.

Trends are evident within the data when looking at overall test results. Descriptively, the researcher identified that in addition to bronze level attainment going down with the application of training, there are gains (as a percent of total participation) in silver, gold, and platinum level attainment of note. In the 2018-2019 and 2019-2020

data sets, there were increases in silver level attainment (2019-2020 year), gold level attainment (2018-2019 and 2019-2020 years) and platinum level attainment (2018-2019 and 2019-2020 years). Non-completers consistently scored bronze at a higher percentage of completion than training completers.

This is important to note given the goal of providing training is increased silver-level and higher attainment as evidence of work-readiness. Attainment of at least a silver-level identifies the individual as possessing the minimum requisite skills required for employment. These skills include proficiency of an individual in basic functional and productivity areas including math, reading for information, and locating information. In Mississippi, this is as a key component in bridging the gap between available labor and the surplus of available, hard to fill middle-skill jobs (Mississippi Department of Employment Security, 2018a).

The Chi Square analyses of the Mathematics, Graphic Literacy, and Workplace Documents sub-tests found limited significance difference in the frequencies of the participant achievement of the ACT WorkKeys Bronze, Silver, Gold, and Platinum levels between Training and No Training groups across data collected for the 2017-2018, 2018-2019 and 2019-2020 program years. The 2017-2018 subtests found no significance difference. The 2018-2019 subtests showed significance difference in Mathematics and Graphic Literacy. The 2019-2020 analyses showed significance in each of the sub-tests of Mathematics, Workplace Documents, and Graphic Literacy. The trend in the data indicates that significance increases with each progressive program year. The researcher suggests that this is a result of modifications to the Smart Start curriculum content. Since 2017, Smart Start has undergone changes as a part of a

process of continuous improvement designed to support learner success. In 2017, the program was shortened to a 4-week program encompassing 45 program hours. In 2018, remediation in math, reading and comprehension, as well as ACT WorkKeys remediation was instituted. The program also initiated the best-practice of increased, continual focus on silver-level attainment to reinforce the goal of reaching the silver-level necessary to meet the goal of employment. (K.Johnson, personal communication, November 5, 2020).

The researcher noted the pattern of decreased bronze level attainment amongst the participants receiving training was consistent across each sub-test during the program year as well. While the analyses did not identify significance, the trends within the data indicate that the application of training is having a positive influence on reducing bronze-level attainment. In each program year, bronze-level attainment is reduced. Further, the researcher noted that in the 2018-2019 and 2019-2020 program years, bronze-level attainment is reduced while attainment of silver, gold and platinum consistently increases as a percentage of the study participants.

This trend of increased level attainment leads the researcher to interpret that the goal of increasing attainment above bronze-level is being met as the application of training is providing learners with skills to support success. This could be a result of the changes made within Smart Start as outlined above. Smart Start appears to positively affect sub-test level attainment, which supports the increases in overall credential level attainment. As outlined previously, this meets the goal of silver-level attainment as a method of unedifying work and career-readiness.

Research Question 2 examined the influence, if any, of gender and race status on overall test scores of ACT WorkKeys National Career Readiness Assessment for those who participated in the Smart Start training compared to those who did not participate in the Smart Start training. A discussion of the findings follows.

RQ2: Is there a significant difference in the ACT WorkKeys National Career Readiness Assessment overall scores, if any, of gender and race for those who participated in Smart Start training compared to those who did not participate in the Smart Start training?

Gender

The Chi-Square analyses of overall test results indicated no significance difference in overall achievement of levels between training and no-training groups when considering gender. The absence of significance in the gender data sets is consistent with findings from similar studies conducted on ACT WorkKeys. Barnes (2002) concluded that gender did not have a significant relationship to performance for high school students, technical college and two-year college attendees. However, Stone's study of a single community college in Alabama found significance between gender and performance on the applied mathematics ACT WorkKeys sub-test (2007). While no significance was found, descriptively silver-level attainment as a percent of the participants were very close between male and female participants across all program years. Another descriptive detail stood out in the trends noticed by the researcher. During the 2017-2018 program year, no significance was found. However, the

researcher noted that bronze-level attainment by female participants was noticeably lower as a percent of the participants.

Race

The Chi-Square analyses of overall test results indicated some significance difference in overall achievement of levels between training and no-training groups when considering race. This significance was found only for the 2017-2018 program year for African-American completers. Significance was not identified across any other race in any other program year. Despite the lack of significance, descriptively it is noteworthy that the application of training generally reduces bronze-level attainment as a percentage of the participants. There are exceptions, 2017-2018 Overall Test Results for Caucasian participants and 2019-2020 Overall Test Results for African-American participants. Of note, when reviewing the data, the researcher found that Caucasian participants' attainment of silver-level and gold-level exceeded African-American participants' achievements. This is confirmed when comparing Caucasian participant bronze-level achievement to African-American participant bronze-level achievement.

Although significant difference was not found in overall achievement , descriptively the researcher notes that race might be a factor in achievement level. Previous research exploring the relationship between ethnicity and achievement on ACT WorkKeys has indicated significance. Barnes concluded that there was a significant relationship between ethnicity and performance on the ACT WorkKeys subtests of applied mathematics and reading for information among 3,000 high school, technical college and community college participants (2002). Stone (2007) found

significance between ethnicity and performance on each of the ACT WorkKeys subtest of reading for information, location information and applied mathematics. Triplett & Ford (2017) found that ethnicity was a significant factor in overall attainment of silver-level on ACT WorkKeys amongst North Carolina Public School participants.

IMPLICATIONS

Mississippi has embraced the work ready credential as a universally recognized credential that provides employers with a “ready to work” passport. A silver WorkKeys credential is considered the minimum standard of readiness. Those individuals that lack a college degree typically do not possess the skills needed to perform successfully on the ACT WorkKeys assessment (Hart, 2013). Participants that enter Smart Start typically do not possess a high school diploma or equivalency, indicating a higher level of support is required to support performance on the assessments. As an example, student performance on assessments that measure skills like reading charts, graphs, diagrams, maps, gauges and instruments are traditionally low within these populations (Hart, 2013). This suggests to the researcher that populations participating in Smart Start may require additional supports to find the level of retention of information necessary to perform well on the various exams. Assessing writing and reading comprehension skills would help identify individuals that need additional support in these targeted areas to increase performance on standardized tests.

The utilization of ACT WorkKeys as a standard that identifies an individual as possessing skills that employers seek seems to be firmly positioned within the construct of Mississippi’s plan to decrease the skills gap. As such, the impact of the achievement gap should not be ignored as it relates to the participants of the study. The achievement

gap is the persistent disparity in achievement between minority and disadvantaged students and their white counterparts (Porter, 2019). The descriptive differences noted in the findings indicate that research on the achievement gap extends to the realm of credential-based assessment and attainment. Particularly in this instance, where the population of participants generally lack a high school diploma or high school equivalency.

The “achievement gap” is defined as the significant and persistent disparity in academic performance or educational attainment between different groups of students, such as white students and minorities, or students from higher-income and lower-income households due to differences in the structures, qualities, and processes in which they live their lives (Burchinal et al, 2011). The term is commonly used to highlight the disparity in national standardized-test scores between sub-groups of students, frequently referencing racial and socioeconomic disparities (Kevelson, 2019). Research suggests that the achievement gap is a result of the complex, intertwined effects of generational poverty, low educational attainment, emotional engagement and low aspiration are persistent with ramifications that extend from the schooling years into adulthood are naturally in play (Reardon, 2011; Howe & Corvell, 2013; Weiss & Garcia, 2017). Consider the factors of educational attainment, graduation rates, household income, unemployment, in Hinds County and the surrounding area. As Porter (2020) notes, a variety of solutions to the achievement gap focusing on systemic issues have been attempted with varying degrees of success. The program has instituted student-focused best-practices of supplemental instruction, increased instructional time, student-centered learning, and frequent progress monitoring to support learner

achievement to overcome these barriers (K.Johnson, personal communication, November 5, 2020).

LIMITATIONS

Limitations must be acknowledged within the context of this study. The proposed study involved only participants from a program located in Mississippi, where program participants resided in three Mississippi counties. Given the geographic location of the residents, students were selected from a single community college in one geographic location in Mississippi serving the same counties where the participants reside. As such the study may not be generalizable to other geographic populations.

The population of the study had varying degrees of academic ability due to variances in background, IQ level, reading and comprehension levels. This study used existing participant data of ACT WorkKeys scores and NCRC credential attainment. Additionally, this study will be limited to participants seeking a NCRC to support employment. Further, the disparity between the number of completers (n_2=777) and non-completers (n_1=224) represents a limitation within the study.

The selection of a causal comparative study presents limitations as well. Causal comparative studies occur ex post facto, limiting the researcher's ability to control or manipulate variables. Additionally, the selection of this study type prevents the researcher from constructing random samples for experimental and control groups (Brewer & Kuhn, 2010).

The ongoing impact of the Covid-19 Pandemic created limitations for the researcher and collection of data. The 2019-2020 data set participants were limited due to the shutdown of in-person learning. At the time of the data collection, no virtual opportunity

had been created for Smart Start training or ACT WorkKeys Credential testing. Ultimately, this would limit the number of 2019-2020 participants available for the study. For the researcher, the Covid-19 Pandemic created personal obstacles and barriers as family matters and traditional day-to-day activities had to be altered for safety.

RECOMMENDATIONS FOR FURTHER STUDY

Recommendations as a result of this study are made in the areas of further research and provides ideas for future research as it relates to ACT WorkKeys and credential attainment as method of demonstrating career readiness within the identified population.

- Expand research to include multiple or all community colleges in Mississippi
- Conduct qualitative research exploring student perceptions of the value of Smart Start as it relates to their success with ACT WorkKeys
- Expand research to determine the connection between race and performance on the ACT WorkKeys assessment
- Examine if achievement of ACT WorkKeys credential results in increased employment rates amongst the population.

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Appendices

Appendix A: Institutional Review Board Approval Letter

MARSHALL UNIVERSITY.
www.marshall.edu

Office of Research Integrity

March 16, 2021

Steve Pickering
1930 Bellewood Rd.
Jackson, MS 39211

Dear Mr. Pickering:

This letter is in response to the submitted dissertation abstract entitled *"Filling the Middle Skills Gap: Increasing Silver-Level Career Readiness Attainment in Mississippi."* After assessing the abstract it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the study does not involve human subjects as defined in DHHS regulation 45 CFR §46.102(e) it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information to the Office of Research Integrity for review and determination.

I appreciate your willingness to submit the abstract for determination. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,

Bruce F. Day, ThD, CIP
Director